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EDGAR R. WAITE, F.L.S.
DIRECTOR



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CONTENTS

		PAGE
No. 1.	Published May 24, 1918	
	Review of the Australian Blind Snakes, Edgar R. Waite, Pl. i, Charts 1-9, Text figs. 1-24 - - -	1
	Description of a New Blind Snake from the Solomon Islands, Edgar R. Waite, Text fig. 25 - - -	35
	Some New and Little-known Fishes from South Aus- tralia, Allan R. McCulloch and Edgar R. Waite, Pls. ii-vii, Text figs. 26-31 - - -	39
	Descriptions of Two New Australian Gobies, Allan R. McCulloch and Edgar R. Waite, Pl. viii - - -	79
	On Australian Coleoptera, Pt. i, Arthur M. Lea, Pl. ix	83
No. 2.	Published August 30, 1919	
	Portrait of Sir Edward Charles Stirling, Pl. x	
	Description of Toas or Australian Aboriginal Direction Signs, Sir Edward Stirling and Edgar R. Waite, Pls. xi-xx - - - - -	105
	Two Australasian Blue Whales, with Special Reference to the Corvisart Bay Whale, Edgar R. Waite, Pls. xxi-xxvi - - - - -	157
	Description of Three New Species of Thynnidae, Row- land E. Turner - - - - -	169
No. 3.	Published June 30, 1920	
	Descriptions of Little-known Australian Snakes, Edgar R. Waite and Heber A. Longman, Pls. xxvii and Text figs. 32-38 - - - - -	173
	Catalogue of Australian Lizards, F. R. Zietz - - -	181
	Arachnidae from Lord Howe and Norfolk Islands, W. J. Rainbow, Pls. xxviii-xxxi - - -	229
	On Australian Coleoptera, Pt. ii, Arthur M. Lea, Pl. xxxii	273
	Notes on Radiographs of Two Mice, Edgar R. Waite, Pl. xxxiii - - - - -	291

No. 4.	Published January 29, 1921	
	Review of the Lophobranchiate Fishes of South Australia, Edgar R. Waite and Herbert M. Hale, Text figs. 39-56	293
	Observations on a Series of Artificially Distorted Skulls, R. W. Cilento, Pls. xxxiv-xlii and Text figs. 57-63	325
	A Review of the Cephalopod Genera Sepioloidea, Sepiadarium, and Idiosepius, S. Stillman Berry, Charts 10, 11, Text figs. 64-67	347
	A List of the Tabanidae (Diptera) in the S.A. Museum, with Descriptions of New Species, E. W. Ferguson	365
	On Australian Coleoptera, Pt. iii, Arthur M. Lea	381
Title page	- - - - -	i
Contents	- - - - -	iii
List of Contributors	- - - - -	v
Index	- - - - -	411

LIST OF CONTRIBUTORS

	PAGE
Berry, S. Stillman	
On the Cephalopod Genera Sepioloidea, Sepiadarium, and Idiosepius - - - - -	347
Cilento, R. W.	
Observations on a Series of Artificially Distorted Skulls -	325
Ferguson, E. W.	
A List of the Tabanidae (Diptera) in the S.A. Museum, with Descriptions of New Species - - - - -	365
Lea, Arthur M.	
On Australian Coleoptera, Pt. i - - - - -	83
do. ii - - - - -	273
do. iii - - - - -	381
McCulloch, Allan R., and Waite, Edgar R.	
Some New and Little-known Fishes from South Australia -	39
Descriptions of Two New Australian Gobies - - - - -	79
Rainbow, W. J.	
Arachnidae from Lord Howe and Norfolk Islands - - - - -	229
Stirling, Sir E. C., and Waite, Edgar R.	
Descriptions of Toas or Australian Aboriginal Direction Signs	105
Turner, Rowland E.	
Descriptions of Three New Species of Thynnidae - - - - -	169
Waite, Edgar R.	
Review of the Australian Blind Snakes - - - - -	1
Description of a New Blind Snake from the Solomon Islands	35
Two Australasian Blue Whales, with Special Reference to the Corvisart Bay Whale - - - - -	157
Notes on Radiographs of Two Mice - - - - -	291
Waite, Edgar R., and Hale, Herbert M.	
Review of the Lophobranchiate Fishes of South Australia -	293
Waite, Edgar R., and Longman, Heber A.	
Descriptions of Little-known Australian Snakes - - - - -	173
Zietz, F. R.	
Catalogue of Australian Lizards - - - - -	181

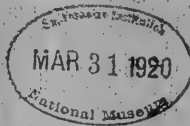


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CONTENTS

	PAGE
Review of the Australian Blind Snakes - Edgar R. Waite -	1
Description of a New Blind Snake from the Solomon Islands - - - - " " -	35
Some New and Little-known Fishes from South Australia - - - - Allan R. McCulloch and Edgar R. Waite	39
Descriptions of Two New Australian Gobies - " " -	79
On Australian Coleoptera - - - - Arthur M. Lea -	83

REVIEW OF THE AUSTRALIAN BLIND SNAKES
(FAMILY TYPHLOPIDAE),

By EDGAR R. WAITE, F.L.S., DIRECTOR S.A. MUSEUM.

Plate i; Charts 1-9; Text figs. 1-24.

IN one of my earlier papers on the Typhlopidae I intimated my intention of writing on the distribution of the Family in Australia. This project had to be abandoned on my leaving Sydney for New Zealand; on returning to Australia, however, the study was resumed, and this "Review" is the outcome.

In order to render the result as complete and satisfactory as possible, I have examined the collections preserved in all the principal Museums of the Commonwealth, and for this privilege I desire to express my cordial thanks to the governing bodies and curators of the following institutions, namely:

Queensland Museum, Brisbane.	National Museum, Melbourne.
Australian Museum, Sydney.	Western Australian Museum, Perth.
Macleay Museum, Sydney.	

The material in our own Museum was, of course, also examined, the total number of specimens studied being 542.

The paper deals critically only with Australian species, but a list of those recorded from the Australian Region, outside the Commonwealth, is furnished as a separate paper.

Habits. The Blind Snakes, or Worm Snakes, as they are also not inaptly called, are widely distributed in tropical and subtropical lands. They are absolutely harmless to man and occur almost throughout Australia, being found even in the dry and arid deserts of the interior. They live underground, in termite mounds, or beneath rotting or termite-riddled logs; also in old saw-dust heaps; they feed largely upon termites or "white ants," also on small worms, the grubs of beetles and on small insects, their eggs, larvae and pupae. Many of them, if not all, emit an objectionable odour when handled or otherwise disturbed, and this faculty may be a protection against enemies, or may provide the means whereby the sexes find each other.

Though it may be presumed that blind snakes cast their skins, I have not seen any indication of sloughing in these reptiles; this may be accounted for on the supposition that the skin is shed underground.



I have before me a live example of *T. bituberculatus*, the most widely distributed and the commonest species in South Australia; placed in a box containing sand it quickly burrows by means of its sharp-edged snout, which is rapidly moved from side to side so as to displace the sand in its passage. This action may also be presupposed in the case of other species having a cutting-edged snout, as, for example, *T. australis*; but blunt-snouted species such as *T. broomi* and *T. ligatus* must burrow in different manner or into soil of different character, presuming that they do actually burrow; while one may fruitlessly speculate as to the use of the extraordinary beak-like snout of *T. grypus*. During progression the tail is curved downwards so as to provide a *point d'appui*, the thorn-like spine at its tip greatly assisting its action. Though I have handled scores of specimens of different species none has ever assumed the position described or illustrated by McCoy. (1) Placed upside down upon a table the snake quickly rights itself, the use of the caudal spine being then very evident. Held in the hand, the pressure of the snout as the snake tries to drive itself through the flesh is surprising, and when applied to the fissure between the closed fingers its efforts can scarcely be resisted; at the same time the application of the caudal thorn against the skin is quite pronounced. It also has considerable constricting powers, and can wind itself tightly round the fingers.

Settling down below the sand the snake may coil itself into a close compact mass, and when discovered in nature, in dormant condition, these reptiles are usually found so coiled. When above ground the blind snakes are so evidently ill at ease that they are in constant movement, endeavouring to burrow, and it is thus difficult to photograph them in life; by placing them on a sanded board, however, they are prevented from burrowing while a natural appearance is maintained. The three photographs on Plate 1 are all of the same specimen, and in all the head is directed towards the left hand.

During the course of its wanderings on the table the snake will sometimes tie itself into a knot by passing its head through a loop of its own body (Pl. I, fig. 2); it is not untied by reverse action, but by continuing the motion, so that the knot is passed backwards along the whole length of the body, when the tail finally emerges from the coil and the knot is undone.

Appearance. Excepting as regards size and comparative proportions, all Australian species are of very similar appearance, having cylindrical bodies of fairly uniform thickness throughout, or somewhat thickened towards the tail, the diameter of which may be greater than that of any other part. The tail terminates abruptly, but in all our species actually ends in a fixed thorn-like point to which the rows of scales converge, and of which it forms a common termina-

(1) McCoy, Prod. Zool. Vict. ii. 1885, pl. 103

tion: it is usually inclined towards the ground and its function is to assist in the progression of the snake when burrowing. In certain examples of some species, notably *T. polygrammicus*, there is a dark brown or black blotch on each side of the short tail near the vent. Seeing that the eyes are almost indistinguishable and the dark blotches often conspicuous, the tails of these snakes are often mistaken for their heads, whilst some people believe that blind snakes have a head at each end; double-headed snakes are occasionally produced, but such a condition is quite analogous to that of the more familiar double-headed calf.

Scales. The scales overlap and are closely adpressed, broader than long, subequal in size and highly polished, so that little resistance is offered in the passage of the snake through the soil. There are no ventral plates, as with the majority of snakes, the scales on the belly being indistinguishable from those elsewhere; the rows of body scales are so uniformly disposed that their number, normally in an even series, provides a reliable diagnostic character. Owing to their small size and highly-polished surface it is sometimes difficult to count in how many rows the scales are disposed: the process is facilitated by sticking into the body at different parts of the circumference two or perhaps three small entomological pins and counting from pin to pin, when the body may be rotated to include the next pin. A watchmaker's glass used in the eye not only enlarges the apparent size of the scales, but allows both hands free for turning the body of the snake.

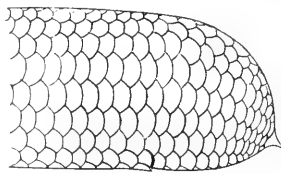


Fig. 1. Tail and hinder portion of body of *T. polygrammicus*.

Head. The diameter of the head is usually less than that of the body into which it emerges without definite constriction or neck; it is covered with enlarged plates, arranged in definite and regular order, but their shape and relative size may differ in the various species, in the determination of which their conformation is utilized.

The arrangement of the head shields differs from that found in the majority of snakes, inasmuch as no two scales form a suture on the mid line, either above or below. The following illustration shows the general arrangement of the shields, and the names by which they are known.

The eyes are rudimentary, but show with greater or less clearness through the ocular scales: it is probable that the visual sensations of the blind snakes are little more than a perception of the difference between darkness and light (the name *Typhlops* is from τυφλος blind, οψ eye). The mouth is small, crescent-

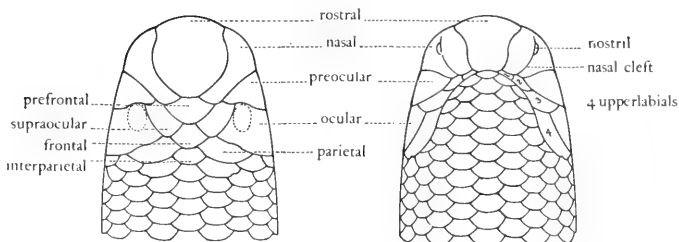


Fig. 2. Terminology of head shields.

shaped, placed wholly on the underside of the head; the teeth are few in number and are confined to the upper jaw, being placed on the maxilla, transversely to the axis of the skull, the tongue is forked and white or pink in colour.

Colour. The different species of blind snakes are generally very similar in colour, being purplish-grey above and flesh-coloured below, the two tints often sharply defined; after preservation in fluid, the colours become leaden above and yellow below. Some of the North Australian species have one or both extremities black; this, and other departures from the usual colouration, will be referred to later.

Reproduction. It is known that some species lay eggs, doubtless all do so; the eggs are of comparatively large size. The sexes cannot be determined without dissection; different examples of the same species sometimes show variation in the respective length of the tail, where such exists the longer tail is generally indicative of the male.

Anatomy. The skull is simpler than in other snakes, having fewer distinct bones, and these solidly united. The skulls of very few species of the Family have been described, and it is more than probable that if those of our blind snakes were examined, considerable differences would be detected. So far I have dissected one species only, namely, *T. australis*, but the shape and proportional size of the cranial bones differ so much from the illustration of those of *T. lumbricalis* (2) and *T. reticulatus* (3) that a tempting subject of research is indicated.

The skin of the snout is closely applied to the bone, and as considerable variation exists in the contour of the head in the different species, the skull will certainly be found to be similarly modified.

Very little original work has been done on the osteology of the Typhlopidae.

(2) Boulenger, Cat. Snakes Brit. Mus. i. 1893, p. 4.

(3) Jan. Icon. Gén., liv. 9, pl. i. fig. 9.

and mistakes made in leading textbooks have been, and will continue to be, perpetuated. Gadow (4) states that: "The pterygoids and maxillaries, connected by the ectopterygoids, are absent, owing to reduction in the Typhlopidae." Seeing that both pterygoids and maxillaries are present, this statement is inexplicable. Parker and Haswell (5) write: "The Typhlopidae differ from the rest of the Ophidia in having the maxillae immobile," and so on.

All writers agree, however, that there is no ectopterygoid in the skull of members of the Typhlopidae, and had we not the assurance of Huxley, Boulenger and other original investigators, I should probably have thought otherwise. I am unaware that any Australian species has been previously examined, and it may be that some of our forms, including *T. australis*, the species now in question, may show some divergence in regard to their cranial features. It is not, at least

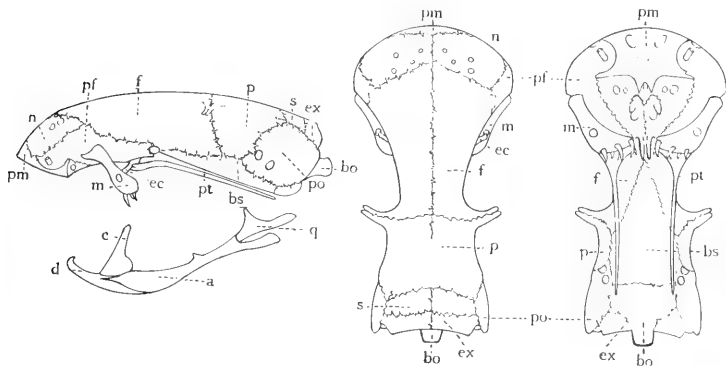


Fig. 3. Skull of *T. australis*.

a. articular	m. maxillary
bo. basioccipital	n. nasal
bs. basisphenoid	p. parietal
c. coronoid	pf. prefrontal
d. dentary	pm. premaxillary
ec. ?ectopterygoid	po. prootic
ex. exoccipital	pt. pterygoid
f. frontal	q. quadrate
s. supraoccipital	

at present, my purpose to deeply consider osteological characters, but I should like to draw attention to the method of articulation of the pterygoid as found in *T. australis*. This slender bone is not connected directly with the movable

(4) Gadow, Cambridge Nat. Hist. viii. 1901, p. 581.

(5) Parker and Haswell, Text-book of Zool. ii. 1910, p. 349.

maxilla, but by means of its forked proximal end it articulates with a small transverse bone which connects the free portion of the maxilla with the palatine. If this transversely placed bone, marked "ec" in the accompanying diagram, is not homologous with the ectopterygoid of less degraded forms of ophidia, is it to be regarded as a detached, though sutured, portion of the outer extremity of the palatine, or should it be referred to some other bone?

The pelvis is represented by a single small bone on each side. The arrangement of the soft parts generally conforms to the conditions found in other snakes, in which, however, there is considerable diversity, not only in the character and position of the lungs, but in their number also; some snakes have two, one of which, in the majority of forms, is more or less rudimentary, whilst others have but a single lung; the blind snakes have only one true lung; it is placed on the right side and extends from the heart to the liver. Another organ, the so-called tracheal lung, regarded by some as the vestige of a once functional lung, is without cavity, is composed of cells of different sizes, and appears to have no communication with the trachea or lung. It has been suggested that this structure may not be a pulmonary organ.

Illustrations. Owing to the roundness of the bodies of these snakes it is not possible, from a fixed point, to see quite half the diameter: it was from such view-point that my former drawings were made, the result being that, as regards their upper and lower aspects, the point of contact of the head scales with the margin does not coincide. The new drawings accompanying this paper are slightly more diagrammatic, inasmuch as the view is supposed to subtend exactly half the diameter of the snake, so that the unsatisfactory condition referred to is thereby remedied. All the drawings are larger than life, but are not to the same relative scale. With one exception, namely, that of *T. waitii*, all the admitted species are illustrated, the drawings being prepared under my personal supervision by my assistant, Mr. Herbert M. Hale, to whom I here express my thanks.

Terms used. In describing the head of a snake, or indeed parts of other animals, two distinct contours often require to be defined, namely (a) that seen from the side, and (b) that seen from above or below. The words "view" or "aspect" may be used in explanation of an illustration, but cannot well be applied in descriptions where the external contour alone is to be expressed.

In describing the outline of an object as seen from the side, we have the simple and exact word "profile," but there is, as far as I know, no single word to express the outline as seen from above or below.

It is really the lateral contour that is sought to be defined, but the use of the word "lateral" at once suggests a side view or profile; then the employment

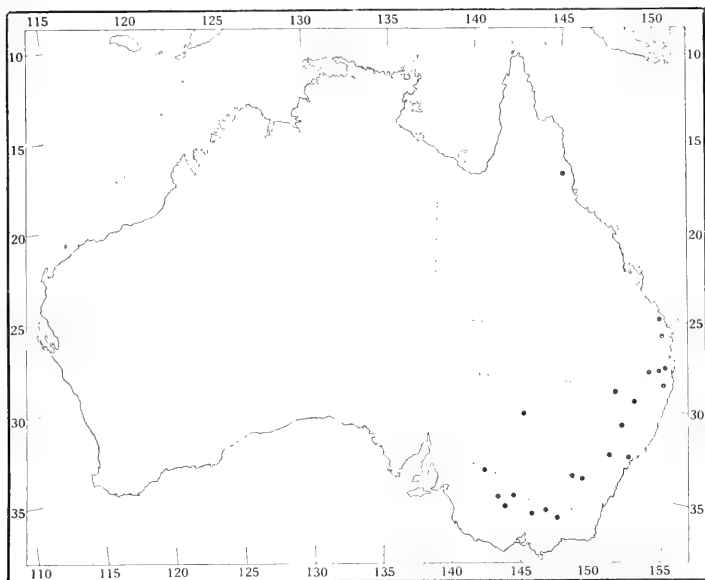


Chart 1. Distribution of ● *T. proximus*.

of the expressions "dorsal profile" or "ventral profile" certainly indicates the upper or lower contours respectively, as seen in profile.

Following custom, the use of the term "head," though admittedly inexact, is hereafter employed to express the lateral contour of the head, while the word "snout" similarly denotes the contour as seen in profile; the mouth, being under-shot, merely completes the lower profile.

Synopsis. In 1893, Boulenger (6) catalogued the Typhlopidae of the world, and it will be conceded that the preparation of a synoptical key of such numerous and generally similar forms presents great difficulties. This difficulty is enhanced when but little material or descriptions only are available, and, in practice, it is found that by the aid of such key alone, the determination of some species is very difficult and unsatisfactory, especially when some of the main divisions, or at any rate subdivisions, are based upon relative and, what prove to be inconstant, characters, to be discovered only when ample material for comparison is available.

(6) Boulenger, Cat. Snakes, Brit. Mus. i. 1893.

Dealing with a much smaller number of species, it becomes possible to devise a more satisfactory synopsis, and that here submitted, together with the illustrations, should enable anyone, after a little study and experience, to identify specimens obtained. In closely allied forms where it is thought that the key may not be sufficiently explicit, some note on identification will be found appended to the description of the species involved. A young *Typhlops* from Champion Bay, North-West Australia, has been associated with *T. olivaceus*, but as the type of that species is from the Philippines, further evidence is desirable before admitting it as a member of the Australian fauna. The description of *T. waitii* is insufficient to enable me to deal satisfactorily with this species, and not possessing specimens I am unable to supply an illustration.

Confining attention to Australian species and seeking for absolute rather than relative differences, it is found that the cleft which proceeds downwards from the nostril provides a constant and therefore reliable character. This, the nasal cleft, runs in the majority of species to either (a) the first, or (b) the

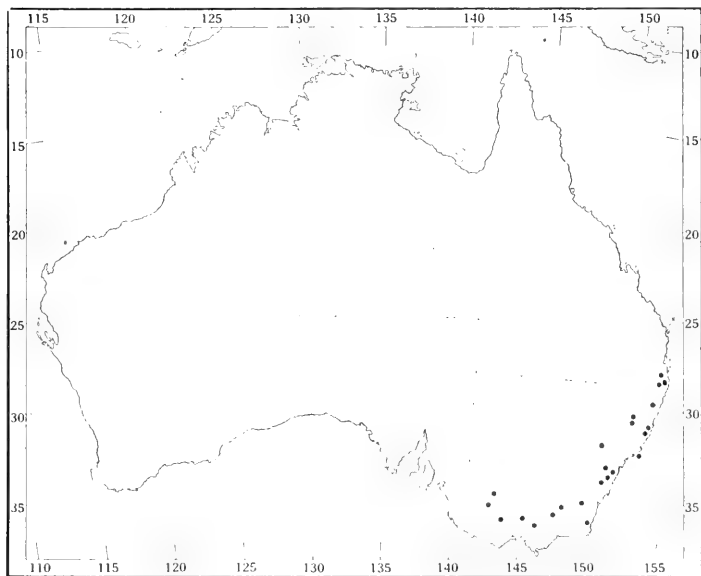


Chart 2. Distribution of ● *T. polygrammicus*.

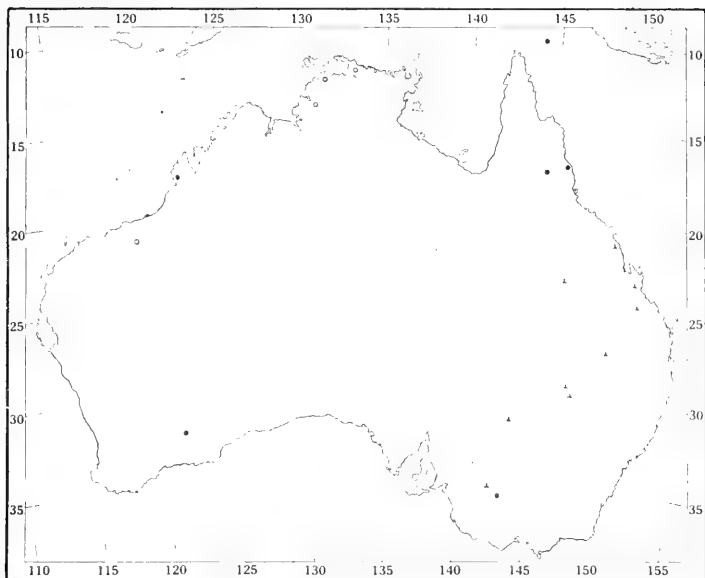


Chart 3. Distribution of ● *T. broomi*, ○ *T. guntheri*, ▲ *T. ligatus*.

second labial, and two main divisions may therefore be recognized. A third main division is formed for those species in which the cleft does not run directly to either the first or second labial, but first makes contact with (c) the preocular shield. The following illustrations show the three conditions here emphasized.

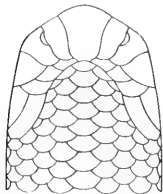


Fig. 4.

T. proximus.

Nasal cleft to first labial.

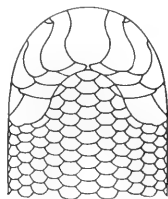


Fig. 5.

T. labialis.

Nasal cleft to second labial.

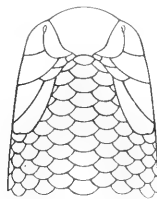


Fig. 6.

T. endotercus

Nasal cleft to the preocular

In most cases the characters indicated can be ascertained only by careful examination with the aid of a magnifying glass. The number of rows of scales round the body is very constant in Australian species, and forms a reliable secondary division under each main group: the range in the number of rows varies from 18 to 24, and they are, normally, always in an even series. Examples are very occasionally found wherein this is departed from; in such, however, it will be found that some of the scales in one or more rows have been split, fused with others, or that some other abnormality exists; the scales bordering the head shields are rather subject to such irregularities.

Specific characters. The lateral contour of the head, as viewed from above, is usually rounded, but it may be blunt as in *T. broomi*, sub-acute as in *T. batillus*, or markedly trilobed, a condition found only in *T. bituberculatus*. The profile is also generally rounded, but provides varying degrees of angularity, *T. kenti* furnishing the extreme instance, in which species the snout is acutely angular; in *T. grypus* the snout forms a distinct hook, like the beak of a cockatoo.

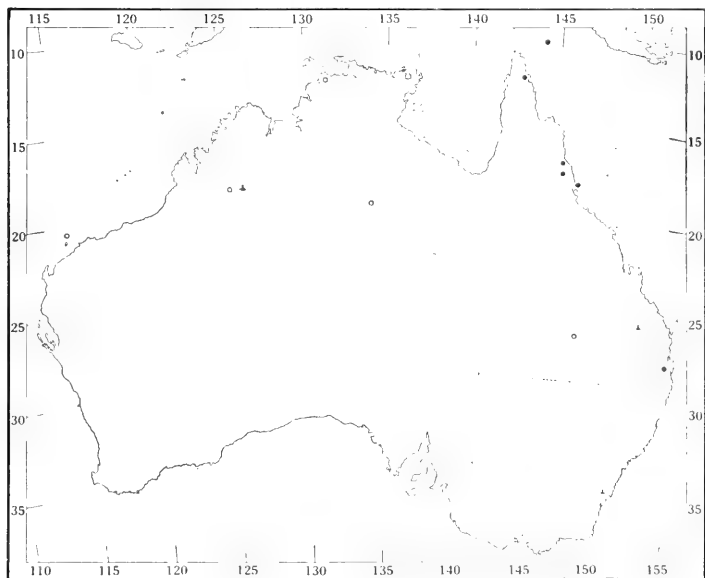


Chart 4. Distribution of ● *T. torresianus*, ○ *T. diversus*, ▲ *T. affinis*.

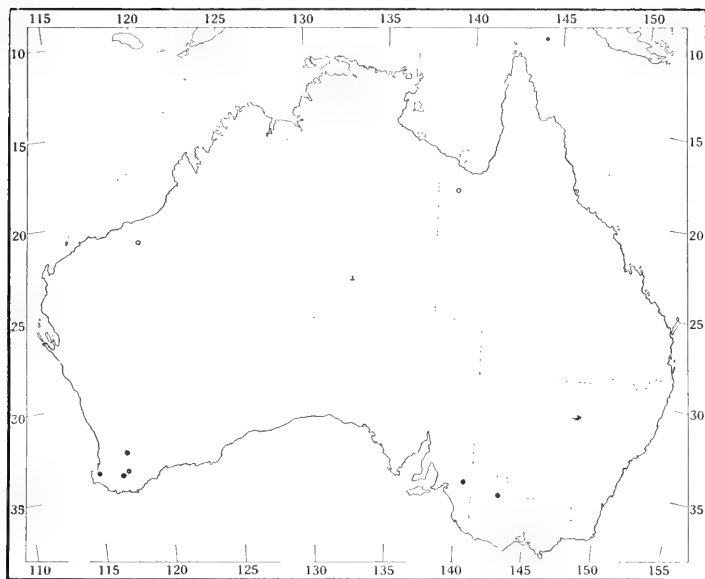


Chart 5. Distribution of ● *T. pinguis*, ○ *T. grypus*, ▲ *T. endoterus*.

The rostral shield extends from or nearly from the level of the eyes to above, to the mouth below, of which it forms the anterior border; it varies greatly in shape, as will be seen by consulting the illustrations, and as regards size may be but a narrow band, as in *T. ligatus*, or fully half the width of the head as in *T. australis*. The nasals (and following shields) do not reach the mouth; it is their extreme tumidity in *T. bituberculatus* that produces the condition already referred to in this species. The nostril, situated in the nasal, is unmistakably inferior in the species named; in most others it occupies a sublateral position; in one only, namely, *T. labialis*, is it truly lateral, appearing on both upper and lower aspects. The nostril may lie close to the rostral, as in *T. affinis*, or be removed considerably therefrom as in *T. polygrammicus*. In *T. endoterus* the cleft is arrested at the nostril; in several species, as in *T. broomi*, it divides the nasal; whilst in *T. torresianus*, instancing an extreme case, it is projected far on to the upper surface of the head. The preocular is present in all Australian species, and in contact with the second and third labials; in all excepting *T. labialis* it is narrower than

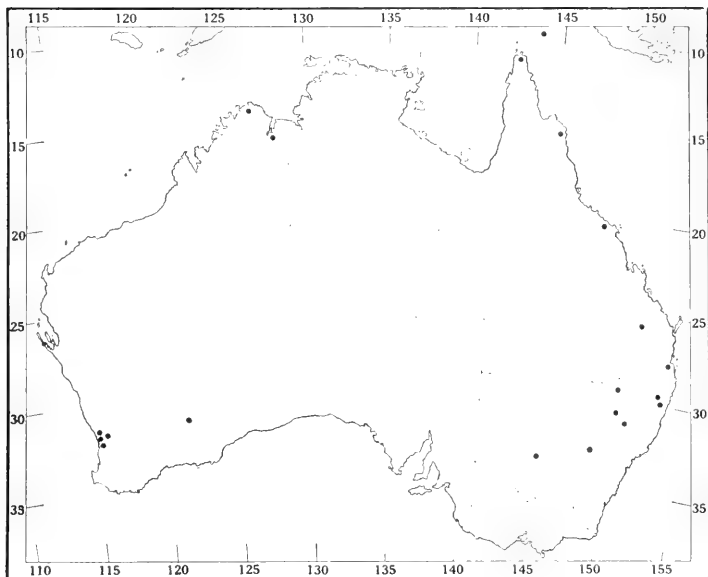


Chart 6. Distribution of ● *T. wiedii*.

the ocular; the last-named similarly makes contact with the third and fourth labials. Four upper labials are present in all Australian species; they are usually longer than broad, *T. labialis* providing a noticeable exception. There are no distinct lower labials, the margin of the jaw being formed by the anterior body scales.

Size. Young examples are usually of greater relative thickness than the adults, and the latter often exhibit considerable variation in this respect. Some species apparently remain small, others attain to considerable length, thus *T. polygrammicus* grows to 717 mm. *T. grypus* is an extremely slender form, its length may be 122 times its diameter. *T. pinguis* is, on the other hand, very stout, the length of the type being but 22 times its diameter.

Distribution. Our knowledge of the geographical distribution of the blind snakes is adversely affected by several conditions; owing to their usually small size, subterranean habits, their superficial resemblance to worms, and the slight interest they evoke, comparatively few specimens are taken; nearly all

known examples are from settled areas; fewer specimens are naturally unearthed in remote districts, and, owing to lack of proper facilities, fewer still are preserved.

It is unfortunate also that precise localities are not always available; in earlier days "New Holland" was considered to be sufficiently exact, providing, as it did, a habitat distinct from India, China or Africa. Collectors operating over wide areas are apt to lose labels, camel transit being notoriously bad, and the name of the State, say, "Western Australia," whose borders extend a distance equal to that separating London and Morocco, may be the only indication of the locality of a specimen. Then, again, the seaport of a State may stand for an inland locality, as in Peters' record of "Melburn," for *T. bicolor* (*T. australis*). Though, as elsewhere mentioned, the examples preserved in all the Australian Museums have been critically examined for the purposes of this paper, quite a large proportion of the specimens are imperfectly localized, and cannot, therefore, be used in assigning the exact range of the species.

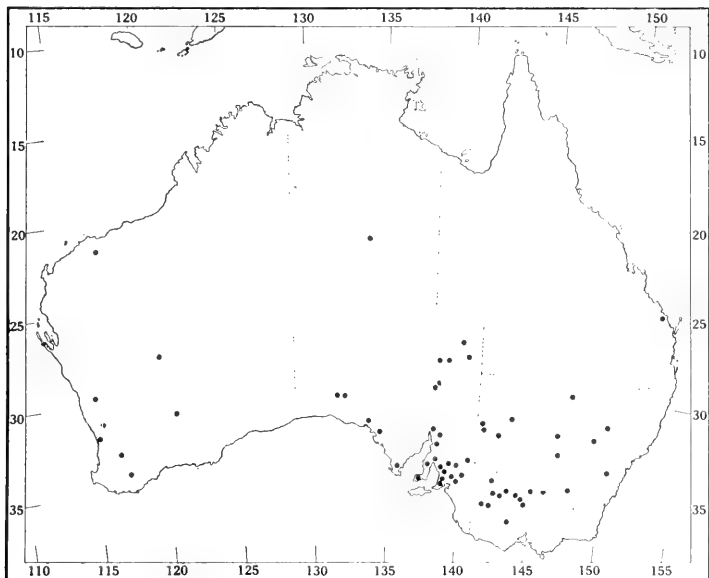


Chart 7. Distribution of ● *T. bituberculatus*.

The accompanying charts represent our present knowledge of the range of the several species included. The position marks, taken individually, do not represent areas of occurrence, but express definite localities, though in Metropolitan districts a single mark may stand for and cover several adjacent productive localities, as, for example, those marking the occurrences of *T. australis* in the neighbourhood of Adelaide. Such "locality" as North-Western Australia,

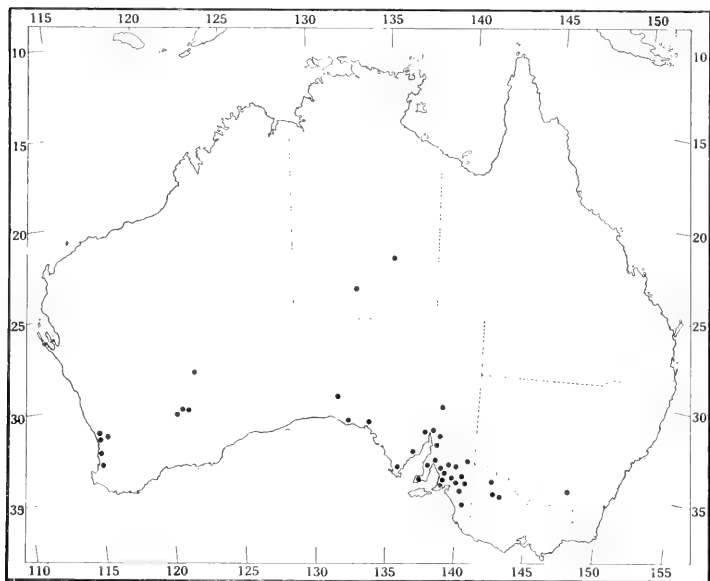


Chart 8. Distribution of ● *T. australis*.

representing, say, a single occurrence, though readily expressed in words, cannot be conveniently charted; in such cases position marks are omitted, though the reference is recorded in the text. The habitat of two species, *T. zaitii* and *T. labialis*, is indefinite, and these do not therefore appear on the charts.

Though the available data is very incomplete, some useful conclusions may be made therefrom. *T. polygrammicus* and *T. proximus* occur in Queensland, New South Wales, and Victoria. *T. bituberculatus* and *T. australis* are found throughout the southern half of the Continent; *T. pinguis* is also a southern.

though less extensively distributed, species. *T. wiedii* occurs in Western Australia and the Eastern States. *T. diversus*, *T. grypus*, *T. guntheri*, *T. kenti*, and *T. xaitii* are generally northern forms. *T. torresianus* is from the coast of Queensland, *T. endoterus* from the middle of the Continent, *T. batillus* from New South Wales, and its ally, *T. labialis*, from Western Australia, without precise locality. The range of *T. broomi* is peculiar, examples being known only

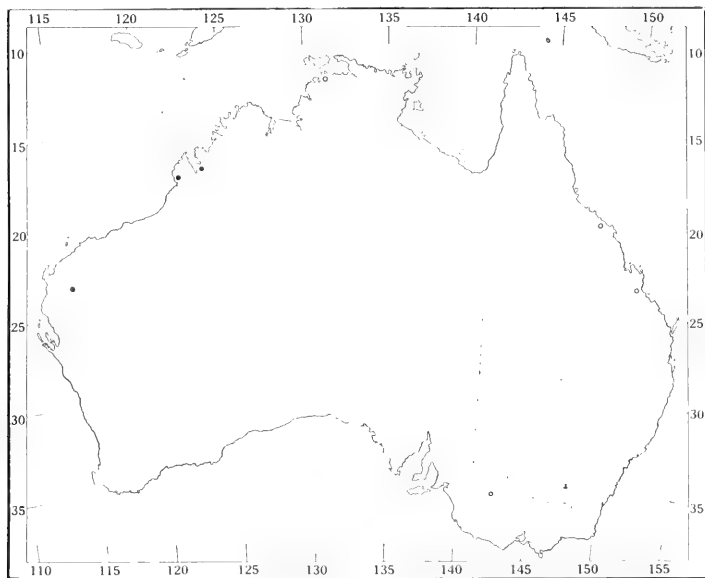


Chart 9. Distribution of ● *T. kenti*, ○ *T. unguirostris*, ▲ *T. batillus*.

from four widely separated localities, the exact positions being shown on Chart No. 3.

It was hoped that a study of the range of the blind snakes would reveal some conformity to the zoological areas as mapped out by various writers, but the result is not convincing.

In point of numbers *T. bituberculatus* is the commonest Australian species; it is followed by *T. polygrammicus*, *T. australis*, *T. proximus*, and *T. wiedii*, all of which appear to be plentiful in the respective areas in which they occur.

KEY TO THE AUSTRALIAN SPECIES (7).

- a. Nasal cleft in contact with the first labial
- b. 18 scales round the body 1 *grypus*
 - bb. 20 scales round the body 2 *proximus*
 - bbb. 22 scales round the body 3 *polygrammicus*
 - bbbb. 24 scales round the body
 - c. rostral nearly as broad as long 4 *unguirostris*
 - cc. rostral a narrow band 5 *ligatus*
- aa. Nasal cleft in contact with the second labial
- d. 18 scales round the body
 - e. snout angular, nasal divided
 - f. rostral produced in front, snout very acute 6 *kenti*
 - ff. rostral not produced 7 *affinis*
 - ee. snout rounded, nasal not divided 8 *guentheri*
 - dd. 20 scales round the body
 - g. head rounded
 - h. body stout 9 *pinguis*
 - hh. body slender
 - i. nasal completely divided 10 *broomi*
 - ii. nasal not completely divided 11 *wiedii*
 - gg. head trilobed 12 *bituberculatus*
 - ddd. 22 scales round the body
 - j. nasal cleft produced on to the upper part of the head 13 *torresianus*
 - jj. nasal cleft not produced on to the upper part of the head
 - k. 14 *australis*
 - kk. (see note under the species) 15 *waitii*
 - dddd. 24 scales round the body
 - l. preocular narrower than the ocular 16 *batillus*
 - ll. preocular wider than the ocular 17 *labialis*
- aaa. Nasal cleft in contact with the preocular
- m. 20 scales round the body 18 *diversus*
 - mmm. 22 scales round the body 19 *endoterus*

(7) Boulenger has identified with *T. olivaceus* Gray, from the Philippines, a young specimen taken at Champion Bay, N.W. Australia

Family TYPHLOPIDAE.

Cranial bones solidly united; (no ectopterygoid=transpalatine, see p. 6); pterygoid not extending to the quadrate or the mandible; no supratemporal (squamosal); prefrontal forming a suture with the nasal; maxillary loosely attached, movable; with a few teeth disposed transversely to the axis of the skull; no teeth on the palate or mandible; coronoid bone present; vestiges of pelvis, reduced to a single bone on each side. Body covered with uniform cycloid scales; eyes beneath the translucent ocular shields. Tail short, ending in a thorn; Oviparous.

(The family includes the genera *Helminthophis*, *Typhlops* and *Typhlops*. The last-named only occurs in Australia.)

TYPHLOPS Schneider.

Typhlops (in part.) Schneid. Hist. Amphib. ii, 1801, p. 339.

Typhlops Oppel, Ordnung. Rept. 1811, p. 54 (*lumbricalis*). (For synonymy see Boulenger, Cat. Snakes Brit. Mus. i, 1893, p. 7, and Stejneger, Bull. U.S. Nat. Mus. 58, 1907, p. 260).

Range. South-Eastern Europe, South Asia, South Africa, Inter-tropical America, Australia and Polynesia; not found in Tasmania or New Zealand.

TYPHLOPS GRYPUS sp. nov.

Chart No. 5 and fig. 7.

Nasal cleft to first labial; scales in 18 rows.

Head sub-acute, much produced; snout very prominent, strongly hooked, the extreme tip recurved, forming a distinct beak; nostrils inferior, the cleft close to the rostral which it touches in front of the nostril, dividing the nasal;

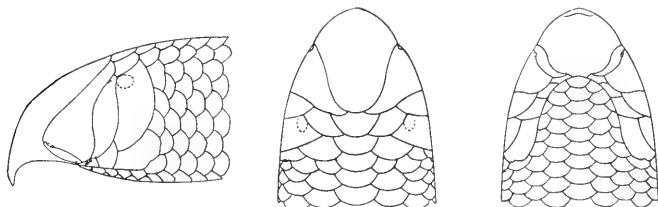


Fig. 7. Head of *T. grypus*.

rostral slightly more than half the width of the head, widest in its front half, reaching to the level of the eyes, the lower part much broader than long; preocular

very narrow, only half of the width of the nasal; diameter of body 63 to 122 times in its length.

Colours. Ivory, tinged with brown above, beak yellow, head, foreneck and tail brown, the last black in some specimens.

Length. 335 mm., longest seen 405 mm.

Type. In the National Museum, Melbourne, No. R. 7102. Specimens also in the Queensland and South Australian Museums.

Range. Of the four examples known, one is from Marble Bar, North-Western Australia, and a second from Gregory Downs, Queensland; the localities of the other two are unknown.

Remarks. This extraordinary snake exhibits some characters of *T. kenti*, but differs from that species in having the nasal cleft in contact with the first labial, and its consequent contiguity to the rostral, by the strongly hooked beak, and in having the rostral below broader than long.

TYPHLOPS PROXIMUS Waite.

Typhlops proximus Waite, Rec. Aust. Mus. ii, 1893, p. 60, pl. xv, figs. 3 and 4; and Australian Snakes, 1898, pl. i. Bouleng. Cat. Snakes Brit. Mus. iii, 1896, p. 588. Lönnb. and Anders. Vet. Akad. Handl. lii, 1915, p. 7.

Typhlops nigrescens McCoy, Prod. Zool. Vict. dec. xi, 1885, pl. 103 (not Gray).

Chart No. 1 and fig. 8.

Nasal cleft to first labial; scales in 20 rows.

Head somewhat produced, tumid at the nasals; snout prominent, obtusely angular; nostrils inferior, the cleft a little nearer to the rostral than to the

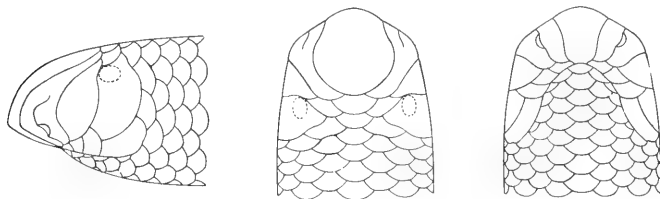


Fig. 8. Head of *T. proximus*

preocular, extending well on to the upper surface; rostral markedly swollen, more than half the width of the head, reaching to, or nearly to, the level of the eyes, the lower part as broad as long. Diameter of body 25 to 40 times in its length.

Colours. Occasional examples show indication of a dark mark on each side of the vent, as in *T. polygrammicus*.

Length. 700 mm.

Type. In the Australian Museum, Sydney, No. 6411.

Range. Queensland, southward from Lat. 17 deg. 5 min. S. Common in New South Wales and Northern Victoria.

Remarks. Under the name "*T. nigrescens*" McCoy writes of this species: "These specimens were dug out of an ant-hill in which they dwelt in the midst of the abundant insect food suited to them." Lönnberg and Andersson remark of a specimen taken at Malanda, near Cairns, that it "lives below rotten stumps in the jungle."

TYPHLOPS POLYGRAMMICUS Schlegel.

Typhlops polygrammicus Schleg. *Abbild. Amphib.* 1844, p. 40, pl. xxxii, figs. 35-38. Dum. et Bib. *Erpét. Gén.* vi. 1844, p. 302. Jan. *Icon. Gén.* 1864, p. 13, liv. 3, pls. iv and v, fig. 9. Peters, *Mon. Akad. Berl.* 1865, p. 262. Bouleng. *Cat. Snakes, Brit. Mus.* i, 1893, p. 34, and iii, 1896, p. 586. Waite, *Proc. Linn. Soc., N.S. Wales* (2), ix, 1894, p. 13.

Anilius nigrescens Gray, *Cat. Lizards Brit. Mus.*, 1845, p. 135.

Argyrophis polygrammicus Gray, *loc. cit.* p. 138.

Typhlops nigrescens Jan, *op. cit.* p. 13, liv. 9, pl. i, fig. 1. Waite, *Rec. Aust. Mus.* ii, 1893, pl. xv, figs. 1, 2, 5.

Typhlops ruppelli Jan, *op. cit.* p. 14, liv. 14, pl. i, fig. 2. Waite, *Rec. Aust. Mus.* *loc. cit.* p. 59, pl. xv, fig. 6 (tail).

Typhlops temminckii Jan, *op. cit.* p. 14, liv. 3, pl. iii and iv, fig. 6. Bouleng. *op. cit.* i, 1893, p. 29.

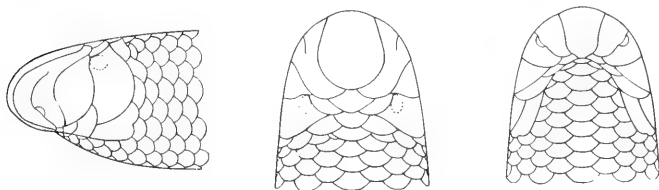


Fig. 9. Head of *T. polygrammicus*.

Typhlops reginae Bouleng. *Ann. Mag. Nat. Hist.* (6), iv, 1880, p. 362, and *Cat. Snakes, Brit. Mus.* i, 1893, p. 35, pl. iii, fig. 1.

Chart No. 2 and fig. 9.

Nasal cleft to first labial; scales in 22 rows.

Head rounded; snout rounded; nostrils inferior, the cleft median, extending on to the upper surface; rostral nearly half the width of the head, reaching nearly to the level of the eyes, or not so far, the lower part a little longer than broad; diameter of body 36 to 59 times in its length.

Colours. A brown or black blotch is frequently present on each side of the tail, above and behind the vent.

Length. 717 mm.

Type. In the Leyden Museum, from Timor.

Range. Queensland, common in New South Wales and Victoria.

Remarks. The type of *T. polygrammicus* was taken in Timor. I am not fully satisfied that Australian examples are of the same species, if otherwise the name *T. nigrescens* should be used. Our specimens from Queensland are, with one exception, unlocalized, and their geographical position cannot therefore be charted. The characters assigned to *T. reginae* come well within the variations to which our examples are subject.

TYPHLOPS UNGUIROSTRIS Peters.

Typhlops (Onychocephalus) unguirostris Peters, Mon. Akad. Berl. 1867, p. 708, fig. 3.

Typhlops curvirostris Peters, *op. cit.* 1879, p. 776, fig. 5. Bouleng. Cat. Snakes, Brit. Mus. i, 1893, p. 48.

Typhlops unguirostris Bouleng. (in part), *op. cit.*, p. 49 and (*emend.*), iii, 1896, p. 589, also Proc. Linn. Soc. N.S. Wales (2), ix, 1894, p. 718. Waite, Proc. Linn. Soc. N.S. Wales (2), ix, 1894, p. 11.

Chart No. 9 and fig. 10.

Nasal cleft to first labial; scales in 24 rows.

Head long, narrowed in front; snout very acute, the lower edge sub-horizontal; nostrils inferior, the cleft nearer to the rostral than to the preocular, pro-

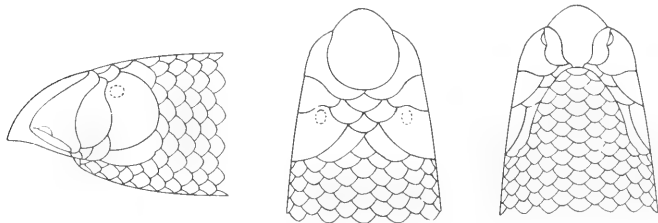


Fig. 10. Head of *T. unguirostris*.

duced slightly beyond the nostril, but not dividing the nasal; rostral half the width of the head, projecting and narrowed in front, not reaching to the level of the eyes, the lower part a little longer than broad, contracted between the nostrils; diameter of body 42 to 61 times in its length.

Length. 610 mm.

Type. In the Berlin Museum, from Rockhampton, Queensland.

Range. Specimens examined from the type locality and Darwin, Northern Territory; examples labelled Mallee, Victoria, and Lyndoch Valley, South Australia, are indistinguishable from the northern forms.

Remarks. It is to be noted that the description in the British Museum Catalogue (i, p. 49), under the name *T. unguirostris*, is a composite one and is emended in a succeeding volume (iii, p. 589).

TYPHLOPS LIGATUS Peters.

Typhlops ligatus Peters, Mon. Akad. Berl. 1879, p. 775, fig. 3. Waite, Rec. Aust.

Mus. ii, 1893, p. 57. Bouleng. Cat. Snakes Brit. Mus. i, 1893, p. 34.

Typhlops curtus Ogilby, Rec. Aust. Mus. ii, 1892, p. 23.

Chart No. 3 and fig. 11.

Nasal cleft to first labial; scales in 24 rows.

Head rounded; snout evenly and bluntly rounded; nostrils inferior, the cleft median, produced beyond the nostril far on to the upper surface of the snout, nearly dividing the nasal; rostral very narrow, forming a band at least twice as

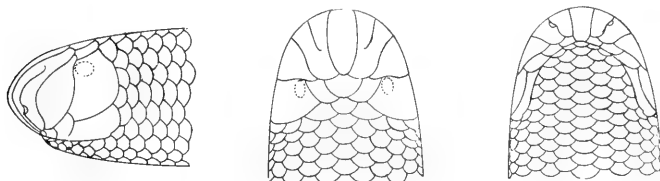


Fig. 11. Head of *T. ligatus*.

long as broad, a fourth, more or less, the width of the head, reaching to the level of the eyes, the lower part also longer than broad; diameter of body 23 to 37 times in its length.

Length. 485 mm.

Type. In the Berlin Museum, from Mackay, Queensland.

Range. Queensland, New South Wales, Victoria.

Remarks. The rostral is narrower than in any other Australian species.

TYPHLOPS KENTI Boulenger.

Typhlops kenti Bouleng., Ann. Mag. Nat. Hist. (8), xiv, 1914, p. 482.

Chart No. 9 and fig. 12.

Nasal cleft to second labial; scales in 18 rows.

Head greatly produced, sub-acute; snout acute, with lower edge horizontal; nostrils inferior, the cleft nearer to the preocular than to the rostral which it touches in front of the nostril, dividing the nasal; rostral a little more than half

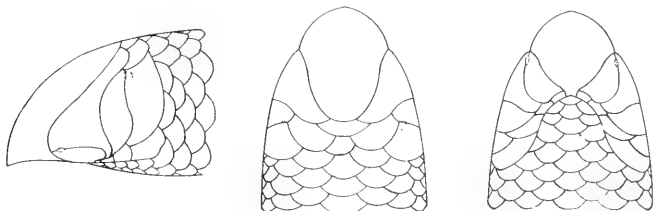


Fig. 12. Head of *T. kenti*

the width of the head, widest in its front half, extending to the level of the eyes, the lower part as broad as long, preocular narrower than the nasal or the ocular; diameter of body 55 to 102 times in its length.

Colours. Pale brown above, yellow beneath; in three specimens the tail is black, in one other the head is also black.

Length. 275 mm.

Type. In the British Museum, from Northern Queensland.

Range. Four specimens examined, one each from King's Sound and Broome, Kimberley Division, and Yanyerredy Station, near Ashburton River, North-western Australia; one from "Western Australia."

Remarks. A note on the differences between *T. kenti* and *T. grypus* will be found under the entry of the latter species.

TYPHLOPS AFFINIS Boulenger.

Typhlops affinis Bouleng., Ann. Mag. Nat. Hist. (6) iv, 1889, p. 363, Cat. Snakes Brit. Mus. i, 1893, p. 49, pl. iii, fig. 3, and Proc. Linn. Soc. N.S. Wales, (2) ix, 1894, p. 719. Waite, Proc. Linn. Soc. N.S. Wales, (2) ix, 1894, p. 11.

Chart No. 4 and fig. 13.

Nasal cleft to second labial; scales in 18 rows.

Head blunt; snout obtusely angular, lower edge sub-horizontal; nostrils inferior, the cleft a little nearer to the rostral than to the preocular, produced to the rostral, dividing the nasal; rostral slightly more than half the width of the head, contracted behind, reaching to the level of the eyes, the lower part much broader than long; diameter of body 48 to 57 times in its length.

Length. 206 mm.

Type. In the British Museum, from Queensland.

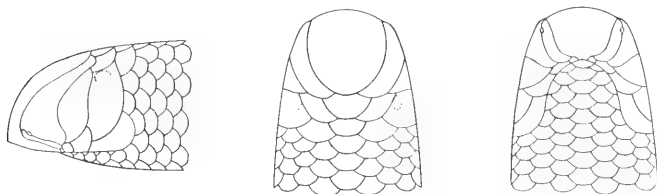


Fig. 13. Head of *T. affinis*.

Range. The three examples examined are labelled respectively: "North Queensland," "Eidsvold, nr. Gayndah, Queensland," and "Campbelltown, New South Wales." Lönnberg and Andersson identified a specimen from Mallallah, interior of Kimberley, North-west Australia, found in the interior of a termites' hill.

Remarks. The original description of this species is unsatisfactory, being mainly comparative: the diagnosis of *T. unguirostris*, with which species it was compared, was afterwards found to include two species. *T. affinis* is intermediate between *T. guentheri* and *T. kenti*, differing from the former in its completely divided nasal, angular snout and heart-shaped rostral, and from the latter in its blunt head, with less produced rostral and less acute snout. All three species are of slender habit with small heads.

TYPHLOPS GUENTHERI Peters.

Typhlops (Onychocephalus) guentheri Peters, Mon. Akad. Berl, 1865, p. 259, fig. 1. Bouleng. Cat. Snakes, Brit. Mus. i, 1893, p. 20.

Typhlops nigricauda Bouleng. Proc. Zool. Soc. 1895, p. 867, pl. xlix, fig. 1, and Cat. Snakes, Brit. Mus. iii, 1896, p. 586.

Chart No. 3 and fig. 14.

Nasal cleft to second labial; scales in 18 rows.

Head blunt; snout rounded; nostrils inferior, the cleft median, terminating at the nostril; rostral half, or rather more than half the width of the head,

reaching to the level of the eyes, sides sub-parallel, the lower part broader than long; diameter of body 46 to 80 times in its length.

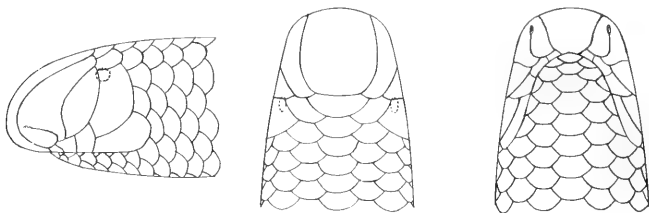


Fig. 14. Head of *T. guentheri*

Colours. Head and tail, brown or black, the colour, especially that on the head, absent in some specimens.

Length. 315 mm.

Type. In the British Museum, from North Australia.

Range. Known from Daly River (British Museum), Port Darwin, East Alligator River, all in the Northern Territory; and Marble Bar, North-western Australia.

Remarks. From the other two species of this division with 18 rows of scales, namely *T. affinis* and *T. kenti*, this species may be recognized by the rounded snout, the incompletely divided nasal and the quadrangular-shaped rostral.

TYPHLOPS PINGUIS Waite.

Typhlops pinguis Waite, Trans. Roy. Soc. S. Aust. xxi, 1897, p. 25, pl. iii.

Chart No. 5 and fig. 15.

Nasal cleft to second labial; scales in 20 rows.

Head rounded, the nasals slightly tumid; snout obtusely angular; nostrils inferior, median, the cleft produced, but not on to the upper surface of the head;

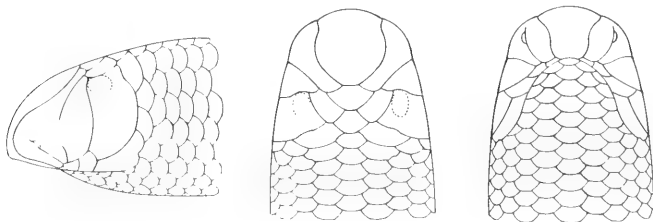


Fig. 15. Head of *T. pinguis*

rostral about half the width of the head, widest medially, extending nearly to the level of the eyes, the lower part broader than long; diameter of body 22 to 32 times in its length.

Length. 485 mm.

Type. In the South Australian Museum, from South Australia.

Range. The headquarters of the species appears to be the extreme south-western corner of the Continent, whence I have examined many specimens. One example (the type) is from South Australia and one from the Mallee district of Victoria.

Remarks. The very stout habit is almost characteristic of *T. pinguis*; from its allies, *T. broomi* and *T. wiedii*, it differs also in its large size and angular snout; further, the former has distinct colour stripes and a completely divided nasal, and in the latter the nasal cleft extends on to the upper surface of the snout.

TYPHLOPS BROOMI Boulenger.

Typhlops broomi Bouleng. Ann. Mag. Nat. Hist. (7), ii, 1898, p. 414.

Chart No. 3 and fig. 16.

Nasal cleft to second labial; scales in 20 rows.

Head rounded, snout evenly rounded, very blunt; nostrils inferior; nearer to the rostral than to the preocular, the cleft just visible from above, where it joins the rostral, dividing the nasal; rostral subcircular, a little longer than broad, reaching to the level of the middle of the eyes, the lower part quadrangular, wider than long. Diameter of body 38 to 55 times in its length.

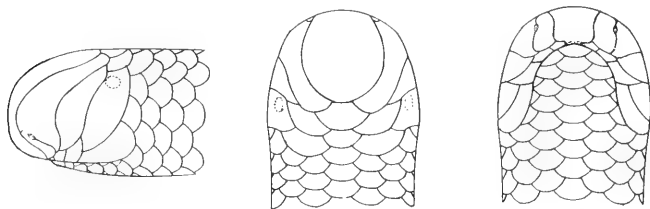


Fig. 16. Head of *T. broomi*.

Colours. Yellow, with eleven reddish-brown streaks on the upper surface.

Length. 192 mm.

Type. In the British Museum, from Muldiva, near Cairns, Queensland.

Range. Of five specimens examined, one is from Cairns, close to the type

locality; another from "North Queensland"; one from Broome, Kimberley Division, North-western Australia; another from Norseman, inland from Esperance Bay, Southern-western Australia; and the fifth from the Mallee districts of Victoria.

Remarks. The colour markings are quite characteristic, and the snout is blunter than in any other Australian species. The completely divided nasal distinguishes it from *T. wiedii*.

TYPHLOPS WIEDII Peters.

Typhlops wiedii Peters, Mon. Akad. Berl. 1867, p. 24. Bouleng. Cat. Snakes, Brit. Mus. i, 1893, p. 36. Waite, Proc. Linn. Soc. N.S. Wales, (2), ix, 1894, p. 13, pl. i, figs. 7-9. Boettg. in Semon, Zool. Forsch. v, 1894, p. 117. Garman, Bull. Mus. Comp. Zool. xxxix, 1901, p. 11.

Typhlops leucoproctus Bouleng. Ann. Mag. Nat. Hist. (6), iv, 1889, p. 361, and Cat. Snakes, Brit. Mus. i, 1893, p. 20, pl. i, fig. 6.

Chart No. 6 and fig. 17.

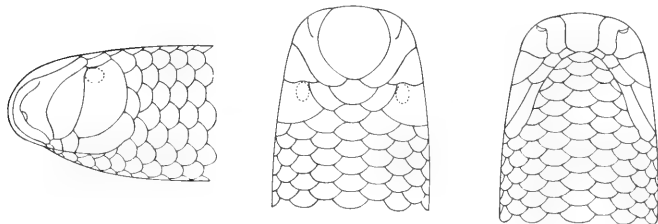


Fig. 17. Head of *T. wiedii*.

Nasal cleft to second labial; scales in 20 rows.

Head obtuse; snout bluntly rounded; nostrils inferior, sub-median, the cleft produced well on to the upper surface of the head; rostral heart-shaped, about half the width of the head, widest medially, extending to the level of the eyes; the lower part broader than long; diameter of body 33 to 76 times in its length.

Length. 295 mm.

Type. In the Berlin Museum, from Brisbane, Queensland.

Range. New Guinea, Torres Strait (Murray and Darnley Islands), Queensland, New South Wales, Victoria, Northern and South-western parts of Western Australia; not yet known from the Northern Territory or South Australia.

TYPHLOPS BITUBERCULATUS Peters.

Onychocephalus bituberculatus Peters, Mon. Akad. Berl. 1863, p. 233, and 1867, p. 708, fig. 4.

Typhlops bituberculatus Bouleng. Cat. Snakes, Brit. Mus. i, 1893, p. 48. Werner, Fauna Südwest-Aust. ii, 1909, p. 256. Waite, Trans. Roy. Soc. S. Aust. xli, 1917, p. 435, figs. 1-3.

Plate i, chart No. 7, and fig. 18.

Nasal cleft to second labial; scales in 20 rows.

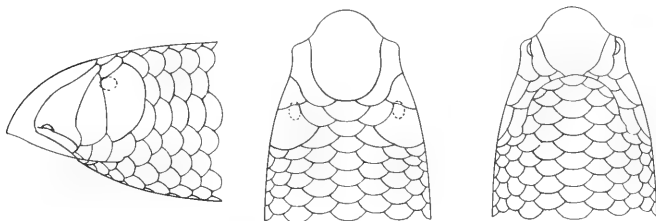


Fig. 18. Head of *T. bituberculatus*.

Head trilobed, the rostral and bulging nasals forming the lobes; snout acutely angular, the lower edge sub-horizontal; nostrils inferior, nearer to the rostral than to the preocular, the cleft produced slightly beyond the nostril; rostral produced in front, half the width of the head, extending nearly to the level of the eyes, the lower part slightly broader than long; diameter of body 42 to 82 times in its length.

Length. 450 mm.

Type. In the Berlin Museum, from Adelaide, South Australia.

Range. The whole of Australia, the northern parts excepted, the most northern localities being Bundaberg, Queensland; Barrow's Creek, Central Australia, and the Fortescue River, Western Australia. It is one of the commonest species, occurring plentifully throughout the southern parts of the Continent.

Remarks.—*T. bituberculatus* is quite unmistakable, even when young, and is the Australian example best illustrating "inferior" nostrils.

TYPHLOPS TORRESIANUS Boulenger.

Typhlops torresianus Bouleng. Ann. Mag. Nat. Hist. (6), iv, 1889, p. 362, and Cat. Snakes, Brit. Mus. i, 1893, p. 34, pl. ii, fig. 4.

Chart No. 4 and fig. 19.

Nasal cleft to second labial; scales in 22 rows.

Head rounded; snout rounded; nostrils inferior, the cleft a little nearer to the rostral than to the preocular, produced far on to the upper surface of the head; rostral narrow, one-third the width of the head, extending almost to the level of the eyes; the lower part as broad as long; diameter of body 34 to 43 times in its length.

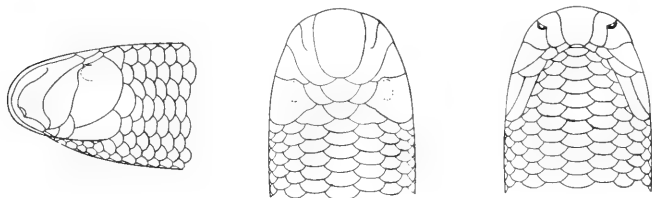


Fig. 19. Head of *T. torresianus*.

Length. 400 mm.

Type. In the British Museum, from Murray Island, Torres Strait.

Range. Torres Strait, east coast of Queensland, Dunk Island.

Remarks. This species differs from *T. australis* by its rounded snout and narrow rostral, and the condition of the nasal cleft which is projected far on to the upper part of the head. Boulenger states that the portion of the rostral visible from below is "half as broad as long"; none of our specimens exhibits this proportion, nor indeed does the original figure agree with the description in this respect.

TYPHLOPS AUSTRALIS Gray.

Anilius australis Gray, Cat. Lizards, Brit. Mus. 1845, p. 135.

Typhlops preissi Jan, Icon. Gén. 1860, p. 15, liv. 1, pl. v, fig. 2.

Onychocephalus bicolor Peters, Mon. Akad. Berl. 1860, p. 81.

Typhlops bicolor Jan, *op. cit.* 1864, p. 31, liv. 4, pl. iv and v, fig. 3. Bouleng. Cat. Snakes, Brit. Mus. i, 1893, p. 48.

Typhlops australis Peters, *op. cit.* 1865, p. 262, fig. 3. Bouleng. *op. cit.* p. 35. Waite, Trans. Roy. Soc. S. Aust. xxi, 1897, p. 26. Werner, Fauna Südwest-Aust. ii, 1909, p. 256.

Typhlops sp. Lönnberg and Andersson, Vet. Akad. Handl. lii, No. 3, 1913, p. 12.

Chart No. 8, and fig. 20.

Nasal cleft to second labial; scales in 22 rows.

Head rounded, with slightly tumid nasals; snout sub-angular; nostrils inferior, the cleft median, scarcely produced beyond the nostril; rostral large, heart-

shaped, about half the width of the head, reaching to the level of the eyes, the lower part broader than long; diameter of body 24 to 49 times in its length.

Length. 460 mm.

Type. In the British Museum, from Western Australia.

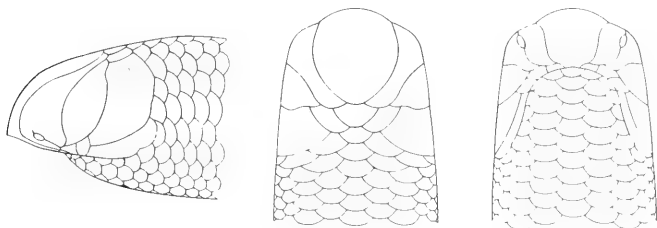


Fig. 20. Head of *T. australis*.

Range. Southern Australia, absent from the coastal districts of New South Wales and Victoria (8), common in South and Western Australia, and found at Fraser Range and McMinns Creek, Central Australia.

Remarks. Lönnberg and Andersson describe a specimen from Perth, Western Australia, remarking that it resembles *T. australis* very much, but that "the long tail prohibits the identification with that form." As previously stated in this paper the length of the tail in the Typhlopidae is subject to considerable variation within the limits of a species. In their description "prefrontal" should be read for "preocular."

TYPHLOPS WAITII Boulenger.

Typhlops unguirostris (in part) Bouleng. Cat. Snakes, Brit. Mus. i, 1893, p. 49.

Typhlops waitii Bouleng. Proc. Linn. Soc. N.S. Wales, (2) ix, 1894, p. 718, and Cat. Snakes, Brit. Mus. iii, 1896, p. 589.

Not charted.

Nasal cleft to second labial; scales in 22 rows.

"Nasal cleft proceeding from the second labial (from the first in *T. unguirostris*); 22 scales round the body (24 in *T. unguirostris*). Tail nearly as long as broad."—Boulenger.

Length. 500 mm.

Type. In the British Museum, from N.W. Australia.

Remarks. The original description, above quoted, is insufficient to enable me to publish the further essential characters of the species, or to ascertain in

(8) Peters' record of "Melburn" is doubtless inexact.

what respects it differs from *T. australis*, with which it is associated in the scheme here adopted, nor can I identify with the description, any specimen I have handled. In order to remedy this deficiency I wrote to Dr. Boulenger on November 22 last, but I greatly fear that either my letter or his reply has been lost as the result of sinking, by our enemies, of one of the vessels carrying homeward or outward mails.

TYPHLOPS BATILLUS Waite.

Typhlops batillus Waite, Proc. Linn. Soc. N.S. Wales, (2) ix, 1894, p. 9, pl. i, figs. 1-3. Bouleng. Cat. Snakes, Brit. Mus. iii, 1896, p. 585.

Chart No. 9, and fig. 21.

Nasal cleft to second labial; scales in 24 rows.

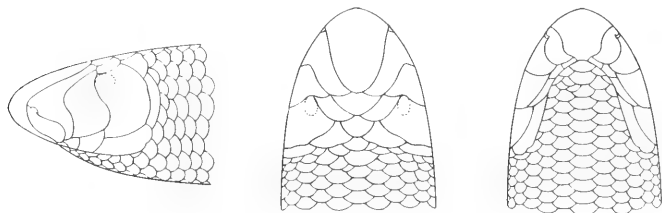


Fig. 21. Head of *T. batillus*.

Head sub-acute, much produced; snout acutely rounded; nostrils lateral, close to the rostral to which the cleft is continued, dividing the nasal; rostral very long, one-third longer than broad, extending to the level of the eyes, widest in front, its width nearly half that of the head, the lower part broader than long; diameter of body 53 times in its length.

Length. 320 mm.

Type. In the Macleay Museum, Sydney, from Wagga Wagga, New South Wales.

Remarks. The type is still the only specimen known, and this is the only species having the peculiar shovel-shaped head.

TYPHLOPS LABIALIS sp. nov.

Not charted, fig. 22.

Nasal cleft to second labial; scales in 24 rows.

Head very flat, rounded; snout evenly rounded; nostrils lateral, the cleft sub-median, completely dividing the nasal; rostral ovate, rather narrow, a little

more than one-third the width of the head, reaching to the level of the eyes, the lower part thistle-shaped, much longer than broad; preocular very wide, wider than the ocular; labials large, wider than long; diameter of body 35 times in its length.

Colours. In spirits: pale olive above and yellow below, the two areas sharply defined.

Length. 340 mm.

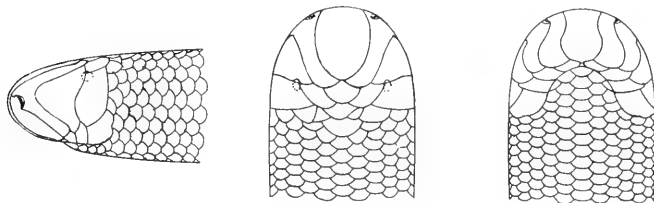


Fig. 22. Head of *T. labialis*.

Type. In the Western Australian Museum; one specimen, No. R. 630, from "Western Australia."

Remarks. Most nearly allied to *T. batillus*, but differs in the flat rounded head (see definition p. 7), the shape of the rostral and its relative proportions above and below; the preocular is wider than the ocular; the labials are wider than long; in both characters *T. labialis* differs from all other Australian species.

TYPHLOPS DIVERSUS Waite.

Typhlops diversus Waite, Proc. Linn. Soc. N.S. Wales, (2) ix, 1864, p. 10, pl. i, figs. 4-6. Bouleng. Cat. Snakes, Brit. Mus. iii, 1896, p. 584. Lönnberg and Andersson, Vet. Akad. Handl. lii, No. 3, 1913, p. 12.

Typhlops ammodytes Montague, Proc. Zool. Soc. 1914, p. 642, pl. i, figs. 8-10.

Chart No. 4, and fig. 23.

Nasal cleft to the preocular; scales in 20 rows.

Head rounded; snout evenly rounded; nostrils lateral, far removed from the rostral, the cleft produced beyond the nostril, just on to the upper surface of the head; rostral rather narrow, much longer than broad, one-third the width of the head, extending almost to the level of the eyes, lower part as long as broad; diameter of body 41 to 67 times in its length.

Length. 300 mm.

Type. In the Queensland Museum, from Morven, Queensland.

Range. Southern Queensland, Northern Territory, Central Australia, Kimberley District, and Montebello Island, North-western Australia (*T. ammodytes*).

Remarks. Four specimens examined. The type specimen was from Mowen, Central Railway, Queensland; not Mowen, as originally stated. A re-examination shows that the rostral shield is unsymmetrical, though unfortunately not so figured, the bulging, or abnormal side, having been duplicated. Examination of further material shows that the actual condition is as now illustrated. Lönnberg and Andersson identified two examples from the interior of the Kimberley district, remarking that they agreed with the description of the type, but

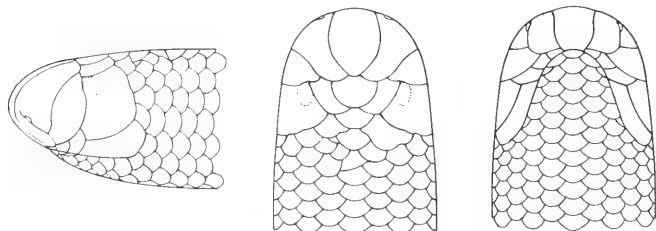


Fig. 23. Head of *T. diversus*.

that the rostral appeared to be narrower. "Nostril between two nasals" is apparently the only distinguishing feature of *T. ammodytes*, and, as the author was evidently unaware of the description of *T. diversus*, I have considered that the specimen obtained should be referred to this species.

In November last I wrote to Mr. Montague in respect to the status of this species. In reply Dr. Hugh K. Anderson informs me that he was killed on active service whilst flying in Palestine. My informant adds that Montague was a delightful man, and had shown great promise as a naturalist and anthropologist.

TYPHLOPS ENDOTERUS sp. nov.

Chart No. 5, and fig. 24.

Nasal cleft to the preocular; scales in 22 rows.

Head rounded, nasals slightly tumid; snout angular, the lower edge not horizontal; nostrils inferior, the cleft terminating at the nostril, which is close to the rostral; the latter widest in front, a little wider than long, forming a triangle with curved sides, not reaching to the level of the eyes, the lower part one-third broader than long; diameter of body 47 times in its length.

Length. 235 mm.

Type. In the South Australian Museum, Adelaide, No. R. 88, from Hermannsburg, Central Australia; three specimens.

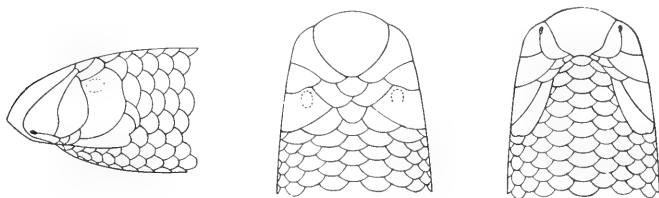


Fig. 24. Head of *T. endoterus*.

Remarks. Differs from *T. diversus*, its nearest ally, in having 22 in place of 20 rows of scales, the snout angular instead of rounded, the rostral much wider and of different shape, above and below; the nostrils inferior and much nearer to the rostral, and the nasal cleft arrested at the nostril.

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 Gray, *Cat. Lizards, Brit. Mus.*, 1845.
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 McCoy, *Prodromus Zoology, Victoria*, 1885.
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 .. *Trans. Roy. Soc. S. Aust.*, 1897, 1917.
 .. *Australian Snakes*, 1898.
 Boettger in Semon, *Zool. Forsch.* v, 1894.

(9) This work is not quoted in the text as the descriptions are copied and the figures are indefinite.

Garman, Bull. Mus. Comp. Zool., 1901.

Werner, Fauna Südwest Aust. ii, 1909.

Lönnberg and Andersson, Vetens. Akad. Handl. lii, 1913, 1915.

Montague, Proc. Zool. Soc., 1914.

Explanation of Plate i.

TYPHLOPS BITUBERCULATUS Peters.

In all the figures the head of the snake is directed towards the left hand, and in fig 2 the reptile is represented in the act of untying the knot into which it had coiled itself (see p. 2).

The striped appearance of the body is due to reflection of light from the highly-polished rows of scales.



1



2



3

TYPHLOPS BITUBERCULATUS Peters.

DESCRIPTION OF A NEW BLIND SNAKE FROM THE SOLOMON ISLANDS,

WITH A LIST OF SPECIES FROM THE AUSTRO-MALAYAN AND POLYNESIAN
SUB-REGIONS.

By EDGAR R. WAITE, F.L.S., DIRECTOR S.A. MUSEUM.

Fig. 25.

Of the species catalogued in the preceding paper, two only are recorded as occurring beyond the confines of Australia proper; these are *T. polygrammicus* and *T. wiedii*.

Many species, on the other hand, have been described from the Australian Region, outside the limits of the Continent. Lacking the necessary specimens and literature, no attempt has been made to critically study these forms; they are therefore merely listed geographically with their recorded distribution within the sub-regions. A species from the Solomon Islands proves to be new and may be described as follows:

TYPHLOPS INFRALABIALIS sp. nov.

Nasal cleft to the first labial, scales in 26 rows.

Habit moderate; head and snout acute; rostral short and narrow, extending to two-thirds its distance from the level of the eyes; nostril sub-lateral, nearer the rostral than to the anterior preocular, its cleft does not quite reach the rostral and extends to the hinder edge of the first labial; no supranasals; a large preocular which however does not touch the ocular; the normal position of the ocular is

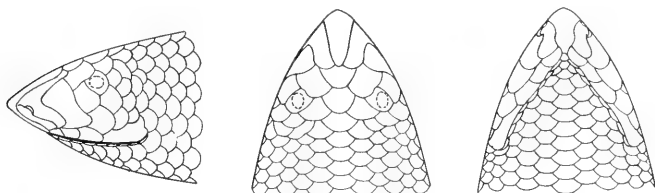


Fig. 25. Head of *T. infralabialis*.

represented by four scales: a small ocular, posterior preocular, subocular, and supralabial, the latter wedged in between the third and fourth labials; four upper

labials and three supralabials; mandible Λ -shaped; a small chin shield and a series of very narrow labials bordering the mouth; diameter of body 52 times in the length; tail as broad as long, ending in a spine.

Colours. In spirits, brown above and yellow below.

Length. 315 mm.

Type. In the Australian Museum, No. R. 4009, from Malaita, Solomon Islands.

Remarks. The only species hitherto known from the Solomon Islands is *T. aluensis*, also recorded from Fiji (1); that species, however, has the nasal cleft in contact with the second labial and has only 22 rows of scales round the body. No other species of the following list (having the nasal cleft in contact with the first labial) has more than 22 rows of scales.

Of the two numbers at the end of each of the following entries, the first indicates the labial with which the nasal cleft is in contact and the second the number of rows of scales round the body; the letters taking the place of numbers in *T. braminus* indicate that the nasal cleft is in contact with the preocular scale.

The accompanying figure is drawn by Mr. Herbert M. Hale.

AUSTRO-MALAYA.

- Typhlops elberti* Roux, Zool. Jahrb. xxx, 1911, p. 499. Lombok. [1. 22
Typhlops polygrammicus Schlegel, Abbild. Amphib. 1844, p. 40, pl. Timor. [1. 22
 xxxii, figs. 35-38.
Typhlops braminus Daudin, Hist. Nat. Rept. vii, 1803, p. 279. Celebes. [pr. 20
Typhlops conradi Peters, Mon. Akad. Berl. 1874, p. 162, fig. 1. Celebes. [2. 18
Typhlops ater Schlegel, Abbild. Amphib. 1844, p. 39, pl. xxxii, figs. Moluccas. [2. 18
 29-31.
Typhlops olivaceus Gray, Cat. Liz. Brit. Mus. 1845, p. 133. Moluccas. [1. 22
Typhlops flaviventer Peters, Mon. Akad. Berl. 1864, p. 271. Moluccas. [2. 22
Typhlops bipartitus Sauvage, Bull. Soc. Philom. (7), iii, 1879, p. 59. Moluccas. [2. 22
 (Boulenger wrote "Tidore (?) Island, Northern New Guinea."
 Tidore Island is adjacent to Ternate.)
Typhlops kealii Doria, Ann. Mus. Genova, vi, 1874, p. 347, pl. xii. Kei Islands. [2. 24-26
 fig. f.
Typhlops multilincatus Schlegel, Abbild. Amphib. 1844, p. 40, pl. xxxii, Papua and adjacent islands. [1. 20
 figs. 39-42.
Typhlops wicidii Peters, Mon. Akad. Berl. 1867, p. 24. Papua. [2. 20

(1) Waite, Proc. Linn. Soc. N.S. Wales, xxii, 1898, p. 695.

- Typhlops inornatus* Boulenger, Ann. Mag. Nat. Hist. (6), i, 1888,
p. 344. Papua. [2. 20]
- Typhlops erycinus* Werner, Verh. Ges. Wien, li, 1901, p. 611, fig. —.
Papua. [1. 20]
- Typhlops depressiceps* Sternfeld, Sitzb. Nat. Freunde. Berlin, 1913,
p. 384. Papua. — —
- Typhlops depressus* Peters, Mon. Akad. Berl. 1880, p. 220, fig. —
New Britain. [2. 22]
- Typhlops subocularis* Waite, Rec. Aust. Mus. iii, 1897, p. 69, figs. 1-3.
New Britain. [2. 34-36]
- Typhlops philococcus* Werner, Zool. Anzeiger, 1898, p. 553.
New Britain. [2. 22]
- Typhlops alucensis* Boulenger, Proc. Zool. Soc. 1887, p. 336, pl. xxviii,
fig. 2. Solomon Islands, Fiji. [2. 22]
- Typhlops infralabialis* Waite, *antea*, p. 35. Solomon Islands. [1. 26]

POLYNESIA.

- Typhlops acuticauda* Peters, Mon. Akad. Berl. 1877, p. 416, fig. 2.
Pelew Islands. [2. 24]
- Typhlops angusticeps* Peters, Mon. Akad. Berl. 1877, p. 417, fig. 3.
New Caledonia. [1. 20]
- Typhlops willeyi* Boulenger, Zool. Results, 1900, p. 603, 4 figs.
Loyalty Islands. [2. 22]

The type of *T. angusticeps* is said to be from New Caledonia, but in placing this species as synonymous with *T. olivaceus* Gray, the locality was omitted from the British Museum Catalogue (i, p. 50): this may account for the fact that Boulenger did not mention it when writing the note accompanying his description of *T. willeyi*: this reads as follows (*vide supra* p. 604): "Considering the general distribution of the Typhlops, the fact of a species inhabiting the Loyalty Islands is far less remarkable than the total absence of representatives in New Caledonia."

Not having specimens for examination I am unable to offer more than a hazard as to the association of *T. angusticeps* with *T. olivaceus*, but I would suggest that they are not synonymous, the former being characterized by having 20 and the latter 22 rows of scales round the body; they are therefore here listed separately.

Since writing the foregoing I have received a letter from Dr. Boulenger, in reply to my inquiry of January 7 last. As the reason for the omission of New Caledonia as a habitat of a species of the genus is now made clear, I cannot do better than publish the following extract from Dr. Boulenger's communication: "It was intentionally that I abstained from including New Caledonia in the habitat

of *Typhlops olivaceus*; regarding the locality given for *T. angusticeps* as erroneous. All explorers of New Caledonia agree that no *Typhlops* occurs there and this is confirmed by the latest writer, J. Roux (2), who has examined the type of *T. angusticeps* in Berlin and supports my identification. On the other hand *T. willeyi* was discovered by Roux on Mari, Loyalties, where it is known to the natives."

(2) Roux, Rept. Nouv. Calédon, in Sarasin et Roux; Nouv. Calédonie, Zool. 1913, p. 135.

SOME NEW AND LITTLE-KNOWN FISHES
FROM SOUTH AUSTRALIA.

By

ALLAN R. McCULLOCH, ZOOLOGIST AUSTRALIAN MUSEUM, (1)

AND

EDGAR R. WAITE, F.L.S., DIRECTOR SOUTH AUSTRALIAN MUSEUM.

Plates ii-vii; Text figs. 26-31.

THIS paper is the result of an examination of some fishes preserved in the South Australian Museum, and marked "Old Collection," but specimens in the Australian Museum have also been used for comparison. Many of the fishes were unnamed, and the names attached to some of the others were found to be incorrect. A few species recently collected by one of us from rock pools at Kangaroo Island are also included.

Family SYNGNATHIDAE.

SYNGNATHUS CURTIROSTRIS Castelnau.

Syngnathus curtirostris Castelnau, Proc. Zool. Soc. Vict., i, 1872, p. 243, and ii, 1873, p. 79. Macleay, Proc. Linn. Soc. N.S. Wales, vi, 1881, p. 290. Johnston, Proc. Roy. Soc. Tasm., 1890 (1891), p. 37. Zietz, Trans. Roy. Soc. S. Aust., xxxii, 1908, p. 298. Duncker, Faun. Südwest-Austr., ii, 1909, p. 244.

Plate v, fig. 1.

D.21-24; P.8-9; V.3; C.10: Annuli 18+43; Subdorsal annuli 0-1, 4+4½. Male pouch covering 16 caudal rings.

Head 3 in the trunk, and 12.1 in the total length: snout 2.7 in the head, and 1.1 in the postorbital portion: eye 1.8 in the snout, and 5 in the head: caudal almost twice as long as the rest of the body.

Snout short and broad, with a median keel before the eyes: interorbital space slightly concave, convex on the median line: head with reticulating raised lines, and radiating series of raised lines on the operculum; no median opercular keel: occipital and nuchal ridges rudimentary; body and tail rings with sharp angles, but no spines. Body scarcely deeper than wide, the depth equal to the length of the snout.

(1) By permission of the Trustees of the Australian Museum.

Fins. Dorsal a little variable in position, commencing either on the posterior body-ring, or wholly situate on the tail: median ridge terminating above the vent and well separated from the lower caudal edge which is continuous with that of the trunk: dorsal edge of the trunk terminating below the hinder part of the dorsal fin, that of the tail curving downward to above the end of the median lateral ridge: ventral surface a little wider than that of the dorsal: caudal fin rounded, longer than the eye, but shorter than the snout.

Colour-markings. The markings vary in intensity in different specimens, but are similarly arranged in all. An adult male is brown, with slightly darker cross-bars on the back: light oval spots encircle the lateral ridge on each body ring, and also the junctions of the rings: large dark spots are present on the lower half of each segment of the trunk. Head with a broad cross-band on the occiput and another between the eyes: tail and egg-pouch variegated with brown reticulating lines: lower surfaces with irregular brown bars radiating from the eye, and enclosing white interspaces.

Described from two males and two females, 125-164 mm. long, the largest of which is figured.

Loc. Kangaroo Island, South Australia. Coll. Waite, 1917.

ICHTHYOCAMPUS CRISTATUS sp. nov.

Fig. 26.

D.26: P.12: C.8: annuli 19-40: subdorsal annuli 1, 5.

Head 3.6 in its distance from the vent, and 13.3 in the total length: trunk 1.8 in the tail: snout 3.4 in the head, much shorter than the postorbital portion of the head: eye 1.3 in the snout, and 4.7 in the head: pectoral about as long as the eye: caudal a little shorter than the snout.



Fig. 26. *Ichthyocampus cristatus*

Head and body uniformly granular: snout with an elevated, obtuse crest, which expands posteriorly to join the orbits: interorbital space flat, with a very low median ridge which is subcontinuous with an indefinite nuchal ridge: occiput and nape slightly elevated: low ridges extend backward on each side of the head from the orbits: opercles with a low, median ridge, and granular radiating striae.

Body as deep as broad, its angles well defined; back slightly concave: upper and lower angles continuous with those of the tail; lateral ridge extending on to the two anterior tail rings, and deflected downwards on the second; a low ventral ridge: ovisac covering thirteen tail rings: a minute anal fin present.

Described from a single specimen, 207 mm. long, preserved in the South Australian Museum: it is completely bleached after long preservation. The ovisac is filled with well-developed young.

The short-crested snout separates this species from all other Australian representatives of *Ichthyocampus* except *I. tryoni* Ogilby: it differs from that species in having more numerous dorsal rays and annuli, the head covered with granules instead of reticulating ridges, and in having the nuchal and occipital crests scarcely developed.

Loc. Spencer Gulf, South Australia.

Family ATHERINIDAE.

TAENIOMEMBRAS TAMARENSIS Johnston.

Atherina tamarensis Johnston, Proc. Roy. Soc. Tasm., 1882 (1883), p. 122, and 1890 (1891), p. 34.

Atherina tasmanicensis Macleay, Proc. Linn. Soc. N.S. Wales, ix, 1884, p. 443.—misprint for *tamarensis*.

Atherinichthys cephalotes Zietz, Trans. Roy. Soc. S. Aust. xxxiii, 1909, p. 264 (not *A. cephalotes* Castelnau).

D.vi-viii; i, 11; A.i, 12-13; P.13; V.i, 5; C.17; Sc. lat. 44-45; Sc. tr. 2+7.

Proportions of a specimen 98 mm. long: depth 6.5 in the length to the hypural; head 4.4 in the same: eye 2.7 in the head: interorbital space 1.2 in the eye, greater than the length of the snout, which is 1.5 in the eye: depth of the caudal peduncle equal to the length of the snout: third dorsal spine slightly longer than the eye.

Body moderately elongate, about three-fourths as wide as deep. Head flat above, with the usual pores and muciferous canals: jaws equal, the maxillary almost reaching the anterior ocular margin or extending slightly beyond it: a single row of large scales on the cheek; operculum, suboperculum and interoperculum also scaly: a narrow band of minute teeth on the anterior half of each jaw; a patch of microscopic teeth on the middle of the vomer, which is difficult to detect in any but dried or shrivelled specimens: a patch of minute teeth on the base of the tongue: gill-rakers slender, the longest equal to about one-third the length of the eye.

Body covered with large cycloid scales extending forward to the nape and to behind the eyes; there are 44-45 on the silver lateral band from behind the base of the pectoral to the hypural, and nine in a transverse series, including the median dorsal and ventral rows.

Fins. Origin of the dorsal well behind that of the ventrals, and much nearer the snout than the hypural; second and third spines longest: the interspace between the anterior spines of the dorsals is greater than the distance between the last dorsal ray and the hypural, and is half or more than half the distance between the snout and the first dorsal spine: anal originating well in advance of the second dorsal, and terminating before the vertical of its posterior ray; the length of its base is about 1.3 in its distance from the hypural; anterior anal rays longer than those of the dorsal, the margin of the fin somewhat incised: upper pectoral rays longest, not quite reaching the vertical of the ventral: ventrals reaching rather less than half their distance from the anal; the vent is placed between or slightly behind their tips.

Colours. Whitish in alcohol, with a broad silver lateral band along the fourth row of scales: upper portion of the head and back densely dotted with greenish-black dots, which also border the scales above the lateral band, and occasionally some of those below it: fins nearly transparent, sparingly dotted with black.

Described from several specimens 68-98 mm. long, selected from a large series secured together in a net. They agree with others in the Australian Museum collection which were received from the Tasmanian Museum in 1884 as *Atherina tamarensis*, and differ only from Johnston's brief description of that species in having an extra ray or two in the anal fin.

This species is allied to *T. microstoma* Günther, but differs in having smaller teeth, more numerous scales between the pectoral and the hypural, and rather longer and more numerous gill-rakers; the maxillary also usually attains the ocular margin in *T. tamarensis*, but falls short of it in the former species. *T. tamarensis* is perhaps synonymous with *Atherina hepsctoides* Richardson, described from Port Arthur, Tasmania; the description of that species, however, differs from the characters of our specimens in having nine dorsal spines and fifteen pectoral rays.

We have examined the specimen identified by Zietz as *A. cephalotes* from Thistle Island, Spencer Gulf, and find it is identical with those described above: it differs from *A. cephalotes* in having more numerous dorsal rays.

Locs. Cornelian Bay, Hobart, Tasmania; coll. C. Hedley, April 1917. Thistle Island, Spencer Gulf, South Australia.

CRATEROCEPHALUS EYRESII Steindachner.

Atherinichthys eyresii Steindachner, Sitzb. Akad. Wiss. Wien, lxxxviii, i, 1884, p. 1075.

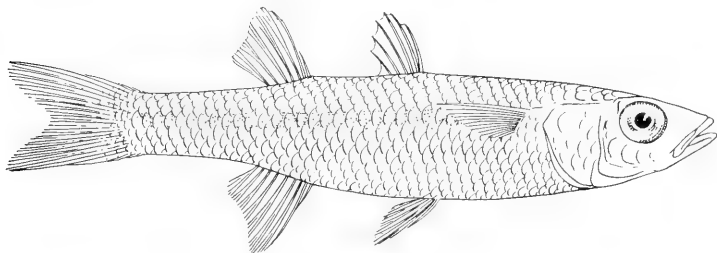
Atherina interioris Zietz, Trans. Roy. Soc. S. Aust., xxxiii, 1909, p. 264 (*nom. nud.*).

Fig. 27.

Br.vi; D.v-vi; i, 6-7; A.i, 6-8; P.12-13; V.i, 5; C.17; L.lat.31-33; l.tr.13-14.

Proportions of a specimen 54 mm. long: head 3.3, depth of body 4.6 in the length of the hypural joint: eye 3.4: interorbital space 3.2 in the head: third dorsal spine 2.6, second dorsal ray almost half the length of the head.

Snout obtusely pointed, almost as long as the eye: interorbital space flat, wider than the eye; length of the eye less than the depth of the caudal peduncle: maxillary slender posteriorly, not reaching the vertical of the orbital margin; mandible closing within the projecting premaxillaries: cheeks with a single row of large scales; opercles covered with large and irregular scales: preopercular angle rounded, opercles unarmed: each jaw with a single row of small curved teeth, which are somewhat spaced; palate and tongue toothless: gill-rakers short and thick, about eleven on the lower limb of the first arch.

Fig. 27. *Craterocephalus eyresii*.

Scales. Body covered with cycloid scales of moderate size, which are conspicuously concentrically striated, and have radiating ridges on their basal portions; they are slightly larger posteriorly than anteriorly, and are largest on the silver lateral band; those of the median row on the back before the dorsal fin are larger than the others on each side of them: the scales cover the base of the caudal fin, extend forward to between the eyes, and become much enlarged on the top of the head: there are 13-14 rows between the back and belly before the second dorsal and anal fins, and 31-33 on the lateral band from behind the pectoral fin to the hypural.

Fins. Origin of first dorsal about midway between the snout and the hypural, and behind the insertion of the ventrals; second and third spines longest; origin of second dorsal behind that of the anal; its anterior rays are longest, but shorter than those of the anal; ventrals almost or quite reaching the vent; upper pectoral rays reaching slightly beyond the vertical of the ventral spine.

Colour-markings. Bleached after long immersion in alcohol, but with numerous minute dots on the back, which border the scales laterally; a silvery lateral band covering a single row of scales extends from behind the pectoral to the base of the tail; fins with dark dots.

Described from several specimens selected from a series, 40-54 mm. long; the figure represents the largest example. They differ somewhat in their proportions from Steindachner's description of *A. eyresii*, but having been obtained at Strangways Springs, in the vicinity of Lake Eyre, they are almost certainly that species.

Two specimens bearing Zietz's label "*Atherina interioris*, Strangways and Coward Springs," are identical with those described above.

This species is closely allied to *C. fluviatilis* McCulloch, but differs in having smaller scales, there being 13-14 in a transverse series instead of only 6-10.

Loc. Strangways Springs, southern Central Australia.

Family CENTRARCHIDAE.

NANNOPERCA Günther.

Nannoperca Günther, Proc. Zool. Soc., 1861, p. 116 (*australis*); Klunzinger, Sitzb. Akad. Wiss. Wien, lxxx, i, 1879, p. 429. Macleay, Proc. Linn. Soc. N.S. Wales, v, 1881, p. 342.

Paradules Klunzinger, Arch. Naturg. xxxviii, i, 1872, p. 20 (*obscurus*). Not *Paradules* Bleeker, 1863.

Microperca Castelnau, Proc. Zool. Soc. Vict. i, 1872, p. 48 (*yarrac*). Macleay, Proc. Linn. Soc. N.S. Wales, v, 1881, p. 308. (Not *Microperca* Putnam, 1863.)

Edelia Castelnau, Proc. Zool. Soc. Vict. ii, 1873, p. 123 (*vittata*). Macleay, Proc. Linn. Soc. N.S. Wales, v, 1881, p. 340. Ogilby, Proc. Linn. Soc. N.S. Wales, xxiv, 1899, p. 175. Regan, Ann. Mag. Nat. Hist. (7), xviii, 1906, p. 452. McCulloch, Rec. W. Aust. Mus. i, 1912, p. 85.

Body oblong, compressed; scales large, ciliated; lateral line more or less incomplete, usually interrupted, the anterior portion parallel to the back, the posterior extending along the middle of the caudal peduncle; its tubes simple and irregularly spaced, and crossing the whole length of the exposed portion of the

scales: mouth small, protractile: bands of villiform teeth on the jaws; a large patch on the vomer, and some on the anterior part of each palatine; tongue smooth: preorbital entire or denticulate, the other bones smooth; operculum with two flat spines; suborbitals ligamentous: cheeks, opercles, nape and interorbital space scaly, snout and lower jaw naked; mucigerous canals and pores are present on the mandible, preopercular margin, snout, upper surface of the head, and above the opercles: nostrils large and widely separate: gill-membranes narrowly united, partly free from the isthmus; pseudobranchiae well developed, gill-rakers moderate, few in number; v-vi branchiostegals. Dorsal fins connected at the base, the spinous portion longer than the soft; D.vi-ix; i, 8-10; A.iii, 6-8; ventral, with a strong spine, inserted behind the pectoral; caudal rounded. Premaxillary processes not reaching the frontals; supraoccipital crest not extending on the upper surface of the cranium; no parietal crests. Vertebrae 28 (12-13+15-16).

Affinities. According to Regan, this genus is allied to *Kuhlia*, in the family Centrarchidae.

Distribution. Southern and Western Australia, and Tasmania.

Synonymy. A careful comparison of the genotypes, *N. australis*, *P. obscurus*, *M. yarrac*, and *E. vittata*, shows them to be very closely allied, and evidently congeneric. Günther's original definition of *Nannoperca* included some important errors which have caused some confusion: he observed no lateral line, whereas his figure shows a very distinct canal, which, however, is quite different from what is actually found in the genus: the entirety or serrature of the pre-orbital bone in *N. australis* and *N. vittata* affords a generic distinction according to Regan, but a somewhat intermediate form is found in *N. obscura*; he also found the interorbital area naked in *Nannoperca* and scaly in *Edelia*, but we find the scales similarly disposed in all our examples of both genera.

KEY TO THE SPECIES OF NANNOPERCA.

- | | | | | | |
|-----|------------------------------|---|-----|-----|---------------------------------------|
| a. | Preorbital rounded, entire | ... | ... | ... | Subgenus <i>Nannoperca</i> |
| | b. | Third anal spine not longer than the second: | | | |
| | | maxillary reaching to below the orbital | | | |
| | | margin: vi-vii, rarely viii spines in the first | | | |
| | | dorsal | ... | ... | <i>australis</i> and <i>tasmaniac</i> |
| aa. | Preorbital angular, serrated | ... | ... | ... | Subgenus <i>Edelia</i> |
| | c. | Third anal spine longer than the second: | | | |
| | | maxillary reaching to below the orbital | | | |
| | | margin: viii-ix spines in the first dorsal | ... | ... | <i>obscura</i> |
| | cc. | Third anal spine not longer than the second: | | | |
| | | maxillary not reaching the orbit: vii-viii | | | |
| | | spines in the first dorsal | ... | ... | <i>vittata</i> |

NANNOPERCA AUSTRALIS Günther.

Pigmy Perch.

- Nannoperca australis* Günther, Proc. Zool. Soc., 1861, p. 116, pl. xix, fig. 2 (not good). Macleay, Proc. Linn. Soc. N.S. Wales, v, 1881, p. 342. Ogilby, Cat. Fish. N.S. Wales, 1886, p. 14. Waite, Mem. N.S. Wales Nat. Club, 2, 1904, p. 29.
- ?*Nannoperca riverinae* Macleay, Proc. Linn. Soc. N.S. Wales, v, 1881, p. 342, and ix, 1884, p. 10. Ogilby, *loc. cit.* Waite, *loc. cit.*
- Paradules lectus* Klunzinger, Arch. Naturg., xxxviii, i, 1872, p. 21, and (*emend. lactus*) Sitzb. Akad. Wiss. Wien, lxxx, i, 1879, pp. 349, 430.

Plate ii, fig. 1.

Synonymy. The identity of *Paradules lactus* and *Nannoperca australis* was recognized by Klunzinger, notwithstanding several striking discrepancies between the descriptions of the two. Macleay later regarded his *N. riverinae* as synonymous with *P. lactus*, although according to his scale-counts their identity would seem improbable: since, however, the type of his species is not now to be found, his opinion must be accepted.

Locs. Murray River. The specimen figured is 65 mm. long, and was taken near Narrandera, on the Murrumbidgee River, New South Wales.

Family POMACENTRIDAE.**GLYPHISODON VICTORIAE** Günther.

- Glyphidodon victoriae* Günther, Ann. Mag. Nat. Hist. (3), xi, 1863, p. 115. Castelnau, Proc. Zool. Soc. Vict., i, 1872, p. 146. Klunzinger, Sitzb. Akad. Wiss. Wien, lxxx, i, 1879, p. 398. Macleay, Proc. Linn. Soc. N.S. Wales, vi, 1881, p. 68. Kent, Proc. Roy. Soc. Tasm., 1886 (1887), pp. 123, 124. Lucas, Proc. Roy. Soc. Vict. (2), ii, 1890, p. 32. Johnston, Proc. Roy. Soc. Tasm., 1890 (1891), p. 34.
- Heliastes lividus* Klunzinger, Arch. Naturg., xxxviii, i, 1872, p. 36.

Plate ii, fig. 2.

D.xiii, 17; A.ii, 15; P.20; V.i, 5; C.15; L.lat.20; Sc.29.

Depth 1.76 in the length to the hypural joint; head 3.03 in the same; eye 4.1 and depth of caudal peduncle 1.8 in the head.

Body elevated, compressed, the dorsal and ventral profiles evenly arched; interorbital space convex, about twice as wide as the eye; snout longer than the eye, the nostril placed in about the middle of its length; greatest breadth of the preorbital about three-fourths the width of the eye; maxillary reaching to below

the anterior portion of the eye, the mouth a little oblique: teeth in a single series in each jaw; they are thick and slightly curved, and laterally compressed towards their bases: operculum with a broad flat spine.

Entire head, with the exception of the snout and lower jaw, covered with scales; these are largest on the operculum, and the basal portions of many are covered by membrane beset with minute pores; they extend forward to between the anterior portions of the eyes. Body scales largest on the sides, becoming much smaller on the caudal peduncle: they cover the basal portions of all the fins except the ventrals, and extend up between the rays of the vertical fins: lateral line a little curved, terminating below the anterior portion of the soft dorsal, and covering twenty scales; there are twenty-nine rows of scales between the origin of the lateral line and the hypural joint.

Fins. Origin of the dorsal above the end of the operculum; the spinous part is rounded; fifth spine longest, about twice as long as the eye: soft dorsal angular, the sixth ray the longest: pectorals as long as the head, the fourth upper ray longest and not reaching quite so far backward as the ventrals, which scarcely attain the vent: caudal forked.

Colour-markings. Bleached after long preservation in spirits, and showing only some pearly markings on the throat and preopercular border; one is on the chin, and a second crosses the throat from behind the angles of the mouth.

Described and figured from a somewhat imperfect specimen in the old collection of the South Australian Museum; it is 176 mm. long from the snout to the hypural joint.

Loc. St. Vincent Gulf, South Australia. The species has been recorded from Victoria, Tasmania, and King George Sound.

Family LABRIDAE.

PSEUDOLABRUS AURANTIACUS Castelnau.

Cheilinus aurantiacus Castelnau, Proc. Zool. Soc. Vict. i, 1872, p. 245, and ii, 1873, p. 71. Macleay, Proc. Linn. Soc. N.S. Wales, vi, 1881, p. 92.

Labrichthys elegans Steindachner, Sitzb. Akad. Wiss. Wien, lxxxviii, i, 1883 (1884), p. 1102, pl. vi, fig. 2-3.

Pseudolabrus elegans Gill, Proc. U.S. Nat. Mus. xiv, 1892, p. 403. McCulloch, Rec. Aust. Mus. ix, 3, 1913, p. 376.

A specimen 119 mm. long, in the old collection of the South Australian Museum, is labelled as *Cheilinus aurantiacus* Castelnau. It agrees with the description of that species in all structural details, and in such colour-markings as remain. It is also identical with *P. elegans* Steindachner, and as Castelnau's

description of the colour-marking agrees with that of the larger specimen figured by Steindachner, we regard the two as synonymous.

This species is remarkable in the genus *Pseudolabrus* in having rounded pectoral fins, thereby approaching *Pictilabrus*; but it has free pencils to the dorsal spines, which feature is characteristic of the first-named genus.

Lôc. St. Vincent Gulf, South Australia.

Family CALLIONYMIDAE.

CALLIONYMUS CALAUROPOMUS Richardson.

?*Callionymus calauropomus* Richardson, Ichth. Erebus & Terror, 1844, p. 10, pl. vii, fig. 4-5. Günther, Cat. Fish. Brit. Mus. iii, 1861, p. 147.

Callionymus calauropomus Castelnau, Proc. Zool. Soc. Vict. ii, 1873, p. 49, and Res. Fish. Aust. (Vict. Offic. Rec. Philad. Exhib.), 1875, p. 21. Klunzinger, Arch. Naturg. xxxviii, i, 1872, p. 31, and Sitzb. Akad. Wiss. Wien. lxxx, i, 1879, p. 386. McCoy, Prodr. Zool. Vict. dec. xx, 1890, pl. cxcii. Lucas, Proc. Roy. Soc. Vict. (2), ii, 1890, p. 29.

A large example, 167 mm. long excluding the tail, agrees with McCoy's description and figures, but differs slightly from the specimen described by Richardson. The bands of teeth in the jaws are broad anteriorly and become very narrow laterally, but they are not reduced to a single row as described in the typical example.

Richardson quoted Western Australia as the origin of his specimen (*loc. cit.*, p. iv), but Günther rendered it as North-Western Australia.

Loc. South Australia.

Family GOBIIDAE.

RHINOGOBIUS LATERALIS Macleay.

Gobius lateralis Macleay, Proc. Linn. Soc. N.S. Wales, v, 1881, p. 602.

Plate ii, fig. 3.

D.v; 10; A.9; P.17; V.i, 5; C.13. Twenty-eight rows of scales between the upper base of the pectoral and the hypural joint, and nine between the anterior dorsal and anal rays.

Depth 5.3 in the length to the hypural joint; head 3.4 in the same; eye 3.1 in the head, a little longer than the snout, which is 4.2 in the head; interorbital width 5.5 in the eye; depth of caudal peduncle 3.1 in the head; middle caudal rays 0.1

longer than the head: breadth between the bases of the pectoral fins equal to the depth.

Head naked, with indistinct rows of mucigerous pores on the snout, cheeks and operculum, along the preopercular margin and each ramus of the mandible; some large open pores on the snout, occiput, and margin of the preoperculum: eyes superolateral, separated by a narrow interorbital space: snout obtusely pointed, its upper profile oblique; anterior nostril in a short tube, the posterior a simple opening near the eye: maxillary reaching back to below the anterior third of the eye: jaws of equal length: a band of small teeth in each jaw, becoming narrower laterally, the outer teeth enlarged, spaced and curved; palate toothless: tongue truncate anteriorly, only its tip free: gill-openings very wide, separated by a space about as wide as the eye: exposed edge of pectoral arch smooth, without papillae.

Body rather elongate, compressed, covered with large angular ctenoid scales, which extend forward on the neck to above the operculum, leaving the occiput naked; they also cover the breast and the base of the pectoral: genital papilla large.

Fins. First dorsal commencing well behind the base of the pectoral: the first spine is filamentous, and reaches beyond the base of the second ray; the second, third and fourth are subequal in length, and shorter than the anterior rays: second dorsal increasing in height to the ninth ray, which overlaps the caudal base: anal opposite the second dorsal, and of similar form: pectoral rounded, without free rays above, the middle rays reaching the vertical of the first dorsal ray: ventrals large, inserted a little behind the pectorals, completely united, and reaching the first anal ray: caudal obtusely pointed.

Colour-markings. Pale greenish in alcohol, mottled with olive brown; six large dark blotches on the sides, one below the spinous dorsal, two below the soft portion, and three on the caudal peduncle, the two last being close together and near the caudal base: two broad dark bars on the side of the snout, one crossing from the eye to the middle of the upper lip, and the other to behind the angle of the mouth; a dark iridescent blotch behind the preopercular margin: cheek and operculum with light pearly vermiculating lines, and some subvertical light streaks are present on the side of the abdomen, becoming broken up into dots on the side of the tail: first dorsal closely dotted with black, the margin white; the dots combine to form a black spot between the two anterior spines, and there are reticulating lighter lines basally: second dorsal with numerous rows of angular grey spots: caudal with transverse rows of grey spots, its lower portion dusky: anal dark grey, pectorals and ventrals light grey, the latter with a blackish margin.

Described and figured from a specimen 78 mm. long. It agrees in all details with the three cotypes of the species with which we have compared it, except in having only five instead of six dorsal spines, which is an individual peculiarity.

Variation. A number of specimens from South Australia exhibit some variation in the relative lengths of the spines and rays of the dorsal and anal fins, which are shorter in younger examples, the rays not reaching the base of the caudal; the pearly lines on the head and body are often wanting in preserved specimens.

Loc. Noarlunga, South Australia; figured specimen. Semaphore, South Australia. St. Vincent Gulf, South Australia. Queenscliff, Victoria.

MUGILOGOBIUS GALWAYI sp. nov.

Blue-spot Goby.

Plate iii, fig. 1.

D.vi; i, 8; A.1, 8; P.15; V.i, 5; C.15; 31 rows of scales between the upper base of the pectoral and the hypural joint, and 10 between the anterior dorsal and anal rays.

Depth 5.3 in the length to the hypural joint; head 3.6 in the same; eye slightly shorter than the snout, 4.4 in the head; interorbital space 2.1 in the eye; depth of caudal peduncle 2.0 in the head; breadth between the bases of the pectorals 1.1 in the depth; second dorsal spine 1.9, seventh dorsal ray 1.7, posterior anal ray 1.9 in the head; median caudal rays as long as the head.

Cheeks naked; some rather indistinct large scales on the operculum; rows of open pores extend around the eye, preopercular margin and mandible; indistinct series of upraised rows of mucigerous pores are present on the cheek and operculum; eyes of moderate size, separated by a slightly concave interorbital space, which is about half as wide as the eye; snout tumid, anterior nostril in a short tube near the upper lip, the posterior a simple opening; maxillary reaching to below the middle of the eye, the lower jaw closing within the upper; teeth villiform, in a band in each jaw, which becomes narrow laterally; the outer teeth somewhat larger than the others; no canines; palate toothless; tongue thick, rounded anteriorly, and largely adnate to the floor of the mouth; gill-openings separated by a space which is about one and one-half times as wide as the eye; exposed edge of pectoral arch entire, without papillae.

Body covered with large ctenoid scales, which extend forward to the eyes above, but are somewhat rudimentary on the breast and base of the pectoral; they are a little larger posteriorly than elsewhere; genital papilla elongate, and well developed.

Fins. First dorsal commencing a little before the middle of the pectoral; its margin rounded and second spine longest; rays of soft dorsal increasing very slightly in height backwards; anal almost opposite the second dorsal, and of similar form; pectoral rounded, without free rays, and reaching to below the middle of the interspace between the dorsal fins; ventrals inserted slightly behind the pectorals, and not quite reaching the vent; they are completely united, and have a deep basal membrane; caudal large and rounded.

Colour-markings. Yellowish in alcohol, closely speckled with olive brown; some larger blotches of irregular form are present on the sides, and saddle-like darker markings cross on the back; first dorsal with about four oblique, irregular, dark bands, the outer one forming the margin of the fin, and iridescent blue in life; a bright blue blotch about the middle of the fin; second dorsal with about four rows of subcuneiform dark spots on its basal half; a broad, dark, horizontal stripe on the outer half, which is separated from the narrow blackish margin by a white band; anal dusky, with a blue margin; pectoral and ventral lighter, the latter with dark bars between the rays; caudal with about ten rows of broad, dark spots on its upper half, the lower portion dusky.

Described and figured from a specimen 67 mm. long; two others of about the same size are quite similar, while a number of smaller examples show that the colour-pattern is constant, and developed at an early age.

This species is distinguished from all other Australian gobies known to us by the scaly operculum. It is congeneric with *Mugilogobius (Vaimosa) fontinalis* Jordan and Seale, with paratypes of which we have compared it.

Loc. Patawalunga, near Adelaide, South Australia; holotype. Noarlunga, South Australia; Freshwater lake, Robe, South Australia.

We have pleasure in associating with this pretty species the name of His Excellency Sir Henry Lionel Galway, K.C.M.G., D.S.O., Governor of South Australia, an ardent angler and patron of the South Australian Fish Protection and Anglers' Association.

Family BLENNIIDAE.

HELCOGRAMMA gen. nov.

This genus is closely allied to *Tripterygion* Risso, but differs in the structure of its lateral line: this runs downwards from the shoulder to the middle of the side instead of extending backward parallel with the back, and there is no secondary series of incised scales posteriorly.

Type. *H. decurrens* sp. nov.

Tripterygion medium Günther is a second species of this genus.

HELCOGRAMMA DECURRENS sp. nov.

Plate iii, fig. 2.

Br.vii: D.iii; xiii; 11: A.22: P.9+7: V.2: C.13: L.lat. 19+19.

Depth 4.5 in the length to the hypural; head 3.2 in the same; eye not quite so long as its distance from the end of the snout, 3.5 in the head; interorbital space 3.5 in the eye; first dorsal spine highest, 1.9 in the head; fourth spine of second dorsal 2.2, median pectoral rays 1.1 in the head.

Head large, naked, with double rows of pores beneath the eye, around the preoperculum and on the mandible; anterior nostril with a tentacle, the posterior a simple opening close to the upper orbital border; a small ocular tentacle; lips large and thick, projecting anteriorly; maxilla reaching to below the middle of the eye; mandible a little shorter than the upper jaw; a broad band of villiform teeth in each jaw which becomes very narrow posteriorly, the outer ones somewhat enlarged; a large patch covers the vomer, and smaller patches are present on the anterior part of each palatine; opercular lobe pointed, incised above.

An upraised nuchal ridge extends downward and backward on each side before the dorsal; scales ctenoid, commencing at the shoulder and increasing slightly in size backward; breast and abdomen naked to behind the origin of the anal; lateral line running downward from the shoulder to the middle of the body, and formed of nineteen simple tubes on enlarged scales, which terminate below the end of the second dorsal; no secondary series of incised scales; the scales above the lateral line are rather irregular, and an extra row is intercalated between each of the lateral line series so that there are about 38 or 60 rows along the body, according to the direction in which they are counted.

Fins. First dorsal spine inserted just behind the vertical of the preoperculum; it is much higher than the following, which decrease backward; membrane of the third spine just touching the base of the anterior spine of the second dorsal; margin of the second dorsal slightly arched, the fourth spine longest but shorter than the anterior spine; membrane of the last spine not reaching the anterior ray; soft dorsal damaged, apparently formed of simple rays; anal rays simple, curved, and increasing slightly in length backward; the last is well behind the termination of the dorsal; pectoral pointed, reaching to below the posterior third of the second dorsal; the lower rays are thickened and simple with their membrane incised, the upper rays bifurcate; ventral rays inserted slightly in advance of the vertical of the anterior dorsal spine, free for more than half their length, the inner the longer; caudal subtruncate.

Colour-markings. Brown in alcohol, with the lower half of the head and the pectoral base blackish. Some symmetrical light spots are present on the sides, and the lower part of the trunk is black speckled; dorsal fins with dark

speckles which form irregular, oblique bars: anal closely speckled, the marginal portion darker.

Described and figured from a single, somewhat damaged specimen, 57 mm. long. It is allied to *H. medium* Günther (2), but differs in the form and composition of its fins.

Loc. St. Vincent Gulf, South Australia.

TRIANECTES gen. nov.

Body rather short and deep, covered with large ctenoid scales which extend over the breast and abdomen: two lateral lines, the first formed of simple tubes and parallel with the back, the second of incised scales along the middle of the tail: head large, rounded, and naked, with numerous pores: eye large: mouth large, the maxillary exposed, jaws subequal: upper angle of operculum forming a flat spine, not rounded: teeth moderate, in a band in each jaw, the lower the larger: a single curved row on the vomer, palatines toothless. Three dorsal fins, the two anterior spinous: pectoral with bifid rays in its upper half and simple ones below: ventrals jugular, with two simple rays.

Type. *T. bucephalus*, sp. nov.

This genus differs from *Tripterygion* not only in the very different form of the head, but also in lacking palatine teeth; the upper angle of the operculum also is spine-like, not rounded, and scales cover the breast and abdomen. It is near *Notoclinus* Gill (3), but has the upper pectoral rays divided and more numerous than in that genus.

TRIANECTES BUCEPHALUS sp. nov.

Plate iii, fig. 3.

Br.vi; D.iii; xiv; 12: A.21: P.15: V.2: C.13: L.lat.28+?: L.tr.?+10?.

Depth 4·7 in the length to the hypural joint; head 3·1 in the same: eye slightly longer than the snout, 3·6 in the head; interorbital space 2·2 in the eye: first dorsal spine a little longer than the eye, shorter than the fifth spine of the second dorsal, which is 2·4 in the head: anterior rays longer than the spines, 2·0 and median pectoral rays 1·2 in the head.

Head large, naked, with double rows of pores around the eye, preopercular margin, and on the mandible; snout and nape also porous: anterior nostril with a tentacle, the posterior a simple opening near the upper orbital margin; a broad ocular tentacle: lips thick, projecting anteriorly: maxilla reaching beyond the

(2) Waite, Rec. Cant. Mus. ii, 1913, p. 5, pl. ii.

(3) *Id. ib.*, p. 9, pl. iv.

vertical of the hinder margin of the pupil, expanded posteriorly: upper jaw with a band of villiform teeth anteriorly, which becomes narrow laterally, and an outer row of larger subcardiform teeth; mandibular teeth larger, the inner ones strongest, and arranged in 3 or 4 rows anteriorly, becoming uniserial laterally; a single arched row of teeth on the vomer, the outer of which are the largest; palatines toothless: opercular lobe pointed, a little incised above.

Neck with a well-defined series of upraised pores separating the head from the back: scales large, ctenoid, commencing on the neck; breast and abdomen covered with weak cycloid scales: lateral line extending backward parallel with the back to below the hinder portion of the third dorsal; a second series of incised scales along the middle of the tail (these scales are mostly wanting in the holotype): about 35 rows of scales between the shoulder and the hypural joint.

Dorsal composed almost entirely of spines, anal with two spines and numerous rays: both fins united with the caudal: pectorals present, united with the of the second dorsal: spines of the second dorsal subequal, increasing slightly in length to the fifth, thence decreasing backward: dorsal rays simple, highest anteriorly: anal rays increasing slightly in length backward: pectoral pointed, the upper rays bifurcate, the eight lower ones simple; the middle rays reach to below the tenth spine of the second dorsal: ventrals inserted a little behind the vertical of the hinder orbital margin, the inner ray longest and largely united with the outer by membrane: caudal rounded, the inner rays bifurcate.

Colour-markings. Pink, after long preservation, with four brown cross-bars descending on to the sides, where they expand and connect with one another: first dorsal blackish with a light submarginal band: second dorsal dusky with oblique bars corresponding to the body marking: soft dorsal lighter, obliquely barred: pectorals, anal and caudal with narrow cross-bars.

Described and figured from a specimen 67 mm. long, which has lost some of its scales, but is otherwise fairly well preserved.

Loc. Spencer Gulf, South Australia. Dredged by Dr. J. C. Verco.

OPHICLINUS Castelnau.

Ophiclinus Castelnau, Proc. Zool. Soc. Vict., i, 1872, p. 246 (*antarcticus* Cast.),
Ophioclinus Castelnau, *Loc. cit.*, ii, 1873, p. 69. Waite, Rec. Aust. Mus., vi, 3,
 1906, p. 209.

?*Neoginellus* Castelnau, Res. Fish. Aust. (Vict. Offic. Rec. Philad. Exhib.),
 1875, p. 27 (*sulcatus* Cast.).

Body elongate, compressed, covered with small scales: lateral line present quite anteriorly or wholly wanting: head long, scaleless, with open pores: anterior nostril tubular: eye in the anterior portion of the head: preopercular

margin subcutaneous, operculum unarmed, its lobe with a cleft: gill-membranes forming a free fold across the isthmus: large teeth, forming bands on the jaws, and similar teeth on the vomer; palatines toothless.

Dorsal composed almost entirely of spines, anal with two spines and numerous rays; both fins united with the caudal; pectorals present, united with the opercular lobe by membrane: ventrals jugular, with a hidden spine and two rays: viviparous.

This definition is based on nine specimens herein ascribed to four species. According to Castelnau, the genotype, *O. antarcticus*, has palatine teeth, but this is probably an error.

Synonymy. In assuming *Neogunellus* to be synonymous with *Ophiclinus*, we rely principally upon the evidence afforded by a specimen in the Australian Museum which is believed to be *N. sulcatus* (see notes under that species): Castelnau's description of *N. sulcatus* is partly unintelligible, and is contradictory in several details, so that we feel justified in disregarding some of the statements which conflict with our conclusions.

KEY TO THE SPECIES OF *OPHICLINUS*.

- a. Pectoral longer than the eye; lateral line present anteriorly.
 - b. Vomerine teeth tubercular, forming a triangular patch.
 - c. Dorsal lviii-lix, I. ?*sulcatus*
 - cc. Dorsal liv, I. *aethiops*
 - bb. Vomerine teeth pointed, forming an angular row or series.
 - d. Dorsal commencing above the end of the operculum, with more than fifty spines *gabrielii*
 - dd. Dorsal commencing before the end of the operculum, with less than fifty spines *gracilis*
- aa. Pectoral shorter than the eye; lateral line obsolete; dorsal commencing well behind the head.
 - e. Dorsal with xli-xliv spines *varius*
 - ee. Dorsal with lii spines *pardalis*

?*OPHICLINUS SULCATUS* Castelnau.

?*Ophiclinus antarcticus* Castelnau, Proc. Zool. Soc. Vict., i, 1872, p. 246, and ii, 1873, p. 69.

?*Neogunellus sulcatus* Castelnau, Res. Fish. Austr. (Vict. Offic. Rec. Philad. Exhib.), 1875, p. 27.

Fig. 28.

Br.v: D.lviii-lix, 1: A.ii, 40-41: P.10: V.i, 2: C.13.

Head about 5 in the length to the hypural joint: depth 1.6, eye 5.2 in the head: snout 2.2 in the eye, greater than the interorbital width, which is half as wide as the eye: pectoral 3.0, inner ventral ray 1.7, last dorsal spine 3.8 in the head.

Elongate, compressed. Head moderately flat above, snout obtuse: lower jaw slightly longer than the upper: anterior nostril in a tube behind the lip: rows of pores surround the eye, nuchal and occipital regions, the margin of the preoperculum, mandible and snout; maxillary reaching to behind the pupil: blunt teeth in several rows in front of the premaxillaries, becoming uniserial laterally: mandibular teeth larger, and extending farther back than those of the upper jaw: a large rounded patch of tubercular teeth on the vomer; palate edentulous.

Body covered with small, loosely imbedded scales, commencing on the nape, and covering the thorax and base of the pectoral: lateral line represented by a short canal anteriorly, which is little longer than the eye: head naked.

Fins. Dorsal beginning above the end of the operculum; the spines increase in length backwards, and the last ray is connected with the caudal by membrane: origin of anal nearer the snout than the hypural joint by a space equal to the length of the head: anal rays increasing in length backward, the last connected with the caudal: ventrals inserted below the middle of the operculum, the inner ray the longer: pectorals almost twice as long as the eye, connected with the opercular lobe by membrane: caudal obtusely pointed.

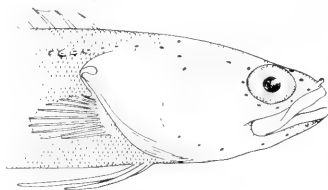


Fig. 28. Head of *O. sulcatus*.

Colour. Light brown in alcohol, the head variegated with darker markings: back with about ten greyish blotches: vertical fins variegated with darker markings.

Described from two specimens 89 and 117 mm. long. The figure represents the head of the larger example.

Identification. The larger of these specimens is part of the old collection of the Australian Museum, and bears a parchment label, "*Neoquimellus sulcatus* Cast., Adelaide." The handwriting is clearly identical with that accompanying other specimens which are known to have been received in exchange from Castelnau, and was probably written by himself. This specimen differs from his description of *N. sulcatus* in having fewer spines and rays in the dorsal and anal fins; in having the anal formed principally of rays instead of spines; also in some proportional details. But the description is clearly inaccurate in parts, since the ventrals are stated to be 5-rayed in one part of his generic definition and 2-rayed

in another, while he described the anal as beginning behind the snout. We therefore rely rather upon the evidence of the label than his description for the identification of the specimen as *N. sulcatus*.

If this identification be correct, it is probable that *Neogunellus sulcatus* is synonymous with *Ophiclinus antarcticus*, since our specimens agree fairly well with the description of that species.

Loc. Port Adelaide and St. Vincent Gulf, South Australia.

OPHICLINUS AETHIOPS sp. nov.

Fig. 29.

D.liv, 1: A.ii, 36: P.10: V.2: C.13.

Head 5.5 in the length to the hypural joint: depth at origin of anal 1.3, eye 4.2 in the head: snout 1.6 in the eye, greater than the interorbital width, which is 2.5 in the eye: pectoral 2.6, inner ventral ray 1.7, and last dorsal spine 3.1 in the head.

Form, structure and dentition similar to those of *O. sulcatus* as described by us.

Colour-markings. Dark brown in alcohol, the sides and lower surfaces speckled with black dots; about ten blackish blotches on the back below the



Fig. 29. *O. aethiops*.

dorsal fin: short dark lines radiate backward from the eye; head with conspicuous blackish dots: dorsal and anal fins with alternate light and dark vertical bands, the former being the narrower; pectorals, ventrals and caudal irregularly spotted.

Described and figured from a specimen 85 mm. long. A second slightly smaller example differs only in lacking the black dots on the head, body and fins.

This species is very similar to *O. sulcatus*, but differs in having fewer spines and rays in the dorsal and anal fins.

Loc. Kangaroo Island. Coll. Waite, 1917.

OPHICLINUS VARIUS sp. nov.

Fig. 30.

D.xli-xliv, 1: A.ii, 26-28: P.7-8: V.2: C.13.

Proportions of a specimen 45.5 mm. long: head 5.1 in the length to the hypural joint: depth at origin of anal 6.8, eye 4.0 in the head: snout 1.6 in the

eye, greater than the interorbital space, which is 2.6 in the eye: pectoral 1.3 in the eye: inner ventral ray 2.0, last dorsal spine 4.0 in the head.

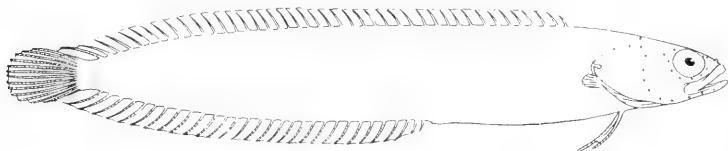


Fig. 30. *O. varius*.

Form and structure of the head and body similar to *O. pardalis*; the dentition of the two species is also similar, except that vomerine teeth form an angular row on the vomer instead of a broad patch as in *O. pardalis*.

Abdomen naked, the scales otherwise distributed as in *O. pardalis*: the form of the fins also is similar, but in *O. varius* the origin of the anal is not much nearer the snout than the base of the caudal.

Colour-markings. Light green or yellowish, with irregular dark lines and dots on the body, most prominent along the middle of the anterior half of the body, and below the base of the dorsal fin, but they are variable and may be absent: head darker, speckled with black dots; some light and dark bars radiating from the eye: vertical fins more or less variegated with light and dark markings, the ventrals with blackish annuli.

Described from four specimens 42-46 mm. long. The figure represents an example 45.2 mm. long, which is selected as the holotype. Two are females, and contain well-developed young, the eyes of which are visible through the abdominal walls; one specimen, on being dissected, was found to have twenty-three young curled up within the left oviduct, and about the same number in the right one; these were of somewhat different sizes, the largest being 7.5 mm. long.

This species is very similar to *O. pardalis*, differing principally in having fewer dorsal and anal spines.

Loc. Kangaroo Island. Coll. Waite, 1917.

OPHICLINUS PARDALIS sp. nov.

Plate iv, fig. 2.

D. lii, 1: A. ii, 39: P. 6: V. i, 2: C. 13.

Head 5.7 in the length to the hypural: depth 1.4, eye 5.0 in the head: snout equal to the interorbital space, 1.6 in the eye: inner ventral ray 1.7, last dorsal spine 3.5, last anal ray 2.7 in the head: pectoral 1.4 in the eye.

Elongate, compressed. Head about as deep as broad at the preoperculum, flattened above, and tapering to the pointed snout: lower jaw projecting beyond the upper: anterior nostril in a tube behind the lip: rows of pores surround the eye, nuchal and occipital regions, the margin of the preoperculum, mandible and snout: eye separated by the flat interorbital space, and situated in the anterior portion of the head: lips broad; maxillary reaching to below the hinder margin of the pupil, and expanded and rounded posteriorly: preopercular margin hidden: operculum without spines, the posterior lobe with a deep cleft: gill-membranes free from the isthmus: teeth proportionately large, forming broad bands in each jaw anteriorly, becoming uniserial laterally; they are obtusely conical, the outer rows slightly larger than the others: a broad patch of similar teeth on the vomer: tongue and palatines toothless.

Body covered with small scales, which are loosely imbedded and scarcely imbricate; their free edge appears to be slightly ciliated: they commence on the nape, and are very small on the sides of the abdomen: head scaleless.

Fins. Dorsal fin beginning well behind the end of the operculum; its spines increase in length backwards, and the single ray is connected with the caudal by membrane: origin of the anal almost twice as far from the tip of the caudal as from that of the snout: its rays are simple and increase in length backwards, the last united with the caudal: ventrals inserted beneath the middle of the operculum; the spine is completely hidden in the skin, and each ray is divisible basally, the inner the longer: pectoral minute, with rudimentary simple rays, and connected by a fold of skin with the upper lobe of the operculum: caudal obtusely pointed.

Colours. Light brown in spirits, with numerous lighter spots together with dark brown spots and longitudinal markings. Head reticulated with dark brown dots and lines radiating from the eye: two blackish streaks extend backwards, which are separated by a white interspace, the upper forming a large black blotch on the operculum: dorsal fin variegated with lighter and darker markings of irregular form, which are also present on the anal and caudal.

Described and figured from a single specimen, 80 mm. long, preserved in the South Australian Museum.

Loc. Streaky Bay, Great Australian Bight.

PERONEDYS Steindachner.

Peronedys Steindachner, Sitzb. Akad. Wiss. Wien, lxxxviii, 1884, p. 1083 (*P. anguillaris*, Steindachner).

Eucetronotus Ogilby, Proc. Linn. Soc. N.S. Wales, xxiii, 1898, p. 294 (*E. zietzi* Ogilby).

Body elongate and compressed, the head depressed. Scales minute, deeply imbedded, non-imbricate, and present on the caudal portion only; lateral line short. Head naked, with series of large open pores. Snout short, rounded; mandible projecting; mouth a little oblique, with thick lips; maxilla expanded distally, and largely exposed; no tentacles or barbels; anterior nostrils tubular; eyes supero-lateral; teeth small, conical, in several rows anteriorly in each jaw, uniserial laterally; vomerine teeth present, palatines toothless; gill-openings wide, the membranes united across the isthmus; pseudobranchiae present, gill-rakers rudimentary; six branchiostegals. A single dorsal fin composed almost entirely of spines, and confluent with the caudal; anal composed principally of simple rays, and united with the caudal; ventrals minute, jugular; pectorals vestigial, the rudimentary rays enclosed in a membrane which is united with the operculum.

PERONEDYS ANGUILLARIS Steindachner.

Peronedys anguillaris Steindachner, Sitzb. Akad. Wiss. Wien, lxxxviii, 1884, p. 1083.

Eucentronotus zietzi Ogilby, Proc. Linn. Soc. N.S. Wales, xxiii, 1898, p. 294.

Plate v, fig. 2.

Br.vi: D.lxxxi, 3: A.ii, 57: V.2: C.13.

Head and body 2.5 in the total length; head 7.6 in the same, and 2.07 in its distance from the vent; depth at the vent 1.4.2 in the total length, and 1.8 in the head; eye as long as its distance from the mandibular symphysis, .5.5 in the head; interocular space much narrower than the eye, 8.6 in the head; caudal 2.1 in the head.

Head depressed, with the gill-covers expanded, naked, with rows of open pores on the snout, occiput, round the eyes, preopercular margins, and on each side of the mandible; others extend along the groove above the opercles to the lateral line, and a series crosses the neck at its junction with the head; eye supero-lateral, situated in the anterior portion of the head, and separated from the maxilla by a narrow suborbital space; interorbital space concave; snout broadly rounded, its upper profile slightly convex; mandible projecting well beyond the premaxillaries; mouth a little oblique, with thick fleshy lips; maxilla expanded posteriorly, and almost reaching to below the hinder orbital border; anterior nostrils tubular, and projecting beyond the upper lip. About three rows of small conical teeth in front of each premaxillary, the outer only of which extends on to the side of the jaw; three or four rows of subequal conical teeth in the anterior part of the mandible; they become uniserial and larger laterally, and extend further back than those of the premaxillary; some spaced conical teeth on the vomer, most of which are arranged in a single curved series; palatines naked;

gill-membranes forming a free fold across the isthmus; gill-rakers represented by one or two minute tubercles on the first gill-arch.

Body very elongate, compressed, and wholly naked as far as the vent; thence minute non-imbricate and cycloid scales appear on the median line and gradually spread until they cover the posterior portion. Lateral line consisting of a short series of tubes on the humeral region: a groove extends along the middle of the body from the shoulder to near the tail, and less distinct ones occur near the bases of the dorsal and anal fins. Vent with two small papillae.

Fins. Dorsal low, commencing a short distance behind the head, the spines increasing in length backwards; the three simple rays are longer than the posterior spine, and united with the caudal: the anal commences just behind the vent, and its rays increase in length backwards; the last is united with the caudal: ventral jugular, shorter than the eye, the membrane apparently enclosing a single ray, which is divided to its base: no true pectoral, but a membrane enclosing rudimentary rays is present, and is connected with the opercular lobe: caudal obtusely pointed.

Colour-markings. Whitish in alcohol, with a sharply defined blackish-brown band extending from the snout to the tail, which covers the top of the head, back, dorsal fin, and upper portion of the caudal: another band, which is light anteriorly but becomes darker backwards, extends from the vent to the tip of the caudal, and covers the lower part of the body and the greater part of the anal: six more or less definite grey stripes extend backwards from the head, the upper of which are mostly distinct: sides of the head with three or four oblique, dark-edged stripes extending along each side of the head, and others are present on its upper surface.

Described and figured from a specimen 100 mm. long.

Identity. This specimen differs from Steindachner's description in several details. It has lxxxi spines and 3 rays in the dorsal, instead of lxxv, 5, and ii, 57 instead of ii, 52 in the anal, and apparently an additional ray in each ventral. The proportions of the eye and the snout are slightly different, and the vomer bears conical teeth instead of being smooth. In all other characters, however, it appears so similar to *P. anguillaris* that we believe it to be correctly identified with that species.

Synonymy. *Eucentronotus zietzi* Ogilby, is apparently synonymous with Steindachner's species: Ogilby counted lxxvii-lxxix, 4, and i, 57-59 spines and rays in the dorsal and anal fins, respectively, which numbers are intermediate between our count and that of Steindachner. He further found only four branchiostegals instead of six, and 2 instead of 3-4 rows of teeth anteriorly. His specimens had three ventral rays, ours appears to have two, while Steindachner

counted only one. Most of these differences are probably due to variation exhibited by the several specimens examined, while others are perhaps attributable to errors arising from the difficulty of accurately observing such small characters.

Loc. Kangaroo Island. Coll. Waite, 1917.

LEPIDOBLENNIUS Steindachner.

LEPIDOBLENNIUS MARMORATUS Macleay.

Lepidoblennius marmoratus (Macleay) McCulloch and McNeill, Rec. Austr. Mus., xii, 1918, p. 24.

Plate v, fig. 3.

Five specimens, 107-126 mm. long, do not differ from the cotypes of the species, with which they have been compared. The largest example is figured.

Loc. Kangaroo Island. Coll. Waite, 1917.

Family BROTULIDAE.

DERMATOPSIS Ogilby.

Dermatopsis Ogilby, Proc. Linn. Soc. N.S. Wales, xxi, 1896, p. 138 (*D. macrodon* Ogilby).

Body rather elongate, compressed; partly covered with non-imbricate, small scales, which are approximate posteriorly but spaced anteriorly; lateral line represented by minute raised tubules. Head naked, with large open pores on the opercles, mandible, and suborbital regions; snout rounded, with large openings and foliaceous lobes; no barbels; mouth slightly oblique, the jaws subequal; maxilla expanded, with an obtuse spine on its lower margin; a band of villiform teeth on the premaxillaries, and some larger ones near the symphysis; mandible with a band of villiform teeth anteriorly, and an inner series of large spaced teeth; an angular series of pointed teeth on the vomer, the exterior of which are enlarged; a triangular patch of pointed teeth on each palatine; tongue pointed, free at the tip; gill-openings broad, lateral, the membranes united with the isthmus; seven branchiostegals; no pseudobranchiae; gill-rakers reduced to minute spinous tubercles; eyes small; opercles covered by a continuous skin, the operculum with a strong spine, which pierces the membrane. Dorsal and anal fins with branched rays, and distinct from the caudal; pectoral well developed; ventrals close together behind the isthmus, each with a single ray. Viviparous.

Ogilby mentioned a spinous tubercle in front of the dorsal fin, regarding it as an anterior dorsal; dissection proves this to be merely the end of a neural spine, pressing against the skin owing to the shrivelled condition of the specimen. The isthmus is also described as wide, whereas it is narrow.

Affinities. *Dermatopsis* is allied to *Dinematichthys* Bleeker, but differs in its squamation, the head being wholly naked, and the anterior body-scales widely spaced.

DERMATOPSIS MULTIRADIATUS sp. nov.

Plate v, fig. 4.

D.102-104: A.62-65: P.19-20: V.1: C.15.

Depth 7·04 in the length to the hypural joint; head 5·4 in the same: eye 2 in the snout and 1·6 in the interorbital space: this is slightly less than the snout, which is 4·5 in the head: breadth between pectoral bases 1·4 in the depth: posterior dorsal rays higher than those of the anal, 2·2 in the head: pectorals and ventrals of equal length, 1·8 in the head.

Head naked, compressed, the snout obtuse: eye distinct, covered with membrane: nostrils are large openings in broad tubes: snout with convoluted dermal lobes surrounding large pores above the upper lip; lower lip fringed, several large openings below the mandibular symphysis. A series of spaced open pores extends from the preopercular angle on to the side of the mandible: a minute tubular pore on the nape behind the eyes, and another at the shoulder: maxilla extending backward far behind the eye; its greatest breadth is less than the length behind the marginal spine: opercular spine well developed: a narrow band of villiform teeth in each premaxillary, those near the symphysis slightly enlarged, and some larger depressible ones behind them: a narrow villiform band in the maxilla, and an inner series of enlarged spaced teeth extending backwards: an angular series of pointed teeth on the vomer, the outermost enlarged: palatines with three rows of similar teeth, the inner series being largest: tongue obtusely pointed, the tip free: isthmus narrow, the gill-membranes sometimes forming a narrow fold across it.

Body covered with minute cycloid scales, which are juxtaposed posteriorly, but spaced anteriorly; they commence behind the pectoral fin on the middle of the sides, and gradually expand backward towards the dorsal and anal surfaces. Lateral line very indistinct, and consisting of minute tubules arising from a linear canal; this curves upwards from the shoulder and descends to the middle of the side some distance behind the pectoral fin. Male urinogenital aperture large, with three horny claspers, two being directed outward at right-angles from their bases, and the median one backward; the latter bears a procurved spine at its tip.

Fins. Dorsal commencing over the middle of the pectorals, and increasing gradually in height backward; the last rays united with the extreme base of the caudal by membrane: anal similar to the dorsal, its origin behind the middle of the total length: pectoral broadly rounded, and reaching less than one-third of

its distance from the vent: ventrals filiform, inserted a little behind the vertical of the preopercular margin: caudal rounded.

Colours. In alcohol greyish-brown on the back, lighter on the sides, and white below. Fins lighter than the body.

Described from two males and two females, 76-83 mm. long, the largest of which is figured and selected as the holotype.

A female 77 mm. long contained three perfectly-formed embryos, each 28 mm. in length, which occupied the greater portion of the abdominal cavity. Two faced forward and one backward, and their tails were curved round at about two-thirds of their length in each case: they showed distinct pigmentation along the back: similarly large embryos of an allied form, *Lucifuga subterranea* Poey, are illustrated by Jordan (4).

Affinities. This species is very similar in its major structures to *Dermatopsis macrondon* Ogilby, but differs in having a much larger number of dorsal and anal rays. The maxilla is broader posteriorly, and the dentition weaker than in that species.

Loc. Kangaroo Island. Coll. Waite, 1917.

Family SCORPAENIDAE.
NEOSEBASTES PANTICA sp. nov.

Plate iv, fig. 1.

D.xii, i, 8; A.iii, 5; V.i, 5; P.20-21; C.15; L.lat.37; Sc.62.

Head 2.6 in the length to the hypural joint, height 2.5 in the same: eye 3.05 in the head: snout 1.6, interorbital space 2.5 in the eye: third dorsal spine 1.2, anterior dorsal ray 1.8, third anal spine 1.6, anterior anal rays 1.5 in the head.

Cephalic spines. A large nasal spine above the anterior nostril: a small antero-superior orbital spine: four over the posterior portion of the orbit increasing in size backward: one small posterior spine and several spinules: a large nuchal spine extending obliquely backward on each side, and a smaller one on the suprascapular: a large spine above the suspension of the preoperculum, which may be bilobed: preorbital with two strong marginal spines, and two on its upper surface: suborbital stay with three or four spines: a long preopercular spine, with another surmounting its base: inferior preopercular margin quadrispinate: two opercular spines, one near the upper angle, and one projecting backward: no median opercular spine.

Head covered with rough scales, leaving only the snout, interorbital groove, nuchal groove, and mandible naked: interorbital space deeply concave, with two bony ridges diverging backward: some rough scales separate this area from the

(4) Jordan, Guide to the Study of Fishes ii, 1905, p. 524, fig. 479.

nuchal groove, which is rather deep, and extends outward and backward to above the preoperculum: nostrils close together, the anterior with raised margins and a tentacle: maxillary reaching back nearly to below the middle of the eye; its upper surface covered with rough scales, its hinder margin obliquely truncate: mandible projecting beyond the upper jaw, it has three large pores on each ramus, and one at each side of the symphysis: bands of villiform teeth in the jaws, the upper of which are broader than the lower; a v-shaped patch on the vomer, and an elongate band on each palatine.

Back elevated anteriorly. Body covered with moderately large, ctenoid scales, which do not extend on to the fins; they are smaller on the base of the pectoral and thorax than elsewhere: there are sixty-two rows below the lateral line between its origin and the hypural joint, eight being in advance of the end of the operculum: only thirty-seven are pierced by the lateral line, which is curved only quite anteriorly, and then runs almost straight to the base of the caudal: about nine scales between the base of the fifth dorsal spine and the lateral line.

Fins. Dorsal commencing above the base of the preopercular spine; third spine longest, the following decreasing evenly to the tenth, the eleventh and twelfth being abruptly shorter; the thirteenth is about half as long as the first ray: margin of the soft dorsal rounded: all the spines of the fins are grooved: anal commencing below the anterior dorsal rays, and terminating behind the posterior rays; second spine very strong, more than three-fourths as long as the first ray; margin of the soft portion rounded: pectoral reaching the vertical of the vent; the rounded margin is broken by the fourteenth to sixteenth rays, which project a little beyond the others; the lower rays are thickened and more or less branched: ventrals reaching a little beyond the vent: caudal rounded.

Colour-markings. Much bleached after long preservation, but with well-defined, reddish-brown areas on the body; one forms a saddle below the fifth to eighth dorsal spines, and extends to below the lateral line; other markings occur below the tenth to eleventh spines, the anterior, and the posterior dorsal rays: the membrane between the third to eighth dorsal spines is largely black: the second dorsal has a broad dark band near its margin, and there is also a basal spot: pectoral, caudal, and ventral fins each with a broad dark band on their distal halves, the two former with light margins.

Described and figured from a specimen 188 mm. long. It is allied to *N. panda* Richardson, but differs in having the lateral line much less arched anteriorly, in lacking a spine on the centre of the operculum, and in having much shorter pectoral fins, which are not evenly rounded.

Loc. Spencer Gulf, South Australia.

Family GOBIESOCIDAE.
DIPLOCREPIS COSTATUS Ogilby.

Diplocrepis costatus Ogilby, Proc. Linn. Soc. N.S. Wales x., 1885, p. 270.

Waite, Rec. Austr. Mus. v, 1904, p. 179, pl. xxiv, fig. 1.

Several specimens from St. Vincent Gulf and Spencer Gulf, South Australia, do not differ from the types in the Australian Museum, with which they have been compared.

The number of fin-rays varies considerably in this species: in nine specimens obtained near Sydney we find D.7-10; A.6-8; C.11-13; V.4; P. about 22.

Family ANTENNARIIDAE.

This family is represented in southern Australian waters by several aberrant species, which appear to differ from the typical *Antennarius* sufficiently, in their dermal armature and fin-structures, to demand the erection of new genera for their reception. Their principal characters are tabulated in the following key to the Australian genera of the subfamily Antennariinae:

- a. Gill-openings pore-like, anal opposite the end of the dorsal.
 - b. Dorsal and anal separated from the caudal, the peduncle free.
 - c. Skin granular or bristly.
 - d. Second spine enveloped in skin.
 - e. First spine smooth, rod-like; 11-13 rays *Antennarius*
 - ee. First spine bristly, thick; 15 rays ... *Echinophryne*
 - dd. Second spine free, bristly like the first; 13-14 rays ... *Trichophryne*
 - cc. Skin smooth, with cutaneous appendages.
 - f. First spine long, placed on the snout ... *Rhycherus*
 - ff. First spine short, placed on the base of the second ... *Pterophryne*
 - bb. Dorsal and anal united with the caudal peduncle and bases of the rays.
 - g. Skin smooth or spiculate; first spine smooth, rod-like *Histiophryne*
- aa. Gill-openings tubular: anal behind the dorsal ... *Tathicarpus*

ECHINOPHRYNE gen. nov.

An Antennariid with fifteen dorsal rays, and the skin thickly beset with large, upstanding, bifurcate spinules: depressible, cardiform teeth are arranged in several rows in the anterior portion of each jaw, which become uniserial laterally; similar teeth in several rows form an oblique group on each side of the vomer; anterior portion of palatines with smaller teeth, which are also present

on each side of the tongue: eye small: mouth oblique, maxillary naked posteriorly: first dorsal spine thick and spiny, terminated by a minute fleshy process: second and third spines well developed and covered with skin: soft dorsal high and long, with fifteen rays: anal opposite the end of the dorsal, with eight to ten rays: pseudobranchium large and mobile, with the pore-like gill-opening placed below the middle of its length.

Enlarged spines on each side of pores define a mucigerous system on the head and body: these commence before the eye, and extend backward to above the shoulder; thence they curve downward to a point above the origin of the anal, and disappear on the lower portion of the tail; another row extends from the mandibular symphysis, and running backward, bifurcates, one branch extending around the preopercular border, and the other towards the pseudobranchium.

Type. *E. crassispina* sp. nov.

This genus differs from *Antennarius* in having fifteen instead of twelve dorsal rays, and its anterior spine is thick and spiny instead of tentacular: the spinate skin distinguishes it from *Histiophryne* Gill.

ECHINOPHRYNE CRASSISPINA sp. nov.

Plate vi, fig. 2.

D.i. i, i, 15; A.8-10; P.10-11; V.5; C.9.

Depth 1.7 in the length to the hypural joint; head, to end of operculum, 2.6-2.9 in the same: eye 1.2-1.5 in the snout: first dorsal spine 7 in the head.

Body deep, compressed, the back elevated. Head deeper than long: mouth oblique, maxillary reaching to below the posterior margin of the eye: eye small, rounded: nostrils superolateral, the anterior with a low skinny margin: skin everywhere covered with upstanding prickles, which are usually bifurcate spines, but are sometimes trifurcate; they are of unequal size, larger prickles being evenly distributed among the surrounding smaller ones. The mucigerous system of pores is defined by rows of large bifurcate spines placed on each side of the openings; enlarged spines form three groups on the upper portion of the maxillary, and a few are present on the cheek.

First dorsal spine comparatively thick and covered with spines; it is about as long as the distance between the tip of the snout and the hinder border of the eye, and only its extreme tip is fleshy: second and third spines well developed, the second a little longer than the first, the third much larger: the rays of all the fins except the caudal are simple: median rays of the soft dorsal slightly longer than the others, the last separated by a wide space from the caudal: anal short, rounded, and well separated from the caudal: pectoral, ventral and caudal rounded, the latter with bifurcate rays.

Colour-markings. A white patch is present on the interorbital space between the bases of the second and third spines, and a larger one below the anterior dorsal rays; two more are below the middle of the dorsal, and a smaller one on the caudal peduncle, and one above the pectoral base: some darker markings surround the lighter areas, and there is a brownish, submarginal band on the soft dorsal.

Described from three specimens 37-46 mm. long; the largest is figured, and is selected as the holotype; it is preserved in the South Australian Museum.

Loc. Spencer Gulf, South Australia; holotype. Western Port, Victoria; paratypes.

TRICHOPHRYNE gen. nov.

Skin closely covered with long, spiniform bristles, which are mostly bifurcate: teeth large, cardiform, and depressible, arranged in about two rows in each jaw anteriorly; two groups of vomerine teeth, palatine and lingual teeth also present. Dorsal spines separate, the first and second free and spinate, the third enveloped in skin: soft dorsal with 13-14 rays, anal opposite the end of the dorsal with 8-9 rays; caudal peduncle free; gill-opening a simple pore below the middle of the pseudobranchium: mucigerous system consisting of series of simple pores opening between two small spines, their course defined by arborescent tentacles placed upon the adjacent bristles; a series extends from behind the nostrils to the shoulder, and forms a lateral line on the body curving downward to above the anterior anal rays, and thence along the lower portion of the caudal peduncle; others extend backward from each side of the mandibular symphysis, and follow the curves of the opercular borders, while some are present on the cheek and above the maxillary.

Type. *Antennarius mitchellii* Morton.

This genus is closely allied to *Antennarius*, but differs in having the second spine as free as the first, and both covered with bristles: the development of the dermal bristles is also greater than is usual in *Antennarius*.

TRICHOPHRYNE MITCHELLII Morton.

Antennarius mitchellii Morton, Proc. Roy. Soc. Tasm. 1896 (1897), p. 98.

Plate vi, fig. 1.

D.i, i, i, 13-14; A.8-9; P.10-11; V.5; C.9.

Depth 1.8-2.0 in the length to the hypural joint; head 3.0-3.5 in the same; eye shorter than the snout, which is 4.0-4.4 in the head; first dorsal spine slightly shorter than the second, and 1.5-1.6 in the head.

Body moderately deep and thick, the back elevated anteriorly. Mouth sub-vertical, the maxillary reaching backward to below the eye and hidden in a fold of skin: eye small, round, and projecting above the cheek, which is deeply hollowed beneath it: teeth long, cardiform, and depressible; they are arranged in two series on the anterior part of the premaxillaries, but become uniserial laterally, the inner ones much the larger; mandibular teeth much larger, biserial, becoming uniserial posteriorly; two rows of similar teeth on each side of the vomer and on the palatines; somewhat smaller teeth on the tongue and pharyngeals.

Skin thickly covered with long, upstanding, bifurcate, spiniform bristles; they are enveloped in membrane in well-preserved specimens, only their points projecting: they extend on to the rays of all the fins, but are replaced by soft tentacles on the distal portions of the caudal and anal.

Fins. First dorsal spine slender, covered by bifurcate bristles, which form a cluster at its tip, together with some dermal tentacles: second spine similar to the first, but with larger bristles: third spine enveloped in thick skin and connected with the back by membrane: soft dorsal formed of simple rays, the tips of which project beyond the membrane: the median ones are the highest: anal opposite the end of, and terminating behind, the soft dorsal; the median rays are highest, and equal to those of the dorsal: pectorals and ventrals rounded, with thick simple rays which are bristly on their upper surfaces: caudal rounded, with bifurcate rays.

Colour-markings. Whitish, with dark brown and blackish markings; the most striking are two oblique spots between the bases of the anterior dorsal rays and the pectoral, another below the middle of the soft dorsal, and one at the base of the posterior dorsal ray: a quadrangular line encloses a white area on the cheek: a doubly-curved line crosses the nape, and numerous spots and oblique bars are present on the sides: soft dorsal with an inframarginal row of grey blotches, and some darker ones towards its base.

Described from two specimens 80 and 109 mm. long, the smaller of which is well preserved, but the larger is a beach-dried example: the figure is unfortunately based on the latter, but correctly illustrates the characters of the species.

In identifying them as *A. mitchellii* Morton, we rely less upon the description of that species than upon notes, and a sketch made by one of us from the type, which is preserved in the Tasmanian Museum. The great length of the bristles and the character of the first and second dorsal spines readily distinguish it from any other Australian species.

Loc. The larger specimen was found by one of us on Brighton beach, South Australia: the smaller was obtained by the Federal trawler "Endeavour," off Wilson's Promontory, Victoria.

RHYCHERUS Ogilby.

Rhycherus Ogilby, Proc. Roy. Soc. Qld., xx, 1907, p. 17. McCulloch, Mem. Qld. Mus., v, 1916, p. 68.

Skin without spines, but more or less thickly covered with fleshy tubercles and tentacles or cutaneous appendages, which also extend on to the fins: teeth rather large, cardiform, and depressible; they are arranged in several rows anteriorly, and become biserial laterally in each jaw; they form two groups on the vomer: palatine and lingual teeth also present: nostrils in a raised protuberance: dorsal spines separate, the first with a slender, naked rod; second and third largely free, mobile, and covered with skin and numerous tentacles: soft dorsal high, with about thirteen rays; anal opposite the end of the dorsal, with about eight rays; posterior dorsal and anal rays well separated from the caudal, leaving the peduncle free: gill-opening a simple pore below the middle of the pseudo-brachium: mucigerous system not evident, hidden by the dermal tentacles.

Type. *R. wildii* Ogilby (*R. filamentosus* Castelnau).

RHYCHERUS FILAMENTOSUS Castelnau.

Chironectes filamentosus Castelnau, Proc. Zool. Soc. Vict., i, 1872, p. 244, and ii, 1873, p. 65.

Antennarius filamentosus Macleay, Proc. Linn. Soc. N.S. Wales, v, 1881, p. 579.

Chironectes bifurcatus McCoy, Prodr. Zool. Vict., Dec. xiii, 1886, pl. cxxiii.

Lucas, Proc. Roy. Soc. Vict. (2) ii, 1890, p. 27.

Rhycherus bifurcatus Ogilby, Proc. Roy. Soc. Qld., xx, 1907, p. 19.

Rhycherus wildii Ogilby, *Loc. cit.*, p. 18.

Rhycherus filamentosus McCulloch, Mem. Qld. Mus., v, 1916, p. 68.

Plate vi, fig. 3, and text figure 31.

Description of two specimens 127 and 162 mm. long.

D.i, i, i, 13; A.8; P.11; V.5; C.9.

Depth 1.4-1.7 in the length to the hypural joint; head 2.7-2.8 in the same; bulge of the eye equal to the length of the snout, which is 4.6-4.8 in the head; first and third spines subequal in length, and about as long as the highest rays; second spine shorter than, or as long as, the others; median anal rays not so high as those of the dorsal; caudal fin equal to or slightly longer than the head.

Body deep and rather thick, the back elevated anteriorly; head deeper than long; mouth subvertical; maxillary expanded posteriorly, and reaching backward to below the hinder portion of the eye; eye small, rounded, and projecting; cheek deeply hollowed below it; nostrils superolateral, and opening into a raised protuberance; skin quite unarmed, but thickly covered with rounded, fleshy tubercles, from which arise cylindrical tentacles of varying lengths, and which are more or

less branched; these are very evident in a well-preserved example, but are shrunken and largely lost in old spirit specimens: mucigerous system hidden by the dermal structures.

Teeth rather large, cardiform and depressible: they are arranged in two or three rows on the anterior part of the premaxillaries, behind which is a short series of larger teeth on each side; they become smaller backwards and biserial: mandibular teeth in three or four rows anteriorly, and narrowing to a single row posteriorly: two widely separated groups of vomerine teeth, and a small patch on each palatine; some smaller teeth on each side of the tongue.

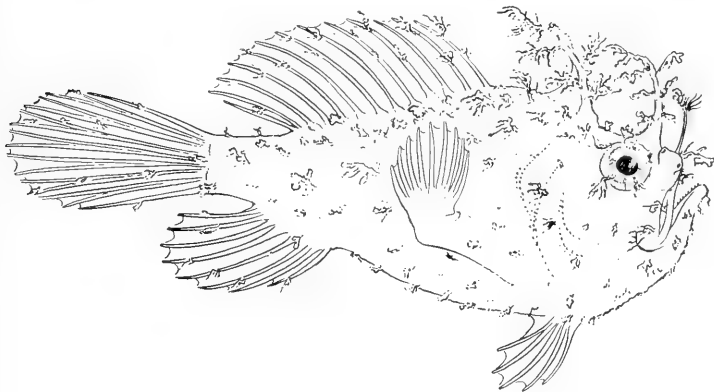


Fig. 31. *Rhycherus filamentosus*

Fins. First dorsal spine a slender, naked rod, terminated by two fleshy tentacles with a petiolate flap at their base, which covers a group of minute tentacles: second and third spines thickly covered with branching tentacles, and terminated by a bunch of tubercles (the second spine is longer than the first and ends in a knob and not as in the specimen figured, which is damaged): soft dorsal high, its rays mostly simple, but subdivided posteriorly; they bear rounded tubercles along their length, and the anterior ones are provided with branched tentacles: anal opposite the end of, and terminating somewhat behind, the soft dorsal; its median rays are longest, and some are weakly divided: caudal rounded, its rays mostly bifurcate: pectorals and ventrals rounded, with thick, simple rays.

Colour-markings. Back blackish, with three broad bars descending on to the white of the sides; the first covers the post-orbital portion of the head, the second extends to behind the pectorals, and the third is below the end of the dorsal: some scattered dark markings are also present on the sides, while striking

white markings occur on the nape, behind the eye, and on the cheek: dorsal and caudal with dark pencillings between the rays.

Young (figure 31). A small example 41 mm. long, differs in being much more elongate, its depth being 2.07 in the length to the hypural joint: the caudal fin is distinctly longer than in the adults, and the eye is larger: the first spine is much shorter than the second, and is terminated by a bunch of tentacles of various sizes: its cutaneous appendages are less numerous than in larger examples, which, however, may be due to its imperfect preservation.

Colour variation. Another specimen, 113 mm. long, differs from the adults described above in its colour-marking, which consists of an almost uniform lighter and darker marbling over the head and body: the dorsal and anal fins each bear a broad, dark inframarginal band, and the caudal has about three rows of dark, inter-radial spots on its distal half.

Locs. Kingscote, Kangaroo Island (Adult specimen, figured). Wallaroo, St. Vincent Gulf (Young specimen, figured). Corny Point and Palmerston, South Australia. This species is also recorded from the Swan River, Western Australia, and Victoria.

HISTIOPHRYNE Gill.

Histiophryne Gill, Proc. Acad. Nat. Sci. Philad., 1863, p. 90; and Proc. U.S. Nat. Mus. i, 1879, p. 222.

Skin either smooth or with microscopic spicules: teeth large, cardiform, and depressible; they are arranged in several rows on the anterior portion of each jaw, and form two groups on the vomer; palatine and lingual teeth also present: dorsal spines separate, the first with a slender, naked rod; second and third spines enveloped in thick skin, and either well-developed or merely tubercular: soft dorsal high and long, with 14-15 rays, the last almost or quite united with the tail by membrane: anal opposite the end of the dorsal, with 8-9 rays, the last more or less united to the caudal base: gill-opening a small pore below the middle of the pseudobranchium: mucigerous system defined by minute pores with skinny tentacles on each side of them; they form a lateral line which is arched from the shoulder to above the anal fin, and is lost on the lower portion of the tail; others are arranged in regular series on the head.

Type. *Chironectes bougainvilli* Cuv. and Val.

HISTIOPHRYNE BOUGAINVILLI Cuv. and Val.

Chironectes bougainvilli Cuvier and Valenciennes, Hist. Nat. Poiss. xii, 1837, p. 431.

Antennarius bougainvillii Günther, Brit. Mus. Cat. Fish. iii, 1861, p. 199.

Histiophryne bougainvillii Gill, Proc. Acad. Nat. Sci. Philad., 1863, p. 90, and Proc. U.S. Nat. Mus. i. 1879, p. 222.

Plate vii, fig. 1.

D.i. i, i, 15: A.8: P.8: V.5: C.9.

Depth 1.5 in the length to the hypural joint; head 2.5 in the same: eye equal to the length of the snout, 5.1 in the head: first dorsal spine slightly longer than the eye.

Body short, deep, and thick: back elevated anteriorly, the head much deeper than long: mouth very oblique, the gape extending to below the anterior portion of the eye: maxillary hidden in a skinny fold: eye small, round: nostrils superolateral, the anterior with a low skinny margin: skin smooth, without spinules (see notes under variation), except on the dorsal spines: mucigerous system defined by small pores with skinny lobes on each side of them; they commence on the snout and curve over the eye to the shoulder, where they form the lateral line which curves downward to above the anterior part of the anal, and is lost on the lower portion of the tail; another series extends backward from the mandibular symphysis around the preopercular margin; about four pores are present above the upper lip, and others cross the cheek and the nape.

Teeth large, cardiform, and depressible: they are arranged in two rows on the anterior part of the upper jaw, the inner ones being much larger than the others: mandibular teeth larger, biserial: a patch of large teeth on each side of the vomer, smaller ones on the anterior part of each palatine, and others on each side of the tongue.

Fins. First dorsal spine free, short and slender, with spinules at its base, and a fleshy knob at its tip: second and third spines scarcely projecting, tubercular, and covered with spinules; a thick membrane connects the third with the soft dorsal: the latter is formed of simple rays which increase slightly in length to about the twelfth; the last ray is united by membrane to the basal third of the upper caudal ray: anal opposite the end of the soft dorsal, its last ray united with the basal portion of the lower caudal ray: pectorals, ventrals and caudal rounded, the last with bifurcate rays.

Colourless after long preservation in alcohol.

Described from a specimen 41 mm. long, which is without *data*: it is well preserved, and appears to agree with the description of *H. bougainvillii*, which was also from an unknown locality.

Variation. Two other specimens in the South Australian Museum are apparently identical with this species, though they differ greatly in appearance owing to their indifferent state of preservation: one is greatly compressed and shrunk, and the skin is beset with microscopic spinules; the anal and pectorals each have nine rays: the other specimen is very robust but distorted, and its skin

is closely covered with minute spicules; it is uniformly speckled with small brown dots, which extend on to the fins.

Loc. Both specimens were taken in St. Vincent Gulf, South Australia.

HISTIOPHRYNE SCORTEA sp. nov.

Plate vii, fig. 2.

D.i, i, i, 15; A.8; P.11; V.5; C.9.

Depth 1.9 in the length to the hypural joint; head, to end of operculum, 3.2 in the same; eye 1.6 in the snout; first dorsal spine 3.0 in the head.

Body rather longer than is usual in the family, and compressed: back elevated anteriorly, head deeper than long: mouth oblique, the gape extending to below the hinder portion of the eye; maxillary hidden by a skinny fold when the mouth is closed; eye small, round; nostrils supero-lateral, the anterior with a low skinny margin; skin leathery, without spines but closely covered with minute dermal tubercles; mucigerous system defined by small pores with skinny lobes on each side of them: they commence on the snout and curve over the eye to the shoulder, where they form the lateral line which curves downward to above the anterior portion of the anal and is lost on the lower portion of the tail; another series extends backward from each side of the mandibular symphysis, and branching, sends one series around the preopercular border and the other around that of the operculum: about four pores are present above the upper lip, and some are distributed on the cheeks.

Upper jaw with two rows of depressible, cardiform teeth anteriorly, which become uniserial on the sides; teeth of the lower jaw similar but much larger: a patch of teeth on each side of the vomer and on the palatines, and a few teeth on each side of the tongue; gill-opening a simple pore below the middle of the pseudobranchium.

Fins. First dorsal spine tentacular; a slender rod with a fleshy tip; it is placed just before the base of the second: second spine enveloped in thick, fleshy skin, and free; its base is in advance of the eye: third spine similar to the second, but smaller and largely united with the back: soft dorsal formed of simple rays, the median of which are the longest; the last is joined to the base of the upper caudal ray by membrane: anal opposite the end of the soft dorsal, its last ray almost united with the caudal base: pectorals, ventrals and caudal rounded, the last with bifurcate rays.

Colour-markings. Dark brown in alcohol, with the fins darker. A white quadrangular patch on the nape behind the second dorsal spine, and an angular white bar from the anterior dorsal rays to the shoulder; a large white spot below the middle of the soft dorsal, another in the axilla, and a minute one on the caudal peduncle.

Described and figured from a specimen 62 mm. long, which is selected as the holotype: a second (paratype) of about the same size differs only in having its white markings less definite though similarly disposed: a third example, only 28 mm. long, is similarly coloured, with the addition of some white markings below the eye and around the mouth; the second and third dorsal spines are more slender, and freer from the back: all differ greatly in general form from *H. bougainvilli*, not only in being much longer but also in having the second and third dorsal spines better developed, and the dorsal and anal fins almost free from the caudal.

Loc. Stansbury, St. Vincent Gulf, South Australia.

HISTIOPHRYNE SCORTEA, var. INCONSTANS, var. nov.

Twenty-one specimens, 26-64 mm. long, appear to be structurally similar to the three described above, but differ greatly in their colour and markings: all are light-coloured with more or less abundant whitish, irregular markings and blackish spots; darker marblings may or may not be present. The extent and disposition of their markings are exceedingly variable, and are differently arranged on the two sides of any one individual: the first dorsal spine may have a bunch of short tentacles at its tip in addition to the fleshy knob, and the second dorsal has sometimes only fourteen rays: they are evidently only colour variations of *H. scortea*, which may be recognized under the varietal name *inconstans*.

Loc. St. Vincent Gulf; Kingscote, Kangaroo Island, South Australia.

Family BRACHIONICHTHYIDAE.

SYMPTERICHTHYS Gill.

Sympterichthys Gill, Proc. U.S. Nat. Mus. i, 1879, p. 221-222.

Skin without spines, but covered with dermal tubercles: teeth small, cardiform, depressible, arranged in several series in each jaw anteriorly; palate and tongue toothless: first dorsal spine a slender, naked rod, terminated by a bunch of foliaceous appendages; it is quite free from the second and third, which are united by membrane and form a cristiform fin: second dorsal long, with 13-16 rays: anal opposite the end of the soft dorsal, with 6-9 rays; posterior rays of the dorsal and anal united by membrane with the caudal peduncle: gill-opening a small tubular pore above the posterior angle of the pseudobranchium: mucigerous system defined by rows of paired tubercles; a series commences above the eye and curves backward to the shoulder, and thence along the side of the body above the median line; another series extends backward from each side of the mandibular symphysis towards the pseudobranchium; others are present above the maxillary, and on the cheek and operculum.

Type. *Lophius laevis* Lacépède.

In distinguishing this genus from *Brachionichthys*, Gill relied upon the partial connection of the three dorsal spines and the soft portion by membrane, as described by Cuvier in his *Chironectes unipennis* (5). This character, however, was not noted by Lacépède in his original definition and figure of the same specimen (6), and we therefore consider it requires verification: if it is found that a membrane is really present between the fins of *S. unipennis* (*S. laevis*), the above definition will not apply to *Sympterichthys*.

SYMPTERICHTHYS VERRUCOSUS sp. nov.

Plate vii, fig. 3.

D. i, ii, 13-14; A. 6; P. 7-8; V. 4; C. 9.

Depth 2.2-2.5 in the length to the hypural joint: head 3.0 in the same: eye subequal to the length of the snout, which is 3.6 in the head: first dorsal spine 1.4-1.5, the second almost equal to the length of the head.

Body comparatively long and compressed, the back elevated anteriorly: mouth oblique, the maxillary reaching back to behind the vertical of the pupil: it is narrow posteriorly and hidden in a fold of skin: eye of moderate size, round: nostrils superolateral, opening on each side of a low protuberance: skin smooth in one specimen, raised into low tubercles in the other, which extend on to the fins: teeth small, depressible, almost villiform, forming a band of three or four rows anteriorly in each jaw which becomes narrow laterally; palate and tongue toothless, but covered with upstanding dermal papillae which resemble teeth.

Fins. First dorsal spine wholly free, terminated by a bunch of foliaceous appendages: second spine arising above the nostrils, and enveloped in a thick membrane, which also encloses the third and extends backward to the nape: soft dorsal formed of simple rays enclosed in a thick membrane; each ray readily splits into two along its median longitudinal line in both specimens: anal rays increasing in length to the penultimate; the membrane from the posterior dorsal and anal rays united with the peduncle almost or quite to the vertical of the hypural joint: caudal rounded, its inner rays bifurcate. Pectorals and ventrals rounded, formed of thick, simple rays.

Colour-markings. Brownish in alcohol, with lighter and darker areas: a large whitish blotch above the gill-opening, and another below the anterior dorsal rays: indefinite brown markings on the head below the eye, on the anterior portion of the back, and covering the abdomen: first dorsal with a dark basal spot, and a larger one on its upper third: an oblique dark marking covers the

(5) Cuvier, Mem. Mus. Hist. Nat., iii., 1817, p. 435, pl. xviii, fig. 3.

(6) Lacépède, Ann. Mus. Hist. Nat., iv, 1804, pp. 202, 210, pl. lv, fig. 4.

base of the tail, the posterior dorsal rays, and all the anal fin: distal portions of the caudal and pectoral fins blackish.

Described from two specimens 41 and 45 mm. long, the larger of which is figured and selected as the holotype. The reduced number of dorsal rays distinguishes this species from its allies.

Loc. St. Vincent Gulf, South Australia.

Explanation of Plates ii-vii.

Plate ii.

- Fig. 1. *Nannoperca australis* Günther. A specimen 65 mm. long, from near Narrandera, New South Wales.
 Fig. 2. *Glyphisodon victoriae* Günther. A specimen 176 mm. long, from St. Vincent Gulf, South Australia.
 Fig. 3. *Rhinogobius lateralis* Macleay. A specimen 78 mm. long, from Noarlunga, South Australia.

Plate iii.

- Fig. 1. *Mugilogobius galwayi* sp. nov. Holotype, 67 mm. long, from Patawalunga, near Adelaide, South Australia.
 Fig. 2. *Helcogramma decurrens* sp. nov. Holotype, 57 mm. long, from St. Vincent Gulf, South Australia.
 Fig. 3. *Trianectes bucephalus* sp. nov. Holotype, 67 mm. long, from Spencer Gulf, South Australia.

Plate iv.

- Fig. 1. *Neosebastes pantica* sp. nov. Holotype 188 mm. long, from Spencer Gulf, South Australia.
 Fig. 2. *Ophichlinus pardalis* sp. nov. Holotype 80 mm. long, from Streaky Bay, Great Australian Bight.

Plate v.

- Fig. 1. *Syngnathus curvirostris* Castelnau. A specimen 164 mm. long.
 Fig. 2. *Peronodys anguillaris* Steindachner. A specimen 100 mm. long.
 Fig. 3. *Lepidoblennius marmoratus* Macleay. A specimen 126 mm. long.
 Fig. 4. *Dermatopsis multiradiatus* sp. nov. A specimen 83 mm. long.
 All from Kangaroo Island, South Australia.

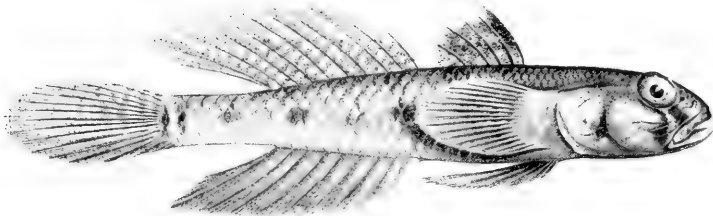
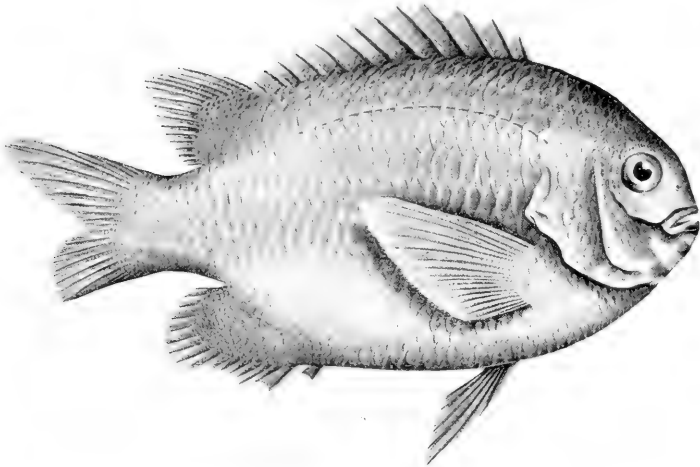
Plate vi.

- Fig. 1. *Trichophryne mitchelli* Morton. A specimen 109 mm. long, from Brighton Beach, South Australia.

- Fig. 2. *Echinophryne crassispina* sp. nov. Holotype 46 mm. long, from Spencer Gulf, South Australia.
- Fig. 3. *Rhycherus filamentosus* Castelnau. A specimen 162 mm. long, from Kingscote, Kangaroo Island, South Australia.

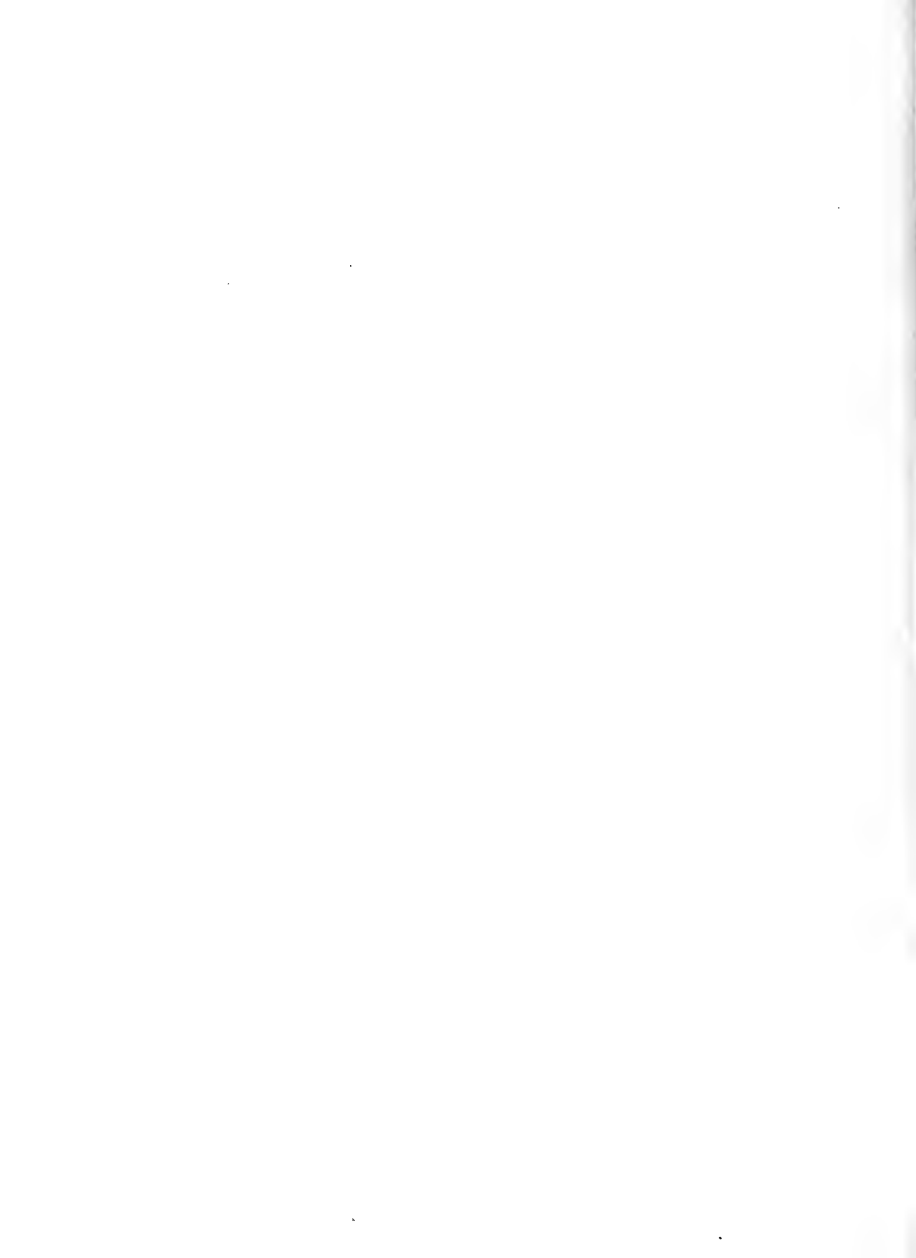
Plate vii.

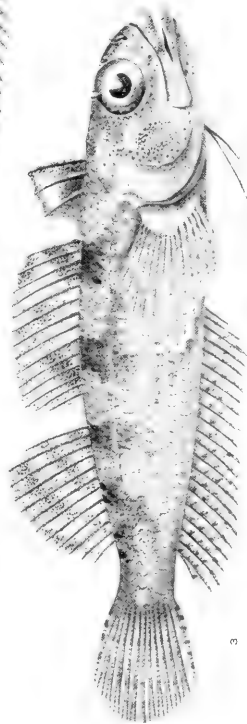
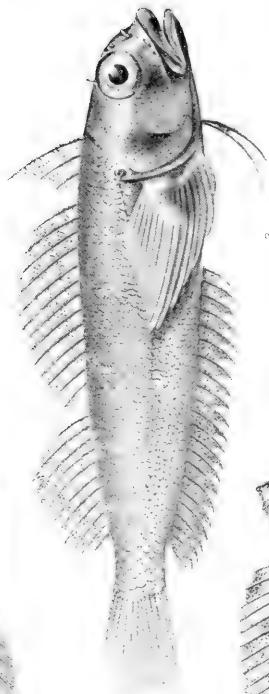
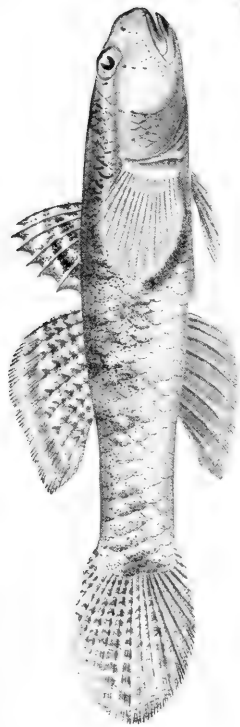
- Fig. 1. *Histiophryne bougainvilli* Cuvier and Valenciennes. A specimen 41 mm. long, from an unknown locality.
- Fig. 2. *Histiophryne scortea* sp. nov. Holotype 62 mm. long, from Stansbury, St. Vincent Gulf, South Australia.
- Fig. 3. *Sympterichthys verrucosus* sp. nov. Holotype 45 mm. long, from St. Vincent Gulf, South Australia.

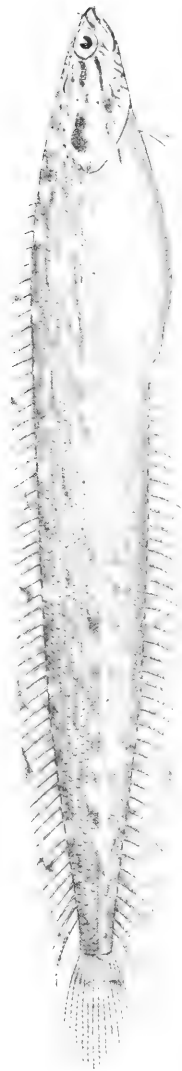
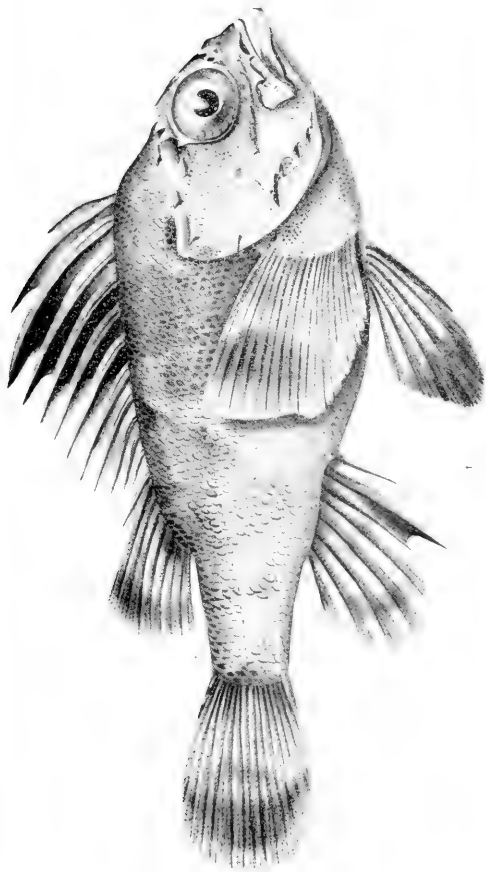


Phyllis Clarke, *d.d.*

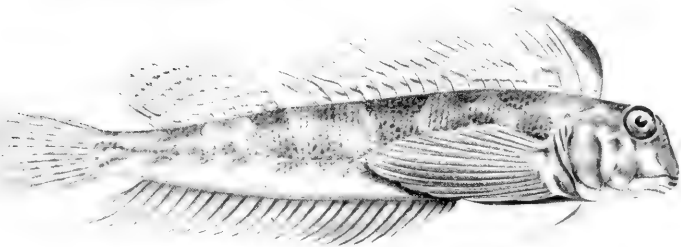
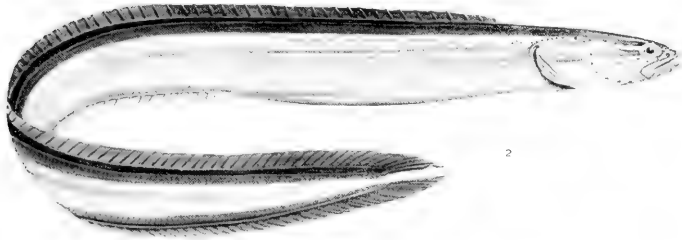
S. AUSTRALIAN FISHES.





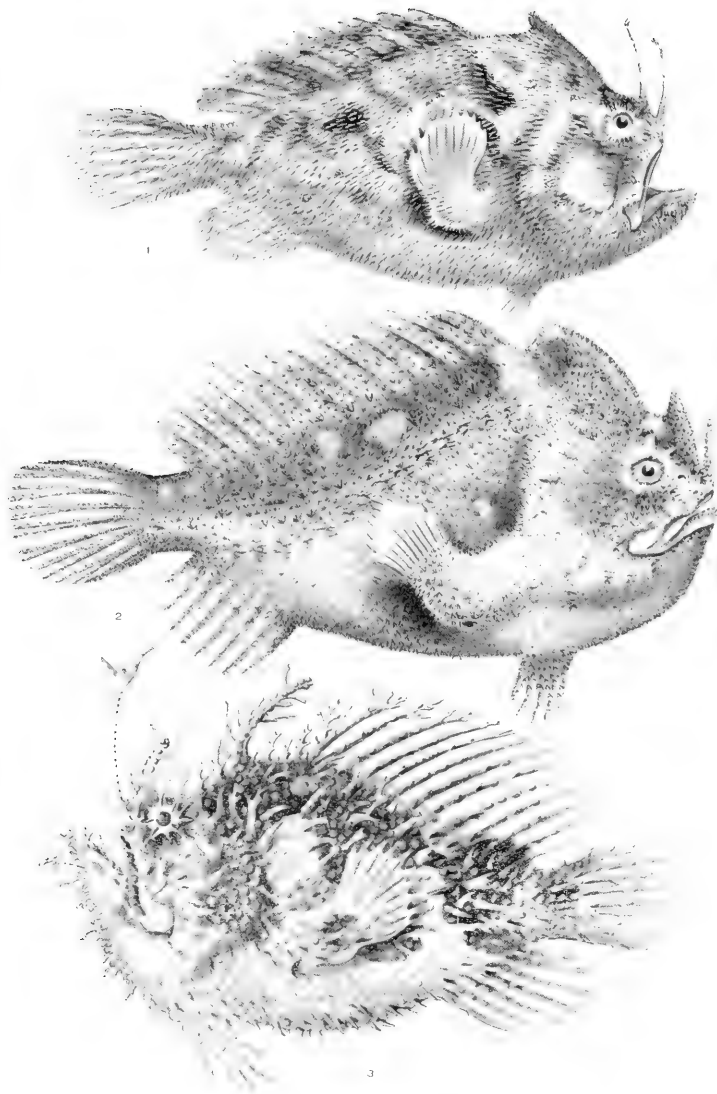






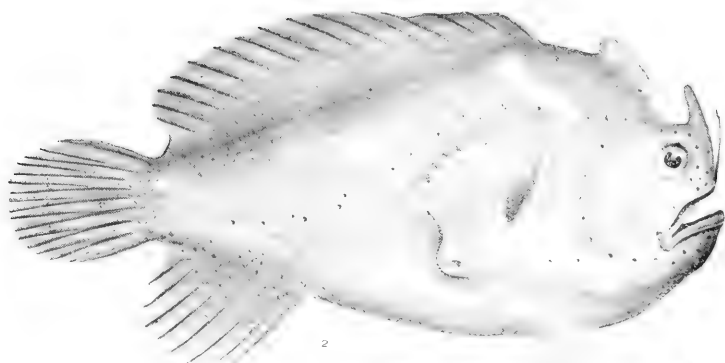
Phyllis Clarke and A. R. McCulloch, *del.*

S. AUSTRALIAN FISHES.



Phyllis Clarke, *del.*

S. AUSTRALIAN FISHES.



Phyllis Clarke, *del.*

S. AUSTRALIAN FISHES.

DESCRIPTIONS OF TWO NEW AUSTRALIAN GOBIES

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AND EDGAR R. WAITE, F.L.S., DIRECTOR, SOUTH AUSTRALIAN MUSEUM.

Plate viii.

THE fishes that form the basis of this contribution were selected along with those dealt with in the preceding paper, but, not occurring in South Australia, are described under a separate title.

Family GOBIIDAE.

BOLEOPHTHALMUS CAERULEOMACULATUS sp. nov.

Plate viii, fig. 1.

D.v. 28; A.27; P.21; V.i. 5; C.17.

Depth 4.1 in the length to the hypural joint; head 3.6 in the same; eye 10.0 in the head; longest dorsal spine 0.6 longer than the head; highest dorsal ray 1.8, highest anal ray 3.4 in the head.

Head covered with papillae representing rudimentary scales; eyes close together, situated on the upper profile of the head, and above the middle of the mouth; snout very oblique, the space between the orbit and the premaxillaries 3.7 in the length of the head; anterior nostril opening at the end of a lobular projection of the upper lip; posterior nostril a simple opening immediately before the eye; maxillary reaching far beyond the eye, covered by the upper lip; mandible closing within the upper jaw; tongue thick and fleshy, adnate to the floor of the mouth; three subulate teeth on each side of the premaxillary symphysis, followed by a single row of small cardiform teeth; mandible with a single row of subhorizontal teeth, which are largest anteriorly, somewhat flattened and obtusely pointed; a large curved canine on each side of the mandibular symphysis; palate toothless; gill-openings not so wide as the base of the pectoral, and scarcely wider than the isthmus separating them.

Body moderately elongate, compressed and covered with imbricate, cycloid scales, which are of moderate size posteriorly, but become rudimentary as they approach the nape; they extend on to the breast and base of the pectoral; a small genital papilla behind the anus.

Fins. First dorsal commencing well behind the vertical of the pectoral, and separated from the second by a space, which is longer than the eye; the spines are

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filamentous, the fourth the longest and reaching beyond the middle of the second dorsal; second dorsal with the margin straight and somewhat pointed posteriorly; the rays increase a little in length backwards to the hinder part of the fin; anal commencing beneath the fourth dorsal ray and terminating slightly behind the last; the fin is lower than, but of similar form to, the second dorsal; pectoral somewhat pointed, almost reaching the vertical of the vent, the lower rays a little thickened; ventrals in front of the pectorals and completely united; caudal somewhat pointed, the lower rays reduced and thickened.

Colour-markings. General colour greyish-brown in alcohol, the head lighter; each scale of the body with a bluish centre, while the papillae on the head are mostly pale blue; first dorsal greyish, with a broad yellow margin, the whole closely spotted with white; second dorsal dark grey, with about seven rows of white, dark-edged ocelli between the rays; caudal dark grey, with numerous similar ocelli between the rays; pectorals, ventrals and anal uniformly coloured.

Described and figured from a specimen 207 mm. long, which is selected as the holotype; four others of about the same size differ only in the relative lengths of their dorsal spines, which are much shorter in one sex than in the other.

The increased number of dorsal and anal rays distinguishes this species from all except *B. dussumieri* Cuvier and Valenciennes, to which it is closely allied, but differs in its colour-markings, the first dorsal particularly, being ornamented with light instead of dark spots, as in that species.

Loc. Adelaide River, Northern Territory.

Type. In the South Australian Museum.

Family GOBIIDAE.

OXYURICHTHYS Bleeker.

The following species would enter *Psclophias* Jordan and Seale, which is distinguished from the typical species of *Oxyurichthys* by the possession of an ocular tentacle, but this character in itself does not appear to us to be of generic worth.

OXYURICHTHYS CORNUTUS sp. nov.

Plate viii, fig. 2.

D.vi, 1; A.14; P.22; V.i, 5; C.15; L.lat.51; L.trans.16.

Depth 4.6 in the length to the hypural joint; head 3.8 in the same; eye 4.6 in the head, and 1.5 in the snout, which is 3.0 in the head; interorbital width about 2.6 in the eye; depth of caudal peduncle 2.2 in the head; breadth between pectoral bases 1.8 in the depth.

Head naked, with upraised lines of mucigerous pores on the cheeks, operculum and nape; a low nuchal crest commences above the preoperculum and

unites with the base of the anterior dorsal spine: eyes of moderate size, separated by a narrow interorbital space, and each with a stout tentacle: snout forming a convex curve with the upper profile of the head: anterior nostril in a short tube near the lip, the posterior one is a large simple opening in the middle of the snout: maxillary pointed posteriorly, reaching backward to below the hinder third of the eye: mandible slightly longer than the upper jaw: premaxillary teeth cardiform, subequal, in a single series: mandibular teeth in a narrow band, the inner ones somewhat enlarged, the others villiform; no distinct canines: palate toothless: tongue obtusely pointed, only its tip free: gill-openings lateral, separated by a broad interspace, which is about one and one-half times as wide as the eye: shouldered-girdle smooth, without papillae.

Body moderately deep, covered with scales which are ctenoid as far forward as the second dorsal and cycloid anteriorly: they extend forward to the sides of the nape above the preopercular margin, and on to the breast, but the pectoral base is naked: genital papilla well developed.

Fins. First dorsal commencing behind the pectoral base, its spines filamentous, the second reaching backward to about the middle of the soft dorsal: the membrane from the last almost connects with the base of the first ray: second dorsal much damaged, the rays increasing in length backward: the posterior ones overlap the base of the caudal: anal commencing beneath the second or third dorsal ray, and terminating slightly behind the last: the rays increase in length backwards, and the posterior ones overlap the caudal base: pectoral obtusely pointed, median rays longest, reaching to the vertical of the third anal ray: ventral large, wholly united, almost reaching the vent: caudal pointed, the median rays produced.

Colour-markings. Yellowish in alcohol, with dusky blotches along the sides and back: each scale of the back with a dark round spot near its margin: head and nape with some symmetrical markings, the most distinct of which is a dark patch under the eye and another on the operculum: first dorsal fin with horizontal rows of dark-edged ocelli between the spines: second dorsal with numerous double rows of inter-radial blackish spots: elongated dark spots between the rays of the upper half of the caudal: numerous small, dark, inter-radial spots on the pectoral: membrane of the anal fin dusky.

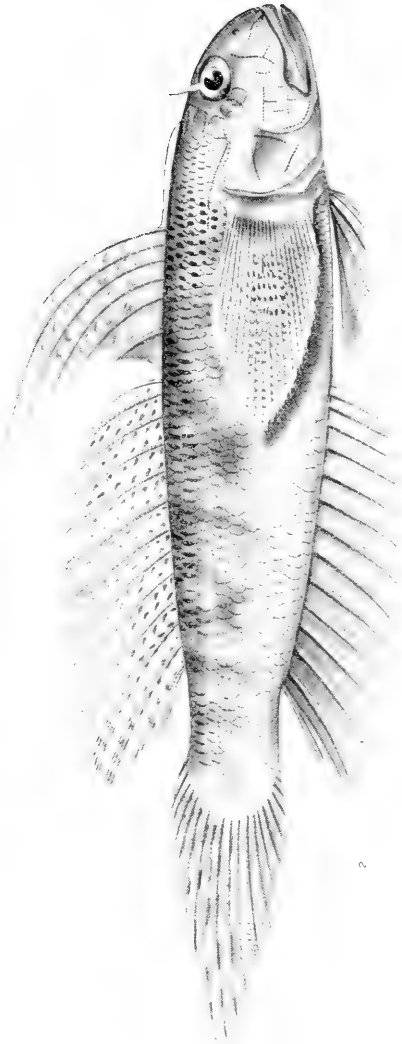
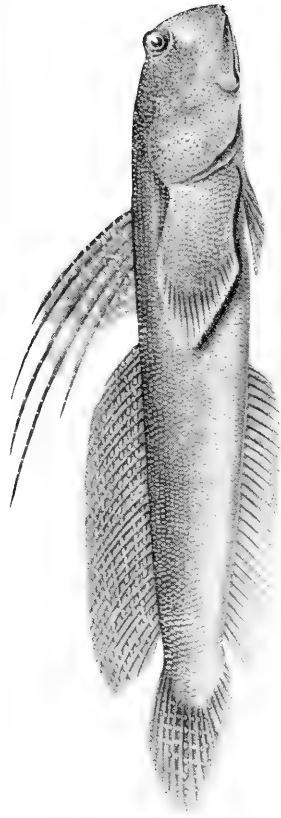
Described and figured from a single specimen 135 mm. long, which is, unfortunately, somewhat damaged. It is very similar in both form and colour-marking to an Indian example of *O. cristatus* Day, with which we have compared it, but its scales are largely ctenoid instead of wholly cycloid. It is also apparently very close to other species of *Oxyurichthys*, such as *O. tentacularis* Cuv. and Val., and *O. microlepis* Bleeker, but the combination of a nuchal crest, ocular tentacles, scale-counts and colour-markings appear to distinguish it from all.

Loc. Cairns, Queensland. Coll. J. A. Anderson.

Type. In the South Australian Museum.

Explanation of Plate viii.

- Fig. 1. *Boleophthalmus caeruleomaculatus* sp. nov. Holotype 207 mm. long, from the Adelaide River, Northern Territory.
- Fig. 2. *Oxyurichthys cornutus* sp. nov. Holotype 135 mm. long, from Cairns, Queensland.



Phyllis Clarke, *del.*

AUSTRALIAN GOBIES.



ON AUSTRALIAN COLEOPTERA.

By ARTHUR M. LEA, F.E.S., ENTOMOLOGIST SOUTH AUSTRALIAN MUSEUM.

PART I.

Plate ix.

THE Coleoptera of Australia have been comparatively well-worked only in the Families or Groups consisting mainly of large, showy, or otherwise attractive species; about 15,000 species have been named, a number probably far short of what may be obtained in the coastal districts of Queensland alone. The work of Macleay and King, followed later by Blackburn and Olliff, with the more or less rapidly-accumulating specimens in the various State Museums and private collections, have enabled local workers to deal with them at a steadily accelerating rate. The South Australian Museum has been especially fortunate; by the acquisition of the collection of the late Rev. T. Blackburn, authentically-named specimens of thousands of species, including cotypes, were obtained; and more recently the Museum acquired the collection of Mr. Augustus Simson; this is especially rich in specimens from Tasmania and Queensland. By its acquisition also the Museum obtained the types of a number of species, as follows:

STAPHYLINIDÆ.

Aleochara baliola Oll.
Calodera atypha Oll.
Calodera simsoni Oll.
Homalota indefessa Oll.
Metoponcus enervus Oll.
Pelioptera astuta Oll.
Polylobus tasmanicus Oll.

MALACODERMIDÆ.

Heteromastix discoflavus Lea.
Metriorrhynchus simsoni Lea.

CURCULIONIDÆ.

Exithius ferrugineus Lea.
Imaliodes frater Lea.
Myrtesis nasuta Lea.
Myrtesis pullata Lea.
Perissops intricatus Lea.
Poropterus simsoni Lea (*nodosus*
Lea, n.pr.).
Pseudometyrus vicarius Lea.

CHRY SOMELIDÆ.

Cryptocephalus sobrinus Lea

The following pages deal mostly with specimens in the South Australian Museum.

Family STAPHYLINIDÆ.

TRIPLECTENOPUS gen. nov.

Head rather large, ovate, with a very narrow neck. *Eyes* absent. *Mandibles* strong. *Maxillary palpi* with two apical joints rather long and subequal;

labial palpi small, supported by a narrow produced portion of mentum. Antennae rather long, most of the joints moniliform. *Prothorax* rather elongate, very narrow in front, truncate at base. *Scutellum* very small, *Elytra* small, depressed, sides finely serrated. *Abdomen* with five strongly margined segments on upper surface, a sixth feebly margined, and a small immarginate seventh. *Legs* rather long; front tibiae near middle with a strong notch, at edge of and behind the notch with three combs; tarsi thin, fourth joint lightly produced under base of fifth. *Apterous*.

The genus should be placed next to *Domene* in catalogues; at first glance the remarkable insect named below appears like an exaggeration of *D. torrensensis*, but the complete absence of eyes is at once distinctive. There is a shining rounded knob close to the base of each antenna, that at first glance appears like a non-faceted eye, and a similar knob is near each antenna of *D. torrensensis*, but on that species there is a coarsely faceted eye on the side behind each antenna; on *T. caecus* a feeble oblique ridge is placed behind each knob, and on the left side of the type, at the end of the ridge, there is a feeble elevation (with a few punctures) that from some directions looks like a very small eye, but on the right side this appearance is wanting, and I have satisfied myself, after repeated examinations from many angles, that eyes are really absent. There are three combs on each side of the front tibiae, but to see these clearly a compound power is required: one margins the edge of the notch, the others being almost parallel with it; the teeth consist of closely placed setae, and in certain lights have a golden appearance; under a hand lens they are hardly more than indicated; apparently somewhat similar combs are present on the front tibiae of *D. torrensensis*. The mandibles are clenched on the type, but so far as they are visible they appear to be nondentate.

TRIPLECTENOPUS CAECUS sp. nov.

Plate ix, fig. 1.

Flavous; antennae somewhat darker; mandibles still darker. Clothed with fine and rather sparse pubescence, a few hairs scattered about, becoming rather numerous on mouth parts, and dense on apex of abdomen.

Head slightly longer than wide, sides and base strongly rounded, with a short and narrow neck, scarcely thicker than basal joint of antennae, with a round, highly-polished elevation near base of each antenna, on each side in front a small projection overhanging the clypeus; with sharply-defined but rather small, irregularly-distributed punctures. Clypeus very short. Labrum moderately long and bilobed in front. Antennae extending almost to base of prothorax, first joint cylindrical slightly shorter than second and third combined,

third slightly longer than second or fourth, eleventh obtusely pointed. *Prothorax* slightly longer than wide, widest across apical third, thence rapidly narrowed to apex, median line conspicuous; with rather dense, small punctures. *Elytra* narrower and shorter than prothorax, sides finely serrated; with fairly dense, and rather large, asperate punctures. *Abdomen* dilated from base to beyond the middle of fifth segment, and thence strongly narrowed to apex; on both surfaces with rather dense, but not very large, asperate punctures. Front *coxae* separated by a strongly elevated narrow keel, the others touching; front femora lightly dentate, the others edentate. Length, 7.75, to apex of elytra, 4.75 mm.

Hab. Queensland: Pine Mountain. Type (unique), K.21540, in Australian Museum.

The only blind beetle previously recorded from Queensland is *Typhluloma inops* of the *Tenebrionidae*.

Family HISTERIDAE.

CHLAMYDOPSIS FORMICICOLA King, var. DARWINENSIS

var. nov.

A specimen from Darwin is structurally so close to some cotypes of *C. formicicola* that I cannot regard it as representing more than a variety of that species; but it differs in several respects; on the cotypes the striation of the vertical side of each elytron is everywhere strong, and is conspicuously directed towards the opening behind the epaulette; on the Darwin specimen the striation is much less strong, and above and just below the opening is altogether absent, or traceable with difficulty, the inner discal ridge on each elytron is acute, and at its apex, still as a distinct narrow ridge, it curves round and abruptly terminates half-way to the outer ridge, and about one-third from the apex; on the cotypes the inner discal ridge is much less acute posteriorly, and at its apex is obtusely connected with a wide feeble elevation; the punctures on the prosternum are also less conspicuous than on the cotypes.

CHLAMYDOPSIS ECTATOMMAE Lea.

Plate ix, fig. 2.

Mr. W. du Boulay has recently taken, in nests of *Ectotomma metallicum* near Sydney, two specimens of this species, but they differ from the type in being paler, dark castaneous-brown with the elytra and legs paler, and one of them has the serrations at the apex of the prothorax more pronounced (pl. ix, fig. 2). The antennae on both are closely fitted into cavities in the head, all parts but the outer portion of the first joint being concealed. At the side of each antenna (the corner of the head and prothorax) there is a depression allowing a small

part of the eye to be seen, behind the side of each depression the margin of the prothorax is rather thin, and, although not really tuberculate, appears as a very conspicuous and rather acute process when viewed from behind.

CHLAMYDOPSIS PALLIDA sp. nov.

Pale castaneous, almost flavous. Head, pronotum and prosternum with a few pale setae.

Head finely reticulate. Antennae with basal joint large, irregularly triangular, and in front with sculpture as on face; intermediate joints thin and closely applied; club large, subcylindrical, and moderately curved. *Prothorax* almost twice as wide as long, sides narrowly elevated and somewhat oblique, front gently bilobed in middle, gently undulating to each side and notched at each end, disc convex, depressed towards each side and conspicuously concave at each front angle; reticulation as on head. *Elytra* slightly wider than long, base with a wide transverse excavation, closed at each side, and with a slightly elevated, setose, transverse ridge near its base; behind the excavation and on the sides with rather numerous but feeble striae. *Prosternum* reticulate on middle portion; metasternum and abdomen shining, and each with a row of small punctures at base; propygidium slightly reticulate; pygidium smooth. *Legs* moderately long; front tibiae, for the genus, not very wide, the others considerably wider, obliquely increasing from base to middle, and then gently rounded to apex. Length, 2 mm.

Hab. New South Wales: Sydney (W. du Boulay). Type, 19302.

Somewhat resembles *C. chipleuralis* on a small scale, but the epaulettes are very different; the prothorax is more conspicuously reticulate, the elytra are glabrous, with their striation finer, and tibiae not angulate about the middle (although the four hind ones are conspicuously inflated). From one antenna of the type the club is missing, the other club from behind appears to be solid, but in front the obscure sutures are invisible. The epaulettes are curved, shining, and each is in one piece, without a hole perforating it from side to side, there is a shallow depression representing the perforation of other species, but the space about the depression is shining, and without striae converging towards it; the epaulettes are also without conspicuous clothing, but within each there appears to be a very short membrane. Mr. du Boulay obtained three specimens from nests of a small reddish ant; Mr. E. H. Zeck has also taken a specimen from a nest of the same kind of ant, which he states is *Meranoplus hirsutus*.

Family BYRRHIDAE.

CHELONARIUM Fabr.

Syst. Fl. i; 1801, p. 101. Lacord. Gen. des. Coleopt., ii, p. 488. Leconte, Class. Col. N. Amer., i, p. 112. Sharp, Biol. Centr. Amer., Col. ii, part i, p. 684.

A beetle recently received from Mr. H. W. Brown proves to be a member of this remarkable genus, hitherto unknown from Australia, and whose headquarters are central America and Brazil. It is characterized by having the head entirely concealed from above, and fitting into a cavity in the prosternum; eyes large, smooth, and with facets so small that they are scarcely visible; antennae approximate at the base, inserted almost at the tip of the head, and produced forward, with the three basal joints fitting into a notch in the mesosternum, the notch very similar to that of many *Elateridae*; all the legs received into cavities, each tibia fitting into a femur, and each tarsus into a tibia; of the tarsal joints the third is conspicuously produced below, and quite concealing, the small fourth, and the claws are strongly appendiculate. The genus constitutes the subfamily *Chelonariidae*, generally regarded as somewhat dubiously placed in the *Byrrhidae*. At first glance the species described below has a vague resemblance to some of the cryptocephalous *Anobiidae*.

CHELONARIUM AUSTRALICUM sp. nov.

Plate i, fig. 3.

Dark brown, in places almost black, parts of appendages paler. Rather lightly clothed with pale depressed setae, in places forming loosely compacted spots; under-surface with shorter, denser, slightly darker, and more uniform clothing.

Head with crowded and moderately large punctures. Eyes separated rather more than their own width from each other. Antennae with first joint concealed except at the sides, second moderately long and about half the length of third. *Prothorax* almost semicircular, margins gently elevated and undulating, base finely denticulate; punctures much less crowded than on head, but similar in size. *Scutellum* moderately large. *Elytra* with outlines subcontinuous with those of prothorax; with rather small, shallow punctures, less numerous than on prothorax. *Prosternum* about thrice the width of head, and with very similar punctures; mesosternum with intercoxal notch triangular; episterna normally concealed; metasternal episterna rather short, epimera small and triangular; clytral epipleurae very conspicuous at sides of metasternum, very narrow thence to apex. *Abdomen* convex; with small, crowded punctures, sparser in middle of base than elsewhere. Length, 7 mm.

Hab. Queensland: South Johnstone River (H. W. Brown). Type (unique), I.9301.

In general appearance like *C. undatum* (from Brazil), and with base of prothorax similarly denticulate, but considerably larger, eyes more widely separated, head more distant from front of prosternum, and punctures and

clothing somewhat different. The type has both antennae damaged, but the three basal joints of each are exactly as on *undatum*. It is a somewhat shining species. From some directions each elytral puncture appears to be in the centre of a small square, but from most directions only the punctures themselves are distinct.

Family LUCANIDAE.

LISSOTES KERSHAWI sp. nov.

Plate ix, figs. 4 and 5.

Male. Black, shining. Sides, under-surface and legs more or less sparsely clothed.

Head excavated in front, a conspicuous semi-double projection on forehead overhanging the excavation; punctures large and round, smaller in middle than elsewhere, becoming confluent on sides. Mandibles strongly curved and simple in front, towards base with a large cuspidate mass. Labrum small, subtriangular and subvertical. Antennae with seventh joint slightly wider than sixth, but of the same shape, the three following considerably wider, tenth widely rounded at apex. *Prothorax* almost twice as wide as long, sides feebly serrated, basal angles rounded off, with a wide and shallow depression along middle; with round and sharply-defined punctures, somewhat irregularly distributed. *Scutellum* very short. *Elytra* slightly narrower than prothorax, each shoulder with a small subdentiform elevation; with fairly large punctures near suture, becoming smaller and crowded about sides and apex; with a few irregularly distributed scratches, and with a few feeble elevations on which the punctures are sparser than on the adjacent surface. Front *tibiae* with from six to thirteen teeth, of which two are large and from three to five moderately large. Length, 14-16 mm.

Female. Differs in having the head smaller, with denser punctures, without a median excavation or projection, mandibles much smaller and otherwise different; prothorax smaller, sides more conspicuously serrated and narrower across apex, and with more crowded punctures.

Hab. Victoria: National Park in Wilson's Promontory, December-January, 1913-1914 (J. A. Kershaw). Types in National Museum; cotype, 1.8506, in South Australian Museum.

The mandibles of the male, although differing in detail, are nearer to those of the Tasmanian *curvicornis* than to those of any other species known to me, but in other respects the species is strikingly different from that one, and the conspicuous projection on the forehead, somewhat suggestive of that on the forehead of the much larger and otherwise different *Lissaferus horvittanus*, will readily distinguish it from all other described species of the genus. The mandi-

bles of the male are of such a shape that their tips can never touch, owing to the cuspidate basal masses; the cusps (or obtuse serrations) vary, on the three males before me they are respectively seven and five, five and six, and four and five. The canthus in front of each eye is moderately prominent, but the head behind each eye is gently rounded. The mandibles of the female are of the usual feminine type, having a ridge on the upper surface, and an acute inner projection about the middle.

Family CERAMBYCIDAE.

BETHELIUM Pasc.

Journ. Linn. Soc., ix, 1866, p. 97. (Type, *signiferum* Newm.)

Ectosticta Pasc., l.c., p. 104. (Type, *cleroides* White.)

Ipomoria Pasc., l.c., p. 105. (Type, *tillides* Pasc.)

Pascoe proposed two of these names on trivial grounds, and I consider that neither *Ectosticta* nor *Ipomoria* are required; the slight differences in size of the facets of the eyes (the eyes of *B. signiferum* and of *B. cleroides* differ somewhat in size, but the facets themselves scarcely differ), and the proportionate lengths of the first and third joints of the antennae are not sufficient to warrant the generic separation of species so obviously allied. The synonymy is now somewhat complicated but, referring all the species to *Bethelium*, appears to be as follows:

cleroides White (*Callidium* White; *Ectosticta* Pasc.).

var. *blackburni* Gahan.

var. *cburatum* Pasc. (*Callidium* Pasc.).

var. *mundum* Blackb.

var. *simillimum* White (*Callidium* White).

var. *tricolor* Blackb.

inscriptum Pasc. (*Callidium* Pasc.).

ornatum Blackb. (*Ectosticta* Blackb.).

ruidum Pasc. (*Ectosticta* Pasc.).

puncticolle Pasc.

signiferum Newm. (near *Callidium* Newm.).

diversicorne White (*Callidium* White; *Ceratophorus* G. and H.).

flavomaculatum Blanch. (*Callidium* Blanch.).

fuscomaculatum H. and J.

personatus Er. (*Phacodes* Er.).

spinicorne Blackb.

tillides Pasc. (*Ipomoria* Pasc.).

BETHELIUM SIGNIFERUM Newm.

This species varies considerably in size (5.5-9 mm.), and in the intensity and extent of its markings. It occurs in Queensland, New South Wales, Victoria, and South Australia, as well as in Tasmania.

var. PICTIPENNE var. nov.

Numerous specimens from Queensland (Coen River and Cairns), and New South Wales (Tweed River and Dorrigo), in structure agree so well with *B. signifera* that I cannot regard them as representing more than a variety; but they differ from normal specimens in being considerably paler, with the dark elytral markings narrower and less extended; on the elytra there appears to be a narrow and somewhat irregular X, but near the upper edge of each side of the X there is usually a short spur, directed towards, but not reaching, the basal incurvature (on the typical form of *signifera* this spur is always present and more extended), there is also at about one-fourth from the apex a narrow fascia somewhat obliquely placed on each elytron, and not joined to the X along the suture, on some specimens, however, it almost joins the X; on two specimens the X only is present, and on one specimen only the posterior half of the X. There are usually three disconnected spots on the pronotum, but sometimes the two front ones are connected with a short apical infuscation, and the hind one with a basal infuscation; on one specimen the three spots are almost connected. There is usually a dark spot between the eyes.

BETHELIUM CLEROIDES White.

var. *eburatum* Pasce. var. *blackburni* Gahan. var. *mundum* Blackb. var. *tricolor* Blackb.

The colour of the prothorax of this species varies from reddish, with or without a slight infuscation at the base and apex, to entirely dark; the ground colour of the basal two-thirds of the elytra also varies from red to almost black, and the antemedian fascia varies in width and completeness. There is nothing in the description of *Ectosticta eburata* inconsistent with its having been drawn up from one of the many slight varietal forms of the species. A cotype of *B. tricolor*, which agrees well with the description (1), also belongs to that species; and *B. mundum* must also be referred to it, the small size, and narrow antemedian fascia, being quite common variations. The description of *B. blackburni* seems also to have been drawn up from a dark Tasmanian form of the

(1) This note was partly drafted before I had seen Gahan's reference of *B. tricolor* to *B. similimum*, one of the named varieties of *B. cleroides*.

species. The species occurs in New South Wales, Victoria, Tasmania, and South Australia.

BETHELIUM RUIDUM Pasc.

B. puncticolle Pasc.

This species varies in length from 4.5 to 9 mm., and the prothorax from a dull red to dark brown. It occurs in South Australia (Port Lincoln and Lucindale), as well as in Western Australia (Warren River, Geraldton, and Yilgarn). It was referred to *Ectosticta*, but I am convinced that the description was founded upon a large female of the same species, that was later described from a small male, under the name of *Bethelium puncticolle*.

BETHELIUM ORNATUM Blackb.

The prothoracic punctures and the general sculpture of *B. ornatum* and its varieties are much as on *B. ruidum*; but the latter species has strong punctures on the apical portion of the elytra.

var. METALLICUM var. nov.

Some specimens from Sydney (H. J. Carter), Gosford (J. J. Walker), and Blue Mountains (G. Masters), are structurally too close to *B. ornatum* to be regarded as belonging to a distinct species; but they differ considerably in colour: the portion of the elytra, except the shoulders, in front of the abbreviated white antemedial fascia, is entirely metallic-purple; on nine specimens of the typical form the white postmedian fascia is sharply limited, but on five of the six specimens of the variety it is less sharply limited, with the part behind it less dark than on the typical form; the prothorax also is more conspicuously metallic-blue.

var. RUFICOLLE var. nov.

Sixteen specimens from Lucindale (B. A. Feuerherdt) are also too close to *B. ornatum* to be regarded as distinct, but they differ in having the prothorax entirely red.

BETHELIUM TILLIDES Pasc.

The general colour of this species is usually black or blackish, but occasionally the prothorax is of a dull reddish-castaneous; the first elytral fascia was described by Pascoe as "widely interrupted at the suture," this it occasionally is, but on most specimens as the fascia approaches the suture on each elytron it is abruptly narrowed and deflected obliquely backwards, the hind part sometimes being quite isolated from the front part, more or less rounded, and almost touching the suture.

BETHELIUM SUPOPACUM sp. nov.

Of a rusty castaneous and subopaque, some parts darker, elytra with flavous markings. Clothed with very short, inconspicuous pubescence, and in addition with numerous moderately long, suberect hairs.

Head with small, crowded, asperate punctures. Antennae moderately long, first joint almost as long as second and third combined, third slightly longer than fourth, and much shorter than fifth, the longest of all, the others gradually decreasing in length. *Prothorax* rather flat, sides rather strongly and almost evenly rounded, base narrowed and with a transverse impression, median line feeble; with dense punctures as on head, and with numerous small granules, each with a setiferous puncture. *Elytra* flat, at base slightly wider than widest part of prothorax, almost parallel-sided to near apex; surface shagreened and with numerous small punctures, becoming larger, denser, and asperate about base, in addition with setiferous granules as on pronotum. *Legs* moderately long; femora stout, hind pair not extending to apex of elytra; tibiae almost straight. Length, 5.7 mm.

Hab. Queensland: Cairns district (E. Allen and A. M. Lea). Type, L9316.

Structurally close to *B. signiferum*, but elytral punctures and markings very different, middle tibiae straight, eyes somewhat larger and less deeply notched, and fourth joint of antennae somewhat longer. The darker parts are not sharply defined, and are the sides of the prothorax, and the parts adjacent to the sub-basal elytral spots; the under-surface and legs, the femora sometimes dark in the middle, are rather pale; the spots on each elytron are two subconjoined, occasionally quite conjoined, ovate ones, at about the basal third (the outer one somewhat in advance of the inner), and a rather large spot of irregular size, occasionally appearing as two subconjoined ones, at about the apical third; on some specimens in addition the shoulder and a space near the scutellum are paler than the adjacent surface. The median line of the pronotum is very feebly impressed, and is usually impunctate; the setiferous granules on the elytra are seen to be in quite regular rows when viewed from behind, but from above seem rather irregularly distributed.

BEBIUS CYLINDRICUS sp. nov.

Plate ix, fig. 6.

Of a dingy rusty-brown, some parts almost black. Lightly clothed with short, depressed, white pubescence, denser on scutellum, metasternum, and abdomen than elsewhere.

Head small; with rather coarse, crowded punctures; median line distinct on basal half. Eyes large, very coarsely faceted, rather deeply notched. Antennae

thin, scarcely extending to middle of elytra, first joint as long as second and third combined, third slightly longer than fifth, and distinctly longer than fourth, the others subequal, but eleventh longer than tenth. *Prothorax* cylindrical, more than thrice as long as wide; with dense and small non-confluent punctures; with a feeble median line. *Scutellum* small. *Elytra* very little wider than prothorax, parallel-sided almost to apex, where each is obliquely truncated; with crowded large and, in places, subconfluent punctures about base, becoming smaller, but still fairly large, posteriorly. *Legs* short; claw joint unusually long. Length, 12.5-14 mm.

Hab. South Australia: Adelaide (Miss A. Adcock and A. H. Elston). Type, L9317.

The most cylindrical longicorn that I have seen. Seen from the side the long prothorax (with front legs set at the extreme base) has a very peculiar appearance. From *B. filiformis* it is distinguished by the longer and more cylindrical prothorax, with very dense small punctures, much smaller than on any part of the elytra, the eyes larger, closer together, and with much coarser facets, and by the much longer claw joint. From the description of *B. variegatus* it differs in many respects. Of the two specimens in the Museum the larger is the darker, having the head prothorax and femora black or almost so; on the smaller specimen the head only is black; the larger specimen also has the suture and sides of elytra somewhat paler than the discal portions.

BEBIUS FILIFORMIS Pasc.

This species varies in length from 7.5 to 11 mm.; and occurs in New South Wales, Victoria, and Western Australia, as well as in South Australia.

OCHYRA VARIABILIS sp. nov.

Colours variable. Upper-surface with short indistinct pubescence, but several distinct patches of white pubescence on under-surface; with a few long, stragling, erect hairs on prothorax, elytra and legs.

Head with dense, but sharply-defined, non-confluent punctures. Eyes deeply notched. Antennae moderately long, first joint stout, as long as second and third combined, fourth as long as fifth, but slightly shorter than third, the others gradually decreasing in length, but eleventh distinctly longer than tenth. *Prothorax* strongly convex, sides strongly rounded and each with a short acute projection; punctures as on head. *Elytra* much wider than prothorax, sides gently incurved to middle; surface shagreened and with indistinct punctures, but polished space with a few distinct punctures. *Legs* rather short and stout. Length, 4.5 mm.

Hab. Western Australia: Warren River (W. D. Dodd), Swan River and Karridale (A. M. Lea). Type, 19313.

Allied to *O. nana*, but pale elytral fascia not elevated, and punctures of pronotum round instead of longitudinal. The type is black and subopaque, but with a highly-polished space on the elytra before the middle, across the middle itself there is a fairly wide whitish fascia, touching the sides, but narrowly interrupted at the suture; the legs and the basal joint of the antennae are of a dingy brown, the rest of the antennae and the tarsi somewhat paler. A second specimen differs from the type only by having the median fascia not quite touching the sides, and with the sutural interruption more pronounced. A third specimen is of a rather pale castaneous, the polished space before the fascia is brownish, an oblique mark on each elytron, bounding the posterior edge of the pale fascia in velvety-black, and between these marks the surface is of the same colour as the base, the apical third is deeply infuscated, the metasternum, abdomen and parts of the legs are more lightly infuscated. A fourth specimen is like the third, except that the base of the elytra is paler than the prothorax, and that the under-surface is scarcely infuscated.

HOMOEMOTA TRICOLOR sp. nov.

Bright reddish-castaneous, scutellum somewhat darker; elytra with a conspicuous narrow pale reversed V, beyond this and the abdomen black, with a vague bluish or purplish gloss. With very short depressed pubescence, absent, except posteriorly, from elytra; a few short setae scattered about on upper-surface, and fairly dense on tibiae, basal half of antennae with some moderately long ones.

Head with small, dense, asperate punctures; face gently concave. Eyes deeply notched, upper portion thin. Antennae long and thin, considerably passing elytra, third joint almost twice the length of first, and much longer than fourth, fifth slightly longer than fourth, the others gradually decreasing in length. *Prothorax* distinctly longer than wide, sides gently and evenly rounded, base slightly narrower than apex; surface shagreened and with dense but rather shallow punctures. *Elytra* rather flat and thin, slightly wider than widest part of prothorax, almost parallel-sided to near apex; with coarse, crowded punctures, becoming sparser some little distance beyond the reversed V, and then much smaller but crowded about the apex. *Legs* long and thin; femora (especially the four hind ones) strongly pedunculate, hind pair passing elytra for more than half of the thickened portion; hind tibiae slightly curved. Length, 6.5-10 mm.

Hab. New South Wales: Dorrigo (H. J. Carter and W. Heron), Wollongong (A. M. Lea). Type, 19315.

In general appearance strikingly resembling the pale form of *Zoecdia gracilipes*, but structurally close to the typical form of *Homocnota (basalis)*; from the latter species it differs, apart from colour, in having the prothorax longer, thinner and less narrowed to the base, the strong elytral punctures continued beyond the reversed V, the latter also with punctures, and not elevated above the surface, the subbasal elevations near the suture very feeble (they are less pronounced than on any other species of the genus), and the legs somewhat longer. The base of the elytra is somewhat paler than the prothorax. The pubescence on the apex of the elytra, and on the scutellum, is no denser than on the pronotum, but being white is very conspicuous on the darker background. The antennae are not spinose, but there appears to be a feeble remnant, invisible from most directions, of an apical spur on the third joint. The finer sculpture of the prothorax varies; on three of the five specimens under examination the punctures are very evident, but on the others the shagreening is rather coarse, and the individual punctures are scarcely evident; on the first three also there are three impunctate slightly elevated longitudinal lines, of which the middle one connects with similar but transverse lines at the base and apex, the sublateral lines are slightly wider and commence at the base, but terminate at the apical third; on the two other specimens the lines are but vaguely indicated. On each elytron commencing near the shoulder at the base, there is a narrow, semivitreous, pale line, that extends almost to the middle; at its apex on one specimen it is connected with a pale vitta that extends to the side, parallel with portion of the reversed V, but there is no indication, or scarcely so, of the vitta on any of the others.

TILLOMORPHA MEDIOFASCIATA sp. nov.

Plate ix, fig. 7.

Black, shining, appendages of a more or less dingy red, elytra with a rather narrow, submedian white fascia, touching sides but not suture. Upper-surface with a few thin, scattered, upright hairs.

Head with crowded punctures in front, becoming sparser towards base. Eyes rather large and deeply notched. Antennae moderately long, not extending to tips of elytra, first joint about as long as second and third combined, third slightly longer than fourth, and shorter than fifth, the others gradually decreasing in length, but eleventh slightly longer than tenth. *Prothorax* distinctly longer than wide, strongly convex, sides gently rounded, but towards base conspicuously narrowed, densely longitudinally strigose, except for a narrow space at apex, and a wider one at base. *Scutellum* small and opaque. *Elytra* at base much wider than base of prothorax, parallel-sided to near apex, widely depressed at basal third, and then convex; with a few small punctures. *Femora* stout, pedunculate, hind pair passing elytra for about half their length. Length, 4.5 mm.

Hab. Northern Queensland (Blackburn's collection), Cairns district (F. P. Dodd). Type, 1.9312.

Rather narrower than *T. moestula*, and elytral markings and proportions of antennal joints different, but prothorax somewhat similarly striated. The two halves of the fascia are somewhat obliquely placed, and are narrowed as they approach the suture. From some directions each eye appears to be divided into two, and the connecting rows of facets are really very few in number. The antennae are slightly flattened towards the apex, so that while, from some directions, the joints slightly decrease in length, they also slightly increase in width. The prothorax from the sides appears to be strongly arched; its under-surface is transversely corrugated in front, and coarsely rugose with strong punctures elsewhere; the metasternum and abdomen are shining and almost impunctate. The elytra at first appear to be impunctate, but on close examination the hairs are seen to be set in small punctures.

TILLOMORPHA MIROGASTRA sp. nov.

Black, shining; antennae (tips infuscated) and legs (except greater portion of femora) castaneous. Upper-surface in places with black and silvery pubescence, and with a few suberect hairs scattered about.

Head with crowded but sharply defined punctures, becoming somewhat sparser towards base. Eyes large and deeply notched. Antennae rather long and thin, first joint slightly longer than second and third combined, fifth the length of first, and much longer than fourth, the others gradually decreasing in length, but eleventh slightly longer than tenth. *Prothorax* distinctly longer than wide, strongly convex, sides rounded to beyond the middle, and then strongly narrowed to base; with rather sparse and small punctures, except at base, where they are dense. *Scutellum* small and rugose. *Elytra* about twice the width of base of prothorax, parallel-sided (except for a slight incurvature at basal third) to near apex, depressed across basal third, within each shoulder and on suture near base; somewhat shagreened and with numerous distinct punctures on basal fourth, apical half shining and with sparse, shallow punctures. *Femora* strongly pedunculate, hind pair just passing elytra; tibiae (especially the hind pair) rather long. Length, 4.5-5 mm.

Hab. Lord Howe Island, six specimens obtained by beating foliage (A. M. Lea). Type, 1.5453.

In size outlines and general appearance very close to *T. moestula*, but prothorax nonstrigose; the elytral clothing is much as on that species, but the silvery antemedian markings do not meet at the suture. The three apical joints of the antennae appear to be always infuscated, the basal joint and tips of the

others are also sometimes infuscated. The upper-surface, at a glance, appears to be glabrous, except for some patches of silvery pubescence, but there is really a median fascia, placed like a reversed wide V, of very short velvety black pubescence, behind this is a narrow silvery edging, and in front of it on each elytron the pubescence forms a curved silvery mark: the mark commences not far from the base, extends as a narrow, and sometimes almost golden, line, almost parallel with the suture, curves round at the dark fascia, and is then strongly triangularly dilated to the margin, its inner curved portion is filled with black pubescence as the fascia; the base of the prothorax and parts of the under-surface are also clothed with silvery pubescence. The prothorax is much less arched than in the preceding species, on the under-surface its apex is lightly corrugated, and elsewhere coarsely shagreened; the metasternum is shagreened, but towards the apex is somewhat shining, the abdomen also is shining. The abdomen of the male is remarkable, at first glance it appears to be composed of but two segments: the first a large one about the length of the metasternum, the second fairly long at the sides, and narrow at the middle, its tip with a dense fringe of long golden-red hairs; the end of the upper-surface of the abdomen is also clothed with similar hairs; the fringe as a result (when viewed from behind) appears to be almost circular, and to margin a cavity (containing the three other segments) that is also filled with golden-red hairs. The abdomen of the female is normal.

TILLOMORPHA MOESTULA White.

There are numerous specimens of this species in the Museum from Queensland (Cooktown, Cairns, Kuranda, Mackay, and the South Johnstone River), but with the exception of one specimen from Mackay they are all smaller (down to two lines) than the type (three lines). They all have the pronotum densely longitudinally striated, a character not mentioned in the original description.

PERIAPTODES Pasc.

Trans. Ent. Soc. Lond., iii (3rd Ser.), p. 282.

PERIAPTODES LICTOR Pasc.

L.c. p. 283, pl. xiv, fig. 3.

P. frater, v. d. Poll, Notes Leyd. Mus. ix (1887), p. 119.

A specimen taken at the Coen River by Mr. W. D. Dodd agrees well, except as to size and the scape, with the description and figure of *P. lictor*, and also with the description of *P. frater*; the former was described as from Dorey, the latter from Cape York and New Britain. The type of *frater* was 41 mm. in length, the

Coen River specimen is 28 mm., and the type of *P. lictor* still smaller—"12 lines"; but even greater differences in length than these are common in closely allied genera. The Coen River specimen has numerous transverse impressions on the hind part of the scape, but not in front, and possibly on the type of *lictor* the impressions were more or less concealed by the clothing.

PROTEMNEMUS Thomson.

Syst. Ceramb., p. 81. Pasce. Trans. Ent. Soc. Lond., iii (3rd Ser.), p. 280.

This genus is very close to *Periaptodes*, from which it differs in the flat elytra, with abruptly vertical sides, about the summit of which are numerous small pointed tubercles.

PROTEMNEMUS TRIMACULATUS sp. nov.

Plate ix, fig. 8.

Black. Densely clothed with very short, depressed, greyish-brown pubescence; with scattered whitish setae, more numerous on the under-surface and legs than elsewhere, and often arising from small nude spots or feeble granules; with a velvety brown subtriangular patch of pubescence about scutellum, and an irregular patch of similar pubescence on each side of disc at about the apical third, each patch sharply bounded on its inner edge, but outwardly obscurely amalgamating with somewhat lighter pubescence on the vertical sides.

Head with feeble granules; with a narrow median line from lip to base. Antennae passing elytra from about the sixth joint, first joint transversely impressed posteriorly, and with numerous granules, third joint also granulate and much longer than first and second combined, fourth to tenth decreasing in length, eleventh much longer than tenth. *Prothorax* feebly transverse, at apex scarcely wider than head, sides strongly armed, with a small, nude, elongate-oval space in middle, a small subconical partially concealed tubercle near it on each side, and with several patches of small granules. *Scutellum* curvilinearly triangular, depressed along middle. *Elytra* much wider than prothorax, with a small acute spine on each shoulder and a larger one on each side of apex; a row of small tubercles or spines marking the summit of the lateral declivity on each elytron, commencing with the spine on each shoulder and ending at the subapical patch, a row of similar spines slightly below and parallel with the summit, and a few spines scattered irregularly on the disc; with rather dense but more or less concealed punctures. *Legs* long and thin. Length, 38 mm.

Hab. Queensland: Coen River (W. D. Dodd). Type (unique), 16765.

Readily distinguished from the three species described by Pascoe, in Longicornia Malayana (*P. scabrosus*, *P. lima*, and *P. pristis*) by the conspicuous, tri-

angular, velvety patch about the scutellum. Traversing the flat portion of the elytra of the type (which is probably a male) at about two-fifths from the base, there is a feebly elevated but distinct ridge, but as it is not quite symmetrical it may be an accidental feature, and for this reason it has not been shown in the figure.

MESOLITA SCUTELLATA sp. nov.

Dull reddish-brown, some parts almost black, legs and antennae reddish, in parts glossed with purple. Clothed with fine, depressed, brownish or greyish pubescence, but variegated with pale spots about the summit of the apical slope of elytra, under-surface mostly with a whitish pubescence, but with a conspicuous ochreous spot on each side of mesosternum and of metasternum, scutellum with dense ochreous pubescence; a few long hairs about mouth; tibiae and tarsi densely setose.

Head with small, dense, normally concealed punctures; with a narrow median line. Antennae thin, passing elytra, third joint almost as long as fourth and fifth combined, these subequal, the others gradually decreasing in length. *Prothorax* slightly longer than wide, moderately convex, sides gently rounded in middle, base and apex equal; punctures as on head. *Elytra* long and thin, at base no wider than base of prothorax, slightly dilated at apical third and then narrowed, with the apex of each produced in an acute spine; base strongly depressed and with coarse punctures; elsewhere with punctures as on head. *Legs* long; femora stout, hind ones passing elytra. Length, 7-9 mm.

Hab. Queensland: Mount Tambourine (R. Hledge and A. M. Lea). Type, 19310.

Structurally fairly close to *M. lincolata* Pasc., but with very different markings. The base of the head, base of elytra and parts of the sterna have the derm blackish, and on one specimen the pronotum is almost black, the tips of most of the antennal joints and the tarsi and tips of tibiae are infuscated. On the elytra of two, of the four, specimens before me there are vague remnants of pale pubescent markings about the base, but the only distinct markings consist of a semicircular row of spots, six or eight in number, crowning the apical slope; the clothing on the apical portion of the suture is also pale. The scutellum, owing to its clothing, is very conspicuous.

MESOLITA INTERRUPTA sp. nov.

Plate ix, fig. 10.

Reddish-brown; in places black or blackish, with a coppery gloss. Clothed with short, depressed, variegated pubescence.

Head with dense and small, partially concealed punctures; median line well-defined on basal half, feeble in front. Antennae slightly passing elytra, first joint stout, third slightly longer than first and second combined, and considerably longer than fourth, the others gradually decreasing in length. *Prothorax* considerably longer than wide, sides rather lightly rounded in middle, base and apex equal and truncate; punctures as on head. *Elytra* at base no wider than base of prothorax, parallel-sided for a short distance, then slightly dilated to beyond the middle, and then narrowed to apex, where each has a conspicuous spine; base depressed and with rows of coarse punctures, elsewhere with punctures as on head. *Legs* short and stout; hind femora not passing third abdominal segment; tibiae slightly shorter than femora. Length, 4.5-5.5 mm.

Hab. Queensland: Bundaberg (Blackburn's collection). Type, L9309.

Differs from the species herein commented upon as *M. pascoei* (and which appears to be correctly identified) by its consistently smaller size, prothorax with pale longitudinal markings (due to a median zone of darker pubescence), and elytra with a postmedian dark band completely interrupting the longitudinal pale lines; the apical armature is also different: at the apex of each elytron the spine is shorter, and appears to be given off at one side (pl. ix, fig. 10), but on *M. pascoei* the spine is conspicuously longer, and appears as a continuation of each elytron (fig. 11). On this species and on *M. pascoei* the hind femora terminate some distance before the tips of the elytra, and it is doubtful if these species can be regarded as generically distinct from *Corestetha insularis*; they are certainly, despite the shortness of the legs, congeneric with *M. lincolata*, but *M. transversa* is the type of the genus; the eyes, including the paucity of the facets, are almost exactly as on *C. insularis*, but the elytra are less parallel-sided, and the markings and tips are different. There is a faint coppery gloss on the reddish parts, but it is very conspicuous on the dark parts; the latter comprise most of the head, most of the prothorax, a space across middle of elytra, and some smaller parts towards apex and about base, most of under-surface, and the femora, except at base and apex; parts of the antennae are usually lightly infuscated. The clothing on most of the upper-surface is rather pale, and more or less lineate in arrangement, but on the dark parts it is usually also dark, except that down the middle of the pronotum the pale pubescence forms lines, about eight in number. On the elytra the lines of pale pubescence are rather conspicuous, but about the middle there is a curved dark space that interrupts them all, between it and the apex there are also a few dark spots, appearing on some specimens as remnants of a circle or semicircle. On the under-surface the pubescence is sparser and uniformly distributed. The elytra are decidedly depressed at the base, but rather less so than on others of the genus, their alternate inter-

stices are really slightly elevated, but appear to be rather conspicuously so owing to their clothing. There are twelve specimens in the Museum, one of which was marked "*Mesolita* sp. n." by Mr. Blackburn.

MESOLITA EPHIPPIATA sp. nov.

Black, in places with a metallic greenish gloss; antennae and bases of femora reddish. Densely clothed with short, depressed, brownish pubescence, becoming whitish on head and most of under-surface and of legs, elytra with conspicuous pale markings; with numerous hairs on muzzle; tibiae, especially the hind pair, with dense setae.

Head with small, crowded, more or less concealed punctures; median line narrow, shining and well-defined throughout. Antennae long and thin, distinctly passing elytra, third joint about twice the length of first, and much longer than fourth, the others gradually decreasing in length, sixth about the length of first. *Prothorax* distinctly longer than wide, sides rather slightly rounded in middle, base and apex equal and truncate, near base a shallow transverse impression, becoming deeper and with a few large punctures on sides; punctures as dense as on head and less concealed. *Elytra* at extreme base scarcely the width of prothorax, from slightly before the middle somewhat inflated, and thence narrowed to apex, where, towards the outer side, each is produced into a short stout spine; punctures dense and very minute, but a few large ones about base. Four front legs moderately long, the hind ones very long, about one-third of the hind femora passing elytra. Length, 10-11.5 mm.

Hab. Queensland: Kuranda (F. P. Dodd and H. Hacker), Cairns (A. M. Lea). Type, I.9306.

Structurally fairly close to *M. lincolata*, but the elytra are narrower and even more depressed about the base, and the clothing is very different; the elytral markings are somewhat as described in *M. transversa*, but the fascia crowning the apical slope is very narrow, not wide as in the figure, and each elytron is armed with a short spine at the outer apex. The suture and tips of elytra are sometimes obscurely reddish, the tips of the antennae are sometimes infuscated. Most of the clothing on the elytra is of a dingy-brown, but about the base there is a conspicuous, bluish-white, saddle-like patch, interrupted near and running parallel with the suture, and there is a conspicuous narrow semi-circle of similar pubescence crowning the apical slope, and slightly enlarged at the suture; the scutellum is clothed with dark pubescence in the middle, but silvery at the sides. The side pieces of the mesosternum are visible from above as thin, silvery processes, at the base of the elytra.

MESOLITA MYRMECOPHILA sp. nov.

Plate ix, fig. 9.

Black, shining, in places with a greenish gloss; parts of antennae and of legs obscurely diluted with red. Clothed with short depressed dark pubescence, but with conspicuous snowy-white patches; muzzle antennae and legs with numerous hairs, moderately numerous on elytra, and sparse on prothorax.

Head with small, dense punctures, becoming very feeble about base; rather strongly depressed in middle, median line well-defined towards base, less defined in front. Eyes small, very narrow in middle. Antennae long and thin, passing elytra for a short distance, third joint lightly curved, much longer than first or fourth, the others gradually decreasing in length. *Prothorax* rather strongly convex, not much longer than greatest width, which is slightly in advance of the middle, apex slightly wider than base and both truncate; with small punctures, sparser in middle than elsewhere, sides densely strigose. *Scutellum* small and semicircular. *Elytra* with the basal third strongly depressed, narrow and with dense punctures; apical half strongly inflated, strongly convex and minutely punctate; tips obliquely truncated and unarmed. *Femora* stout, hind pair considerably passing elytra; hind tibiae about the length of elytra. Length, 4.75-5.75 mm.

Hab. Queensland: South Johnstone River, in nests of ants (H. W. Brown). Type, 1,9314.

Seven specimens were sent by Mr. Brown, mounted with some black ants of the genus *Polyrhachis*, and at first glance the beetle strikingly resembles the ant, although the parts when examined separately are seen to be very different. No other Australian longicorn has been recorded as occurring with ants, but there are some from South and Central America known to associate with ants. Mr. Brown, in answer to an enquiry, wrote: "Concerning that ant-like longicorn, it is always found in company with the ant it imitates, and I have taken it inside a dead leaf with several ants." In its shining black appearance it is very different from all others of the genus, but structurally it is fairly close to *M. incermis*. The head has a conspicuous metallic-green gloss; on some specimens the legs are almost entirely red. The snowy-white patches of pubescence on the upper-surface are: a strip across the apex of the prothorax, two small patches at the base, sometimes irregularly conjoined, the scutellum, and a fascia, touching neither the suture nor sides, across the elytra at about the apical third; there are also snowy patches at the sides of the mesosternum (from above its side-pieces appear as silvery processes at the sides of the elytra as in the preceding species), tips of the metasternum, and on the intercoxal process of abdomen.

Behind the scutellum there is a patch of pubescence that in some lights is brightly iridescent, but tipped with snowy-white, the patch is shaped somewhat as in *M. inermis*, and in *M. ephippiata*.

MESOLITA PASCOEI v. d. Poll.

Plate ix, fig. 11.

Two specimens, from New South Wales, identified in the Blackburn collection as *M. pascoei*, and two others (from Nowra) that agree with specimens in the Macleay Museum so identified, differ only from the original description in being slightly longer (6.5-8 mm.) than the type (6.0 mm.); a specimen that I cut out, together with a pupa, evidently of the same species, from a dead leaf of a tree fern, in the National Park, near Sydney, differs from these in being slightly longer (9.0 mm.), and the pale pubescence on the pronotum having a vaguely lineate appearance (a trace of this is to be seen on only one of the others). All five have but one conspicuous stripe of pale pubescence on each elytron, and this stripe is continuous from the base to near the apex, but other less conspicuous stripes are present.

The species of *Mesolita* excluding *M. transversa* which is unknown to me, may be thus tabulated:

- A. Elytra unarmed at apex.
 - a. Apical slope of elytra uniformly clothed with pale pubescence *inermis*
 - aa. Apical slope without pale pubescence *myrmecophila*
- AA. Elytra armed at apex.
 - B. Pale markings at summit of apical slope isolated from all others.
 - b. The markings consist of isolated spots obliquely placed *scutellata*
 - bb. The marking consists of a curved fascia *ephippiata*
 - BB. Pale markings not as in B.
 - C. Disc of pronotum with isolated spots of golden pubescence *lineolata*
 - CC. Disc without golden pubescence.
 - D. Longitudinal stripe of pale pubescence on each elytron, continuous from base almost to apical spine *pascoei*
 - DD. Stripe conspicuously interrupted just beyond middle *interrupta*

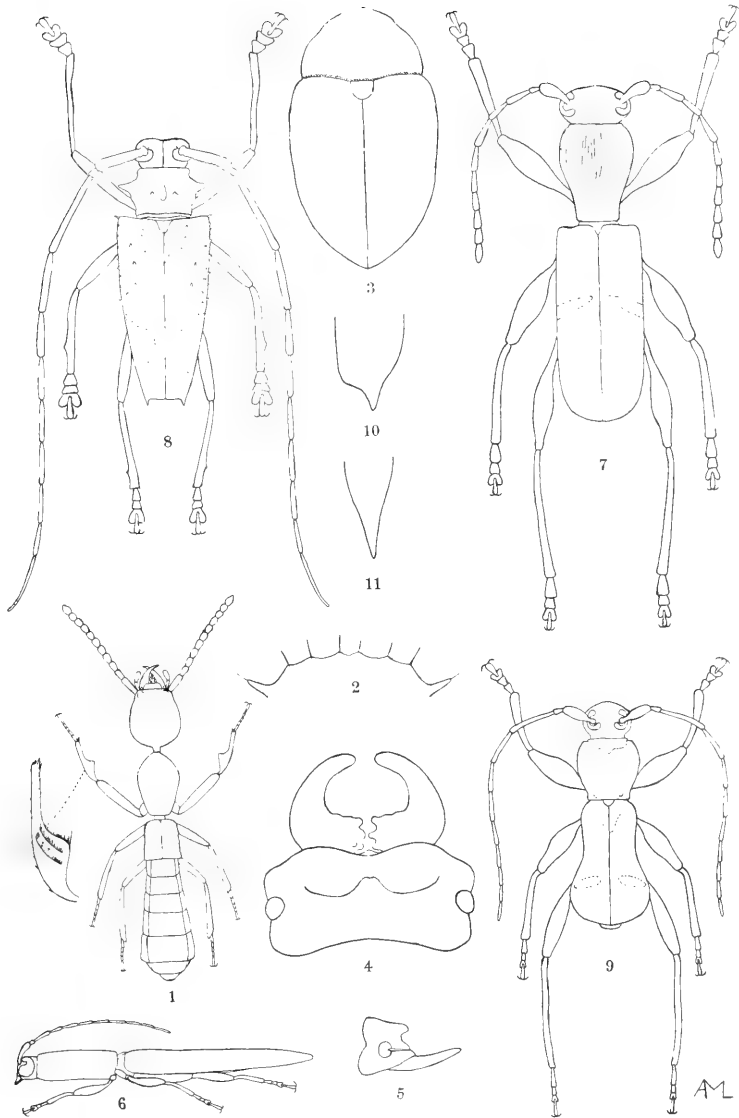
CORESTETHA.

This genus was proposed by Pascoe, as distinct from *Mesolita*, mainly on account of its comparatively short legs, but those of the typical and only species—*C. insularis*—are much as those of *M. pascoei* and *M. interrupta*, and it is doubtful if the genus can be maintained.

Explanation of Plate ix.

- Fig. 1. *Tripectenopus caecus* sp. nov.
Fig. 2. *Chlamydopsis cecatommae* Lea, apex of prothorax, as seen from behind.
Fig. 3. *Chelonarium australeum* sp. nov.
Fig. 4. *Lissotes kershawi* sp. nov., head.
Fig. 5. *Lissotes kershawi* sp. nov., head, as seen from the side.
Fig. 6. *Bebius cylindricus* sp. nov.
Fig. 7. *Tillomorpha mediofasciata* sp. nov.
Fig. 8. *Protommemus trimaculatus* sp. nov.
Fig. 9. *Mesolita myrmecophila* sp. nov.
Fig. 10. *Mesolita interrupta* sp. nov., tip of elytron.
Fig. 11. *Mesolita pascoei* v. d. Poll, tip of elytron.

NOTE. -It will be noticed that certain lines are set in different type from the rest of the text: this is due to the inability of the linotype machine used to set certain signs, such as diaereses and accented letters.—EDITOR.



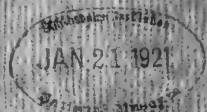
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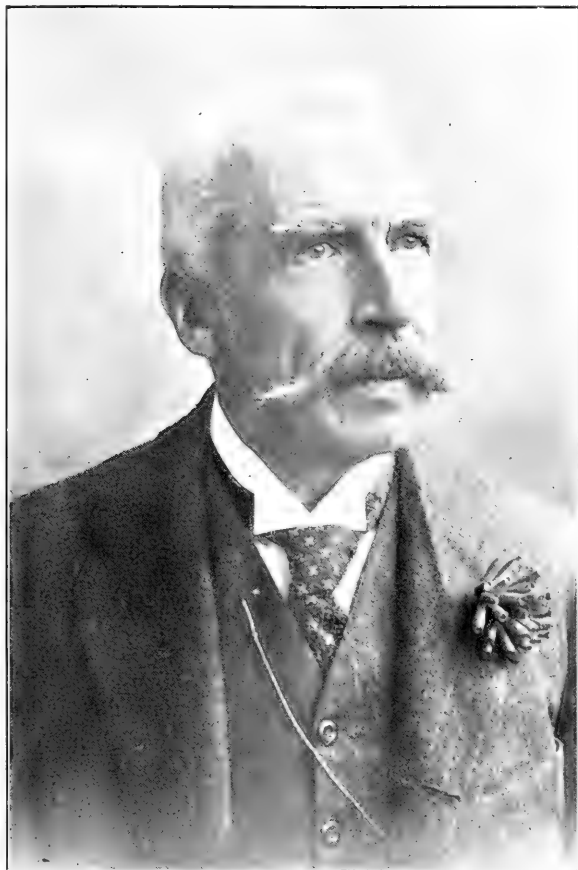
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CONTENTS

	PAGE
Description of Toas, or Australian Aboriginal Direction Signs - - -	105
Sir Edward Stirling and Edgar R. Waite	
Two Australasian Blue Whales, with Special Reference to the Corvisart Bay Whale	157
Edgar R. Waite -	
Description of Three New Species of Thynnidae - - - - -	169
Rowland E. Turner	



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Hon. Director of the Museum	-	-	1889-1895
Director	-	-	1895-1913
Hon. Curator of Ethnology	-	-	1914-1919
Born Sept. 8, 1848. Died March 20, 1919			



DESCRIPTION OF TOAS,
OR AUSTRALIAN ABORIGINAL DIRECTION SIGNS.

BEING AN ABSTRACT FROM THE J. G. REUTHER MANUSCRIPT, BY THE LATE
SIR EDWARD STIRLING, M.D., D.Sc., F.R.S., ETC., HON. CURATOR IN ETHNOLOGY,
AND EDGAR R. WAITE, F.L.S., DIRECTOR, SOUTH AUSTRALIAN MUSEUM.

Plates xi-xx.

Introduction. This paper is based upon the manuscript written, and the collection made, by the late Rev. J. G. Reuther, who for eighteen years was in charge of the Lutheran Mission Station at Kallalpaninna (to the east of Lake Eyre) and which I visited in 1916 (1). This MS. and collection was purchased by the Board of Governors, but a study of the writings indicates that certain portions, at least, were previously copied and sent to M. von Leonhardi, of the *Städtischen Völker-Museum* at Frankfurt am Main, a fact of which my Board was probably unaware. Many papers by the Rev. Carl Strehlow, of Hermannsburg, also sent to von Leonhardi, were published in the "Veröffentlichungen" of the Frankfurt Museum, but I am unaware if any of Reuther's MS. has so far been issued, war conditions preventing the exchange of correspondence and literature.

The descriptions of the Toas is published, therefore, at some risk of being anticipated in Germany, but even so it seems advisable to issue in English, and in our own "Records," an account of the specimens permanently preserved and exhibited in the South Australian Museum.

Some of the MS., dealing with the actual description of the Toas, was translated and arranged by Sir Edward Stirling with a view to its ultimate publication. Two days before his death, which occurred on March 20, he asked me to continue and complete the work and publish it under my own name.

A certain portion of the translation was done for Sir Edward by his daughter, Mrs. T. B. Robertson, and by Mr. F. R. Zietz; to the last-named I also owe thanks for assistance in this direction.

As far as I am aware the only account of these objects so far published is that by Dr. R. H. Harris (2), who on the authority of H. J. Hillier gives a

(1) Waite, *Trans. Roy. Soc. S.A.*, xli, 1917, p. 414.

(2) Harris, *Mem. Queensland Mus.*, vi, 1918, p. 18.

general account of the significance of the objects under the name Thdoa. I am given to understand that Mr. Hillier was engaged by Mr. Reuther to make coloured drawings of the Toas, and that the accompanying illustrations are reproductions of copies prepared by Miss Rose C. Fiveash.

A detailed description of each of the Toas represented on the accompanying plates is hereafter supplied, but these descriptions may be prefaced by an account of the so-called religious beliefs of the Diari Tribe as interpreted by Mr. Reuther, and culled from his manuscript, explaining, as it does, much that might be otherwise unintelligible in the descriptions.

From the large amount of MS. available, and of which a specimen page is reproduced, it is not an easy task to select such as may be relevant to the subject of this paper. It would almost seem also that in relating the beliefs of the natives, the Rev. Mr. Reuther has, in some measure, reflected European teachings, for, among other legends, we read accounts of the creation of the world and its destruction by flood, which are substantially identical with Biblical records.

Legendary Ancestors. Mr. Reuther endeavoured to show that the natives of the Diari and other tribes originally believed in the existence of a single supreme being, the name of which varied in different districts. The name *MURA* was in common use among the Diari, Tirari, Wankanguru, Janraworka, Jandruwanta, Wonkarabana, Pillatapa, Ngamani, Kujani, Nguraworla, Mardala and other tribes in the district to the east of Lake Eyre. *JELKURA* is the name used to the north of the district on the Diamantina (or Warburton) River within the Queensland border. *ALTJIRA* is used by the tribes of the Wonkaranta, to the north-west of Lake Eyre.

Being the one in most common use, the name *Mura* may be further considered. In the formation of compound or composite words, one of the two syllables, *mu* or *ra*, of which the word is composed, is often used to express a higher sense or chief idea of the word with which it is conjoined, as, for example, *Mungara* (soul) composed of the two words *Mura* (god) and *ngara* (heart), meaning the heart of the god, the syllable *ra* being here omitted. The word *Kapara* (king, ruler, chief) is formed of *Kapa* (loins, and implying strength) and *Mura* (god), the syllable *mu* being omitted. If the suffix *la* is used as in *Murala*, all that has been accomplished by or pertains to the god is understood, or in other words it implies his creation as: *Mita ngania murala* (the earth belongs to god, or was created by him).

Like many others in the Diari language, the word *Mura* is capable of duplication, and *Muramura* (demigod) is formed. *Mura* is a specific name and is used in reference to a supreme being. *Muramura* is used generically; of these

Toa
Waxekatipitikaluni,

(Diavi.)

i. f. der norden der fetarlose Gintastail einod fumi.
 der decaramera Kirlawilina ferd an der fann der ein fumi brikam,
 walgad niden und find an fuf zu foinam Wafen die fideru und gupf fide
 feten, ufer mof miter maut, mof fow Wafen fow gab, tan der ufer zu fow
 namm.

der Net oben von Toa zuigledad muller Gintastail eruf fumi mit mof ein,
 zelner fideru, weiß behaltet die fiefen in der fignets - loekt, vor der
 decaramera der behaltente fumi gupf mof, die gelben Kirlawilina find
 Wafen foinam.

der Toa fage: Mit fawan und auf fideru fignets fiefen fow wafen fow, vor mof
 der decaramera Kirlawilina ein behaltente fumi fuf, mof ad eruf
 Gintastail fuf fetarlob maut.

demigods there were very many, at least eighty being known, hence a common belief that the tribes were Polytheists, which may here be taken to mean the practice of invoking the help of many gods.

Each Muramura had a distinguishing name used in apposition; thus Muramura Darana (the demigod of the drought, who lived at the period of a great drought) by appealing to the Mura, had his request for rain granted; Jelkabalubaluna (the demigod of Jelka) formed of Jelka, an edible bulb, much esteemed by the natives, and balu, meaning peeled.

The Mura is known by his attributes, the chief of which is his greatness, the word for which is *pirna*, also implying power or strength as exemplified in the saying: *Mura nanja morla pirna warupotuni* (god is greater than all). His greatness is also often expressed in ordinary conversation in simile, as *Kana nanja murajeri* (this man is like god), which means that the man is the greatest, tallest and strongest man that he has ever seen. The same simile is used to express the highest mountain, the tallest tree, the largest lake, etc., and is employed in the sentence: *Mura morla pirna, ngaiani japali nunkangu* (god is greater than all, we fear him). Another of his attributes is beauty (*ngumu*) in its fullest sense, as: *Mankara nania ngumu murajeri* (that girl is as beautiful as god), or *Kanauaja wirina-wori murajeri* (this man has made himself—by decoration—as beautiful as god), which explains why the Muramura painted himself with the most glaring colours when he appealed to the Mura. The songs of invocation still persist in the native corroborations. The native says the noble beautiful god desires to see noble looking and beautiful people, thus: *Mura nanja ngumu pirna ngaiana nunkangu nintali* (the Mura is very beautiful, we are ashamed before him), and this is the reason why no mourner, no one who has lately committed murder, no woman who has recently given birth to a child, can take part in the ceremonies or corroborations. Other attributes of the Mura are omnipresence, righteousness and omniscience. He is everywhere, he sees all that men do and chastises them if they offend him. It is, however, possible to conceal oneself from him and deceive him. Should a man be travelling during a thunderstorm he covers his head with a bush so that the Mura cannot see him, and is then protected from the power of the lightning flash. The natives believe that the Mura does not approve of men travelling during a thunderstorm.

The Muramuras were created by the Mura from clods of earth (*daka*), and, whereas some were imperfectly formed, attaining full development on the surface, others were perfect even to their decorations, and with them arose one or more wives or subjects, called Mili. Some of these subjects were likewise unformed, being *dupudupu*, the word meaning contracted. The

Muramuras completed their formation as far as the limbs are concerned; the wrinkles in the skin on the joints are the scars of the cuts made with a stone knife and demonstrate the truth of the belief. The Muramura Pitikipana, who perfected the Mili, had much difficulty in healing all the wounds in some parts of their bodies.

The Muramuras are regarded as the ancestors of mankind: their descendants and subjects are held in veneration and are considered to be the ancestors of the different tribes. Every man knows, even at this date, from which Muramura he is deemed to be descended, and he believes that his language (dialect) is that spoken by his legendary ancestor. The Muramuras wandered about the country, meeting with various adventures by the way, and the legends of the natives are nothing less than records of their journeyings, the events which befell them, and their songs of invocation addressed to the Mura, which have been carefully preserved by being handed down from father to son.

The presence of large trees, hills, lakes and other natural features is held to be due to some action of the Muramura. Wherever the demigod placed his foot a large tree grew. A certain Muramura killed an exceedingly large kangaroo and pegged out its skin, and in the place where this happened a large lake was formed (Lake Eyre). Watercourses are supposed to be the result of the tracks of the Muramuras and water-holes represent their camping grounds, thus Papapapana came from the south, and a watercourse of this name (Frome creek) formed itself in his tracks; Makadakabana (meaning to make fire by friction) came from the north-west and the country over which he travelled is traversed by the Makamba creek (the word Macumba meaning the fire creek). The Muramura Pillatapa (meaning wounds caused by glowing coals) traversed that part of Cooper's creek between Lake Eyre and Kallalpaninna; Darana (the Muramura of the drought) journeyed thence to Lake Hope. From Lake Hope to the Queensland border the course of the Cooper denotes the route of the Muramura Ngurawordubununa (stumpy-tail, the lizard *Trachysaurus rugosus*, which is common in the central districts).

The tribal districts are bounded by natural features, such as creeks, ranges, or remarkable formations surrounding the spots whence each Muramura arose from the earth. In some cases two or more Muramuras arose within one tribal district. Three came into being in the Diari territory, namely: Ditji (the sun), a female Muramura who arose at Ditjiminka (sun cave), but because the heat of her body was too great for her own children she removed to the east, where she now rises. The Muramura Durana, already mentioned, is said to have petitioned the Mura for rain and the

Witchity grub (an edible caterpillar). The third Muramura was Jelka-balubaluna, also previously referred to as the demigod of an edible bulb.

When the Muramuras arose from the earth there were no edible plants, so they invoked the aid of the Mura, and immediately the earth brought forth a vegetable, but only one kind, and each particular plant desired had to be specially petitioned for; in the same manner the birds, animals, edible reptiles, insects and seeds were increased, and even rain, wind, water, heat, cold, etc., were obtained by supplication. All things were named by the Muramuras, who associated with them some characteristic peculiarity; the names of animals, etc., have reference to their coverings, fur, feathers, scales, or colour, shape, or habit. Useful trees, shrubs, herbs and grasses received distinguishing names. The Muramura also named each place he camped at, perpetuating some feature he noticed, as, for example, Kaparamara (Kopperamanna), kapara meaning root and mara hand. The Muramura noticed that the roots of several of the trees were exposed owing to the wash of flood waters, and thus the roots appeared to him like a hand supported on the finger tips: or, again, Jidnaminka (Innamineka) meaning you are in a hole; Jidna being you and minka a hole, and has reference to one of the legends.

When the Muramura appealed to the Mura for some particular favour he adorned his body with coloured stripes and other marks, using special distinguishing ornaments, generally on the head, signifying the object petitioned for, and his actions and songs related to that special object only. These ornamentations, actions and songs have been carefully handed down from father to son of the family of the particular Muramura using them, but the natives have forgotten that the petition was originally addressed to the Mura, and in their corroborces they now invoke the aid of the Muramuras.

On the death of a Muramura—some of them died from natural causes and others were killed in fights or murdered—his body usually turned into stone which was often smeared with red ochre and always venerated by his particular descendants. So also the sun and moon and some of the constellations were regarded as abodes of departed Muramuras. Some of them are also believed to exist at the present day in the form of trees.

In many respects the Muramuras of the Lake Eyre tribes correspond to a similar class of legendary beings, the Alcheringa ancestors of the dream, or far-away times, from whom the Arunta natives believe themselves to be descended.

Explanation. After the plates were arranged for reproduction it was found that in several instances some particular locality is represented by two or more Toas: numbers 92, 193, and 300 all refer to the place Mardalburu

named by the Muramura Wittimarkani of the Diari tribe: 172 and 198 refer to the same place also as having been named by Wittimarkani, but of the Pillatapa tribe; while numbers 47 and 124 refer to a similar legend respecting the place Kanjalura, named by the Muramura Turupillana of the Tirari tribe. All these references relate to places strewn with small sharp stones. Toas numbered 96, 238 and 246 similarly indicate the place strewn with Emu bones.

In a few cases, duplication was detected before the plates were arranged and the illustrations involved are omitted; as, however, the numbers are attached to the specimens exhibited in the Museum, their sequence could not well be disturbed, in such cases the places of the Toas on the plates are occupied by their respective numbers only.

It is interesting to notice that variations of the same legend may be held to account for different objects, as in the case of numbers 54 and 129, the respective Toas representing features derived from the actions of the Muramura Yelkabalubaluna.

Had Sir Edward Stirling lived to complete this paper he would doubtless have instituted comparisons with the legends of tribes in other parts of Australia, and would have infused into the work his wide personal knowledge and extensive reading of the literature of the aboriginal. The actual descriptions of the Toas were, for the most part, compiled by Sir Edward; I am responsible for the selection of the matter comprising the introductory portion. A portrait of my late friend accompanies this paper.

E.R.W.

SIGNIFICANCE OF THE TOAS.

The purport of the Toas may be described as topographical in the sense that each represents, and serves as an indicator or sign-post to, some particular locality. Their shape, colours, patterns or appendages depict, realistically or ideographically, either certain conspicuous or peculiar natural features of the localities represented, or, very frequently, these details have reference to episodes which are believed to have occurred during the frequent legendary wanderings of the Muramuras.

It is with the incessant wanderings of these Muramuras, and with their songs of invocation and ceremonies, that the legends of the natives are chiefly concerned; moreover, the native place-names of the district, which are believed to have been given by the Muramuras, are derived either from episodic happenings in the course of these wanderings or from some physical feature characteristic of the locality. The Toa, then, symbolizes the locality, and

it bears the same name with the addition of the suffix "ni" or "ri," which indicates "direction towards."

The Toas are used in the following way: when a native is about to break camp and move to some other place he makes a Toa representing the locality to which he is moving and sticks its pointed end into the earth at the camp about to be left; signs are also made on the ground to call attention to its presence. In this way the friends of the departing native, who recognize the significance of the Toa, are made aware of the place to which he has gone.

The Toas are rather roughly made, as if intended to serve only a temporary purpose. In size they mostly fall within length limits of six to eighteen inches, though a few are longer, and one (No. 1) is over five feet. In construction they mostly consist of a piece of natural or artificially flattened wood, pointed at one end, and either coloured, or plastered over with white clay which itself may be coloured uniformly or marked with simple designs. At the upper end the clay is frequently moulded into a spherical or oval knob, and this also may be plain or variously coloured, or have inserted some object typical of the locality or symbolical of a Muramura's adventure, such as a tuft of grass, twigs, feathers, hair, etc., pieces of bone, charcoal, or a model of some weapon or utensil. In a considerable number of Toas the upper end is modelled into a representation of some part of the human body such as the head, hand, or foot, or into that of the whole or some part of a bird, fish, or other animal. All these details as well as the forms, colours, patterns, and appendages of the Toas have reference to the physical features of the places they represent, or to the events that occurred there during the wanderings of the Muramuras.

DESCRIPTION OF THE TOAS.

1. **DAKARAWITJARINI (Diari Tribe).** This represents a place called Dakarawitjari, the terminal "ni" indicating "to" or "in the direction of," and the Toa therefore gives the information that the natives have gone to the locality of that name. The word means a hard flat, or plain, where Emus run to and fro, and it originates from the legend of the Muramura, Ngurakar-lina, who, coming to the place, saw many of these birds running about.

The longitudinal, vertical, and partly sinuous black stripe on the Toa represents a salt creek, the oval patch being a deep waterhole, and the lateral branches tributary creeks. Surrounding these is the plain where the Emus

used to run, the white spots indicating bushes and scrub. This is the largest Toa in the collection, being over five feet in length.

2. **PINGALPIRINI (Diari Tribe)**. To the place where much Pingalpiri grass grows. This word means place of quarrel, *i.e.*, a place where a fight against strangers occurred. The form of the Toa is said to represent that of Cooper's Creek at Pingalpiri, this being narrow at one point represented red, then widening out and contracting again. The black vertical stripe near the top and the crescentic figure below it represent washed out water-holes. Below the latter the horse-shoe shaped patch with a white border and centre is the native camping ground, which is near a larger water-hole (Pingalpiri) delineated by the black crescent with the hollow side directed downwards. Here the river bed expands as shown by the black oval ring which encloses raised ground (yellow), the white ring outside this denoting water. The other black figures in the lower, narrowing part also show washed out water-holes, and the small red spot in the lowermost black stripe means a heap of stones. The white, red, and yellow bands are indicative of the white soil and red or yellow sand. The absence of dots on this Toa means that no bushes are present.

3. **JULTURANI (Tirari Tribe)**. Meaning "to the boggy ground," the name, according to the legend, having been given by the female Muramura, Katimarkara, who came here disguised as an emu so that she should not be recognized by her two daughters whom she wished to observe in secret. Accordingly the Toa bears the feathers of this bird.

The red ground of the Toa indicates a boggy river-bed, the black patches water-holes in its course, and the coloured areas projecting from each side toward the centre line stand for high banks which jut out and are partly overgrown with bushes (yellow dots). These projections are margined with white because their soil is of a chalky character. The two transverse white lines show paths by which the creek may be crossed, the double row of yellow dots on the black stripes, which margin the white, being stones in the creek bed. The patch of yellow at the top is the place where once, according to the legend, the two daughters of Katimarkara camped and sought for fresh water in the water-holes represented by the black patches. They dug here and there but found at first only salt water. At last, finding the water fresh they camped there, and the place is still a native camping ground.

4. **KATJARANI (Wonkanguru Tribe)**. To the Katjara plain. This received its name from the Muramura, Piriana, who is said to have found it covered with a creeping plant like a cucumber, which provided him and his servants with food. He named the plant Katjara and called the plain after it.

The plant is represented by the tuft of vegetable fibre string at the top, and the white patch below it is the chalky plain on which the plant grows. The rest of the Toa is the plain, the black stripes and patches representing small creeks. The central, oval figure is a permanent water-hole. The red, lower part of the Toa signifies the colour of the earth of the plain, and the white dots trees. The white stripes bordering the black patches have reference to the chalky earth.

5. **KARARITJINI (Tirari Tribe).** To the place where the Muramura spun string out of the fur of the tails of the "White Kapita," probably the Rabbit-Bandicoot (*Thylacomys lagotis*). This string is called Kararitji. In the course of his wanderings the Muramura, Patjalina, came here with his disciple and, finding water, camped. Noticing many Kapita holes in the ground he resolved to kill the animals; their flesh was eaten, the fur rubbed off with rough stones, and the tail-tips made into a decoration. Eagles' feathers are attached to the head of the Toa because, according to the legend, the Muramura saw Eagles at this place.

The body of the Toa represents the plain, also called Kararitji, the yellow indicating the colour of the earth; the black bands and patches are water-courses and claypans where water stands for some time after rain.

6. **PARAITJIMANDRANI (Diari Tribe).** In the midst—literally in the belly (mandra)—of the light or lightning (paraitji). The topmost black spot signifies the place where the female Muramura, Paraitjimandrani (3), once came out of the earth with her two daughters and camped. One day the daughters went, after heavy rain, to bathe in a rock-hole, and thenceforwards took the form of two crocodiles. They left their mother, who followed them, but always a day behind. Every evening the pursuing and sorrowful mother made a fire and wept for her daughters, who, from afar, saw her in the fire-light warming herself; hence the name of the place. For five days the mother followed her daughters, but as she could not overtake them she left them to their fate.

The five camps are indicated by the five black spots below the top one; the red-coloured lower end represents the colour of the soil, and the white dots are the stones on the plain where the Muramura and her daughters camped.

7. **MARUPILAKANI (Diari Tribe).** To where the black stones lie on the plain. The Toa represents a plain in the middle of which is a great hollow (black stripe). In this hollow the female Muramura, Wariliwulani,

(3) The ending *ni* in this name does not denote a preposition, but is the sign of the feminine gender, *na* being the masculine form.

found a pool of water from out of which rose rocks: hence the name. The white circles denote boulders and the yellow dots at the lower end the scrub.

8. **MALTARANI (Diari Tribe)**. To the place of the emu feathers. There the Muramura, Billipanpana, made for himself a decoration of emu feathers; hence the name, and for this reason the Toa bears a tuft of these feathers. The rest of the Toa represents a plain with a depression in the middle (black) where water collects. The white dots are gum trees and the yellow ones scrub.

9. **TJUTJUPARANIPIRNANI**. To where the big snake lies. The white upper end represents a plain into which a creek (sinuous black band) with sandy bank (yellow) runs. Thither once came on his wanderings the Muramura, Kudnamitjirina, who, noticing the windings of the watercourse, said to himself "the watercourse winds in the plain like a big snake," and so he gave this name to the place.

10. **PURAMANINANI (Wonkanguru Tribe)**. To the place where the mud was scraped out. Here the Muramura, Kurkalina, once scraped out the mud from a hole in the creek with his hand in order to obtain drinking water. The white knob at the top represents a high hill near the creek, and the black vertical stripe the creek itself. The white dots are Magamaga trees growing on the banks.

11. **TJUTJUPARANI (Diari Tribe)**. To where a snake lies. The two girl Muramuras, Mankarawulu, are said to have wandered here in the form of snakes. The sinuous, black band represents a creek bordered by gum trees (white dots) which runs into a plain (white top) covered with bushes (yellow dots).

12. **NGAPAKUTUMARAPUNI (Tirari Tribe)**. To the many water-holes. Hither on his journey once came the Muramura, Patjalina, and found many holes washed out in the Cooper, which are represented by the three black circles on the Toa. The white top signifies that the Cooper spreads out and has no longer a definite bed. The red and white dots are trees.

13. **MURAMURADUNKANANI (Diari Tribe)**. To the place where the Muramuras arose. This is the name of an island in Lake Perigundi, where the first Muramuras are said to have come out of the earth. They were stiff on account of the dampness, but were soon warmed by the sun. The first to come forth is said to have been Wondamalirana together with his servants; he saw the others come out after him and gave the island its name. The top of the Toa represents a human head emerging from the earth, and the white part, below, the island with watercourses (red bands) and Winpara bushes (red dots) which grow there.

14. **MARARUNI (Wonkanguru Tribe)**. To the hand with four fingers, the Toa representing a four-fingered hand. The Muramura, Wutjukana, had a servant whose index and middle fingers had partly grown together as indicated by the Toa. The Toa also has a geographical significance, for when Wutjukana came to a gorge which divided into four branches, one being deeper than the others, he said to himself, "this place looks like the hand of the servant," and so he gave it this name.

15. **PIRRAWODANI (Diari Tribe)**. To the half-finished bowl. The Muramura, Pilikipana, intended to gouge out a wooden food bowl for himself, but having half-finished it he threw it away, and from it originated a water-hole shaped somewhat like a bowl. The head of the Toa thus represents a partly finished bowl, and the black bands below it the gouged out pieces of wood.

16. **WINPARAWONPANI (Diari Tribe)**. To the Winpara hill; so called because the Muramura, Yelkabalubaluna, found the hill overgrown with Winpara bush, a tuft of which is attached to the head of the Toa.

17. **PIRRAWOKARIBANANI (Diari Tribe)**. To the broken bowl. Here the Muramura, Ngardutjelpani, broke a bowl and she so named the place. The head of the Toa represents a broken bowl, and the two black bands two channels of Cooper's Creek. The broad white band is an elevation between the channels, and the narrower bands below denote elevations between other watercourses.

18. **MANJITANTANI (Wonkamarla Tribe)**. To the long lake, the whole Toa showing the form of the lake. The red ground at the top indicates the colour of the soil at one end of the lake on which grow gum trees (white dots), the rest of the lake bed being yellowish. The two black figures represent stones arranged in the form of emu tracks, because an emu is said to have stopped here once. The Muramura, Kurkarli, was the first to see the lake, and she gave the name on account of its length.

19. **WINKARAMINDRINI (Diari Tribe)**. To the Winkara invocation song. Here the Muramura, Winkarakalpina once sang his invocation to the Mura (Supreme Being). The Toa represents a sandhill which, at its upper part, is divided into two, the red knobs indicating parts that have been washed away.

20. **YERRANGARUNI (Yandruwanta Tribe)**. To the sloping banks. At this place the female Muramura, Ngutirini, noticed sloping banks which seemed to her remarkable. The Toa represents the bed of the Dingdinga Creek, which makes many bends (red marks), and it indicates how the water had washed out the banks.

21. **PARLAGUNKUNINANI (Diari Tribe)**. This Toa represents a locality at which a Muramura died from the consequences of his dissipated life. The white head represents a chalky hill overgrown with bushes (red dots). The ochre-coloured vertical band stands for Cooper's Creek, the banks of which are bordered by gum trees (white dots). The ball suspended by a cord from the head of the Toa has an anatomical reference.

22. **PIJARANI (Wonkanguru Tribe)**. To the ant-hill. Named thus because the Muramura, Godagodana, found an ant-hill at Cooper's Creek. The knob on the top represents the ant-hill, and the red dots on it the ants. The black crossbar just below the head stands for Cooper's Creek, the black circular patches for water-holes in it, and the white dots indicate gum trees.

23. **WARINGALKANI** (Significance not known).

24. **TJURARINI (Wonkamarla Tribe)**. To the clay-pan. The sloping knob on the top means that the clay-pan lies slanting in the midst of the sand-hills, its white ground indicating the chalky colour of the soil. The red band represents a depression in the clay-pan where water stands for some time. The absence of dots signifies that no bushes or trees are present. Once, after heavy rain, the Muramura, Piriana, finding water here camped for a time and went hunting with his servant.

25. **PITJILANI (Diari Tribe)**. To the bark bowl. Here the Muramura, Pirnaworankana, once made such a bowl for himself. The head of the Toa represents the utensil, and the white below is a plain overgrown with bushes and trees (yellow and white dots).

26. **BUNURUNI (Wonkanguru Tribe)**. To the cotton bushes. So named because the Muramura, Wutjukana, once found this place overgrown with these bushes. These are represented by the white dots; the yellow bands are indicative of the colour of the soil, and the white bars or strips of chalky soil which cross the plain. The two figures of unequal size near the top (yellow centre with white border) on a red ground are waterholes surrounded by red soil.

27. **PARIKARPAMALINANI (Tirari Tribe)**. To the two water-courses which bend towards one another. So named because the Muramura, Patjalina, once noticed how two branches of Cooper's Creek (black) curved towards one another. One branch comes from Kankuwula, the other from Kindalamanko. At Kanatalka the two branches unite and then again divide into two. The knob of the Toa represents an adjacent sandhill, and the red dots are trees growing along the Cooper.

28. **POTOBULUNI (Diari Tribe)**. To the white things. Here the Muramura, Yelkabalubaluna, is said to have decorated himself with white

down feathers. The Toa represents a part of the Kirraworduni Creek, and the oval knob is meant to show that it broadens out at this place. The yellow and black dots represent stones of these colours, which lie in the creek.

29. **PITILINANI (Wonkanguru Tribe)**. To the place where seed is ground. The Muramura, Karkalina, once rested here on his wanderings, and with two stones ground the seed he had collected into meal. The red lower end of the Toa indicates the colour of the soil of the plain, and the red and yellow figures above this are hollows where the water remains for a long time. The white dots are Magamaga trees which grow there.

30. **WAKATANI (Diari Tribe)**. To the Wakata ornament, a representation of which appears at the head of the Toa. The white band signifies a water-hole where once the Muramura, Wariliwulani, came out of the earth wearing this decoration. First appeared the ornament, then her head (red) with the forehead band (black) which held the former in place.

31. **MARAWUTJUWORINANI (Diari Tribe)**. To the pointing finger. The white swollen part of the Toa represents a plain crossed by two watercourses (red bands), and the black projection from the head stands for a pointing finger. From this plain arose the Muramura, Wariliwulana, who poked his finger out of the earth, his body soon following.

32. **JAKARANI (Diari Tribe)**. To the spring. The head of the Toa represents a steep hill on Cooper's Creek, which is overgrown with different kinds of bushes depicted as red and yellow spots. From this hill, in wet seasons, water trickles, which was regarded as a spring by the Muramura, Patjalina, who named the place. This water flows into Cooper's Creek (coloured black), which is bordered by gum trees (white dots).

33. **NGAMANIKALJAKUPANI (Ngamani Tribe)**. So called because the Muramura, Ngamanikaljakupana, is said to have, here, come out of the earth. The Toa represents a hill which has a top of white earth, from which the Muramura came forth. The white dots are stones.

34. **WOMADUNDRUNI (Diari Tribe)**. To the eggs in the body of the woma snake. (4) The white knob signifies a chalky hill on which the female Muramura, Ngattanimarumaru, once killed a snake, in the body of which were eggs.

35. **DOTINANI (Diari Tribe)**. To the notches. The white swollen part of the Toa represents a plain where once the Muramura, Pintanganina, had a well dug out. For climbing in and out he fixed two stakes and made

(4) Waite, Trans. R.S.S. Aust. xli, 1917, p. 436.

notches in them to serve as steps. These are represented by the two notched sticks surmounting the Toa.

36. **BALPARAKURATERINANI (Diari Tribe).** To where the Balpara birds lay. The Toa indicates a plain, the curved black bands creeks, the white spots gum trees, and the yellow scrub. The two notches at the top signify chalky hills which advance into the plain, the red ground showing the colour of its soil. On this plain the female Muramura, Ngattanimarumarū, once gathered seeds for herself and children and found Balpara birds' eggs. Therefore she thus named the place.

37. **MINTAPIRRAPIRANI (Wonkanguru Tribe).** To the curved and steep river bank. The Toa, by its curvature, represents a part of Salt Creek, which was examined by the Muramura, Kuruljuruna, who noticed its bend and steep banks. The black bands denote swampy and impassable places, and the yellow bands shallows with hard bottoms.

38. **KURIPINTANI (Tiari Tribe).** To the place where the mussel shells spring open. So named because here the Muramura, Patjalina, once found many gaping pairs of mussel shells. This is indicated by the cleft at the top of the Toa. The black marks signify deep holes in Cooper's Creek, and the white spots gum trees growing round them.

39. **MANAWILPARAMARANI (Wonkanguru Tribe).** To the place of the opened mouth (yawn). So called because here the two Muramuras, Malkumalkuwulana, yawned.

40. **KULATJERKINI (Ngamani Tribe).** To the pointed, twin branches. So named because the Muramura, Ngaltimpara, there noticed a tree from which a forking pair of branches was broken off. The Toa represents this tree.

41. **KANDRIWIRINANI (Diari Tribe).** To the place where the Kandri weapon entered. Here two attendants of the Muramura, Patjalina, once fought with Kandris (curved missile weapons pointed at both ends), and that of one pierced the body of the other so that he died. This happened on a plain (the white head), and the curved red stripe represents Cooper's Creek, the red lines meeting this at right angles being tributary watercourses. The yellow dots indicate that the banks of the creek are here overgrown with trees.

42. **TJILPIKURANANI (Wonkanguru Tribe).** To the place where a decayed, gnarled tree sprouted with young shoots. It is said that the Muramura, Kuruljuruna, arrived here on his wanderings, and noticing an old gnarled tree sprouting from the trunk he gave this name to the place. The

white head of the Toa represents the decayed tree, and the yellow dots the knots on it. The projecting piece indicates a shoot from the trunk.

43. **NGANKABURINANI** (To where the beard was torn out. Here the Muramura, Piridakana, once tore out his beard and threw it away, for which reason a tuft of hair from the beard is attached to the Toa. The rest of the head represents a bush-grown plain where the Muramura is supposed to have eaten.

44. **KUDNAMPIRANI (Diari Tribe)**. To the creek on which Kudnampira bushes grow. Twigs of this plant are fixed to the head of the Toa, which represents the Kirraworduni Creek where the bushes grow. The coloured spots indicate stones. Named by the Muramura, Yelkabalubaluna.

45. **TJIRIPALKURANI (Diari Tribe)**. To the place where the Tjiri and Palkura plants grow. The Toa represents a stony plain traversed by watercourses (red lines), and at the top are twigs of the Palkura plant. The Muramura, Tipankarana, finding this plain overgrown with both these bushes, so named it.

46. **PINGALPIRINI (Tirari Tribe)**. To the hill covered with Pingalpiri grass. The white knob of the Toa represents a sandhill encroaching on Cooper's Creek, which is covered with Pingalpiri grass (yellow dots). The curved vertical black stripe is Cooper's Creek, and the two black cross bars are waterholes in its course. The white dots represent bushes. Named by the Muramura, Patjalina.

47. **KANJALURANI (Tirari Tribe)**. To the place of small sharp stones. The knob represents a sandhill, overgrown with bushes (red and yellow spots), that projects into Cooper's Creek, which is represented by the black vertical band. This is bordered by gum trees (white dots). Here the Muramura, Turupillana, found the banks of the Cooper bestrewn with small sharp stones.

48. **NGANKUMILKINI (Diari Tribe)**. To the large waterhole which looks like an eye. The lower black patch on the Toa represents a waterhole in the course of Cooper's Creek. The white head is a sandhill bordering the creek, round which bushes grow in rings (red and yellow spots). Named by the Muramura, Parlangukuna, because the waterhole appeared to him like an eye.

49. **TAMPANGARATIRKANANI (Tirari Tribe)**. To the place where many pelicans stand. Here, on a lake, the Muramura, Mandramankana, saw many pelicans standing, and so named the place. The Toa represents a pelican's head.

50. **KIRRAWORDUWULUNANI (Diari Tribe)**. To the two short boomerangs. The Toa represents a tree stump with two broken branches.

Here the Muramura, Narimalpiri, observed a* watercourse having the form of a tree stump whose two broken branches resembled short boomerangs (Kirra); hence the name. The white parts of the Toa represent a watercourse, and the red portions holes in it.

51. **YIMINILINANI (Wonkanguru Tribe).** To where one clasps with the arms. Here the Muramura, Palungopina, rested, and clasped in his arms two of his dead attendants, whom he had brought with him. The upper part of the Toa represents a sandhill on which are several watercourses (red and yellow stripes). At the top of the hill is a solitary tree such as is recognized as a land mark, this being indicated by the erect tuft of fur. The black figure below the head signifies Salt Creek, which here expands into a lake with various small islands in it (white spots).

52. **PANTUMANDRUYAPARUNI (Diari Tribe).** To the two lakes where fish are caught. White denotes two lakes which are separated by an elevation of the land. In accordance with the name, fish bones are inserted into the head of the Toa.

53. (Name and significance not known.)

54. **TALPALINI (Diari Tribe).** To the two ears. The Muramura, Yelkabalubaluna, carrying about with him his two murdered sons, threw away, from time to time, parts of their bodies because they were too heavy for him. At this place he threw away the head of one son from which a hill, bush-covered, is said to have been formed. The two projections from the Toa represent the ears, and the hill, in fact, has two spurs opposite to one another, the soil of one being red and of the other chalky in colour.

55. **KARUWONKARLI (Ngamani Tribe).** To the grey hairs. So called because the Muramura, Karuwontirina, once sat here, and on hearing that two young people had eaten a fat snake, he turned their hair grey. Consequently a wisp of grey hair is inserted into the head of the Toa, which represents a plain crossed by two watercourses (red bands).

56. **NGATTIMARUNI & NGATTANIMURALYANI (Diari Tribe).** To the black, and to the red, child. Once there were two Muramura women, one of whom gave birth to a black child, and the other to a child of reddish colour. These children are represented by the two arms of the Toa, and the white part from which they spring signifies a waterhole, called Nintiwiya, in which grow gum trees (small red projections at the top of the white head).

57. **PIRIKUNDINI (Diari Tribe).** To Lake Perigundi, the name meaning crooked. This is a lake in the course of the Cooper above Lake Hope. The Toa represents, inside the outer red border, a lake basin which is flooded

in wet seasons, and when dry shows cracks and holes (red spots). The red border denotes a surrounding belt of trees, and outside this, the white denotes a margin of rushes. The Muramura, Wāntamalira, on coming to this place, noticed these features and so named it as above.

58. **PALKALARAMARANI (Diari Tribe)**. To the plain overgrown with Palkalara bush, a tuft of which is attached to the Toa. This place was discovered and named by the Muramura, Kuruljuruana.

59. **KALKUKULNUNI**. To the single clump of rushes. So named because, on a small flat amongst the sandhills represented by the white part of the Toa, the Muramura, Wirrakidnina, once saw a single rush stem growing, which seemed to him peculiar. A bunch of rush stems is attached.

60. **KUDNAKIRINI (Ngamani Tribe)**. To the Dysentery plain. On this plain, represented by the white knob, which was sparsely covered with Dikeri grass (yellow spots), the Muramura, Ngurakalana, had an attack of dysentery. The black patch denotes a waterhole surrounded by bushes (yellow spots).

61. **WIRLAMINTERANI (Diari Tribe)**. To shake the Wirla bush with the breast-bone. This bush, called also Danju, bears red berries and is much relished by both natives and emus. The Muramura, Yelkabalubaluna, noticing how an emu shook one of these bushes with its breast-bone and ate the berries which fell, gave this name to the place. The white knob represents a sandhill jutting into Cooper's Creek, from which the Muramura made his observation, and the three black patches bordered with yellow are waterholes, with yellow banks, in the river bed below the sandhill.

62. **DAKUNGARANGARANI (Wonkanguru Tribe)**. To the heart-shaped sandhill. The red ground of the body of the Toa represents a plain, on which are four waterholes lying close together, (the four black patches) with banks of yellow sand. The knob denotes a sandhill overgrown with bushes (red dots) which is said to resemble a heart, and so it was named by the Muramura, Ngaltimparana.

63. **WARILANI (Tirari Tribe)**. To the perpendicular banks. The head of the Toa represents a sandhill which is overgrown with bushes and trees (red and yellow spots). Below is Cooper's Creek (yellow) bordered with trees (red and white dots). Between the two a flood of the Cooper has broken through. There the Muramura, Patjalina, saw a waterhole and noticed the steepness of its banks.

64. **PADLANGAJINKILANI (Tirari Tribe)**. To where they went down. The black tip and stripe of the Toa represent waterholes. The two Muramuras, Katimarkara, went down from one hole to the other in the form

of crocodiles, their route being indicated by the wavy red band. The yellow dots are small stones, and the white spots bordering the black band, gum trees surrounding the waterhole.

65. **KALKABURITJINI (Yeluyanti Tribe).** To where the sunset faded. So called because on his wanderings the Muramura, Wutjukana, once came to a plain just as the sunset faded. The white head represents the plain, which was overgrown with bushes (red dots). The yellow ground below, indicates the nature of the soil, and the irregular black band the Kalkaburitji Creek, across which the natives can wade at a shallow place shown by the interruption. This creek is bordered by trees (white dots), and the red dots are bushes.

66. **WITJIKURAWINPANI (Tirari Tribe).** To the tracks of the whirlwind in the sand. When the Muramura, Patjalina, once came, hunting, to this place he noticed that a whirlwind had passed over it which had effaced the tracks of animals and had swept together a litter of leaves and grass: hence he named it thus. The white knob represents a sandhill overgrown with bushes (red dots) which adjoins Cooper's Creek. The crescent-shaped, black figure below indicates the creek itself, and the black vertical band a deep waterhole at the foot of the hill, which has been washed out by a flood. The surrounding borders of white and yellow signify soil of these colours, and the white spots, trees.

67. **WARTJIYAMPUNA (Diari Tribe).** To the place of honey-sweet fat. The Toa represents a peculiarly formed sandhill, overgrown with bushes (red and yellow spots), on which the spotted dog of the Muramura, Pirnarankana, killed an emu. As the Muramura ate its fat it seemed to him sweet as honey. Thankful to the dog for killing the emu he gave the above name to both dog and sandhill.

68. **KIRRAWORANAWIRINANI (Diari Tribe).** The Toa represents a painted boomerang (kirra) which is sent from camp to camp as an invitation to a tribal emu hunt. On reaching the camp the bearer lays down the kirra and enters without it, thus signifying that he comes without hostile intent. This method of invitation was devised by the Muramura, Mardubaluna, who sent one of his attendants with such a kirra to invite other Muramuras to a hunt.

69. **KIRRANI (Diari Tribe).** To the boomerang (kirra). Here, at Lake Gregory, the two female Muramuras, Ngardutjelpani and Watapajiri, quarrelled. The former threw a boomerang at the latter, and where it fell on the ground it is said that a crescent- or boomerang-shaped hillock arose

which jutted out into the lake. The Toa represents the hillock, and the red dots on it, scrub.

70. **WULPUNUNI (Tirari Tribe)**. To the flax plain. The Toa represents the plain, which is overgrown with flax bushes (yellow and white spots), and at the head of it is a tuft of the prepared fibre. Here the Muramura, Yikaura, prepared flax from the bushes.

71. **KATARUNKANGAMANI (Wonkanguru Tribe)**. To where the white cockatoos sit. The Toa represents a branch of Cooper's Creek, where the Muramura, Kuruljuruna, once camped. There he saw a number of white cockatoos sitting (white dots), for which reason feathers of this bird are attached to the Toa.

72. **DIKULUWORANI (Ngamani Tribe)**. To the place of the cane-grass (Dikulu). The Muramura, Ngandawarana, once finding the plain overgrown with this grass, so named it. The white head represents the plain, and the yellow dots the clumps of cane-grass. The two projections denote hills of red coloured earth which encroach on the chalky plain.

73. **KIRRAMANDRANI (Diari Tribe)**. To the finely curved boomerang. The Toa represents a plain, in the middle of which is a waterhole (black patch) surrounded by trees (white dots). Here the Muramura, Pirnawarankana, finished making a boomerang which had a beautiful curve.

74. **PARAKAMARALYINI (Diari Tribe)**. To the red slope. So called because here the Muramura, Darana, noticed an incline of red earth.

75. **KAPITAPIRNARUWULANI (Diari Tribe)**. To the two male Kapitas (Rabbit-bandicoot, *Thylacomys lagotis*). So named because the Muramura, Nurawordubununa, once came to this place and saw two Kapitas. The Toa represents the head of the animal.

76. **PAYAWORLANI (Ngamani Tribe)**. To the bird's nest. The Toa represents a nest made of mud which the Muramura, Piritintina, once saw there in a tree. As he had never seen the like, it appeared to him so unusual that he named the place after it.

77. **PARLANKARANI**. The meaning of this word is unfit for expression. The Toa represents a bush-clad hill where once sat the Muramura, Mardubudatupura, with the Mankara-worana, that is with girls whose souls are now believed to be the Pleiades.

78. **WIRKARIPUDLANI (Wonkanguru Tribe)**. To the two watercourses. So named by the Muramura, Godagodana. The yellow ground of the Toa represents a plain with soil of that colour, and the black sinuous band two watercourses which join on the plain. The white knob studded with red dots indicates that the upper end of the plain is beset with small stones.

79. **NGANPANAWIRINANI.** To the place of furious anger. The Toa represents a watercourse crossed by rows of trees (white stripes). Here, with uncontrollable rage, the Muramura, Kirlawilina, fought with his uncle.

80. **TAMPANGARAKURATERINANI (Diari Tribe).** To where the pelicans lay. This is the name of a lagoon in a swamp where the pelicans breed. So called because the female Muramura, Marumarunu, once came here and found many pelicans' eggs. The lagoon, also, appeared to the Muramura to have the shape of a pelican's foot, which she attributed to the fact that one of these birds had trodden there. Thus the Toa has the shape of a pelican's foot.

81. **KUTIRANI (Tirari Tribe).** To the crooked place. So called because the Muramura, Patjalina, noticed that the part of Cooper's Creek which the Toa represents was very crooked. The white dots are gum trees which stand in the bed of the creek.

82. **NGANTIBURUNANI (Diari Tribe).** To where the animal squats. Here the Muramura, Karuwontirina, once saw two emus squatting and sleeping together behind a bush. The Toa represents an emu, the oval swelling at the top end being the head and beak; the succeeding narrow part denotes the neck, and the yellow dots the ribs.

(When the emu squats, it rests flat on the ground with the neck stretched straight out. The Toa represents the body of the bird in this position.)

83. **KIRRATARANANI (Diari Tribe).** To the place where the boomerang (kirra) ascends. The white section of the Toa represents a waterhole with sandy banks (yellow). Here two servants of the Muramura, Dimpiwalakana, threw their boomerangs, which ascended in an unusual way.

84. **TURUKURUNI (Diari Tribe).** To the firesticks. So named because once the Muramura, Turipuwulana, made fire here by rubbing pieces of wood together. The pointed projection from the head of the Toa represents a piece of wood so used. The knob denotes a waterhole, and the red stripes rows of trees which cross it.

85. **WOMAMAKUNI (Diari Tribe).** To the snake's skeleton. The Toa represents such a skeleton, which was found by the Muramura, Billipilpana, on a plain. This is traversed by a deep watercourse (longitudinal, wavy, red line) which receives tributary channels on each side, this arrangement suggesting the appearance of the back-bone of a snake (woma) with its attached ribs.

86. **MALKAMALKANI (Kuyani Tribe).** To the many marks. So named because, here, the female Muramura, Malkamalkani, painted herself with marks similar to those shown on the Toa.

87. **NGAPAMANAWORANI (Diari Tribe).** To the place where the Manawora plant stands in water. This is a cucumber-like creeper, a piece of which is affixed to the head; the latter represents a water-covered flat in which the Muramura, Patjalina, found these plants growing (red spots).

88. **KARLAYERINANI (Diari Tribe).** To the rush buds. So called because here, on Cooper's Creek, represented by the white head of the Toa, the Muramura, Darana, found rushes in bud. A bunch of these is affixed.

89. **NGANTIMINKANI (Diari Tribe).** To the animal's hole (in which a crocodile was supposed to live). The white at the top represents chalky soil, and the two black spots the entrances to the hole. The yellow rings round the black spots, and the yellow cross-bar, indicate sand of that colour. The marks on the rest of the Toa represent the decorations painted on the chest and belly for the great annual (Mindiri) festival which was held at this place.

90. **WARIWARINGURANI.** To the place of Wariwari plants. The white head represents a flat which the Muramura, Yikaura, found overgrown with this plant. The red ground denotes a creek, and the white spots, gum trees.

91. **DAKUWORDUNI (Wonkanguru Tribe).** To the short sandhill. So named because when the Muramura, Wadlulana, once came to this place and saw the sandhill he was surprised at its shortness. The hill is represented by the knob, and the red dots the bushes with which it is overgrown. The black patch is a watercourse which empties itself into Salt Creek, and the surrounding yellow band denotes the colour of the banks on which no trees grow.

92. **MARDALBURUNI (Diari Tribe).** To the place of the small, sharp stones. The body of the Toa represents a river bed bestrewn with small, sharp stones (red and white spots), and the knob a sandhill overgrown with bushes (red spots). Here the female Muramura, Wittimarkani, did not stop long because of the pain caused by the stones.

93. **TURPAKUPARUWALUNI & TURPAKUDRUNANI (Yandruwonta Tribe).** Meaning "to the two ash-coloured young dogs," and "to the ashes on the knoll," respectively. The Toa represents an island in Lake Gregory with a curved outline, which had been broken through by water (transverse red stripes). At the convexity of the island, the land rises into a knoll, on which the female Muramura, Ngardutjelpani, once sat and made a fire, thus leaving ashes.

94. **WONKUTURUNI (Ngamani Tribe).** To the snake's back. The Toa represents a sandhill where the Muramura, Darana, once found a snake which, when provoked, arched its back as indicated by the red prominence.

95. **NGURAKIRRANI (Diari Tribe).** To the crooked leg. So named because one of the attendants of the female Muramura, Wittimarkani, had a leg bent like a boomerang, though he, nevertheless, was able to throw this weapon (kirra). White represents the plain, and the boomerang-shaped head has reference to the bent leg.

96. **WARUKATI WALPINI (Diari Tribe).** To the place covered with emu bones. The white knob represents a chalky plain on which the Muramura, Patjalina, found many emu bones; hence he gave this name and, in accordance, pieces of this bird's bones are affixed. The white dots on the bones and below the knob are small, sharp stones with which the ground is covered.

97. **KIDNIPARKALINI.** Unfit for explanation.

98. **NGANDAWORANI (Diari Tribe).** Meaning "to stretch the leg." Here arose out of the earth the Muramura of this name, and, feeling stiff and cold from the damp earth, he stretched out his legs in the warmth of the surface. The head of the Toa represents the form of the hill, out of the flat top (white) of which the Muramura is said to have arisen. The red and yellow denote earth colours.

99. **MAMPINUDLANI (Diari Tribe).** To the head of the Mampi bird. The white part of the Toa represents the shape of a limestone hill, and the red spot a depression thereon. The red band encircling what corresponds to the neck indicates that the hill is divided by water. When the Muramura, Pillakana, saw this formation it struck him that it resembled the head of a Mampi bird; hence its name and the form of the Toa.

100. **PALKARAKARANI (Diari Tribe).** To where the spirits rise up. So named because the Muramura, Mitjimanamana, saw here the spirits of the dead. The white base of the lower division of the head of the Toa represents the earth, that below the upper division the heavens, the constriction between the two parts denoting the intermediate region of air. The white stripes on the lower division are the spirits ascending to the heavens from all directions, and the white spots on the top are stars which are symbolical of the spirits.

101. **i WIDLAPIRNAWULANI, or ii PAJANGURANI (Diari Tribe).** (i) To the place of the two venerable women; (ii) to the place of birds. The Toa represents an island in Lake Gregory named Pajangura, or place of birds. Here the two female Muramuras, Watapajiri and Ngardutjelpani, once searched for birds' eggs on the island during the laying season. The island was covered with white, yellow, and black stones, which are represented by the bands of these colours. The circular spots on the white ground

of the head, denote swans' nests, and the two projecting arms are peninsulas of the island, their black tips also representing stones of this colour.

102. **NGARLIWORANKANI (Wonkanguru Tribe).** To the plain, into the left side of which a little watercourse runs. The Toa represents the plain, which is overgrown with various sorts of trees and bushes (red and yellow spots), but the watercourse is not indicated. Discovered and named by the Muramura, Kurkalina.

103. **PAYAMARDANI (Ngamani Tribe).** To Egg Hill. The white swelling below the top denotes a hill on which "petrified eggs," such as that forming the head of the Toa, are supposed to lie. Here the Muramura, Ngardutyelpani, in the form of a bird, is said to have laid eggs and died.

104. **PIRRANGARIMANI (Yeluyanti Tribe).** Meaning "to shake the food bowl." Here the Muramura, Marluna, collected seeds and winnowed them from the husks by shaking them in a bowl. The Toa shows the shape of the bowl as the Yeluyanti people used to make it. The dots on it represent the incised markings.

105. **MARDUBALUNI (Diari Tribe).** To the white stone. The head of the Toa represents the shape of a limestone hill, the red ring at the top indicating prominent stones. The red, vertical stripes at the lower part, denote watercourses running down the hill into a water-hole (red band just below the head), and the other red bands smaller holes whose water flows into the Mardalburuna Creek, which was so called by the Muramura of that name.

106. **TURUPILLANI (Tirari Tribe).** To the charcoal. The white head of the Toa, to which a piece of charcoal is attached, represents a plain on Cooper's Creek where the Muramura, Turupiwulana, is said to have come out of the earth and to have invented the Wilyaru ceremony. On this plain the Cooper divides into two branches (represented by the two red bands) which re-unite. The charcoal has reference to the fact that the Muramura taught the practice of sprinkling ashes on the boys undergoing the Wilyaru ceremony.

107. **MILKIWILPAWULUNI (Wonkanguru Tribe).** To the two eyes. The Muramura, Yikaura, on coming once to this place found two water-holes close together like two eyes, and they are thus represented on the Toa. The yellow ground denotes the colour of the plain, and the white dots are gum trees. The white top signifies a sandhill which juts into the plain.

108. **MALKAKURKUNANI (Tirari Tribe).** To the Malka fruit. Named by the Muramura, Kaparaniwirina, who, finding a hill covered with these bushes, ate the fruit. The white knob represents the hill, and the yellow

spots the bushes. The black stripes are watercourses from the hill, which run into a waterhole at its foot (black vertical stripe), the banks of which are bordered by gum trees (white spots).

109. **TULATAPANI (Ngamani Tribe)**. To the stone knife's wound. Named by the Muramura, Pillapilpana, who, at this place, chipped stone knives into shape. In melting resin for making hafts for them he burned his fingers. The white head of the Toa indicates the plain on which the Muramura found the stones, pieces of which are inserted into the head.

110. **KIRKATINTINI (Diari Tribe)**. To the half-finished boomerang. White represents a plain on the Cooper where a certain Muramura was going to make a boomerang, but he did not complete it; hence the name. The Toa represents the unfinished weapon.

111. **KAKURAWORLAKI (Diari Tribe)**. To where the Kakura bushes wave. The white head of the Toa represents a waterhole, and it bears a sprig of Kakura bush. The Muramura, Warlatana, discovered the hole, and as the wind was blowing the bushes waved.

112. **PANKAPANKARABURUNI (Wonkanguru Tribe)**. To the rush plain. So called because the Muramura, Palangopina, once came here and found it overgrown with rushes. The plain is represented by the white oval head, and the rushes by the yellow spots and the bunch attached.

113. **PALKALARABURUNI (Tirari Tribe)**. To the place of Palkara bush. Palkara is a kind of salt-bush which is represented at the top of the Toa. The white part denotes a plain, and the red marks depressions in which water remains for some time. Here, after rain, the natives stay for as long as the water lasts.

114. **PANYIWORDUNI**. To the place of the sharply-pointed bone. Here the Muramura, Mardabaluna, found people with such a bone, which is used as an instrument of magic as well as for extracting splinters and thorns from the feet. The white ground of the knob represents the plain on which this happened, and the red spots Pulpuru bushes. A pointed bone is inserted.

115. **WULPUWULPUNANI (Wonkanguru Tribe)**. To the Wulpu plain. Wulpu is a plant that yields a flax-like fibre, and a piece of this prepared for spinning is inserted into the head of the Toa. The head of the Toa represents a plain overgrown with Wulpu bushes (yellow and white spots) which was discovered and named by the Muramura, Patjalina.

116. **PANINKULANI**. To the bark bowl. The white knob represents a plain where, once, the female Muramura, Narimalpirini, gathered seeds, and having no bowl with her, she stripped the bark from a tree and made a recep-

tacle into which she put the seeds she had collected. Such a bowl is represented by the piece of bark at the head of the Toa, and the tree from which the bark was taken is said to exist to this day.

117. **MINDRINGAPANI (Diari Tribe)**. To the place where Mindri bush stands in the water. The white of the head of the Toa represents a plain, and the black band below, a waterhole in which Mindri grows, a bunch of this plant being affixed. The yellow rings mean sand, and the white and red bands soil of these colours. Named by the Muramura, Kirrapajirka.

118. **KULUWAMULURANI (Diari Tribe)**. To the little Kuluwa bushes. The white head represents a plain with watercourses (red bands) which the Muramura, Yelkabalubaluna, found overgrown with these bushes. Hence the tuft of Kuluwa twigs at the top.

119. **DITJILUNI (Diari Tribe)**. To the stars. The white head of the Toa represents a waterhole in which, when drinking one evening, the Muramura, Godagodana, saw reflections of the stars, which are denoted by the red spots. The white band below the head is another waterhole.

120. **KANTJALURANI (Diari Tribe)**. To the big stones. The white head represents a hill on the Cooper covered with large stones, and the two red bands on the stem signify hollows with banks of red soil. Name of the Muramura who discovered the place not known.

121. (Name and details not known.)

122. **YUKARANI (Tirari Tribe)**. To the spring. Here the Muramura, Patjalina, once discovered two springs and, on account of the excellence of the water, he camped there with his attendants. The twin points of the Toa represent the two springs, the water from which runs down into a waterhole (black). The white, yellow, and red bands indicate the differently coloured sands which have been washed up on the banks.

123. **NGARUMADLINTJANI**. To the worthless emu feathers. The white of the Toa represents a flat between sandhills (red) where water collects. Here the Muramura, Worawakuna, stayed for some time, and when two women asked him for emu feathers he gave them an inferior sort. This suggested the name for the place and, in accordance, emu feathers of inferior quality are affixed to the Toa.

124. **KANJALURANI (Tirari Tribe)**. To the place of little sharp stones. The knob of the Toa represents a sandhill overgrown with bushes (red and yellow spots) that projects into Cooper's Creek. The black, vertical band denotes the Creek itself which is bordered by gum trees (white spots). The Muramura, Turupillana, here, found the banks of the Cooper bestrewn with small stones.

125. **TERIWULANIPITAWUTJUNI (Diari Tribe).** To the firestick of the two young men. Details of this Toa are not known.

126. **NGURLUWARILANI (Ngamani Tribe).** To the high forehead. The head of the Toa represents a plain on Cooper's Creek, and the red stripes the cracks in the ground in dry seasons. The white band, below, is a depression in the plain. The Muramura Darana's dog, which he called Ngurluwarila because it had a high forehead, tried to run away here, and so he named the place after it.

127. **MANATANDRANI (Diari Tribe).** Meaning to the tooth. Details not known.

128. **DITJILUNGANI.** Meaning "this is, indeed, a star." The Muramura, Winkarakalpina, wandered here one night and, seeing a shooting star, he was frightened, and exclaimed: "this is, indeed, a star!"

129. **KIDNIKALUWULUNI (Diari Tribe).** To the two hills. Here the Muramura, Yelkabalubaluna, wandered about, carrying with him his two dead boys. On one occasion he is said to have thrown away his two testes, from which arose two adjoining hills. These are represented by the two knobs of the Toa. The black patches at their ends denote stones of that colour at the tops of the hills. The red and white bands on the knobs signify layers of stones on the yellow soil of the hills.

130. **YADINGURANI (Diari Tribe).** To the place of the spindle. The shape of the Toa is intended to represent a spindle (yadi) with two crossbars on which string is wound. So named because the Muramura, Nurawordubununa, once sat here on the plain and made a spindle for himself.

131. **PIRRANGURANI (Diari Tribe).** To the "Moon camp." The central prominence of the Toa represents a hill round which are banks of red, white, and yellow sand, indicated by the circular bands of those colours. The central point of the prominence indicates a crater-like depression, and the radiating red lines are watercourses which lead into it. Here the Muramura, Pirra, is said to have appeared out of the earth. The black areas between the radiating lines signify that he was burned there by his children.

132. **PANTUNI (Diari Tribe).** To the lake. The Toa is a representation of the shape of Lake Hope (Panto). The red circle in the middle is a deep place where the Muramura, Nurawordubununa, originally came forth, and the bed of Cooper's Creek is said to have formed itself along the line of his tracks. It is also said that the bitch, Pantupayani, with her young, lived in the hole out of which the Muramura came forth, and that, later on, the female Muramura, Ngattanimarumaru, enticed them to her. The red spots

on the reverse side of the Toa indicate places where the Muramura, Pintanganina, fixed stakes for his fishing nets. These are believed to have taken root and to be standing there to-day.

133. **KURLAMANKINI (Wonkanguru Tribe).** To where the water-course spreads out. The body of the Toa represents a flat where Salt Creek spreads out to such an extent that it is no longer a definite channel. The red and yellow spots indicate that various bushes grow on the flat, and the two red prongs below, denote river channels which receive water from the flat.

134. **NURAWORDUPUNUNANI (Diari Tribe).** To the place where the Muramura, Nurawordubununa, crept into the earth. The white head denotes a plain surrounded by hills (red) where this event happened. The projecting arms represent two sticks (kunya), which the Muramura wore in his hair.

135. **MINKAYERINI (Wonkanguru Tribe).** To the open grave. The white ground of the body of the Toa represents soft ground on Salt Creek, which is overgrown with bushes (red and yellow spots), and the upper red bar denotes harder ground. The gap between the bar and the body of the Toa represents the grave itself, which was dug by the Muramura, Palungopina.

136. **KALDRITJERKANANI (Diari Tribe).** To the place of warlike gestures. Wishing to kill Pitikipana the Muramura, Marluna, here made threatening gestures with his spear. The Toa represents a curved hill at the top of which are black stones (black top), and below this is an encircling belt of limestone (white). The red lines denote watercourses running down the hill. The black top also symbolizes the blackened cap (kabuluru) which a native wears when going on an avenging expedition.

137. **MARDAMARDAPARINANI.** To the place where many stones lie about. So named because on this plain (white top) the Muramura, Karluwarankana, found many large stones.

138. **KARKUMARRANI (Diari Tribe).** To the beautifully coloured hole. So named because the female Muramura, Wariliwulani, here discovered a red-coloured hole, which the head of the Toa represents.

139. **KUTJIELIDIJANI (Diari Tribe).** To the place from which the devil was hunted away. The white knob in the middle of the Toa represents a waterhole, and the part above, a sandhill having a curved form. As the Muramura, Mandramankana, sat at this waterhole, one evening, the devil crept out to take possession of one of his attendants; but the Muramura chased him away with his boomerang, and, where it fell, arose the curved sandhill.

140. **MULUMPIRINI (Yauraworka Tribe).** To the Mulumpiri water-bird. The Toa represents the head of a bird which the Muramura, Kirlawilina, saw swimming on a lake, so he gave the same name to both bird and lake.

141. **BILLITJILPINI (Diari Tribe.)** To the knotted net. The Toa represents a net stretched over a ring which is made of a bent root. At the same time the ring denotes a waterhole, at one end of which are some trees (red spots). The female Muramura, Wittimarkani, once made nets as she sat at this place, and, in so doing, she discovered a new way of making them by introducing a knot at each mesh, so that if torn the net would not come undone.

142. **NGARAKALINANI (Diari Tribe).** To where they warmed themselves. The Toa represents a hill, the top of which is pointed, and the lower part is constricted; the red stripes are rows of small stones. Here the female Muramura, Watapajiri, once stole fire from the two Muramuras, Putantara. The wind was cold, and neither of the two latter had the firesticks wherewith to make a fire, so they slept on the hill in one another's arms to keep themselves warm.

143. **NGANTITIDNAPIRINI (Diari Tribe).** To the emu's tracks. The top of the Toa represents the foot of this bird, and the white, below, a waterhole. The two Muramuras, Wontamarlirana and Katakuntjirina, once came to this place and observed the tracks of emus, which told them that these birds came here to drink. Hiding behind bushes, the Muramuras killed the emus and greatly relished their flesh.

144. **POTUWORDUNI (Diari Tribe).** To the little things. Under the name "little things" (Potuwordu) are included small articles such as stone chisel heads, bone needles, pieces of sinew, etc., which are carried about in a small wallet. The black vertical band represents a low-lying flat on which various kinds of bushes grow (yellow spots). Surrounding it are gum trees (white spots).

145. **PARUWALPANI (Diari Tribe).** To the place covered with fish. When the water in Lake Kirlawilpani became salt the fish died and were thrown up on the shore by the waves. They were collected by the Muramura, Pitikipana, for drying in the sun, and there were so many that the place was covered with them; hence the name and the form of the Toa. (The dried fish are pounded into a meal by the natives and kept in this form for future use.)

146. **PUNKUTUNI (Diari Tribe).** To the flax plain. The white head represents a plain traversed by watercourses (red stripes), on which the Muramura, Patjalina, once found many Punku bushes. At the top is a piece of the flax prepared for spinning (punkutu).

147. **KARLAKARLANI**. To the rush plain. So named because when the Muramura, Pirnaworankana, came to the plain he found it overgrown with these plants. The white ground of the head of the Toa represents the plain, and the red spots clumps of rushes. A bunch of rush heads is attached.

148. **KALYUMARUNI (Yauraworka Tribe)**. To the Kalyu plain: So named because the Muramura, Nurawordubuna, found it overgrown with these bushes, a bunch of which is affixed to the Toa.

149. **KULUWANTANI (Diari Tribe)**. To the Kuluwa flat. So named by the Muramura, Pintanganina, because the flat was covered with Kuluwa bushes (Needle bush, a species of *Hakca*) a bunch of which is affixed to the Toa. (This species of *Hakca* is one of the plants from whose roots a supply of water can be obtained in seasons of drought.)

150. **PALPALITANTAMALINANI (Tirari Tribe)**. To where they quarrelled on the Palpa bush plain. Here the two Muramuras, Billipilpana and Kapaniwirina, quarrelled. Twigs of the Palpa bush are affixed to the Toa, and the red figures below denote two waterholes.

151. **WORALAMANKUNANI (Wonkanguru Tribe)**. To the place where side roots grow from the main root of the Woralu plant. Woralu roots are eaten, and when the Muramura, Patjalina, once dug up these plants from the plain, he found the appearance mentioned. The Toa represents the plain traversed by watercourses (red and yellow stripes), and twigs of the plant are attached.

152. **KIRRAWORDUNI (Diari Tribe)**. To the short boomerang (kirra). Here the Muramura, Yelkabalubaluna, killed his son with a weapon of this sort, which the Toa represents. It also represents a bend in the Cooper, the white stripes denoting water channels in the river bed.

153. **NGAPANGANDRINI (Diari Tribe)**. To the mother of waterholes, *i.e.*, to the biggest waterhole. So named by the Muramura, Darana, because it was the largest waterhole he had ever seen. In kneeling to get a drink, Darana pressed his hand upon a stone, the imprint of which is said to remain to this day. For this reason the Toa has the form of a hand.

154. **MURAMURATIDNANI (Diari Tribe)**. To the foot of the Muramura. So named because the Muramura, Darana, trod on a stone on which the impress of his foot is said to remain to this day.

155. **MANKAMANKARAWORANI (Diari Tribe)**. To the young girl. The Toa represents the bust of a young girl—the maid of the female Muramura, Wittimarkani, who, after a heavy rain, bathed in a waterhole, and saw in its shape a resemblance to the form of the girl. Hence the name. The white

of the Toa represents the waterhole, and the two breasts deep parts of it. The red bands on the neck and head signify elevations of the land.

156. **TJUKURUTIDNANI**. To the kangaroo's foot. The Toa represents a hind foot of this animal, but the particulars of its reference are not known.

157. **NGANTIBURUNANI (Diari Tribe)**. To the place where the animals crouch. The Toa represents the heads of two Tidnawarukatji animals, because when the Muramura, Karuwontirina, came here he saw these animals crouching.

158. **TIDNAWARUKANANI (Diari Tribe)**. Meaning "to lift the foot." So named because, when the female Muramura, Noangandrani, killed her husband, she crept up to him while he slept and lifted her foot in the act of striking. The Toa thus represents an uplifted foot.

159. **TJTJUTULURANI (Kuyani Tribe)**. To the snake's back. To the Muramura, Papapapana, who once came here, the range of hills appeared like a snake's back; hence the name he gave. The white parts of the Toa indicate the limestone nature of the soil, and the red patches stones of that colour.

160. **PAYATIDNANI (Diari Tribe)**. To the bird's foot. Here the Muramura, Darana, once saw a Mulpu bird standing upon a large stone, and when it flew away it had left the impress of its foot upon the stone. The red part of the base of the Toa represents the foot-print, and the white below, the stone.

161. **TILTJAWATAPATANANI (Diari Tribe)**. This name means "are not your legs weary?" Here the Muramura, Yelkabalubaluna, met another Muramura and told him how far he had travelled. The latter then said: "*tiltjayinkani wata patai?*"—are not your legs tired. The former then moved his leg, as represented by the Toa to show that he was not weary.

162. **NGATTANIMARALJANI (Diari Tribe)**. To the red daughter. So called because the Muramura, Pirranguruna, here found a mother with a reddish-coloured daughter, which seemed to him remarkable. The larger of the two prominences represents the mother, and the smaller, the daughter.

163. **PARALKUTERKANANI (Diari Tribe)**. To where the Paralku bird stands. The white ground represents Lake Hope, and the red colour three peninsulas jutting into it. Because the Muramura, Darana, found many Paralku birds there, and because the disposition of the three peninsulas resembled a foot-print of these birds, he so named the place.

164. **TIDAPIRNAYAWAKANI (Wonkanguru Tribe).** To the large and small projections. The red part of the Toa represents an elevated plateau tapering towards the two ends, from which project a large and a small stony hill (black). Noticing these formations the Muramura, Pataramuruna, gave the name Tidapirna to the larger hill, while the smaller he called Tidawaka. Tida means constriction.

165. **WONAWARUNI (Diari Tribe).** To the Wonawa mushroom. The white stem denotes a waterhole, and the red band a creek; at the top is a representation of a mushroom of the kind named. Here the Muramura, Kirlawilina, found many of these fungi, and so named the place.

166. **KUNYANI (Diari Tribe).** To the pointed sticks. Kunya are pointed sticks of various kinds used as awls or needles, and for other purposes. The two arms of the Toa represent such sticks, and the head denotes a plain scored by watercourses (red marks). Here, with such a stick, the Muramura, Godagodana, mended his net bag (billi), and named the place accordingly.

167. **KAPARAMARANI (Diari Tribe).** To the roots like fingers. The Muramura, Darana, once noticed how, on an arm of Cooper's Creek which entered Kaparamara Lake, the roots of the trees had grown out like the outstretched fingers of an opened hand. The white of the head of the Toa represents the lake, and the red projection the branch of Cooper's Creek which runs into it.

168. **PAYAMOKUNI (Diari Tribe).** To the bird's bone. So named because the Muramura, Mankaraworana, once used a bird's bone for piercing the partition between the nostrils. This act is symbolized by the bone transfixing the head of the Toa. The white knob denotes a plain where the event occurred.

169. **KAPITAKUNI (Diari Tribe).** To the Kapita holes. The Toa represents the head of a Kapita (Rabbit Bandicoot, *Thylacomys lagotis*). So named because the Muramura, Wilarawulana, once came here and found many holes of this animal.

170. **TJAKULANI (Diari Tribe).** To Tjakula Hill. This hill has the shape of a dog's head, which the top of the Toa represents. Upon this hill stood the Muramura, Pintanganina, whose dog, Tjakula, ran down to an adjoining waterhole to drink.

171. **DIYAKAPARANI (Diari Tribe).** To the place where the lateral roots branch out from the main root. The white of the head represents a place on Cooper's Creek where the earth had been washed from the roots of the

trees so that they could be seen. The middle vertical, red stripe on the knob indicates the main root, and those on each side the laterals.

172. **MARDALBURUNI (Pillatapa Tribe)**. To the place bestrewn with small stones. The white head denotes a waterhole, on the bank of which the female Muramura, Wittimarkani, once found many small, sharp stones that hurt her feet. In reference to this a small stone is affixed. The red parts of the head represent channels passing through the waterhole.

173. **NGATJINANI (Diari Tribe)**. Meaning "to the request." Here the Muramura, Kirlawilina, begged his uncle to allow him to marry a girl of the place. The Toa represents a human head which is supposed to resemble a hill in the locality of the above name. The red and white of the Toa denote soil of those colours. In the position corresponding to the eyes, mouth, and nostrils are caves in the hill, into which the girl was obliged to crawl to hide from Kirlawilina.

174. **WINTIKARUNI (Diari Tribe)**. To the grey winti (pubic hair). The white knob represents a waterhole at which the Muramura, Kalukupana, is said to have pulled out his grey, pubic hair, for which reason a tuft of such hair is affixed to the Toa.

175. **KURINI (Diari Tribe)**. To the mussels. The Toa represents a waterhole in which the Muramura, Turupivulani, found many mussels. A mussel shell is consequently affixed.

176. **PARAKALANI (Diari Tribe)**. To the bald head. White represents a plain, at which the Muramura, Kuruljuruna, once stopped. Because his father, Parakalana, was bald the place was thus named.

177. **PIRRAPIRRANI (Diari Tribe)**. To the ring. So called because the two Muramuras, Putantara, here discovered a plain surrounded by a belt of sandhills. For this reason the head of the Toa has the form of a ring.

178. **MARUPITINI (Diari Tribe)**. To the black hole. The piece of charcoal affixed symbolizes the blackness, and the rest of the head of the Toa denotes two small wet flats amongst sandhills, which are separated by an elevation (central red band). This hole was discovered by the Muramura, Kirlawilina, and is said to exist to this day.

179. **WURUMANI (Yauraworka Tribe)**. To the Wuru bird's beak. So named because the Muramura, Nurawordubununa, saw in the water-course of Cooper's Creek a beak of this bird, as represented by the projection. The creek spreads out on to a plain (white), and then again assumes its channels (stem of Toa). In the middle of the plain is a waterhole (eye spot).

180. **PALPARANANI (Diari Tribe)**. To the place of Palpara bushes.

So named because the Muramura, Kurkalina, found a waterhole (black stripe) surrounded by these bushes (yellow spots).

181. **KANTIKANTIWORKUNYANI (Ngamani Tribe)**. To the plain where roots branch out. The white head represents a plain, surrounded by ironstone (red band), where the Muramura, Pirratintina, in digging up roots to eat, found that the main root gave off laterals. These are indicated by the two red arms projecting from the knob.

182. **YANDAKUPANI (Diari Tribe)**. To the plain where the Muramura carved a yanda (a wooden slab or "bull-roarer" used in certain ceremonies, generally known as yuntha in the Cooper's Creek district). So named because, here, the Muramura, Turupillana, made himself such an instrument for the Wilyaru ceremony. The Toa has the form of a yuntha, and at the same time represents a plain crossed by watercourses (yellow bands) covered with gum trees (white spots).

183. **TURUKURANI (Diari Tribe)**. Meaning, "to sit on the back." The Toa represents a sandhill perched on the back of another or, so the formation appeared to the Muramura, Nurawordupununa. The red lines denote watercourses.

184. **PITYIBAKANANI (Diari Tribe)**. Meaning, "to peel off the bark." The white knob represents a plain where, once, the female Muramura, Wariliwulani, stripped the bark off a tree to make a vessel for carrying seed. This is indicated by the piece of bark attached to the Toa.

185. **WONKUTURUNI (Diari Tribe)**. To the sandhill having the form of a snake, which, under provocation, arches its back. The shape of the Toa represents the contour of this hill, whereon the Muramura, Darana, once stood and contemplated the expanse of a large plain into which the hill runs out. The white head of the Toa denotes the hill, and the red point the plain.

186. **MANDAMARUNI (Diari Tribe)**. To the broad waistband. The Muramura, Pirnaworankana, thus named a creek near Mangurani (Munge-*ranie*). Its watercourse (white) spread out in such a way that it appeared to him like a broad waist-girdle worn by a stout man, and thus he named it. The red and yellow spots signify that the flat is overgrown with bushes.

187. **MURAMURAWINTINI (Tirari Tribe)**. To the Muramura's hair. So named because on this plain the Muramura, Patjalina, tore out his hair and threw it away. The white colour represents the plain, with watercourses (red and yellow stripes), and, in accordance with the name, the Toa bears a tuft of hair.

188. **KUNTJIKUNTIWALPANI (Diari Tribe)**. To the place of much Kuntjikuntji bush. The white knob represents a plain, traversed by a watercourse (red band) which the Muramura, Pitikapana, found covered with this grass, a sprig of which is affixed.

189. **YULTJURANI (Diari Tribe)**. To the slipping sand. The Toa represents a wide, tree-covered plain on the Cooper. There the Muramura, Patjalina, once tried to dig a hole, but the sand kept slipping back into it. The white spots indicate the trees.

190. **YANDAWIRKANI (Diari Tribe)**. To the cracked plain of the bull-roarers (yanda, generally called yuntha in the Cooper's Creek district). The upper part of the Toa is a representation of a bull-roarer, such as is used in the Wilyaru ceremony, and the white band signifies a plain, the soil of which is much cracked. On this plain the Muramura, Turupilana, made bull-roarers for himself; hence the name.

191. **IDIBURINANI (Diari Tribe)**. Meaning, "to lose the tail feathers," or "to lose the beard." According to the first meaning this place derives its name from the fact that the Muramura, Wutjukana, when wandering there, in the form of a bird, is said to have lost his tail feathers. The second meaning, in accord with which the Toa has been made, is derived from the legend that the Muramura, Darana, and his people, there tore out their beards. The white knob, into which some hair has been inserted, indicates the plain where this event is supposed to have occurred.

192. **PUNKUTUNI (Wonkanguru Tribe)**. To Punkutu Hill. Punkutu is a plant from which a kind of flax is obtained, and the hill was so named because the Muramura, Dampawaruna, found these plants growing on it. The white on the Toa represents a limestone hill, and the red crossband of flax fibre-string joining the two arms, denotes a watercourse with banks of this colour. The red part below indicates a watercourse which runs into the other, but divides into two branches before reaching the limestone hill. The white bands on the arms indicate sand of that colour in the creek bed.

193. **MARDALBURUNI (Diari Tribe)**. To the plain bestrewn with small stones. The plain is represented by the white head of the Toa, the red spots denoting the stones. Named on this account by the female Muramura, Wittimarkani.

194. **KANDRITERKANANI (Diari Tribe)**. To where the kandri stands. The Toa represents a kandri (a curved missile weapon with pointed ends) which the Muramura, Kandriwirina, stuck into the ground when he rested.

195. **KUDNAMPIRATJURUNI (Yauraworka Tribe).** To the Kudnampira plain. So named because, on this plain, the Muramura, Wontamalina, found much of this bush, a bunch of which is affixed.

196. **KALKUKULNUNI (Diari Tribe).** To the single rush stem. So named because, on a small flat amongst the sandhills, represented by the white part of the Toa, the Muramura, Wirrakidnina, once saw a single rush stem growing. A bunch of rush stems is attached.

197. **KAWOLKALANI (Yauraworka Tribe).** To what belongs to the crow. Here the Muramura, Warlatana, once found a kind of plant, a bunch of which is affixed to the Toa. Finding the plant inedible, he exclaimed, "Kawolkala!", meaning "this belongs to the crow." The white represents a washed-out hole in the course of Cooper's Creek, and the red denotes the creek itself.

198. **MARDALBURUNI (Pillatapa Tribe).** To the place bestrewn with small stones. The white head represents a waterhole, on the bank of which the female Muramura, Wittimarkani, once found many small stones that hurt her feet. A piece of stone is accordingly affixed to the Toa, and the two red bands denote watercourses entering the waterhole.

199. Name and details not known.

200. **MURAMURA WINTIWORANI (Diari Tribe).** To the place where the pubic hair of a Muramura was pulled out and thrown away. Here the Muramura, Tjeluwarina, was wounded by other Muramuras, and so that the blood should not clot in the hair it was pulled out and thrown away. The Toa represents a limestone plain on which this occurrence is said to have taken place, and a tuft of hair is attached to the top.

201. **KURIWOKARIBANANI (Diari Tribe).** To where they cracked the mussels. Here, on a plain (white) with two watercourses (red bands), the female Muramura, Narimalperini, once sat with her children. She had a quantity of mussels in her net bag (billi), which the children cracked. A mussel shell is attached.

202. **MALKAKIRRAWULANI (Diari Tribe).** To the place where they made boomerangs (kirra) out of Malka wood. So named because, here, on a plain (white) the two Muramuras, Turipuwulana, made boomerangs for themselves out of this wood. The red, horizontal arm denotes a sandhill rising from the plain.

203. **PULAWARUNUNI (Diari Tribe).** To the white stone chisel. The Toa represents a limestone plain where the Muramura, Yelkabalubaluna, once found stone chisels, a representation of which is affixed to the head.

204. **PUNTUWORANI (Diari Tribe)**. To the wooden needle. So named because, here, the Muramura, Tupuworana, once killed an animal, took out its entrails, and sewed up the opening with a wooden awl. The Toa represents the awl.

205. Name and details not known.

206. **WIMAWALPAWORANANI (Diari Tribe)**. To the abandoned place of invocation. The Toa represents an open space where, once, the Muramura, Darana, taught his attendants invocations to the Mura, and when he had finished he left the place.

207. **TJUTJUMILKINI (Diari Tribe)**. To the snake's eyes. The red ground of the stem of the Toa represents a plain where the female Muramura, Ngattani, is said to have once seen a snake (sinuous yellow band) which stared at her with its two eyes. Consequently the head of the Toa is intended to represent that of the snake, with its two eyes shown as red circles with black centres.

208. **PILTIRANI (Diari Tribe)**. To the splinters of wood. The top of the Toa, to which splinters of wood are attached, represents a plain traversed by watercourses (red stripes). Here the Muramura, Pitikipana, fought with other Muramuras and, when the fight was finished, many splinters from their weapons lay around.

209. **MANAWILPARAMARANI (Wonkanguru Tribe)**. Meaning, "to open the mouth wide as in yawning." The Muramura, Wadlulana, once stopped with his attendants on a plain (represented white on the Toa); he became ill and died, and while dying he opened his mouth wide like one who yawns. The head of the Toa represents the trunk of a tree broken by the wind in such a way that two projecting points were left as if they were gaping. The yellow spots indicate bushes.

210. **KARLAYERINI**. To the rushes. The Toa represents a plain overgrown with these plants. The yellow spots denote clumps of rushes, and a bunch of them is affixed to the head.

211. **MARDAKUPARUWULUNI (Diari Tribe)**. To the two pounding stones. The Toa represents Lake Gregory, the red colour denoting an island on which are two mound-shaped hills. On this island the two female Muramuras, Ngardutjelpani and Watapajiri, had their camp. The former had two fine pounding stones which the latter wished to take from her. A fight ensued, and in the struggle the two stones fell from Ngardutjelpani's hands. From these stones the two hills are said to have arisen.

212. **WALJUTULANI (Diari Tribe)**. To the place of the boundary dispute. At a waterhole, denoted by the red band on the Toa, the Muramura, Kuyumokuna, and his uncle, once disputed about the boundaries of their respective territories. The white knob represents a sandhill traversed by watercourses (yellow vertical stripes) which run into another at right angles to them (circular yellow band). The white bands below the head are other sandhills also traversed by watercourses (black), and the yellow bands on the stem are sandbanks.

213. **YAUANIWIRINI (Diari Tribe)**. To the Yaua bulb. The top of the Toa represents the bulb of the Yaua grass which is just beginning to sprout, and the white band, below, a waterhole at which the Muramura, Noangandrani, unearthed bulbs of this kind of grass, from which the young shoots were beginning to grow.

214. **PANKARAKATIRINANI (Wonkanguru Tribe)**. To the crest of the hill where the rushes grow. The white head signifies a plain crossed by watercourses (red) from which rises a hill (yellow). Here the Muramura, Kuruljuruna, found a single rush stem growing: this struck him as peculiar. A bunch of rush fibre is attached.

215. **MUDLABULUNI (Tirari Tribe)**. To the white outlook. The white part of the head of the Toa represents a salt lagoon with sandhills at each end (yellow tip and band). So named because from this point the Muramura, Darana, gazed on the expanse of the lagoon and observed how white it was.

216. **DAMPUWULUNI (Diari Tribe)**. To the two round hills. These hills, which were discovered by the Muramura, Turupiwulana, are represented by the two knobs at the top. The rest of the Toa indicates a plain, the soil of which is partly of a limestone character and partly reddish (white and red colours).

217. **KUTJIKUTJINI (Diari Tribe)**. To the Kutjikutji lake. The upper part of the head of the Toa represents a bird, and the lower swelling denotes a lake with red shores where the Muramura, Mitjimanamana, noticed a bird unknown to him, which kept on calling out "kutjikutji," and so he gave this name to both bird and lake.

218. **KUNDIKUNDINI (Diari Tribe)**. To the bend. Kundikundi is the name given to a part of Cooper's Creek, above Lake Hope, by the female Muramura, Wittimarkani, because of its winding course, which feature is represented by the bent shape of the Toa. The red bands are waterholes.

219. **MAMBUDIRKANI (Diari Tribe)**. To the wrongly moved arm. The Toa represents a plain on Cooper's Creek, with cracks in the ground (red stripes) and overgrown with bushes (yellow spots). Here the female Muramura, Wittimarkani, collected seed. Wishing to return to camp after filling her bowl, she put her arm round it in order to carry it on the hip in the usual woman's way, but making a wrong movement of the arm she let the bowl drop.

220. **KIRRAKIRRANI (Diari Tribe)**. To the waterhole shaped like a boomerang (kirra). The Muramura, Yelkabalubaluna, once, when examining a waterhole in Cooper's Creek saw a boomerang lying before him, and for this reason, and on account of the shape of the waterhole, he so named the place. The central white portion represents the waterhole, the yellow parts signify sandy banks, and the white band near the top the camping place. Fish bones are attached because the waterhole contained fish.

221. **PUNKUTUNI (Diari Tribe)**. To the flax (Punkutu) plain. The white head represents a plain with watercourses (red) on which the Muramura, Patjalina, once found many flax (Punku) bushes). At the top is a piece of the flax prepared for spinning.

222. **PITJIRIWOMAWORANTJINI (Diari Tribe)**. Meaning "to sweep away the litter." The shape of the Toa is supposed to represent that of a flat where the Muramura, Timpiwalakana, once wished to dig a well, but before he could begin he had to sweep away a litter of leaves.

223. **MITAKANTINI (Wonkanguru Tribe)**. Meaning, "real soil." The Toa represents a hill composed of white and red earth. The two Muramuras, Teriwulana, seeing this hill from afar, thought it was a hill of stones, but when they came near they found it composed of earth, and so they said "mita kanti," this is real soil.

224. **MURAMURAMOKUNI (Diari Tribe)**. To the bones of the Muramura. The white knob signifies a lake into which flows the Manju Creek. Here the Muramura, Darana, once camped with his attendants, many of whom are said to have died, and, being unburied, many of their bones remain to this day. Thus pieces of bones are affixed to the Toa.

225. **BILLIYERKINANI (Diari Tribe)**. To the burnt billi (net bag). The white head represents a plain on which the female Muramura, Wittimarkani, once camped. She put her billi so close to the fire that it burnt; thus a piece of a net bag is affixed to the Toa.

226. **PARLIPARLINGUMARDANI (Diari Tribe)**. To the high place where one gets cool. The white part of the head of the Toa represents a

limestone hill, and the red, ironstone. The Muramura, Parlparlina, once climbed this hill on a hot summer's day to sleep because a cool breeze blew there.

227. **KIRRAWORDUNI (Diari Tribe)**. To the place of the short boomerang (kirra). Here the Muramura, Yelkabalubaluna, after killing his son with such a weapon threw it away. The boomerang, by its shape, represents a bend in Cooper's Creek, and the white bands denote watercourses which lead into this part.

228. **PIRILTJANGANDRANANI (Diari Tribe)**. To the place of the four-cornered decoration (piriltja). It is said that, in honour of the Mura, the Muramura, Kirlawilina, wore this decoration as he came out of the earth. In the representation of this legend, it is worn as a head ornament in the Bird and Snake ceremonials. The Muramura, Mandramankana, received this valued decoration from Kirlawilina, and always carried it with him on his wanderings, but when he rested at Piriltjangandrana he, unfortunately in forgetfulness, left it lying there. Out of the forgotten piriltja the upper crust of the earth is said to have been formed. In the centre is a waterhole, and the surrounding rings represent accumulated deposits of red, white, and yellow sand which have been washed up.

229. **KIRRAKIRRANI (Tirari Tribe)**. To the place where the Muramura sent round the painted boomerang (kirra). The Toa represents such a boomerang, which is sent from camp to camp as an invitation to a tribal emu hunt. On reaching the camp the bearer lays down the kirra and enters without it. This is to say that he comes without hostile intent. This method of invitation was introduced by the Muramura, Mandrabuluna, who sent one of his attendants with such a kirra to invite other Muramuras to a hunt.

230. **MANATANDRANI (Diari Tribe)**. To the tooth. The Toa, to which a tooth is affixed, denotes a plain (white) where the Muramura, Mandramankana, once lost a tooth. From this occurrence toothache is supposed to have originated.

231. Name, tribe, and details not known.

232. **KADNITERKANANI (Diari Tribe)**. Kadni means lizard, and this plain derives its name from the fact that the Muramura, Kadni, once camped here. The head of the Toa denotes the plain with red margins, and, in accord with its name, lizards' feet are attached.

233. **MARUKUTUMANINANI (Kuyani Tribe)**. To the place of red ochre. The Toa represents the hills near Beltana, from which the natives obtain their red ochre, the red stripe indicating the track where they climb

up. The yellow colour at the top indicates the ochre mine, and the red point a foothill.

234. **KARAWORANI (Diari Tribe).** To the place where the Muramura saw an eagle. The head of the Toa represents a waterhole with red banks, where the Muramura, Tupuworana, once saw an eagle. Feathers of this bird are attached.

235. **TJUTJUNURAWORDUNI (Diari Tribe).** To the stumpy crocodile's tail. This flat, represented by the white head of the Toa, was named by the Muramura, Nurawordubununa, who, seeing its shape, likened it to a stumpy tail of a crocodile. The red stripes are watercourses.

236. **MIRINGARUNI (Diari Tribe).** To the emu feathers on the hill. Here the two Muramuras, Wariliwulani, once found emu feathers on the top of a hill; hence the name and the tuft of emu feathers affixed.

237. **PILTIRANI (Diari Tribe).** To the place of splinters of wood. The head of the Toa represents a plain traversed by watercourses (red stripes), where the Muramura, Pitikipana, once fought with other Muramuras. When the fight was over many splinters from their weapons lay about. Wood splinters are affixed.

238. **WARUKATI WALPUNI (Diari Tribe).** To the place bestrewn with emu bones. So named because when the Muramura, Patjalina, once came to this place he found many emu bones scattered about. The head of the Toa is a piece of an emu's leg bone covered with white earth, and the two white bands on the stem denote waterholes with red banks.

239. **KUYAMARAKILINANI (Diari Tribe).** To where the Kuyamara bushes wave. So named because, here, the Muramura, Wontamalirina, once saw these bushes waving in the wind. Twigs of the bush are inserted into the head of the Toa, which represents a plain crossed by two watercourses (red bands).

240. **DIDLAWALPANI.** To the Didla bush flat. So named because the Muramura, Patjalina, found the flat covered with this bush, a bunch of which is attached. The red and yellow stripes are watercourses.

241. **TALTRANTANI.** To the Taltranta grass flat. The head denotes the flat with red banks which the Muramura, Pirnaworankana, found overgrown with this grass, a bunch of which is inserted at the top.

242. **WARUKATI WIRINANI (Diari Tribe).** To the place where the emus come in. So named because, here, on a stony plain (red spots), the Muramura, Pitikipana, once saw many emus coming in from the sandhills; hence the tuft of emu feathers at the top.

243. **BILLITJILPINI (Diari Tribe)**. Meaning, to knot the net. Here the female Muramura, Wittimarkani, once invented a new way of making nets by knotting the meshes so that they should not slip if the net were torn. For this reason the Toa bears a piece of net, while the white knob represents a sandhill where the Muramura is supposed to have sat.

244. **BILLIMUNUNI (Diari Tribe)**. To the billimunu. This is a kind of net bag which is used by the women for carrying various kinds of grass with edible seeds, and a piece of such receptacle is attached to the Toa. White denotes Billimunu Lake, which was so named because the Muramura, Noangdrani, there, knitted a billi of that kind.

245. **TJURLUKURANI (Pillatapa Tribe)**. To the Tjurlu bush plain. The white part of the Toa represents a plain with red margins, and to the head, twigs of this plant are affixed. The red stripes denote watercourses, and the red spots stones. Named by the Muramura, Papapana, on account of the presence of these bushes.

246. **WARIKATI WALPUNI (Diari Tribe)**. To the place bestrewn with emu bones. The white knob represents a chalky coloured plain on which the Muramura, Patjalina, found many emu bones; hence he gave this name, and in accordance pieces of emu bone are affixed.

247. **DILADILANI (Ngamani Tribe)**. To the sandhill overgrown with Diladila grass. So named because the Muramura, Patjalina, found this kind of grass growing on a small sandhill which projects into Cooper's Creek. The knob denotes the sandhill, and the reddish dots upon it the grass. The vertical black stripe on the stem represents Cooper's Creek, into which run tributary watercourses, and the white spots are trees on the banks.

248. **MANGANWORUNI (Wonkanguru Tribe)**. To the widows. White is the mourning colour of the natives, white earth being smeared on the head, face, and body during this period. The Toa represents two limestone hills which, by their colour, thus symbolize the mourning. The two Muramuras, Pildra and Yikaura, having killed each other, their two widows sat together and smeared themselves with white earth in token of mourning, and from them the two hills are believed to have arisen.

249. **KIRRAWIRINANI (Diari Tribe)**. To where the boomerang (kirra) entered the earth. The Muramura, Mardumana, once threw his boomerang from Kirlawilpa with such force that it reached Kunowana (Kanowana)—a distance of 40 miles—and buried itself in the ground. Hence the name. The Muramura painted all his boomerangs with red bands as shown on the Toa.

250. **KURAMORLAWORANI**. To the prickly grass (Porcupine Grass). Details not known.

251. **TIRIPARANI (Diari Tribe)**. To where the revenge party rested. To the top is affixed a pointed piece of blackened wood representing a spear-head, and the white part, below, denotes a limestone plain where the Muramura, Yikaura, once rested with his warriors when he was setting forth to kill the Muramura, Pitikapana.

252. **WORLAKANI (Diari Tribe)**. To the big stones. So named because here, on a plain, the Muramura, Patjalina, once found many large stones. The white of the Toa represents the plain with two watercourses, one showing red, and the other yellow, banks. A piece of stone is affixed.

253. **WARUWARUNI (Diari Tribe)**. To the place of white (waru) bush. Here, in the scrub, the female Muramura, Ngattanimarumaru, once found a kind of whitish bush. Gathering grass seed, she winnowed it with this grass, a tuft of which is affixed to the Toa. The white head denotes limestone soil.

254. **TIPAKALKUNI (Diari Tribe)**. To the rush plain. White represents a plain on which rushes grow, and a bunch of rush fibre is affixed. Name of Muramura not known.

255. **TAPAYINKINIETJANI (Diari Tribe)**. To the "Giver of wounds." Thus was called the female Muraniura, Wariliwulani, who is believed to have come out of the earth at this place. The head of the Toa represents a hill, on which watercourses (black stripes) have been washed out, and its white top denotes the spot where the Muramura reached the surface. As she arose she noticed that her body was covered with sores, and so she named the place.

(When a man, at the present time, desires, by magic, to cause anyone to become afflicted with sores, he sings an invocation to Wariliwulani.)

256. **PAYAMARAPUNI (Diari Tribe)**. To the place of many birds. The Toa represents a waterhole on which the Muramura, Yelkabalubaluna, saw many birds, for which reason a bunch of feathers is affixed.

257. Name and details not known.

258. **KAWOLKANGAPINI (Diari Tribe)**. To the crow's water. Here the Muramura, Darana, saw many crows, for which reason some of the feathers of this bird are attached to the white knob, which denotes a small plain with depressions (red spots) in which water collects.

259. **MURLAPARANI (Wonkarabana Tribe)**. To the place of the Murlapara pigeon. The head of the Toa represents a plain on which the Mura-

mura, Darana, once saw many of these birds. Hence the pigeons' feathers attached.

260. **MOKURANI (Ngamani Tribe)**. To the ashes. Hither came the Muramura, Yelkabalubaluna, and found ashes, which was a sign to him that another Muramura had camped here. White denotes a plain crossed by water-courses (red), and a piece of charcoal is affixed in reference to the ashes.

261. **TALANI (Diari Tribe)**. To the place of circumcision. Here, upon a little flat, the Muramura, Dalkuna, circumcised two sons and threw away the foreskins. The white part of the Toa represents the flat, and to it is attached a piece of bark, because tala means rind or bark as well as foreskin.

262. **WIRRAPANTUNI (Diari Tribe)**. To the lake where Wirra bushes grow. Named on this account by the Muramura, Darana: The white head of the Toa represents the lake, which has red shores, and a sprig of the Wirra bush is affixed.

263. **KOKUNI (Diari Tribe)**. To the tall tree. The white part of the Toa represents Cooper's Creek, which, there, has red banks, and the black spot at the top indicates a tall tree which the Muramura, Nurawordupununa, found growing there.

264. **NGURDUWALYUNI (Tirari Tribe)**. Meaning, "sand in the hair." By the waterhole bearing this name once slept the Muramura, Patjalina, with his attendants. During the night a severe sand storm arose, filling everyone's hair with sand. This is represented by the black top of the head of the Toa. The black band on the stem denotes the waterhole, and the knob a sandhill covered with bushes (red and yellow spots) jutting into the waterhole, which itself is surrounded by trees (white spots).

265. **NGAPAMILKIPIRLAPIRLANI (Tirari Tribe)**. To the muddy waterhole. So named because the Muramura, Patjalina, on coming to the hole found its water very muddy. The black stripe represents the hole, which is fringed by gum trees (white dots).

266. **MARDAWILPANI (Diari Tribe)**. To the perforated stones. The Toa represents variously shaped, perforated stones which appeared remarkable to the Muramura, Darana, when he found them.

267. **PIRRAWORDUNI (Diari Tribe)**. To the little bowl. Here sat the female Muramura, Wariliwulani, with a little wooden bowl. The head of the Toa represents half such a bowl, and the white parts denote two hills, between which is Cooper's Creek.

268. **WONATIRINI (Diari Tribe)**. To the sharp stakes. Here the Muramura, Pintanganina, sharpened stakes (wonatiri), which he placed in the water to support his fishing net. The Toa represents such a stake.

269. **DARUDARUWORANI (Diari Tribe)**. To the many Darudaru birds. So named because, there, on Lake Gregory the Muramura, Teriwulana, saw many of these birds. The Toa represents one of them.

270. **KIRRAWORDUWULANI (Diari Tribe)**. To the two short boomerangs (kirra). Here a man was once strangled; when the pain of the strangulation was over and he had become delirious, he stood up and threw a boomerang at a tree, thinking that it was a man, with such force that it broke at the middle into two pieces. The Toa represents a boomerang.

271. **KIRRANI (Diari Tribe)**. To the boomerang. The knob of the Toa represents a hill composed of red and whitish soil, from which projects a spur shaped like a boomerang; on this are depressions (red circles). This spur is said to have arisen from a boomerang which the female Muramura, Wata-pajirani, once threw here.

272. **NGUNAWARAPINI (Tirari Tribe)**. To the bent arm. The Toa represents a part of the lower course of the River Cooper, which, there, narrows into a deep channel and makes a sharp bend. On coming here, once, the Muramura, Billipilpana, noticed the bend and gave it this name. The black bands on each margin denote deep parts of the river bed containing fresh water, the white spots are gum trees, and the yellow streak at the angle signifies a sandhill.

273. **KIRRAKIRRAPRATJALANI (Diari Tribe)**. To the place where everyone had a boomerang (kirra). So named because, here, all the attendants of the Muramura, Dimpiwalakana, worked at making boomerangs. The Toa represents this weapon.

274. **PIRRILANINANI (Diari Tribe)**. To the white patch. Pirrila, meaning "one who has a white patch on the forehead," was the name of the Muramura Darana's dog, which died on a sandhill. Hence the Toa represents a dog's head with a white streak on its forehead.

275. **KOKULAKULDRUNI**. To the Kokula's back. So called because, here, the Muramura, Patjalina, once saw a Kokula (a species of rat) with a young one on its back. The white ground of the Toa represents a plain on which a sandhill (red patch with yellow margin) is situated in such a way as to give the appearance of the young on the back of the Kokula.

276. **PALKURUNUNI (Diari Tribe)**. To the Palkurunu bush hollow. White denotes the depression, and at the top are leaves of this plant, which the Muramura, Mardalburuna, found growing there.

277. **WODIKABAKANI (Wonkanguru Tribe)**. To the Wodika bushes. The Toa represents one of these bushes with its crown chopped off. The

Muramura, Wadlulana, coming once to this place on Salt Creek, saw many tributary creeks from various directions joining the main channel. In this conformation he saw a resemblance to the converging branches of a Wodika bush. Salt Creek is, there, very boggy, and the white band indicates where it can be crossed.

278. **WORANTIRRANI (Wonkanguru Tribe).** To the high bank. The white head of the Toa represents Salt Creek where it makes a sharp bend, and the red margin denotes a high bank of that colour formed at the bend. The eye spot denotes a waterhole, also with red banks. Named by the Muramura, Turuturungamiri.

279. **PALYANGANIMINIKANI (Diari Tribe).** To the place of gum. So named because when the Muramura, Kaluworankana, came here he found much edible gum (palyangani) on the trees. To ensure a continuance of the supply he killed a fat opossum, heated a piece of stone, and climbed a tree. Holding the opossum fat against the heated stone, he sang a song of invocation, and let the fat run down the trunk of the tree. As the fat runs down, so the sweet gum shall ooze out of the tree. This ceremony is still performed, and in reference thereto a piece of stone is affixed to the Toa.

280. **WADLAYERKINANI (Diari Tribe).** To the burnt mill-stone. So called because the Muramura, Kuruljuruna, hid his mill-stone at this place. The wurley in which it was hidden caught fire, and the mill-stone was broken by the heat. Fixed to the head of the Toa is a piece of a mill-stone, and the part below represents the plain on which the Muramura camped. The red and yellow bands denote watercourses with banks of these colours.

281. **PARUMARDANI (Diari Tribe).** To the "fish-stone." The white part of the head of the Toa denotes a flat with red margins, where the Muramura, Pintanganina, discovered a kind of glassy stone (gypsum), a piece of which is affixed. According to the legend the Muramura used such stones as charms for fish, and, on that account, they serve at the present time as articles of barter amongst the natives of the district.

282. **BURKUNDRANUNI.** Details not known.

283. **MANDRAMANDAMI (Kuyani Tribe).** To the belt. The Toa represents a stony hill from which stones crop out in the form of a girdle. Coming, once, to this place the Muramura, Papapapana, noticed the conformation of the hill, and said to himself, "these projecting stones look like a belt round the body." The red ring encircling the knob represents the hill and the belt.

284. **KIDAKIDAWULUNI (Ngamani Tribe)**. To the place where two waterbags were made. The stem of the Toa represents a plain crossed by watercourses (red bands). Here the Muramura, Pirnaworankana, killed two wild dogs and made their skins into waterbags. These he placed close together, and from them arose two hills, which are represented by the two knobs at the head of the Toa.

285. **KADIPALPURANI (Wonkanguru Tribe)**. To the place where the watercourses cross. The head of the Toa represents a lake bed in which two watercourses (red stripes) cross. So named by the Muramura, Kurkarli.

286. **TULANI (Ngamani Tribe)**. To the stone chisel. So named because, here at a lake, the Muramura, Piridakana, once threw away his stone chisel. The red band denotes the lake, and a representation of the chisel is inserted in the head of the Toa.

287. **NGAPATIRIPOTUNI (Diari Tribe)**. To where the down feathers float on the water. The knob represents a waterhole, and the red stripes deposits on the banks, and in accord with the name, down feathers are affixed. Coming, once, to this waterhole and seeing feathers floating, the Muramura, Kirlawilina, so named it.

288. **MILKIWILPANI**. To the place of the eye cavity (orbit). The two Muramuras, Kalkuwulana, coming, once, to a plain and seeing a hollow in a tree, said to one another, "it looks like the cavity of an eye," and so they named it. The knob represents the tree, and the red ring the hole in the tree.

289. **WALYUTALANI (Diari Tribe)**. To the place where they quarrelled about the boundary. So named because, here, the Muramura, Kuyamokana, and his uncle had a dispute about their respective boundaries. The head of the Toa represents a hill bestrewn with stones (red spots).

290. **WARILILANANI (Tirari Tribe)**. Meaning, "straight forward." So named because the Muramura, Patjalina, once noticed how, in the lower part of its course, Cooper's Creek takes a straight course. The black band denotes a waterhole in the creek and the white dots, above and below it, gum trees on the banks. The knob indicates a sandhill which is overgrown with bushes (red spots). The Toa thus means, to the waterhole in the Cooper where it takes a straight course.

291. **MANATAULAWULUNI (Diari Tribe)**. To the two wild ducks. The white part of the Toa represents a plateau shaped like a duck's head which the Muramura, Kirlawilina, discovered, and on hearing a pair of ducks quacking there he gave the above name. The Toa represents a duck's head with opened beak.

292 **WULURUTERKANANI (Diari Tribe)**. To the place of the Wuluru bird. So called because the female Muramura, Nguturini, once saw a Wuluru bird here. The Toa represents the head of the bird.

293. **MARLURANI**. As the Muramura, Kirlawilina, once sat with his uncle at this place there came out of a hole in a hill a wonderfully beautiful girl wearing a white head-band which the Muramura desired to possess. The vertical part of the Toa represents the girl emerging from the hill, the white band near the top denoting the head-band.

294. **KIRRATINTINI (Diari Tribe)**. To the place of the unfinished boomerang (kirra). Here the people of the Muramura, Pirnawarankana, once began to make boomerangs, but only half completed them because they were in a hurry. The Toa represents a partly finished boomerang, and the red bands on it watercourses on the plain.

295. **KAWOLKAMUDLANI (Diari Tribe)**. To where the crows sit on the end of the hill. The Toa represents a sandhill overgrown with bushes (red spots), at one end of which the Muramura, Ditjiminka, saw many crows sitting. Crows' feathers are attached.

296. **MANIWALKUNI (Diari Tribe)**. To the place where emu feathers were smeared with red ochre and fat. White represents a plain where the female Muramura, Manuwalkunini, once sat and smeared emu feathers with red ochre and fat. A tuft of such feathers is attached.

297. **KAWOLKATJARINI (Diari Tribe)**. To the young crow. Here, on a tree in a plain, the Muramura, Kuritjuruna, once found a crow's nest containing young birds; hence the name, and the crows' feathers on the Toa. The red stripes are watercourses.

298. **KANTALPANI (Diari Tribe)**. To the place covered with Malka grass (Malka kanta), a tuft of which is affixed to the Toa. Here the female Muramura, Marumarumi, once hid herself by day in high grass of this kind, and only went down the hill in the evening to fetch water from a neighbouring waterhole. The white, rounded head of the Toa represents the hill.

299. **WIRRAPANTUNI (Diari Tribe)**. To the lake where Wirra bushes grow. The head of the Toa represents the lake, which has red shores, and twigs of Wirra bush are attached. Named by the Muramura, Darana, on account of the presence of these bushes.

300. **MARDALBURUNI (Diari Tribe)**. To the place bestrewn with small stones. The white head represents a waterhole, on the banks of which the female Muramura, Wittimarkani, once found many small, sharp stones

which hurt her feet. The red band denotes the creek channel passing through the waterhole, and a piece of stone is inserted.

301. **MUDLAMANA WORANI (Diari Tribe)**. To the sandhill overgrown with Mudlamana bush. The Toa represents the end of a sandhill which the Muramura, Kirlawilina, found covered with this grass.

302. **DUNTJINI**. To the Duntji bush plain. The grey part of the Toa represents the colour of its soil, which a certain Muramura found covered with these bushes; hence the name, and the bunch of this bush at the top.

303. **KURAUARANI**. To the Kurauara bush plain. The white head represents a flat on which grow gum trees (red spots). When the two Muramuras, Turipiwulana, once came to this place they found many Kurauara bushes, and so named it. A bunch of the leaves of the bush is affixed.

304. **WONATIRIWORDUNI (Diari Tribe)**. To the short, pointed stakes. Here the Muramura, Pintanganina, sharpened short stakes with his stone axe, which he fixed in the water for the purpose of attaching his nets to them. The Toa represents such a stake.

305. Name and meaning not known.

306. **PITJIBAKANANI (Diari Tribe)**. To the place where he peeled off the bark. So named because the Muramura, Kirlawilina, having no boomerang, stripped a piece of bark from a tree and threw it at some birds. Pieces of bark are affixed to the Toa, the white part of which represents a flat with red margins.

307. **KADNIWONKALANI (Tirari Tribe)**. To where the lizards come out. So called because a Muramura, here, saw lizards (kadni) coming out of a hole. The head of the Toa, into which a piece of lizard's tail is inserted, represents a waterhole with red banks.

308. **BUNURUBURUNI (Wonkanguru Tribe)**. To the Bunuru bush hill. The upper end denotes a conical hill which the Muramura, Wiltjukana, found overgrown with this kind of bush. The red bands indicate watercourses.

309. **PARAKARLINI (Diari Tribe)**. To the place of curly hair. So named by a Muramura because he, there, noticed how curly was the hair of his dog. For this reason a tuft of dog's hair is affixed to the head of the Toa, which represents a sandhill through which Cooper's Creek had broken.

310. **WONAMARRANI (Diari Tribe)**. To the new digging stick. Here the Muramura, Darana, made himself a new stick for digging up roots. The Toa represents the stick. The white bands denote watercourses, and the red the colour of the soil.

311. **PITITERKANI (Diari Tribe)**. To the Wirra bush, which extends its roots upwards. This is a plant which grows in a globular form, and when it withers it is easily blown away by the wind, and then remains with its roots extended upwards. When the Muramura, Patjalina, came to this place and saw a hill, it appeared to him just like a Wirra bush with its roots in the air. The white knob represents a conical hill, and the black transverse band is a watercourse near the hill, whose banks are overgrown with bushes (red and yellow spots). The black band below the head is a waterhole in the creek, at which the natives camp.

312. **MILDIRANI (Diari Tribe)**. To the stone chisel quarry. This place was discovered and named by the Muramura, Turupiwulana, who also invented the chisel. The white of the Toa denotes a plain on which stone chisels are made, and a representation of this implement is affixed.

313. **PA-ULANI (Diari Tribe)**. To the Pa-u bush plain. So named because the Muramura, Warriwulani, found it covered with this kind of grass. White represents the plain, which is crossed by the Cooper (red band), and a bunch of the grass is attached.

314. **TAPAYINKINIETJANI (Diari Tribe)**. To the place where the female Muramura, Wariliwulani, called the giver of wounds, came out of the earth. The head of the Toa represents a hill on which watercourses (black stripes) have been washed out, and its white top the place where the Muramura emerged. As she arose she saw that her body was covered with sores, on which account she so named the place. (When, at the present day a man desires, by magic, to cause anyone to be afflicted with sores he invokes the Muramura, Wariliwulani.)

315. **WINTIKARUNI (Diari Tribe)**. Significance unfit for description.

316. **TURUPILLANI (Diari Tribe)**. To the charcoal. The white part of the Toa represents a waterhole where the Muramura, Turupillana, came out of the earth. The piece of charcoal is affixed because the Muramura introduced the practice of sprinkling ashes over boys undergoing the Wilyaru ceremony.

317. **WIRRAWORALUNI (Diari Tribe)**. To the place where the Muramura threw the club (wirra). The wirra is a fighting weapon, represented by the form of the Toa. With such a club the female Muramura, Noangandrani, slew her husband, Yelkabalubaluna, and when he was dead she threw the wirra far away. Where it fell appeared a waterhole, represented by the white head, and Noangandrani said, "thither have I thrown the wirra."

318. **WARIWARINI (Diari Tribe)**. To the Wariwari bushes. Discovered and named by the Muramura, Mandramankana. The white part represents a plain on which these bushes grow, and a bunch is affixed.

319. **MAKUMURUNI (Diari Tribe)**. To the Makumuru bush plain. Here the Muramura, Pintanganina, found this kind of bush, a bunch of which is affixed to the Toa, the white head representing the plain.

320. **WONPATJARADANKARLI (Wonkanguru Tribe)**. To the place where the Wonpatjara bird sits. So called because the Muramura, Kurkarli, once saw one of these birds sitting on a sandhill. The head of the Toa represents the hill, which is overgrown with bushes (red spots).

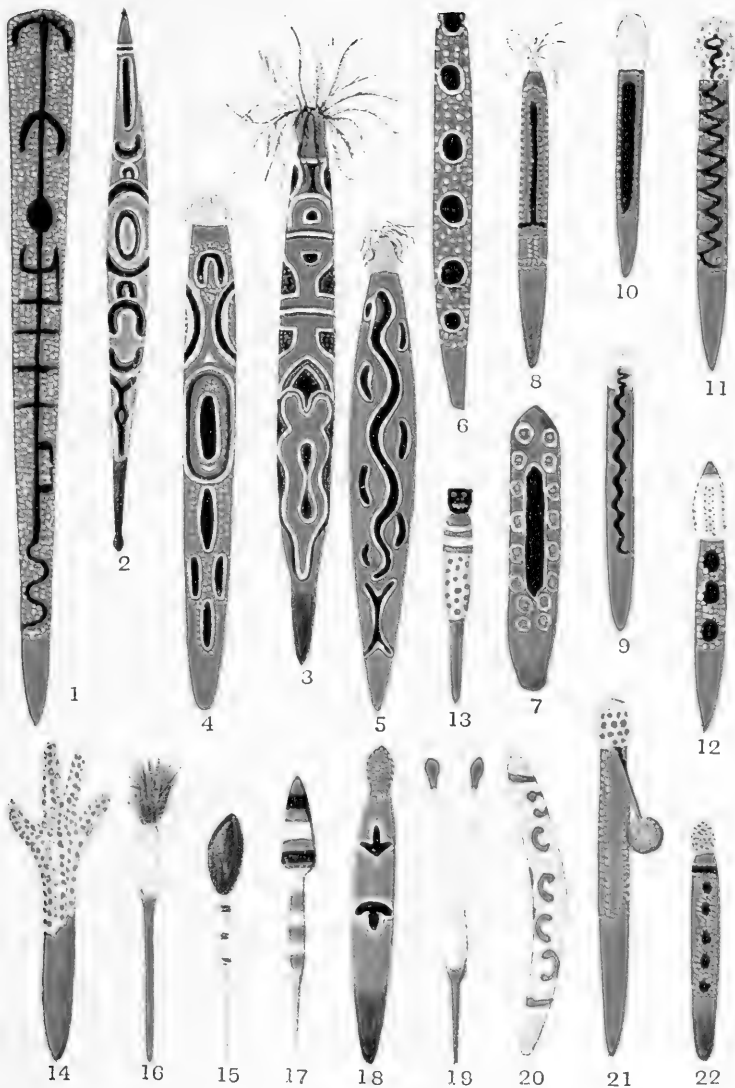
321. **NGUNKUWORANI (Diari Tribe)**. To the place of many mounds. The Toa represents a plain on which were many cone-shaped sandhills, which are indicated by the red spots on the head of the Toa. This plain was discovered and named by the female Muramura, Wittimarkani.

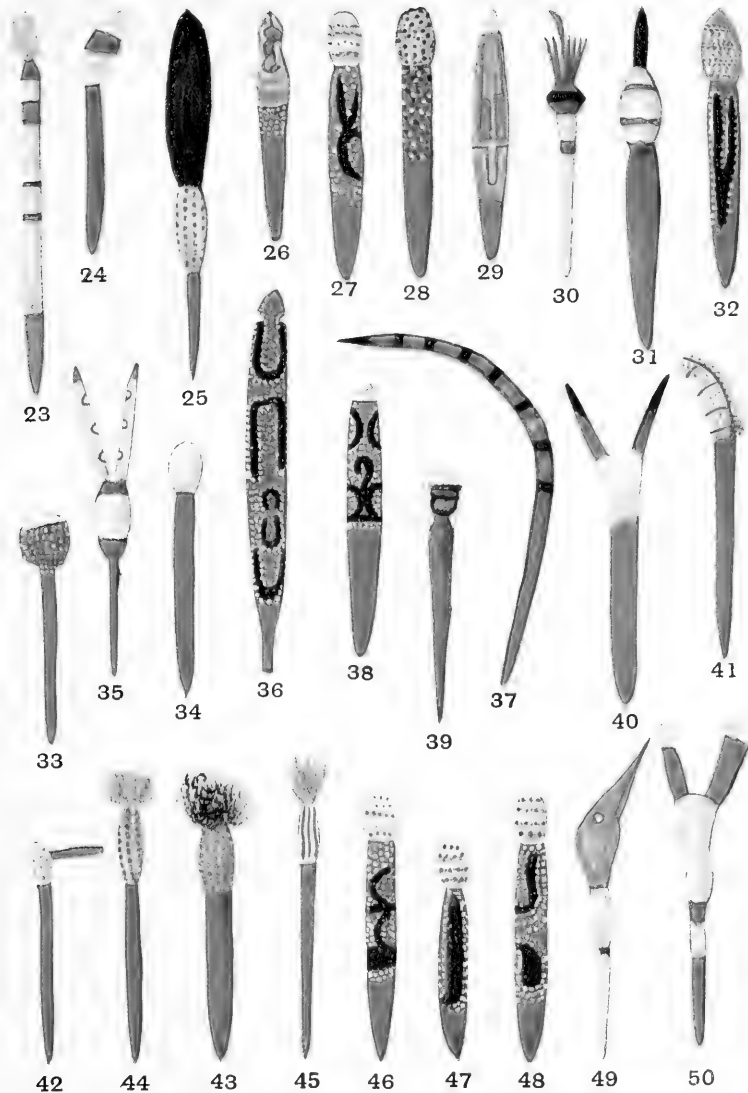
322. **KUDUKUDNANI (Tirari Tribe)**. To the flat overgrown with Kudukudna grass. The Muramura, Turupiwulana, found this kind of grass growing on a plain (knob of the Toa) which is traversed by many water-courses (red stripes). A tuft of the grass is attached.

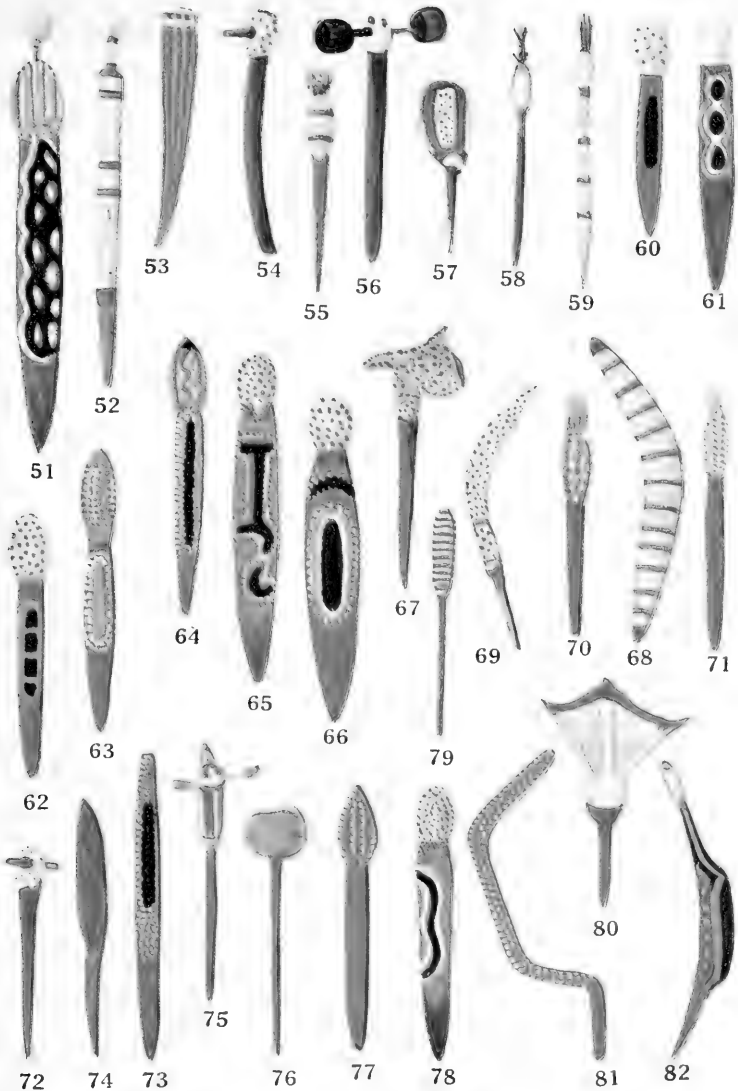
Explanation of Plates xi.-xx.

Figs. 1-322. *Toas or Australian Aboriginal direction signs*. Being duplicates, the illustrations represented by Nos. 124, 224, 237, 257, 299, and 314, are omitted.

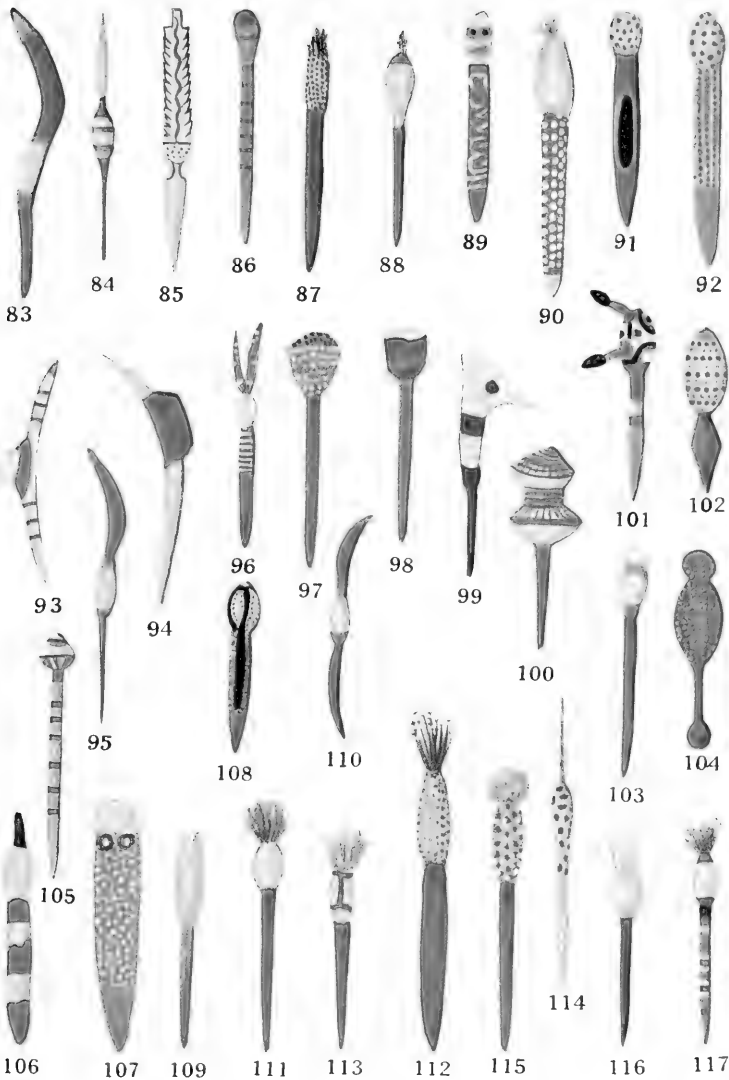
From drawings by H. J. Hillier and Rosa C. Fiveash.

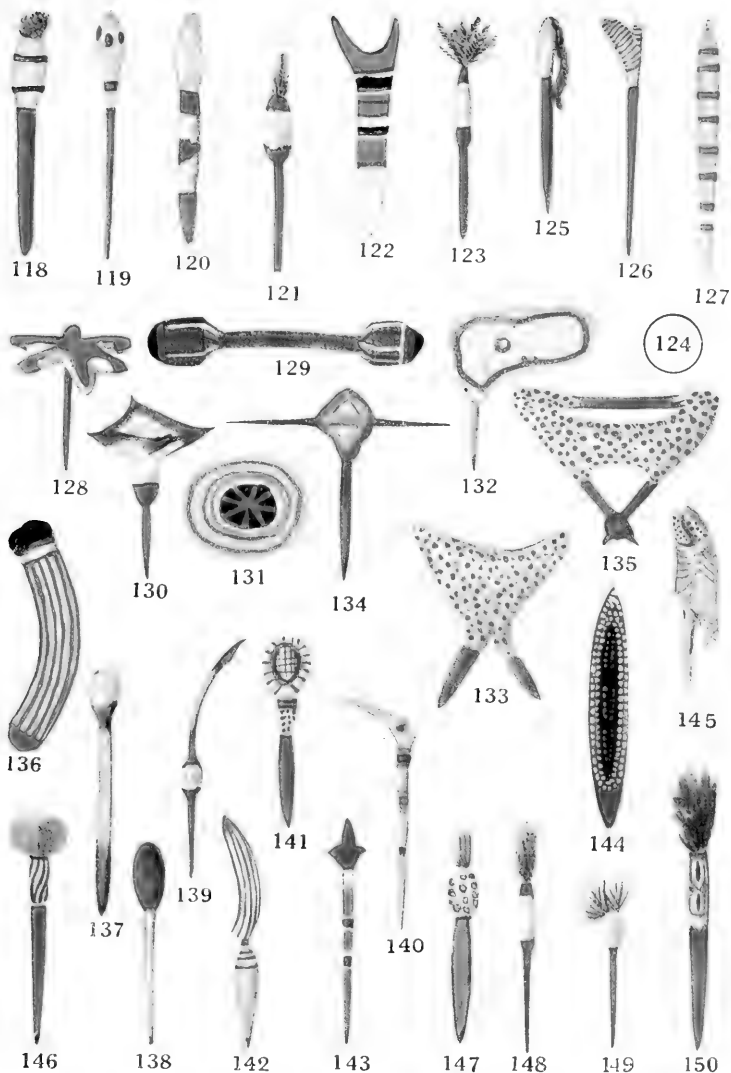




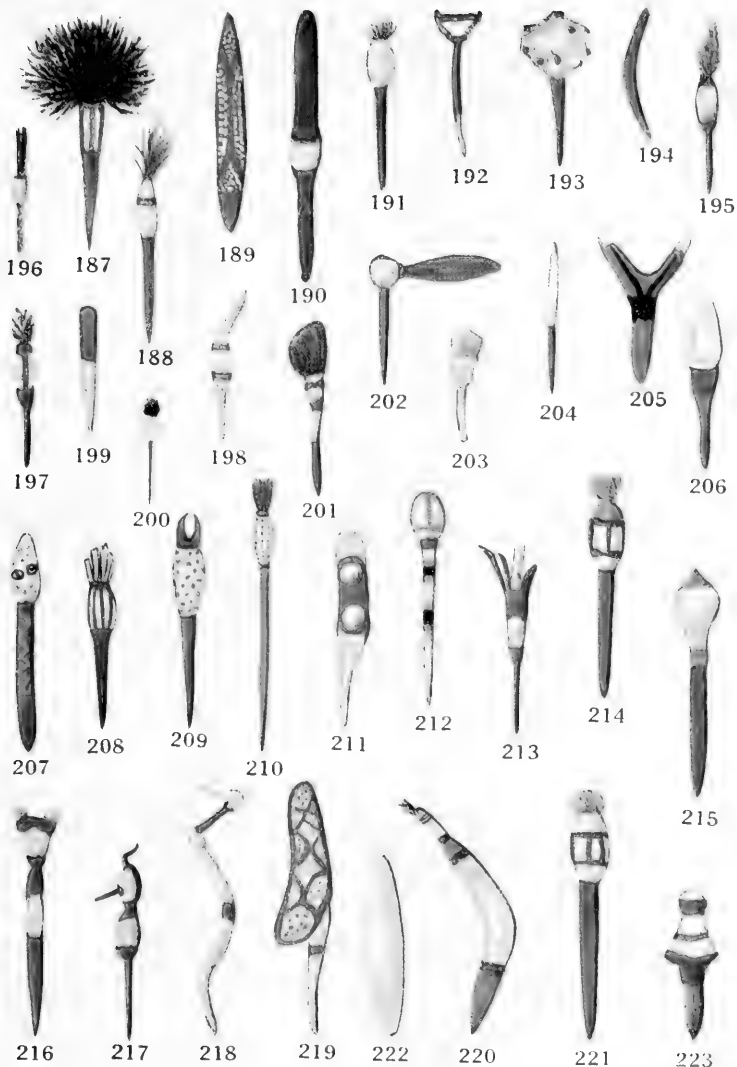


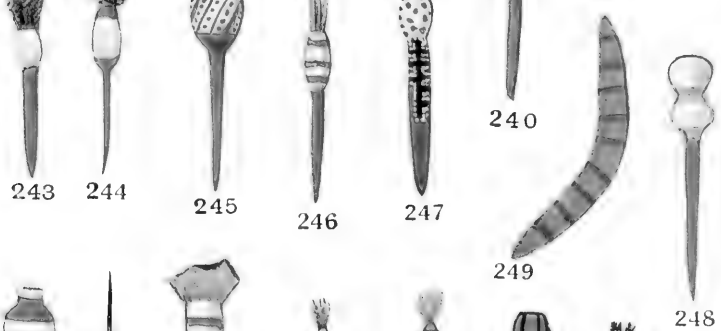
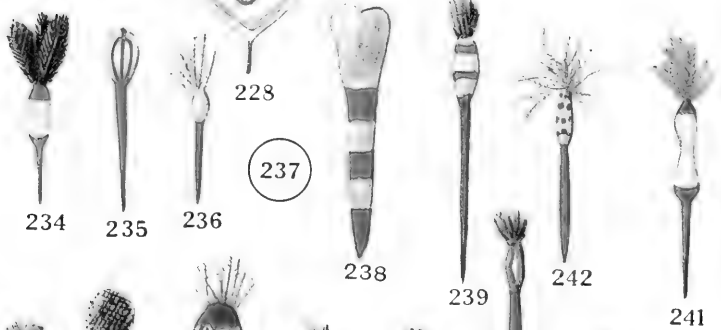
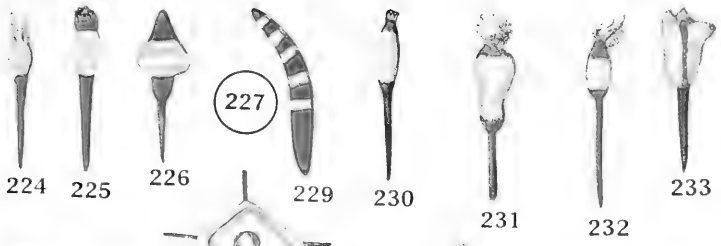
AUSTRALIAN TOAS.













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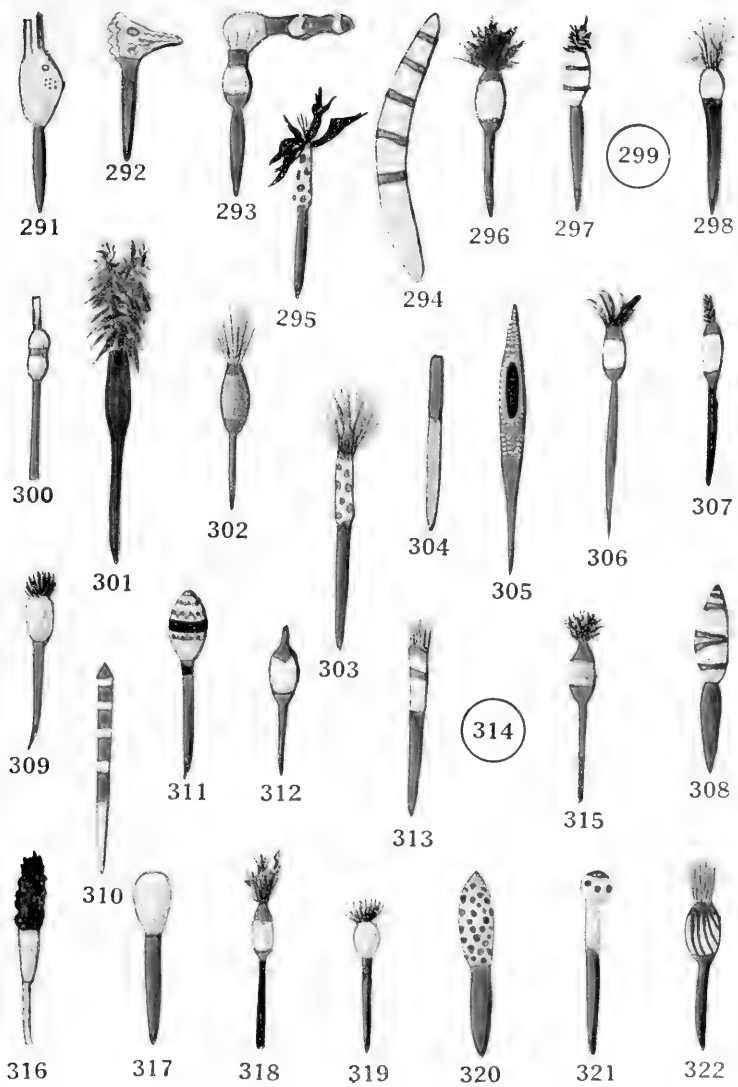
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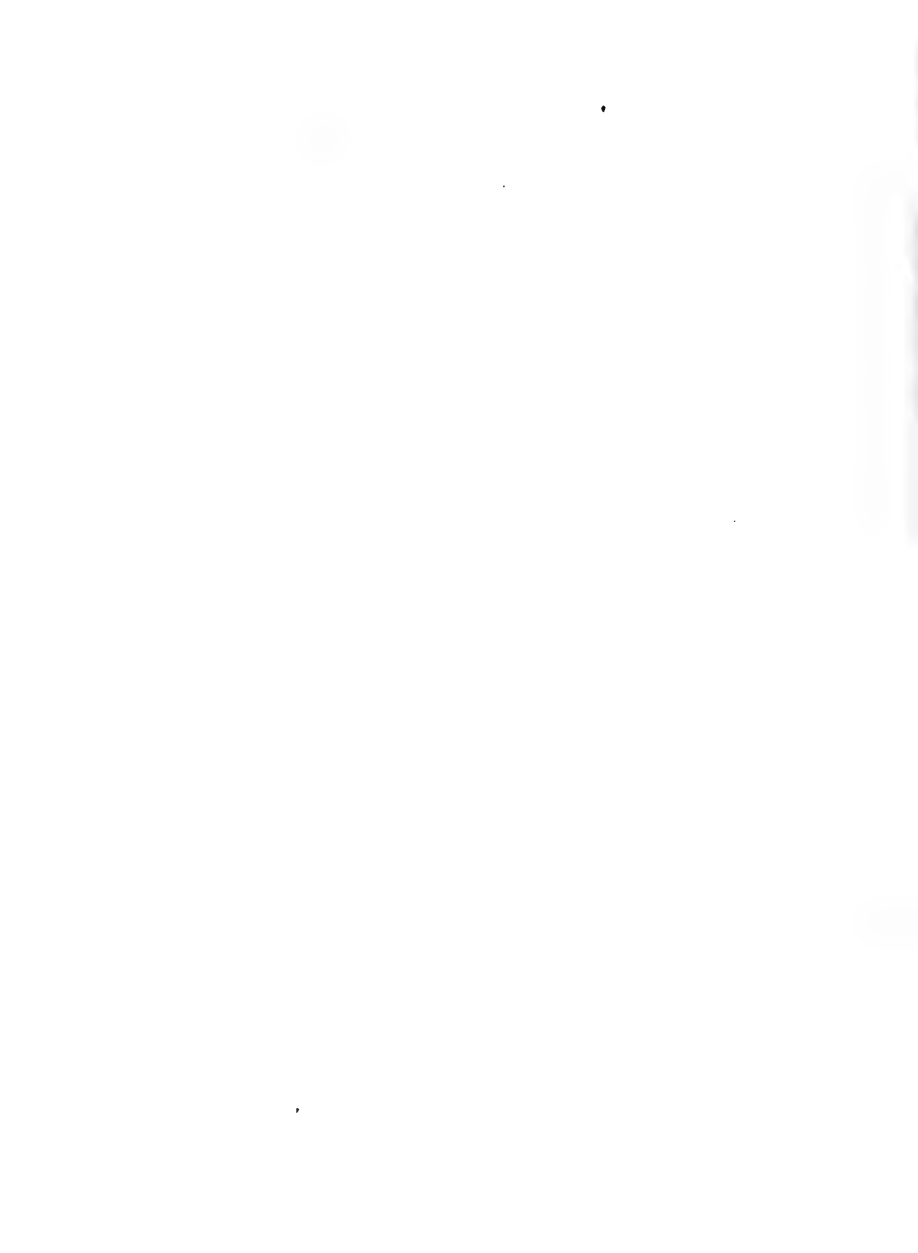


289



290





TWO AUSTRALASIAN BLUE WHALES

WITH SPECIAL REFERENCE TO THE CORVISART BAY WHALE.

By EDGAR R. WAITE, F.L.S., DIRECTOR, SOUTH AUSTRALIAN MUSEUM.

(Plates xxi-xxvi.)

I. THE OKARITO WHALE.

In 1908, when in New Zealand, I was fortunate in having the opportunity to examine and make some notes upon a large blue whale stranded on the west coast of the South Island. Careful measurement showed the length, from the tip of the snout to the notch in the tail, to be 87 feet exactly. The skeleton was secured and mounted in the Canterbury Museum, of which institution I then had charge. I claimed this specimen to be the largest preserved in any museum, and, in consequence, considerable local correspondence ensued, longer examples being said to exist in London, Paris, Copenhagen, and America.

In order to put the question to a wider test, I published a letter in "Nature" (1), detailing the occurrence and asking that Directors of Museums possessing the skeletons of large whales should furnish details of their size. To this Mr. F. A. Lucas, Curator-in-Chief of the Brooklyn Institute of Arts and Sciences, New York, very courteously replied (2); he mentioned that in 1903 he had measured a number of blue whales taken off the coast of Newfoundland, and of twenty-six so measured only six reached a length of 74 feet, the maxima of which were 74 feet 4 inches and 75 feet exactly. Mr. Lucas added that if the projection of the lower jaw and the depth of the fork of the flukes is included, a total length of nearly 80 feet is obtained as the length of the longest specimen. Mr. Lucas also drew attention to the unreliability of axial measurements obtained from mounted skeletons, as the thickness of the inter-vertebral cartilage is invariably exceeded.

As Beddard justly says (3), the most obvious character of the whale tribe is their large and occasionally colossal bulk, and, in consequence, he might have added, the temptation of exaggeration is correspondingly great and

(1) Waite, *Nature*, lxxix, 1908, p. 98.

(2) Lucas, *Nature*, lxxx, 1909, p. 105.

(3) Beddard, *Book of Wales*, 1900, p. 1.

frequently yielded to. Even Mr. Lucas with his *data* in hand evidently felt that in describing the length of the Okarito whale as 87 feet I had measured along the curves or had taped the mounted skeleton. In the "Guide Book" (4), portion of which was reprinted (5), I was careful to explain the method of taking the measurements, writing:—"In order to ascertain the length of the carcass a stake was placed in the sand at the end of the snout and another in the notch of the tail, and the distance between them showed the animal to be 87 feet in length." I have thought it well to emphasize this statement so that there may be no supposition, suggestion, or misunderstanding as to the length of the Okarito whale in the future. The skeleton, as mounted, is possibly somewhat longer than the figure supplied for the carcass; I have not measured it, but this does not affect the size of the animal as it was in the flesh.

No reply other than that by Mr. Lucas was elicited. I have not seen any authoritative reference to the whale indicated in the following paragraph, published in 1913: "A 'blue' whale, 90 feet long, was recently captured off Mossel Bay (Cape Colony). The carcass is expected to yield about seventy barrels of oil (6)."

Dr. F. W. True (7) discusses very fully the various records of the size of large examples of this species, and setting aside those that are obviously erroneous, he considers that the records of Norwegian specimens by Prof. Aurivillius and Drs. Forstand and Finsch represent the maxima. These measurements, however, he regards as approximate only, as it is not definitely stated whether they are from the tip of the upper or lower jaw, from the notch or the border of the flukes, along the curves or in straight lines. As far as I am aware, also, the skeletons of these specimens have not been preserved.

Dr. Harmer (8) evidently still believes in the 100-foot whale, writing:—"The blue whale, probably the largest animal that has ever existed, is sometimes more than 100 ft. long."

The name generally associated with the blue whale is *Balaenoptera sibbaldii* Gray, 1847, but True (9) maintains that *Balaena musculus* Linnaeus, 1758, is the blue whale, the name of which should therefore stand as *Balaenoptera musculus*.

(4) Waite, Guide to Whales and Dolphins of New Zealand, 1912.

(5) *Id.*, Rec. Cant. Mus. i, 1912, p. 323, pls. lix-lxi.

(6) Empire Magazine, Aug., 1913, p. 53.

(7) True, Smiths. Contrib., xxxiii, 1904, p. 152.

(8) Harmer, Nature, June 12, 1919, p. 294.

(9) True, Proc. U.S. Nat. Mus., xxi, 1899, p. 629.

2. THE CORVISART BAY WHALE.

As the question of the size of large whales has long been one of doubt and uncertainty, I am pleased to be able to record another example of a length practically identical with the New Zealand specimen. Owing to its greater accessibility I was able to be on the scene of the stranding at a relatively earlier period, and photographs taken are consequently more satisfactory than those obtained at Okarito, some of which were printed in the publications referred to.

On September 10, 1918, information was received by telegrams from two independent sources, namely, the Survey Department and the Harbours Board, that a whale 92 feet in length had been stranded at Corvisart Bay, near Streaky Bay, at the eastern extremity of the Australian Bight. I left Port Adelaide the same day, arrived at Port Lincoln next morning, and, travelling two days by motor mail, reached Streaky Bay, where I was met by Mr. Robert Fleming and Constable P. G. Crafter. A drive of nine miles or so and we alighted from the car above the cliffs, a quarter of a mile from "The Rocks," where the whale lay stranded. These cliffs rise gradually, attaining their greatest height at the "Rocks," but so dwarfing is their effect that, approaching the carcass along the rocky shore, I formed the idea that the whale was not nearly so large as the New Zealand specimen previously referred to, which was stranded high and dry on a sandy beach. The fact that the tide was high and submerged the body to a depth of four or more feet also contributed to lessening the apparent size of the animal. I took photographs as the tide receded, and when sufficiently low to permit of wading, prepared to measure the length of the whale. By this time my estimate of the size had risen considerably, and it became a question whether, after all, it would not yield a figure equalling that of the New Zealand leviathan. The measurement was very carefully made; a short line was run out from the tip of the snout at right angles to the axis of the body, whence the tape was carried towards the tail, from the notch of which a similar line was taken. In order to avoid the introduction of any local interest I was assisted by my son, and the tape showed the length to be 87 feet 4 inches. I may mention that as the body was lying parallel to the shore and in a perfectly axial position, no allowances or computations had to be made. The specimen proved to be a female blue whale, in well nourished condition, and when stranded, only four days previously, the whole of the baleen was *in situ*. Souvenir hunters had unfortunately mutilated it on one side, but the plates on the other were intact.

I learned that the animal was first noticed by the Misses Bockleberg, on the foreshore of whose property it was stranded, when they thought it was the hull of some wrecked vessel. The carcase was photographed by local residents on the following day, and copies kindly handed to me (Pl. xxi) are interesting in comparison with my own (Pl. xxii), illustrating how soon the plumpness of the body diminishes. A further idea of the "settling" process may be gained by referring to the published picture of the New Zealand whale taken two weeks after stranding; in the case of the latter animal, however, it had been dead a still longer time, as the baleen had rotted out of the mouth prior to stranding.

After inspecting the animal there was no doubt as to the advisability of attempting to secure the skeleton for the Museum. At the same time it was obviously impossible to entertain the idea of salvage with the whale in its then position. The cliffs, beetling above (Pl. xxii, fig. 3), precluded the possibility of working from the shore, for it is only at low tide that the bases of the cliffs are exposed, and, as the shore itself is formed of jagged rocks which have fallen from the faces of the cliffs, no work could be attempted in such situation; moreover, if stormy conditions arose, the carcase would soon be pounded to pieces in such situation, and as, at the lowest estimate, it would take a month to recover the bones, the possibility of the sea remaining calm for that period was altogether too remote. Then it had been suggested to me that the oil would be valuable and that an effort should be made to preserve as much as possible.

On the morning following the day upon which I arrived I commenced the return journey, and on reaching Adelaide made arrangements for having the carcase towed off the rocks and beached in a more suitable and accessible situation. Difficulties were smoothed away by the kind offices of the Marine Board, which permitted us to hire an official tug boat, with master and crew. Having made necessary inquiries when in the district, I was advised that the carcase should be towed to Crawford's Landing, a sheltered beach within Streaky Bay and four miles or so from the township (Flinders); sufficiently near to ensure economic working, yet far enough from human habitations to disarm any possible charge of menace to health or olfactory organ. It would appear, however, that some misunderstanding arose, for the intention was not at once carried out. The actual towage of the body was not without excitement and incident. I was not present, but am permitted to quote from a letter written on September 30, 1918, by Mr. E. R. Bayer, of the Harbours Department.

Towage. "Last week I received instructions to tow a large whale from the south end of Corvisart Bay to Carawa jetty, a distance of about 32 miles. We left Thevinard about 4 o'clock on Thursday afternoon and arrived just outside Streaky Bay at 11 p.m., where we anchored for the night, leaving again at 4 a.m. on Friday. I was awakened by the master of the tug at 6.30 saying he had sighted the whale, which was on the rocks a few hundred yards away. After breakfast all hands went ashore to inspect the whale. The huge animal was stranded against two large rocks, and as it was over 80 feet long and 16 feet high you can imagine we faced a difficult problem. When I walked around to the head the smell was something frightful. To get a fastening around the neck, as instructed, I soon found impossible, so decided to tow it by the tail, which was 22 feet across. We then waited for the tide to rise. On going ashore we noticed several fins projecting above the water in the bay, and came to the conclusion that they were of big sharks, which subsequently proved to be correct. When the tide rose high enough the tug hove up anchor and started to pull, and much to the relief of all hands the beast came off quite easily. From all directions came big sharks. Our men dropped a huge, well-baited hook over, and a monster was soon hooked. We estimated the length at 20 feet, but I think that was under the mark. Two bullets from my rifle killed it, and the united strength of nine men could lift only his head out of the water. This we quickly chopped off with axe and tomahawk. Two other sharks were soon settled with the rifle, and then we had a little peace until our tow ropes were secured to the carcass of the whale.

"We left Corvisart Bay about 3 p.m. on Friday for Carawa, and as we got outside into the Bight the wind increased, causing a heavy swell and high seas, which did not improve our task. Further excitement followed, for just at dusk our 5-inch manilla tow-line parted, and we were left with only a smaller safety line around the whale's body. We were travelling three miles an hour, and still had several miles to go before reaching calm water. About two hours afterwards the second tow-line parted, and the whale got adrift on the high seas. We turned about, and again managed to make a small line fast, but noticed that the sharks (including one we had branded in the eye with a boat hook) were following. After making fast we were able to go only dead slow until we got well into calm water. We then passed a large chain around the tail, and whilst doing so the sharks rubbed up against the tug, but took no notice of a prod with a boat hook. We arrived at Carawa landing at 2 a.m. on Saturday morning, having covered 32 miles in eleven hours, when all hands were ready for bed.

"On Saturday morning we made a start to beach the whale. Four men in each of two 18-foot dinghys started to tow it ashore. As we got close in, the sharks became savage, and one huge monster charged our boat, and just as the tail of the whale touched bottom another got underneath the boat nearest the whale, making it too dangerous for the men, who objected; so we had to adopt another method, namely, that of passing a long line ashore and all hands pulling. Just as we were getting well in I received a telephone message from Streaky Bay to the effect that we were in the wrong place, the Museum men waiting at Streaky Bay for us. I then telegraphed to our head office for instructions, and got a reply at 1 p.m. to take the whale to Crawford's Landing, near Streaky Bay jetty, another 18 miles' tow. We arrived at 6.30 p.m., the Museum representative and a police officer awaiting us on the beach. We soon passed a line ashore and made it fast, and then went to Streaky Bay to wait for high tide at midnight.

"After getting provisions for the ship we went back to Crawford's Landing, hauled in the whale and anchored for the night. Just before we left we could see heads of sharks bobbing up around the carcass, they having followed us into the bay. The jaws of the shark we caught will easily drop over my shoulders without touching me."

Some Dimensions. The carcass was fleshed on the beach, and the bones and baleen were subsequently removed to the Museum at Adelaide. I have mentioned that it was considered advisable to attempt to conserve the oil; the commercial undertaking was, however, outside my jurisdiction, and the process of removing the blubber, as shown in the photograph (Pl. xxiii, fig. 1), considerably delayed the gathering of the bones.

For comparison with descriptions by the writers quoted, measurements, in the general discussion, are given in feet and inches; definite dimensions of the bones, etc., are rendered by metric factors, as below:

	Metres
Total length, in the flesh, from tip of upper jaw to the caudal notch ..	26'619
Width of tail flukes	6'604
Extreme length of skull (approximately)	6'985
Greatest width of skull	3'277
Interorbital width	2'997
Length of mandible in direct line	6'426
Length of mandible along the curve	7'112
Girth of mandible at coronoid	1'943
Girth one metre in front of coronoid	1'346

									Metres
Length of sternum	..	..	..	..	..	..	..	..	500
Breadth of sternum	..	..	..	..	..	..	..	..	1'000
Length of scapula	..	..	..	..	..	..	..	..	1'920
Height of scapula	..	..	..	..	..	..	..	..	1'195

Skin.—Very soon after a dead whale is stranded, the thin epidermis dries and peels off, leaving no trace of the actual colour or markings of the skin. I was sufficiently early on the scene at Corvisart Bay to see much of the skin intact, especially where it had been kept moist by the waves or spray. The actual colour of the skin on the back and sides is black or nearly so, but it is marked with closely set, light-coloured, irregularly radiating streaks, which arise from white patches. Some of the streaks anastomose with those from an adjoining centre, and the general effect when seen from a little distance is to produce a bluish tinge, whence the name "blue whale" is derived. The accompanying photograph (Pl. xxiii, fig. 2) illustrates the condition described. At that part of the body shown on one corner of the picture the surface skin had peeled off, and with it disappeared the peculiar markings, which are purely epidermal. It might be assumed from the photograph that the surface of the body is irregular; this effect, however, is due entirely to the markings, for the skin is absolutely smooth and shiny except where denuded of the epidermis.

Baleen.—As previously mentioned, the whalebone of one—the right—side of the head was intact; its position in the mouth is shown in the photograph (Pl. xxii, fig. 2). It must be borne in mind that as the animal was lying on its back, it is the upper jaw that is awash, and the picture should be reversed to realize how the baleen depends from the mouth. The colour of the whalebone, including the bristles, is black. The plates number about 330 on each side, the length of the longest, measured along the outer edge, is 812 mm., that of the longest bristle 406 mm.

Running along the whole inner side of the main series is a narrower set, formed, not of wide plates, but of strips, the largest of which measure 25 mm. in width. This auxiliary set of plates, nowhere more than 178 mm. in length, is free from the main series except at the base, where it forms, at its area of attachment to the roof of the mouth, a characteristic pattern, somewhat like the radiator of an automobile, but with the components directed obliquely, so that the rows are successively lost. The condition is well shown in the accompanying photograph (Pl. xxiii, fig. 3). I presume the term "inter-

mediate substance," mentioned by Turner⁽¹⁰⁾, refers to the structure here indicated.

Tongue Bones.—The basihyoid is a massive bone measuring 1.65 m. across. It is illustrated on Plate xxiv, together with the stylohyoids, the connecting ceratohyoids being represented by cartilage only.

Ribs.—Of the New Zealand whale I wrote: "Zoologists differ as to the number of ribs possessed by the blue whale, some giving fifteen and others sixteen pairs. While the Okarito whale has the lower number, it is significant that the sixteenth (dorsal) vertebra has an articular surface, so that did we not know that all the ribs were secured and preserved we should, by examination of the vertebrae, pronounce the number to be sixteen pairs."

The South Australian whale likewise has fifteen pairs of ribs; the series of the left side is here illustrated (Pl. xxiv, fig. 1). It is generally stated that in some whales the first rib is formed of two components, each of which has a separate head, one being attached to the first dorsal and the other to the last cervical vertebrae. The anterior rib of the specimen under notice has a single head only, but it possesses two articular surfaces which respectively conjoin with the transverse processes of the contiguous cervical and dorsal vertebrae. The next three ribs have large capitular processes, as shown in the photograph. In a specimen described by Flower⁽¹¹⁾ the processes were fully developed only on the second and third ribs; he remarked that the capitular processes extended towards the bodies of the vertebrae.

In this connection attention may be drawn to the very pertinent remarks of Eschricht, as detailed by Giebel and Leche⁽¹²⁾, who write, in effect: "In contradistinction to the statements given in most anatomical text-books, as founded upon wrongly mounted skeletons, the heads of the ribs do not articulate with the bodies of the vertebrae, but with the ends of the transverse processes only, a conclusion arrived at from a study of the attachments of the ligaments." This statement is probably true only of the baleen whales; in the Odontoceti some of the anterior ribs do form a connection with the bodies of the vertebrae, and are likewise connected with more than one element of the sternum, which in the Mysticoceti consists of a single bone only.

The length of each of the fifteen ribs, measured in a straight line between their extreme points, is as follows:

(10) Turner, Marine Mammals in Anat. Mus. Edin., 1912, p. 44

(11) Flower, Proc. Zool. Soc., 1864, p. 412.

(12) Giebel and Leche, Bronn's Thier-reichs, i, 1874, p. 372.

Rib	Metres	Rib	Metres	Rib	Metres
1 ...	1'965	6 ...	3'272	11 ...	2'848
2 ...	2'743	7 ...	3'120	12 ...	2'756
3 ...	3'130	8 ...	3'078	13 ...	2'682
4 ...	3'205	9 ...	3'015	14 ...	2'725
5 ...	3'215	10 ...	2'937	15 ...	2'664

Sternum. The sternum of this species, as evidenced by our specimen, is very different from that of *B. physalus*, for example. True⁽¹³⁾ reproduced the figures of a large number of sterna of the latter species which may be contrasted with the photograph here submitted (Plate xxiv, fig. 3). In our example the bone forms a butterfly-like figure, twice as broad as long, the major dimension being 1 metre. Unlike the condition in many examples of *B. physalus* the anterior part of the bone consists of a boss, whereas the hinder part is deeply notched, a condition foreshadowed in a specimen of *B. musculus*, from Ostend, as illustrated by Fischer (*vide* True).

Vertebrae. Though not fused together the seven vertical vertebrae form a compact mass. In the atlas (Pl. xxv, fig. 1) the processes are feebly curved backward, the transverse diameter of the bone being 1'029 m. The Axis (Pl. xxv, fig. 2) is a massive member with the diameter of 1'448 m.; the processes are curved backwards, and the superior and inferior apophyses are strongly ankylosed and enclose the lateral foramina. The processes of the third vertebra are weak and are also directed backwards, while those of the fourth have a lateral direction: the apophyses of the fifth and sixth vertebrae are directed forwards; in the latter the extremity of the diaphysis is expanded and approximates the parapophysis of the fifth; the parapophysis of the sixth vertebra is very short. In the last cervical the superior process is large, whereas the inferior one is represented by a tubercle only. The processes of the last cervical and first dorsal are in apposition and are connected by a pad of cartilage arising from a bony boss on the cervical, and a cup with raised bony margins on the dorsal; the latter condition is shown on Plate xxv, fig. 3. The processes of each side are not ankylosed in the third to sixth vertebrae. The diapophyses of the cervicals are set vertically to the body; those of the first few dorsals are oblique and of the remainder throughout, subhorizontal. As will be seen in the illustration, the extremity of the neural spine of the first dorsal is not thickened, nor is the character apparent in the next two vertebrae. The first lumbar is shown on Plate xxvi, fig. 1. The third to sixth lumbar are the largest vertebrae, the span of their

(13) True, Smiths. Contrib., *loc. cit.*, pp. 140, 141.

lateral processes being 1.829 m., the total height of the sixth is 1.359 m., and the width of its centrum .508 m. The neural spine appears last on the fifty-fifth and the first perforated diaphragm on the fifty-second vertebra. Portion of each lateral process, on the left side, from the seventh to fifteenth lumbar inclusive, had been broken and reunited during life. One of the hinder ribs also appears to have received damage, facts suggesting that the animal had collided with some vessel and received somewhat extensive injury thereby. Twenty-six caudals are preserved, but two were certainly lost by abrasive influences or owing to the attention of sharks during the towage as previously described. The first twenty caudals bear chevron bones, the anterior of which is an unpaired bone. The number of vertebrae is as follows: Cervical 7, Dorsal 15, Lumbar 15, Caudal 26+2, total 65. These are the precise figures rendered by Beddard (14).

Scapula. Judging by illustrations, the scapula is not subject to much variation, though the processes may be. A specimen in the Edinburgh University Museum has the acromion rather narrow and of uniform depth, whereas in our example it is deep and markedly expanded, its distal extremity being almost twice the depth of the shaft. The coronoid also appears to be larger, but some little allowance must perhaps be made for a slight difference in the photographic plane as indicated by the curvature of the base; on the other hand the relation between the acromion and coronoid in Turner's figure (15) and mine (Plate xxvi, fig. 2) are not dissimilar.

The principal dimensions of the scapula are given above; the diameter of the glenoid cavity is 343 x 229 mm., and the greatest length of the acromion 457 mm. The borders of the scapula are deflected outwards so that the aspect presented to the ribs is slightly convex; it is possibly this peculiarity that has deceived articulators, for in many mounted skeletons of whales the scapulae will be found to be reversed, the bone of the right side appearing on the left and *vice versa*.

Pelvic Bones. In the New Zealand whale the pelvic bones were represented by two on each side, the smaller of which are no larger than walnuts. In the Australian specimen the larger pair of bones only was developed.

Turner has also noted the absence of a rudimentary femur in a female of this species. In his "Marine Mammals" this author (16) illustrates two speci-

(14) Beddard, *loc. cit.*, p. 147; note: the references to the signs * and † should be reversed.

(15) Turner, *loc. cit.*, pl. iv, scapula.

(16) *Id. ib.*, p. 50.

mens, to the upper figure of which our examples are very similar. Owing to foreshortening in our picture the more slender element appears to be shorter than in reality, the tip being strongly curved towards the observer. The longer member of the right bone measures 340 mm., and the smaller one 245 mm. The distance between the extremities of the two long processes is 400 mm. The pelvic bones are illustrated on Plate xxvi., fig. 3.

Professor O. Abel has written a valuable paper on the pelvic bones, under the title "Die Morphologie der Huetftbeinrudimente der Cetaceen" (17), and has also supplied a bibliography of the subject. He has not discussed the species under notice, but has dealt with *B. physalus* Linn.: in this species the Ilium and Ischium form a more direct line than in the Blue Whale, in which the bones are fused almost at right angles.

Explanation of Plates xxi-xxvi.

Plate xxi.

Blue Whale at Corvisart Bay, near Streaky Bay, South Australia, taken shortly after stranding. Dorso-lateral aspect.

Photograph by G. Watson.

Plate xxii.

Fig. 1. The whale, four days after stranding, showing the change in contour.

Fig. 2. Head of the whale. If the picture be viewed upside down the baleen will appear in its correct position, depending from the upper jaw.

Fig. 3. The whale, ventral aspect.

Photographs by the author.

Plate xxiii.

Fig. 1. Flensing the whale at Streaky Bay. A horse was used for dragging off the blubber as it was released by the men.

Fig. 2. Portion of the skin, showing epidermal markings.

Fig. 3. Attachment area of portion of baleen, showing the bases of the inner (narrow) and outer (broad) plates.

Photographs by the author.

(17) Abel, Denks. der K. Akad. Wissen Wien, lxxxi, 1907, p. 139.

Plate xxiv.

- Fig. 1. Ribs of the left side.
- Fig. 2. Basihyoid.
- Fig. 2a. Stylohyoids.
- Fig. 3. Sternum.

Photographs by Herbert M. Hale.

Plate xxv.

- Fig. 1. Atlas of the whale, anterior aspect.
- Fig. 2. Axis, anterior aspect.
- Fig. 3. First dorsal vertebra, anterior aspect, showing the bony cups, to which are conjoined the bosses of the transverse processes of the seventh cervical vertebra.

Photographs by Herbert M. Hale.

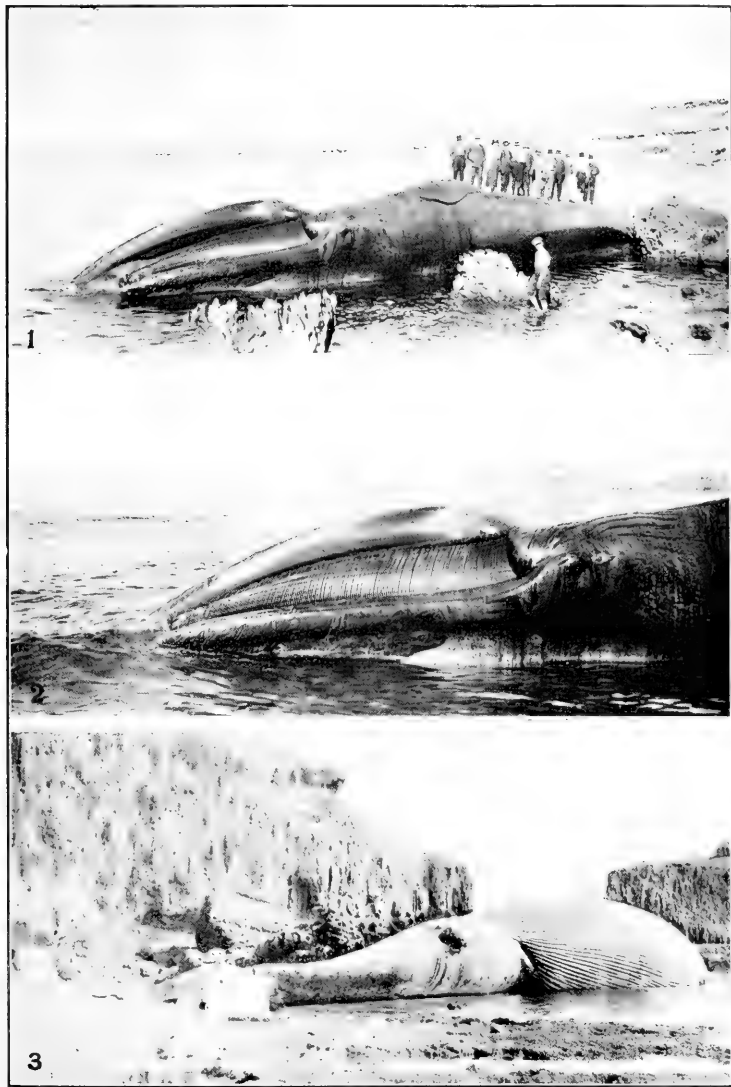
Plate xxvi.

- Fig. 1. First lumbar vertebra.
- Fig. 2. Right scapula.
- Fig. 3. Pelvic bones. I, ilium; Is, ischium; P, pubis.

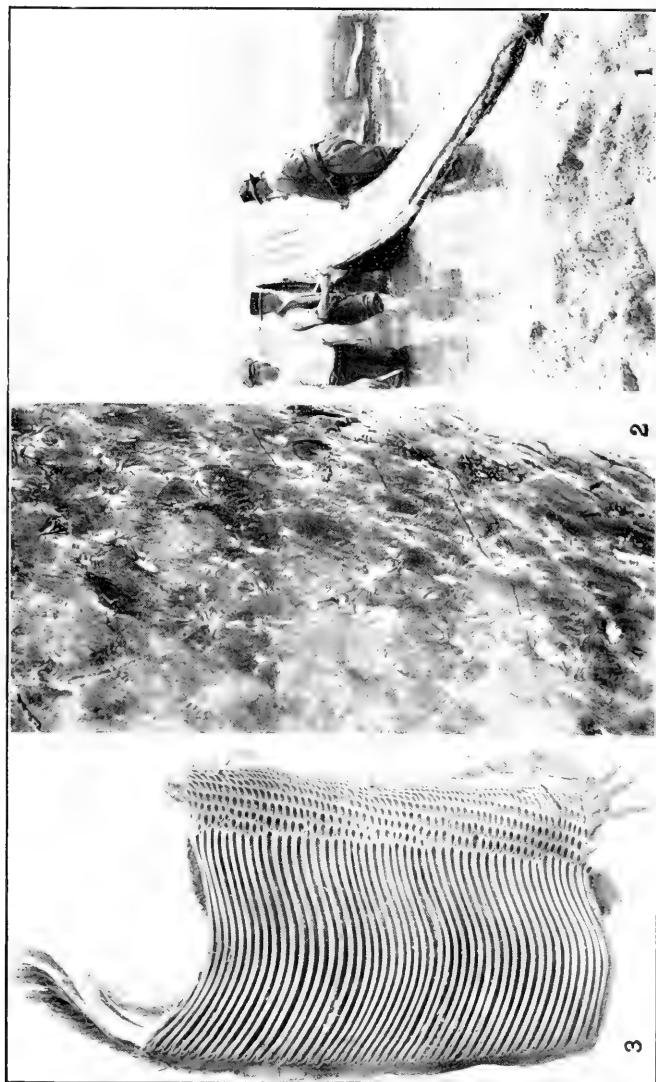
Photographs by Herbert M. Hale.



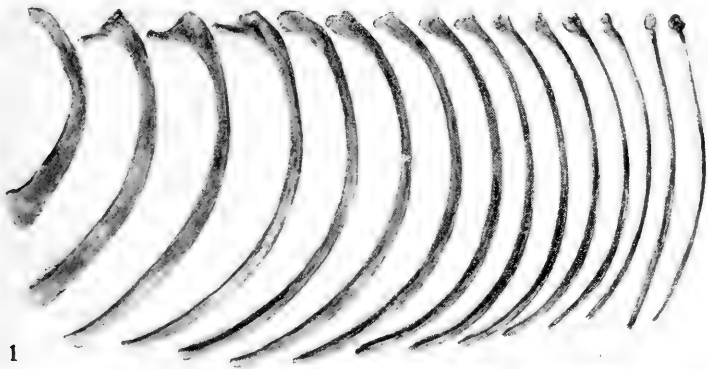
BLUE WHALE.



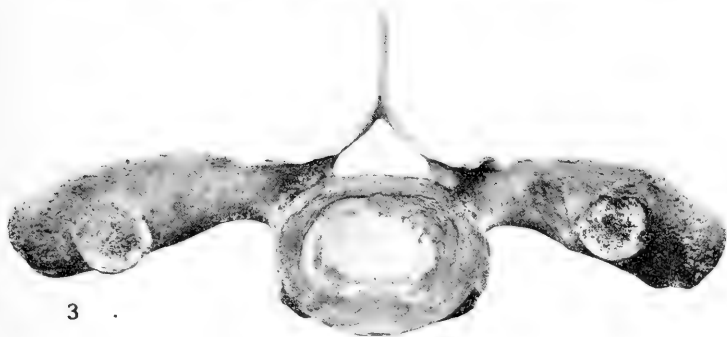
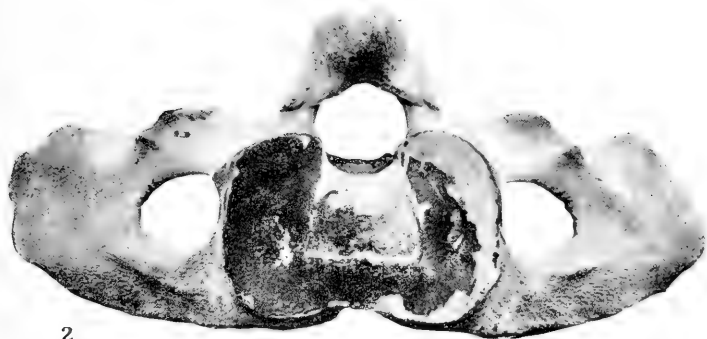
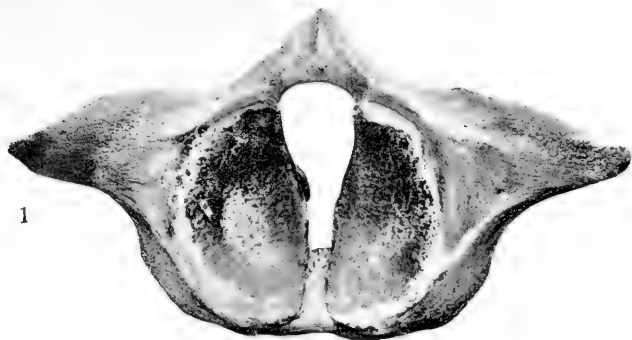
BLUE WHALE.



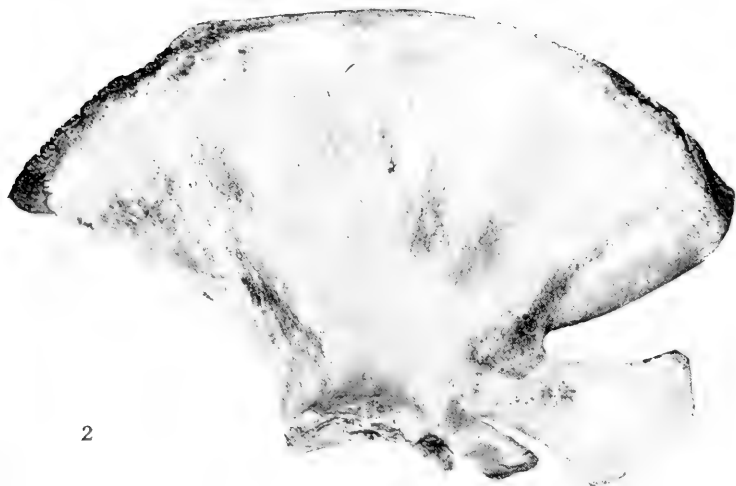
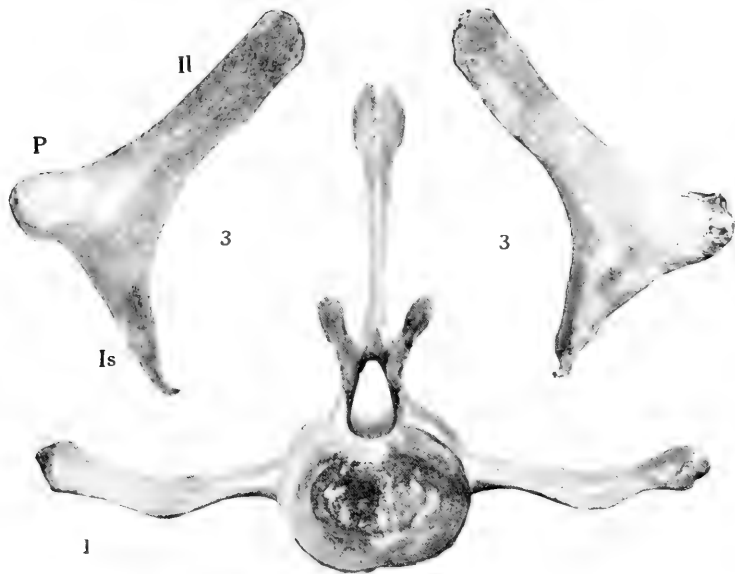
BLUE WHALE.



BLUE WHALE.



BLUE WHALE.



BLUE WHALE.

DESCRIPTION OF
THREE NEW SPECIES OF THYNNIDAE
(HYMENOPTERA)

By ROWLAND E. TURNER, F.Z.S., F.E.S.

LESTRICOTHYNNUS EXTRANEUS sp. nov.

♂ Niger; mandibulis, clypeo, linea obliqua utrinque inter antennis, orbitis oculorum, propleuris linea antice, mesonoto macula quadrata postice, scutello macula magna mediana maculaque parva utrinque angulis basalibus, postscutello linea transversa, mesopleuris macula sub alis, tergitis 1-6, sternitisque 2-6, macula transversa utrinque, tergito septimo fascia lata obliqua utrinque, sternitoque primo macula apicali flavis; tegulis brunneo-testaceis; alis hyalinis, venis nigris.

♀ Nigra; capite prothoraceque rufis, pedibus pygidioque testaceis; tergitis 1-4 macula parva flava utrinque, tergito secundo transverse septemcarinato, pygidio angustissimo.

Long.: —, 15-17 mm.; —, 12 mm.

♂ Antennae as long as the head, thorax and median segment combined, the apical joints a little more slender than the basal, and very feebly arcuate beneath. Clypeus strongly convex, sparsely but deeply punctured, the apical margin broadly transverse. Head and thorax closely punctured, the pubescence greyish brown on the head and dorsal surface of the thorax, white on the sides of the head and on the pleurae. Interantennal prominence rather broad; a low frontal carina not extending to the anterior ocellus. Pronotum rather strongly narrowed anteriorly, the anterior margin straight. Median segment rounded, rather more finely punctured than the thorax, rather closely clothed with long whitish pubescence, which is not dense enough to hide the sculpture. Abdomen rather slender, deeply but rather sparsely punctured, the sides almost parallel, except at the extremities; seventh tergite with a few curved striae at the apex. Hypopygium elongate triangular, with an acute apical spine, the basal angles produced into a rounded prominence on each side. Sternites more closely punctured and sparsely clothed with white hairs, the black ground colour mingled with ferruginous. Second abscissa of the radius a little longer than the third; second recurrent nervure received just beyond one-quarter from the base of the third cubital cell.

♀ Head half as broad again as long, broadly rounded at the posterior angles, moderately convex, shining, with a few very fine and scattered punctures and a short longitudinal frontal sulcus. Pronotum more than twice as broad as long, finely and sparsely punctured, with a row of larger punctures, each bearing a long hair, along the straight anterior margin. Median segment obliquely truncate posteriorly. Abdomen shining, very sparsely punctured; the second tergite with seven transverse carinae, including the strongly raised apical margin; fifth sternite closely longitudinally striated; pygidium elongate, very narrow, constricted before the base of the oblique apical truncation; the dorsal plate of the truncation very much shorter than the ventral, very narrowly lanceolate, with raised margins, and pointed at the apex; the ventral plate narrowly rounded at the apex.

Hab. Port Lincoln, South Australia (Lea).

Types. I. 10799. ♂ ♀ in South Australian Museum; Cotype ♂ retained in British Museum. Allied to *L. fraucifeldianus* Sauss. from Sydney, and to *L. nubilipennis* Sm. from Queensland, but has the hypopygium of the male and the pygidium of the female much narrower. The legs of the male are also black, not ferruginous as in the species mentioned above and in *L. modestus* Sm. The hypopygium and pygidium are also much narrower than in *L. vigilans* Sm.

EIRONE BASIMACULATA sp. nov.

♂ Niger; mandibulis macula parva basali flava; alis hyalinis, venis nigris. Long.: 8-9 mm.

♂ Clypeus truncate at the apex, without a triangular truncation, rather strongly convex and almost subtuberculate in the middle; antennae rather short, about as long as the head and thorax without the median segment, the apical joints slightly arcuate beneath. Head finely and closely punctured, a little broader than the thorax, the posterior ocelli about twice as far from the eyes as from each other and as far from the posterior margin of the head as from the eyes. Thorax shining, rather sparsely punctured, the pronotum much more finely punctured than the mesonotum, the mesopleurae rather coarsely punctured-rugulose. Median segment rather short, very delicately punctured-rugulose, the base shining and almost smooth. Abdomen shining, very delicately punctured, the tergites without any distinct raised marks. Hypopygium rounded and ciliated. Calcaria pale. Third abscissa of the radius short, usually only about half as long as the second. Head, pleurae and apex of the abdomen rather sparsely clothed with cinereous hairs.

Hab. Hobart, Tasmania (Lea).

Type, I. 10800, in South Australian Museum, cotype retained in British Museum.

This is nearest to *E. tenebrosa* Turn., but may be distinguished by the yellow spot at the base of the mandibles, and the absence of raised marks on tergites 2-4.

EIRONE MAJOR sp. nov.

♂ Niger; mandibulis, apice excepto, clypeo margine antico late, linea obliqua utrinque inter antennas, pronoto margine antico, tegulisque basi flavis; antennis, dimidio apicali infuscatis, tegulis, pedibusque, coxis exceptis ferrugineis; alis subhyalinis, venis nigris.

Long.: 11 mm.

♂ Head large and massive, produced behind the eyes, posterior ocelli fully half as far again from the eyes as from each other, and nearly twice as far from the hind margin of the head as from the eyes. Clypeus with a carina from the base not reaching the middle, a flattened, strongly punctured, triangular space extending from near the middle to the apex, the apical margin transverse. Head shining, rather sparsely punctured; antennae as long as the head and thorax without the median segment, the apical joints feebly arcuate beneath. Thorax rather sparsely punctured, the mesopleurae more closely punctured than the mesonotum; median segment very delicately rugulose, almost smooth at the base. Abdomen elongate, very finely and closely punctured, tergites 2-4 with a raised transverse mark on each side just before the apex. Hypopygium very broadly rounded and ciliated. Third abscissa of the radius a little shorter than the second.

Hab. Forest Reefs, between Bathurst and Orange, N.S.W. (*Lea*).

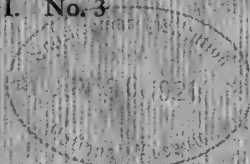
Type, I. 10801, in South Australian Museum, cotype retained in British Museum.

Allied to *E. grandiceps* Turn., but is a smaller species, differing much in colouring, in the form of the clypeus and in the shorter antennae. The maxillary palpi are also much stouter and less elongate in the present species. The head is much larger than in *E. ruficornis* Sm., from which it differs in colour and other details.

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CONTENTS

	PAGE
Descriptions of Little-known Australian Snakes - - - - -	Edgar R. Waite and Heber A. Longman 173
Catalogue of Australian Lizards - -	F. R. Zietz - - 181
Arachnida from Lord Howe and Norfolk Islands - - - - -	W. J. Rainbow - 229
On Australian Coleoptera - - -	Arthur M. Lea - 273
Notes on Radiographs of Two Mice -	Edgar R. Waite - 291

DESCRIPTIONS OF LITTLE-KNOWN
AUSTRALIAN SNAKES.

By

EDGAR R. WAITE, F.L.S., DIRECTOR SOUTH AUSTRALIAN MUSEUM.

AND

HEBER A. LONGMAN, F.L.S., DIRECTOR QUEENSLAND MUSEUM.

Plate xxvii, and Text figs. 32-38.

Seven species are herein dealt with; of these, two, namely *Demansia carinata* and *Furina multifasciata*, are represented by figures only. *Pseudechis guttatus* is re-described and a key to members of the genus provided. *Tropidechis dunensis*, *Denisonia suta*, and *Denisonia maculata* are also re-described and a variety of the last established and re-named. The head shields of all the species included are figured in detail. We have to tender our thanks to Mr. H. M. Hale for the photographs and drawings utilized.

DEMANSIA CARINATA Longman.

Diemnia carinata Longman, Mem. Queensl. Mus. iii, 1915, p. 31, pl. xiv.

Fig. 32.

Detailed drawings of the head of the specimen illustrated by the photograph published by Longman are here supplied.

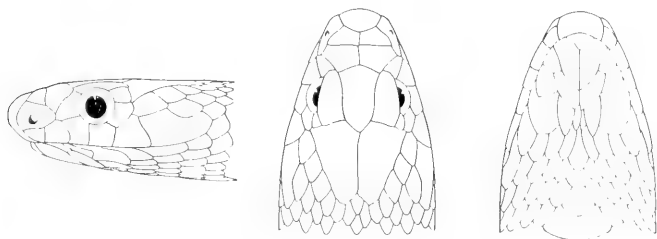


Fig. 32. Head of *Demansia carinata*.

Bicarinate ventral shields are generally indicative of climbing, as in *Dendrophis* and *Hoplocephalus* (1), and the very pronounced keels in this *Demansia* may be associated with similar habit.

(1) Waite: Rec. Aust. Mus. vi, 1905, p. 38.



PSEUDECHIS GUTTATUS De Vis.

Pseudechis guttata De Vis, Ann. Queensl. Mus., No. 6, 1905, p. 49.

Fig. 33.

Scales in 19 rows. Ventrals 181-193. Anal divided. Subcaudals 52-59, the great majority (37-44) being single.

Description. Vertical diameter of eye equal to its distance from the mouth; pupil round. Rostral broader than deep, the portion visible from above about a third as long as its distance from the frontal. Internasals one-half as long as the prefrontals. Frontal rather small, a little wider than the supraocular (exceptionally a little narrower), two-thirds the length of the parietals; two-thirds as wide as long; shorter than its distance from the end of the snout. Nasal divided; posterior nasal just in contact with the single preocular. Two postoculars. Temporals 2 + 2, the lower anterior large and wedged in between the fifth and sixth labials. Six upper labials, third and fourth entering the eye; third, fourth and fifth sub-equal in depth. Three or four lower labials in contact with the anterior chin shields, which are a little shorter than the posterior.

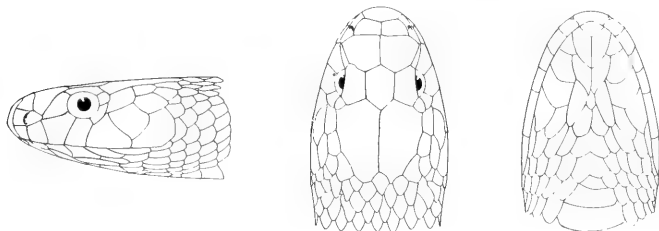


Fig. 33. Head of *Pseudechis guttatus*.

Colours. Dark olive brown above; many of the dorsal scales with a single white or yellow spot; spots disappearing at about two-thirds the length of the body. Head and nape uniform dark olive brown above and lighter beneath. Lateral scales of body each with a yellowish marking. Ventrals slate grey with lighter markings.

The four specimens examined show considerable variation in colour, and in one the light spots are so prevalent on the anterior third of the body as to give a creamy effect to the whole dorsal surface.

Total Length (type). 1100 mm.; tail 172 mm.

Loc. Cecil Plains, S. Queensland (type); Cannon Creek, S. Qld.; Kooralbyn Station, S. Qld. (contained fifteen immature eggs); Range, Toowoomba, S. Qld.

Pseudechis guttatus may be distinguished from *P. australis* Gray and *P. colletti* Boulenger by its smaller number of ventrals. From *P. denisonioides* it may be separated by its shorter frontal and divided anal. The presence of two anterior temporals distinguishes it from *P. cupreus*.

Total Length. 1235 mm.; tail 180 mm.

KEY TO THE SPECIES OF PSEUDECHIS.

- a. Anterior subcaudals single
 - b. Scales in 17 rows on the body
 - c. Anal divided
 - d. Frontal once and one-fourth to once and two-thirds as long as broad; rostral scarcely broader than deep, anal very exceptionally entire ... *porphyriacus*
Belly blue var. *mortonensis*
 - dd. Frontal nearly twice as long as broad; rostral scarcely broader than deep... *cupreus*
 - ddd. Frontal once and two-thirds to twice as long as broad; rostral considerably broader than deep *australis*
 - dddd. Frontal as broad as long, wider than the supraocular... .. *darwiniensis*
 - cc. Anal entire
 - Frontal almost twice as long as wide, rostral wider than deep *denisonioides*
 - bb. Scales in 19 or 21 rows on the body
 - e. Frontal as broad as the supraocular
 - f. Ventrals 221-224 *papuanus*
 - ff. Ventrals 181-193 *guttatus*
 - ee. Frontal much narrower than supraocular ... *colletti*
- aa. Subcaudals all in pairs, scales in 23 rows
 - g. Anal entire
 - h. Frontal twice as long as broad *scutellatus*
 - hh. Frontal once and a half as long as broad ... *microlepidotus*
 - gg. Anal divided *ferox*

DENISONIA SUTA Peters.

Hoplocephalus sutus Peters, Monatsb. Akad. Berlin, 1863, p. 234.

Denisonia suta Bouleng. Cat. Snakes, Brit. Mus. iii, 1896, p. 339.

Fig. 34.

Scales in 19 rows. Ventrals 169. Anal entire. Subcaudals single in 29 rows.

Description. Vertical diameter of eye twice its distance from the mouth. Pupil vertically elliptic. Rostral much broader than deep, just visible from above. Internasals shorter than the prefrontals, which latter are broader than long. Frontal nearly twice as wide as the supraocular; one-half longer than wide and longer than its distance from the end of the snout: a little shorter than the parietals. Nasal entire, in contact with the single preocular. Two postoculars. Temporals 2 + 2, the lower anterior wedged between the fifth and sixth labials. Six upper labials, third and fourth entering the eye. Three lower labials in contact with the anterior chin shields, which are as long as the posterior.

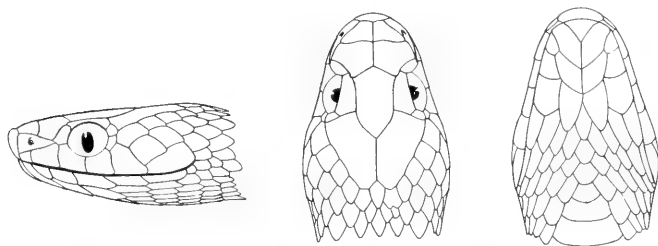


Fig. 34. Head of *Denisonia suta*.

Colours. Olive brown above. Head slightly darker above; nape dark brown. A black streak arises on the upper part of the rostral and passes through the nostril to the eye, thence to the upper part of the sixth labial and the nape marking of which it forms the lower border. A yellow marking on the pre-, supra-, and postoculars partly encircling the eye. Black blotches on the lower part of the rostral and first four labials; also on the mental, first chin shield, and first lower labial. The rest of the rostral, labials, and entire under parts to the tip of the tail pale yellow. A median, irregular, reddish streak from about the sixth ventral to the second preanal scale. Lower body scales and lateral edges of ventrals margined with grey.

Total Length. 490 mm.; tail 56 mm.

Loc. Moolooloo, South Australia. Collected F. Angel and E. Savage.

The single specimen examined appears to be the third known; the definite locality recorded indicates that the species inhabits the country bordering the dry interior regions. It was taken during an excursion of the Field Naturalists' Section of the Royal Society of South Australia.

As Boulenger ⁽²⁾ pointed out, this species is allied to *Denisonia forresti* and *D. frontalis*. Longman ⁽³⁾ has also made reference to the variety *propinqua* De Vis. He examined seven specimens of *D. frontalis* in the Queensland Museum, and remarking on the considerable variation in the juxtaposition or otherwise of the nasal and preocular scales, finds it difficult to separate these forms from *D. suta*.

DENISONIA MACULATA Steindachner.

Hoplocephalus maculatus Steind. Reise Novara, 1867, p. 81. Günth. Journ. Mus. Godeff. xii, 1876, p. 46.

Denisonia ornata Krefft. Proc. Zool. Soc., 1869, p. 321, and Snakes of Austr., 1869, p. 82, pl. xi, fig. 4.

Denisonia maculata Bouleng. Cat. Snakes iii, 1896, p. 341.

Plate xxvii, fig. 1, and Text fig. 35.

Scales in 17 rows. Ventrals 134. Anal entire. Subcaudals single in 24 rows.

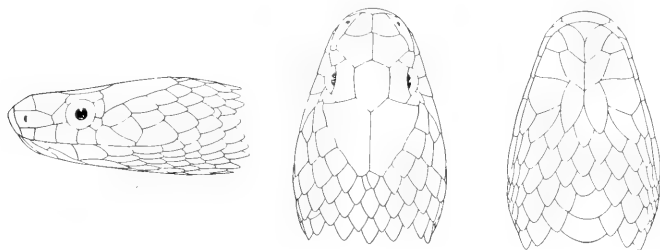


Fig. 35. Head of *Denisonia maculata*.

Description. Vertical diameter of the eye greater than its distance from the mouth and about half its distance from the end of the snout. Pupil round. Rostral almost twice as broad as deep and just visible from above. Internasals shorter than the prefrontals, the last-named being as broad as long. Frontal once and one-half times longer than broad and as long as its distance from the end of the snout; much shorter than the large parietals. Nasal entire in our specimen

(2) Boulenger: Ann. Mag. Nat. Hist. (7), xviii, 1906, p. 441.

(3) Longman: Mem. Queensl. Mus. I, 1912, p. 23.

(usually divided), in contact with the single preocular. Two postoculars. Temporals 2 + 2, the lower anterior wedged between the fifth and sixth upper labials. Six upper labials, the third and fourth entering the eye. Three lower labials in contact with the anterior chin-shields, which are shorter than the posterior.

Colours. Dark reddish brown above. Head slightly darker above, all the head shields mottled with yellow. Lower labials brown, each with an oblique yellow streak. A darker edging on the nape. Anterior ventrals largely mottled with brown. Markings in the thoracic region confined to the lateral edges of the ventrals. Lateral body scales also mottled; subcaudals with median, faint brown markings.

Gunther (4) noted that Krefft's *Denisonia ornata* "was accidentally provided with a separate shield in the loreal region."

Total Length. 360 mm.; tail 42 mm.

DENISONIA MACULATA var. DEVISI nom. nov.

Hoplocephalus ornatus De Vis, Proc. Roy. Soc. Qld., i, 1884, p. 100, pl. xv (not *Denisonia ornata* Krefft). Bouleng. Cat. Snakes, iii, 1896, p. 341.

Plate xxvii, fig. 2, and Text fig. 36.

Scales in 17 rows. Ventrals 129-140. Anal entire. Subcaudals single. 25-37 (type).

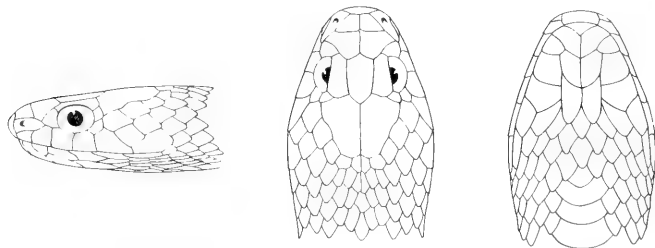


Fig. 36 Head of *Denisonia maculata* var. *devisi*

Description. Vertical diameter of the eye greater than its distance from the mouth. Pupil vertically elliptic. Rostral broader than deep; visible from above. Internasals shorter than the prefrontals, the last-named broader than long. Frontal wider than the supraoculars, nearly twice as long as wide and slightly longer than its distance from the end of the snout; shorter than the parietals.

(4) Gunth. Journ. Mus. Godefr., xii, 1876, p. 46.

Nasal entire, in contact with the single preocular. Two postoculars. Temporals 2 + 2; lower anterior large, and partly wedged in between the fifth and sixth labials. Six upper labials, third and fourth entering the eye. Three lower labials in contact with the anterior chin shields, which are a little shorter than the posterior.

Colours. In spirit, yellowish, with 52 more or less irregular or broken, dark brown bars across the back, extending from the nape to the beginning of the tail; the latter with brown zigzag lines above. Head pale, largely obscured with darker mottlings, but with yellowish spots above; labials yellow, the sutures broadly edged with dark brown. A linear series of blotches between the bars and the ventrals, definitely marked on the anterior part of the body, but elsewhere less defined, forming V- or W-shaped figures. Lower surfaces immaculate but with some spots on the gular region.

Total Length. 345 mm.; tail 56 mm.

Described from six specimens—four from Western Queensland, namely, Surat (De Vis' type), Aramac, Tambo and Coreena Stations; and two from unknown localities.

This variety is readily distinguished from *D. fasciata* Rosen (⁵) (West Australia) by its lesser number of ventrals. Boulenger pointed out that *Hoplocephalus ornatus* agrees in all structural characters with *D. maculata*, but these barred snakes, which are apparently confined to Western Queensland, are so strikingly distinct in colour that they require a varietal name. The proportions of the head shields in our series vary somewhat, but we find that the variety *devisi* has a relatively longer frontal.

TROPIDECHIS DUNENSIS De Vis.

Tropidechis dunensis De Vis, Ann. Queensl. Mus., No. 10, 1911, p. 20.

Fig. 37.

Scales in 23 rows. Ventrals 216. Anal entire. Subcaudals 54 pairs.

Description. Eye large, its distance from the mouth equal to 2/5 the vertical diameter. Pupil round (vertically elliptic on one side). Rostral broader than deep, just visible from above. Internasals as long as the prefrontals. Frontal three-fourths as wide as long, one-third broader than the supraocular, longer than its distance from the end of the snout and three-fourths as long as the parietals. Nasal entire, in contact with the single preocular. A single large postocular. Temporals 3 + 4. Seven upper labials, third and fourth entering the eye. Three

(5) Rosen: Ann. Mag. Nat. Hist. (7), xv, 1905, p. 179.

lower labials in contact with the large anterior chin shields, which are longer than the posterior. Scales on body strongly keeled, ventrals smooth.

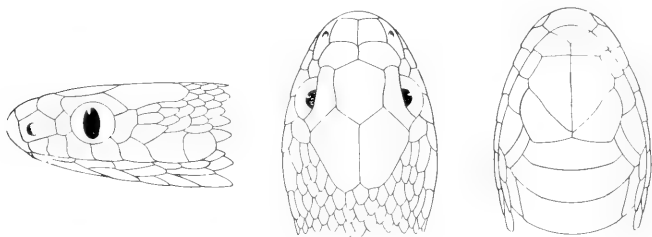


Fig. 37. Head of *Tropidechis dunensis*.

Colours. Completely bleached after long preservation in spirit.

Total Length. 370 mm.; tail 50 mm.

Loc. Darro, Darling Downs, Queensland.

The very large anterior chin shields are a distinguishing feature of this species. Unfortunately only one immature example is available for examination.

FURINA MULTIFASCIATA Longman.

Furina multifasciata Longman Mem. Queensl. Mus. iii, 1915, p. 30.

Plate xxvii, fig. 3, Text fig. 38.

As this species has not been previously figured, a photograph of a preserved specimen and drawings of the heads shields are now furnished.

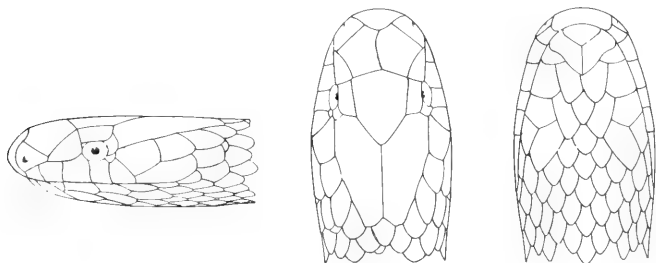


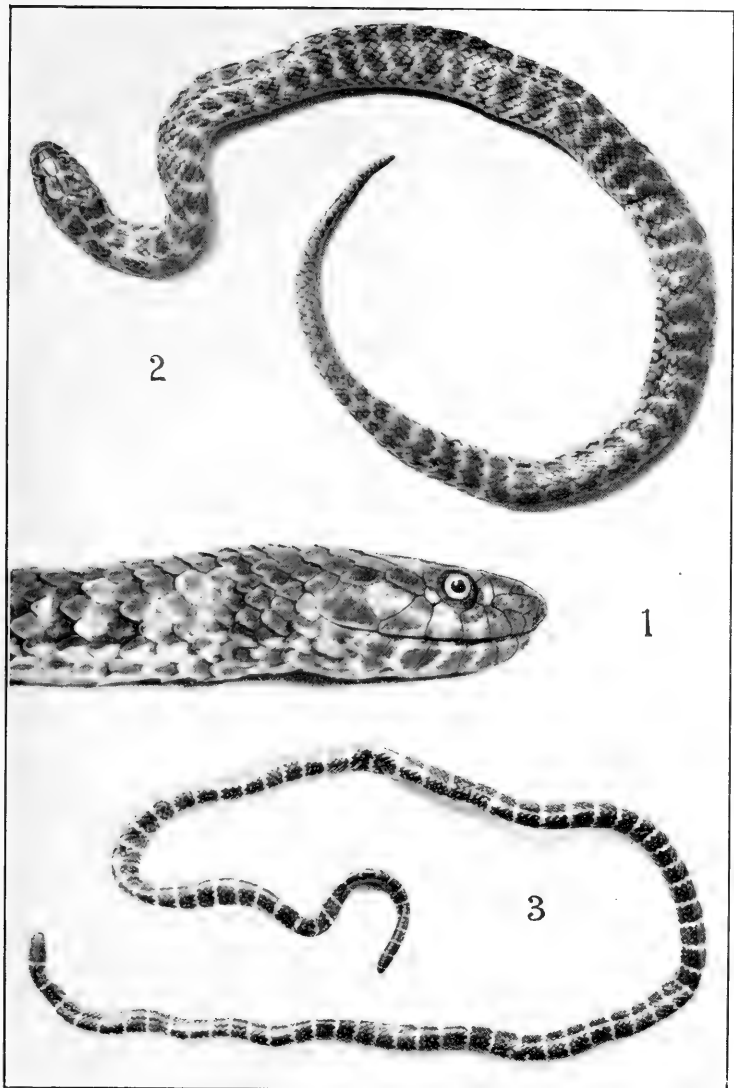
Fig. 38. Head of *Furina multifasciata*.

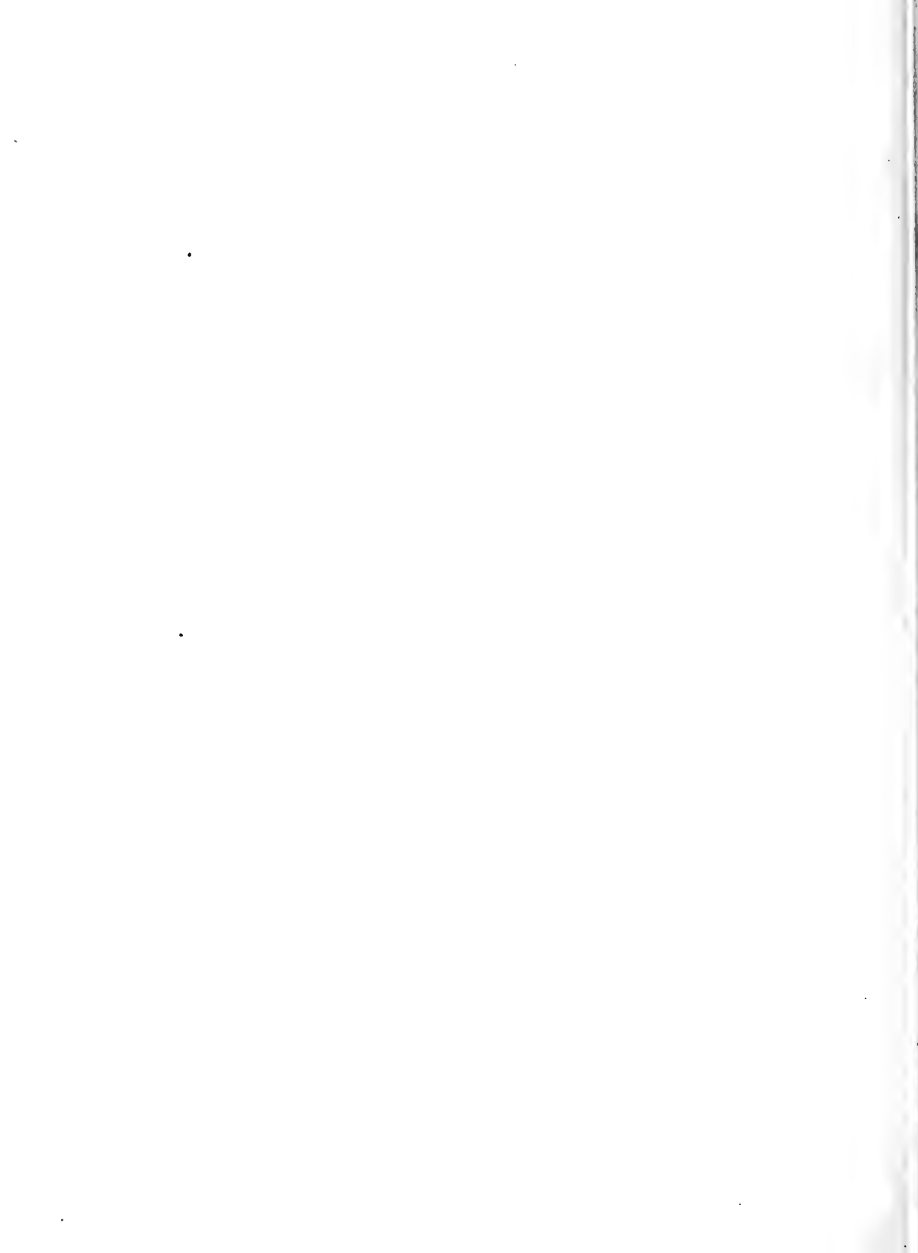
Explanation of Plate xxvii.

Fig. 1. Head of *Denisonia maculata* Steindachner (enlarged).

Fig. 2. *Denisonia maculata* var. *devisi*, nom. nov.

Fig. 3. *Furina multifasciata* Longman.





CATALOGUE OF AUSTRALIAN LIZARDS.

By F. R. ZIETZ, S.A. MUSEUM.

The object of this catalogue is to bring together under one cover references to all the described species of Australian lizards. The only previous publications that thus dealt with the subject as restricted to Australia, are those by Gray in Grey's Travels in Australia, 1841, and Lizards of Australia and N. Zealand, 1867. Lucas and Frost listed the Australian lizards, but beyond the names of the species and those of the authors, no references were supplied. The catalogues by Gray (1845) and Boulenger (1885-87) dealt with the lizards of the world, and the bulk of their contents is therefore not required by Australian workers; these publications, moreover, are also out of date.

The scope of the present catalogue may be thus defined: To record all the Australian species; to supply a reference to the original descriptions and to include the principal synonyms added since the publication of the 2nd edition of the British Museum Catalogue (1885-87), and, lastly, to furnish a bibliography of the subject.

No new species is described but it has been found necessary to supply names to forms standing as *Lygosoma (Heteropus) vertebralis* De Vis and *Lygosoma (Rhodona) tetradactylum* Lucas and Frost, which, being preoccupied, are changed to *L. waitei* and *L. frosti*, respectively. The classification is based on that of Boulenger's catalogue, and with the exception of two species, of which the descriptions are not available to the compiler, all since described have been placed according to their relative characters.

Priority has been observed, and it may be noted that species ascribed to White were described by Shaw, to whom they are here credited.

In conclusion I wish to express my indebtedness to the Museum Director for his kind assistance in respect to nomenclature in tracing some of the early references, as well as for the use of his valuable private library.

The geographical range of the several species, where not printed in full, is indicated by the following letters:

C.A.	Central Australia	N.W.A.	North-west Australia
N.G.	New Guinea	Q.	Queensland
N.Q.	North Queensland	T.	Tasmania
N.S.W.	New South Wales	V.	Victoria
N.T.	Northern Territory	W.A.	Western Australia

[Owing to the circumstance that the linotype machine by which this paper is set is not provided with accented letters or diaereses, such names and words as Duméril, Günther (Guenther), and Südwest have, unfortunately, had to be set as in English. In order to provide for accented letters this paragraph has been set by hand.—ED.]

FAMILY GECKONIDAE.

NEPHRURUS Gunth., Journ. Mus. Godefr. xii, 1876, p. 46.

NEPHRURUS ASPER Gunth.

Nephrurus asper Gunth., *l.c.*, Bouleng., B.M.C. i, 1885, p. 9. Longman, Mem. Q. Mus. vi, 1918, p. 37, pl. xi.
Hab. W.A., C.A., Q.

NEPHRURUS LEVIS De Vis.

Nephrurus levis De Vis, P.L.S., N.S.W. (2) i, 1886, p. 168.
Nephrurus platyrurus Bouleng., A.M.N.H. (5), xviii, 1886, p. 91.
Nephrurus laevis Bouleng., B.M.C. iii, 1887, p. 477; Stirling and A. Zietz, T.R.S., S.A. xvi, 1893, p. 159; Lucas and Frost, Rep. Horn Exp. ii, 1896, p. 116; Werner, Fauna Sudwest-Austr. ii, 1910, p. 451, fig. 1; Lomub. and And. Kungl. Sv. Vet. Akad. Handl. (3), 1913, p. 3; and (7), 1915, p. 3.
Hab. W.A., S.A., C.A., Q., N.S.W.

RHYNCHOEDURA Gunth., A.M.N.H. (3), xx, 1867, p. 50.

RHYNCHOEDURA ORNATA Gunth.

Rhynchoedura ornata Gunth., *l.c.*, p. 51; Bouleng., B.M.C. i, 1885, p. 12, pl. ii, fig. 1; Stirling and A. Zietz, T.R.S., S.A., xvi, 1893, p. 160.
Hab. W.A., S.A., C.A., Q.

CERAMODACTYLUS Blanf., A.M.N.H. (4), xiii, 1874, p. 454.

CERAMODACTYLUS DAMAEUS Lucas and Frost.

Ceramodactylus damacus Lucas and Frost, P.R.S., V. (n. ser.) viii, 1896, p. 1, and Rep. Horn. Exp. (2), 1896, p. 119, pl. ix, fig. 2.
Hab. C.A., Q.

GYMNODACTYLUS Spix. Spec. Nov. Lacert. Bras., 1825, p. 17.

GYMNODACTYLUS PELAGICUS Girard.

Heteronota pelagica Girard, Proc. Ac. Nat. Sc. Philad. 1857, p. 197.

Gymnodactylus pelagicus Bouleng. Ann. Mus. Genova, xiii, 1878, p. 327; B.M.C. i, 1885, p. 40; and A.M.N.H. (6), xvi, 1895, p. 327; Waite, Mem. Aust. Mus. iii, 1897, p. 179; Mehely, Termeszetráji Füzetek xx, 1897, p. 415; Lucas, P.L.S., N.S.W., xxiii, 1898, p. 358; Werner, Zool. Anz. 1899, p. 374, and Mitt. Zool. Samml. Mus. Natur. Berlin, i, 1900, p. 28.

Hab. N.Q., Islands of the Pacific from New Guinea to Tonga.

GYMNODACTYLUS CHEVERTI Bouleng.

Gymnodactylus cheverti Bouleng., B.M.C. i, 1885, p. 41.

Hab. N.Q., Fitzroy Island.

GYMNODACTYLUS MILIUSII Bory.

Phyllurus miliusii Bory de St. Vinc., Diet. Hist. Nat. vii, 1825, p. 183, pl. —, fig. 1.

Gymnodactylus miliusii Bouleng., B.M.C. i, 1885, p. 48; McCoy, Prod. Zool. Vict. ii, 1887, p. 121, pl. cxxxii, fig. 1; Werner, Fauna Sudwest-Austr. ii, 1910, p. 452.

Hab. W.A., S.A., Q., N.S.W., V.

GYMNODACTYLUS PLATURUS Shaw.

Lacerta platura Shaw, in White's Journ. N.S.W. 1790, p. 246, pl. iii, fig. 2.

Gymnodactylus platurus Bouleng., B.M.C. i, 1885, p. 49, Lomb. and And. Kungl. Sv. Vet. Akad. Handl. lii (7), 1915, p. 3.

Hab. N.T. (?), Q., N.S.W.

GYMNODACTYLUS SPHYRURUS Ogilby.

Gymnodactylus sphyrurus Ogilby, Rec. Aust. Mus. ii, 1892, p. 6.

Hab. N.S.W.

GYMNODACTYLUS OLIVII Garman.

Gymnodactylus olivii Garman, Bull. Mus. Comp. Zool. xxxix (1), 1901, p. 1, pl. ii, figs. 1, 1a-1d.

Hab. N.Q.

GYMNODACTYLUS CORNUTUS Ogilby.

Gymnodactylus cornutus Ogilby, Rec. Aust. Mus. ii, 1892, p. 8.

Hab. N.E.Q.

GYMNODACTYLUS ASPER Bouleng.

Gymnodactylus asper Bouleng., A.M.N.H. (8) xii, 1913, p. 563.

Hab. N.S.W.

CARPHODACTYLUS Gunth., Nov. Zool. iv, 1897, p. 403.

CARPHODACTYLUS LAEVIS Gunth.

Carphodactylus laevis Gunth., l.c. pl. i.

Hab. N.E.Q.

AELUROSCALABOTES Bouleng., A.M.N.H. (5), xvi, 1885, p. 387.

AELUROSCALABOTES BRUNNEUS Cope.

Pentadactylus brunneus Cope, Proc. Ac. Nat. Sc. Philad. 1868, p. 320.

Aelurosaurus? brunneus Bouleng., B.M.C. i, 1885, p. 74; Woodward, W.A. Yearbook, 1900-01, p. 266.

Aeluroscalabotes brunneus Bouleng., A.M.N.H. (5), xvi, 1885, p. 387.

Hab. W.A.

HETERONOTA, part, Gray, Cat. 1845, p. 174.

HETERONOTA BINOEI Gray.

Heteronota binocci Gray, l.c., Bouleng., B.M.C. i, 1885, p. 74; Werner, Fauna Sudwest-Austr. ii, 1910, p. 453; Montague, P.Z.S. 1914, p. 640, pl. i, figs. 1-3; F. R. Zietz, T.R.S., S.A., xli, 1917, p. 469.

Heteronota bynoei Lucas and Frost, Rep. Horn Exp. ii, 1896, p. 120, pl. xi, figs. 1-2.

Hab. W.A., C.A., N.T., Q., N.S.W.

HETERONOTA DERBIANA Gray.

Eublepharis derbianus Gray, Cat. 1845, p. 274.

Heteronota derbiana Bouleng., B.M.C. i, 1885, p. 75. Oudemans in Semon, Jena Denkschr. viii, 1894, p. 132.

Hab. N.W.A., N.T., Q.

HETERONOTA EBORASCENSIS Macleay.

Heteronota? eborascensis Macleay, P.L.S., N.S.W. ii, 1877, p. 101. Bouleng., B.M.C. i, 1885, p. 76.

Hab. N.Q.

PHYLLODACTYLUS Gray, Spicil. Zool. 1830, p. 3.**PHYLLODACTYLUS MARMORATUS Gray.**

Diplodactylus marmoratus Gray, Cat. 1845, p. 149.

Phyllodactylus marmoratus Bouleng., B.M.C. i, 1885, p. 88, pl. vii, fig. 6. McCoy, Prod. Zool. Vict. ii, 1887, p. 124, pl. cxxxii, fig. 2; Werner, Fauna Sudwest-Austr. ii, 1910, p. 454; Lomb. and And. Kungl. Sv. Vet. Akad. Handl. lii, 1913, p. 4.

Phyllodactylus macrodactylus Bouleng., B.M.C. i, 1885, p. 89, pl. vii, fig. 2.

Phyllodactylus affinis Bouleng., *l.c.*, fig. 4. Werner, Fauna Sudwest-Austr. ii, 1910, p. 455.

Phyllodactylus guentheri Bouleng., B.M.C. i, 1885, p. 90, pl. vii, fig. 3. Ogilby, P.L.S., N.S.W. ii, 1888, p. 900.

Hab. W.A., S.A., V., Lord Howe I., Norfolk I., N. Hebrides?

PHYLLODACTYLUS OCELLATUS Gray.

Diplodactylus ocellatus Gray, Cat. 1845, p. 149.

Phyllodactylus ocellatus Bouleng., B.M.C. i, 1885, p. 93; Werner, Fauna Sudwest-Austr. ii, 1910, p. 456.

Hab. W.A., Houtman's Abrolhos.

EBENAVIA Boettg., Abh. Senck. Ges. xi, 1876, p. 276.**EBENAVIA HORNI Lucas and Frost.**

Ebenavia horni Lucas and Frost, P.R.S., V. (n. ser.) vii, 1895, p. 264, and Rep. Horn. Exp. ii, 1896, p. 122, pl. xii, fig. 1.

Hab. C.A.

DIPLODACTYLUS Gray, P.Z.S. 1832, p. 40.**DIPLODACTYLUS SPINIGERUS Gray.**

Diplodactylus spinigerus Gray, Zool. Miscel. 1842, p. 53. Bouleng., B.M.C. i, 1885, p. 99; Werner, Fauna Sudwest-Austr. ii, 1910, p. 456.

Diplodactylus ciliaris Bouleng., B.M.C. i, 1885, p. 98, pl. viii, fig. 2. Longman, Mem. Q. Mus. i, 1912, p. 24. Lomb. and And. Kungl. Sv. Vet. Akad. Handl. lii, 1913, p. 4. F. R. Zietz, T.R.S., S.A. xxxix, 1915, p. 767.

Diplodactylus intermedius Ogilby, Rec. Austr. Mus. ii, 1892, p. 10; Werner, *l.c.*, p. 457, fig. 2.

Phyllodactylus strophurus Dum. and Bibr. Erp. Gen. iii, 1839, p. 397, pl. xxxii, fig. 1.

Hab. W.A., Houtman's Abrolhos, S.A., C.A., N.T., N.S.W., V.

DIPLODACTYLUS TAENICAUDA De Vis.

Diplodactylus taenicauda De Vis, P.L.S., N.S.W. (2) i, 1886, p. 169.

Diplodactylus taeniocauda Bouleng., B.M.C. iii, 1887, p. 483.

B.M.C. iii, 1887, p. 483.

Hab. Q.

DIPLODACTYLUS VITTATUS Gray.

Diplodactylus vittatus Gray, P.Z.S. 1832, p. 40. Bouleng., B.M.C. i, 1885, p. 100.

pl. viii, fig. 3. Lucas and Frost, P.R.S., V. (n. ser.) vi, 1894, p. 30; Werner,

Fauna Sudwest-Austr. ii, 1910, p. 457.

Hab. W.A., S.A., N.S.W., V.

DIPLODACTYLUS MICHAELSENI Werner.

Diplodactylus michaelseni Werner, Fauna Sudwest-Austr. ii, 1910, p. 460, fig. 3.

Hab. W.A., Houtman's Abrolhos.

DIPLODACTYLUS POLYOPHTHALMUS Gunth.

Diplodactylus polyopthalmus Gunth., A.M.N.H. (3) xx, 1867, p. 49. Bouleng.,

B.M.C. i, 1885, p. 101, pl. viii, fig. 4; Werner, Fauna Sudwest-Austr. ii, 1910,

p. 459.

Hab. W.A., N.T.

DIPLODACTYLUS STEINDACHNERI Bouleng.

Diplodactylus steindachneri Bouleng., B.M.C. i, 1885, p. 102, pl. viii, fig. 5.

Hab. N.S.W.

DIPLODACTYLUS BYRNEI Lucas and Frost.

Diplodactylus byrnei Lucas and Frost, P.R.S., V. viii, 1896, p. 2; and Rep. Horn

Exp. ii, 1896, p. 124, pl. xii, fig. 2.

Hab. C.A.

DIPLODACTYLUS ELDERI Stirling and Zietz.

Diplodactylus elderi Stirling and A. Zietz, T.R.S., S.A. xvi, 1893, p. 191, pl. vi,

figs. I and 1a. F. R. Zietz, T.R.S., S.A., xxxviii, 1914, p. 441.

Hab. W.A., C.A.

DIPLODACTYLUS STENURUS Werner.

Diplodactylus stenurus Werner, Zool. Jahrb. xxviii, 1909, p. 267.

Hab. Q.

DIPLODACTYLUS CONSPICILLATUS Lucas and Frost.

Diplodactylus conspicillatus Lucas and Frost, P.R.S., V. (n. ser.) ix, 1897, p. 55.

Lonnb. and And. Kungl. Sv. Vet. Akad. Handl. lii, 1913, p. 5.

Hab. C.A.

DIPLODACTYLUS ALBOGUTTATUS Werner.

Diplodactylus alboguttatus Werner, Fauna Sudwest-Austr. ii, 1910, p. 462, fig. 4.

Hab. W.A.

DIPLODACTYLUS STENODACTYLUS Bouleng.

Diplodactylus stenodactylus Bouleng., A.M.N.H. (6), xviii, 1896, p. 232. Lonnb. and And. Kungl. Sv. Vet. Akad. Handl. lii, 1913, p. 5.

Hab. W.A.

DIPLODACTYLUS PULCHER Steind.

Stenodactylophis pulcher Steind., Sitz. Akad. Wiss. Wien, lxii, 1870, p. 343, pl. ii, figs. 3-5.

Diplodactylus pulcher Bouleng., B.M.C. i, 1885, p. 102; Werner, Fauna Sudwest-Austr. ii, 1910, p. 462.

Hab. W.A., Q.

DIPLODACTYLUS TESSELLATUS Gunth.

Stenodactylophis tessellatus Gunth., Zool. Erebus and Terror, 1875, p. 16.

Diplodactylus tessellatus Bouleng., B.M.C. i, 1885, p. 103, pl. viii, fig. 6. Lucas and Frost, P.R.S., V. (n. ser.) vi, 1894, p. 31. Stirling and A. Zietz, T.R.S., S.A. xvi, 1893, p. 160.

Hab. W.A., S.A., C.A., V.

DIPLODACTYLUS PACHYURUS Werner.

Diplodactylus pachyurus Werner, Zool. Jahrb. xxviii, 1909, p. 267.

Hab. Australia.

DIPLODACTYLUS ANNULATUS Macleay.

Diplodactylus? annulatus Macleay, P.L.S., N.S.W. ii, 1877, p. 97. Bouleng., B.M.C. i, 1885, p. 97 (footnote).

Hab. Palm Is.

DIPLODACTYLUS HILLI Longman.

Diplodactylus hilli Longman, Mem. Q. Mus. iii, 1915, p. 32.

Hab. N.T., Q.

DIPLODACTYLUS LUCASI Fry.

Diplodactylus lucasi Fry, Rec. W.A. Mus. i, 1914, p. 177.

Diplodactylus bilineatus (non Gray) Lucas and Frost, P.R.S.V. (*n. ser.*) xv, 1933, p. 146.

Hab. W.A.

DIPLODACTYLUS WOODWARDI Fry.

Diplodactylus woodwardi Fry, Rec. W.A. Mus. i, 1914, p. 175, pl. xxvii, fig. 1

Hab. W.A.

OEDURELLA Lonnb. and And., Kungl. Sv. Vet. Akad. Handl. lii, 1913, p. 5.

OEDURELLA TAENIATA Lonnb. and And.

Oedurella taeniata Lonnb. and And., *l.c.*, p. 5, figs. 1-3.

Hab. N.W.A.

OEDURA Gray, Zool. Misc. 1842, p. 52.

OEDURA MARMORATA Gray.

Oedura marmorata Gray, *l.c.*, Bouleng., B.M.C. i, 1885, p. 104, pl. ix, fig. 2.

Longman, Mem. Q. Mus. iii, 1915, p. 33.

Hab. W.A., S.A., C.A., N.T., Q.

OEDURA TRYONI De Vis.

Oedura tryoni De Vis, P.R.S. Q. i, 1884, p. 54. Bouleng., B.M.C. iii, 1887, p. 483.

Oudemans, in *Scmon Jena Denkschr.* viii, 1894, p. 133. Broom, P.L.S., N.S.W. xxii, 1897, p. 640.

Oedura ocellata Bouleng., B.M.C. i, 1885, p. 105, pl. ix, fig. 1.

Phyllodactylus (*Oedura*) *castelnaui* Thomassinot, Bull. Soc. Philom. (8), i, 18—, p. 22.

Hab. S.A., C.A., Q.

OEDURA ROBUSTA Bouleng.

Oedura robusta Bouleng., B.M.C. i, 1885, p. 106, pl. x, fig. 1. Lonnb. and And.

Kungl. Sv. Vet. Akad. Handl. lii, 1915, p. 4.

Hab. W.A., C.A., Q., N.S.W.

OEDURA LESUEURII Dum. and Bibr.

Phyllodactylus lesueurii Dum. and Bibr., Erp. Gen. iii, 1836, p. 392.

Oedura lesueurii Bouleng., B.M.C. i, 1885, p. 107, pl. x, fig. 2. Woodward W.A. Yearbook 1900-01, p. 266.

Hab. W.A., S.A., Q., N.S.W.

OEDURA RHOMBIFERA Gray.

Oedura rhombifer Gray, Cat. 1845, p. 147.

Oedura rhombifera Bouleng., B.M.C. i, 1885, p. 107. Woodward, W.A. Yearbook 1900-01, p. 147. Lonnb. and And. Kungl. Sv. Vet. Akad. Handl. lii (3), 1913, p. 6.

Hab. W.A., N.T., Q.

OEDURA VERRILLII Cope.

Oedura? verrillii Cope, Proc. Ac. Nat. Sc. Phil. 1868, p. 318. Bouleng., B.M.C. i, 1885, p. 108. Woodward, W.A. Yearbook 1900-01, p. 266.

Hab. W.A.

OEDURA FRACTICOLOR De Vis.

Oedura? fracticolor De Vis, P.R.S., Q. i, 1884, p. 160. Bouleng., B.M.C. iii, 1887, p. 483. Woodward, W.A. Yearbook 1900-01, p. 266.

Hab. N.W.A., N.T.

OEDURA CINCTA De Vis.

Oedura cincta De Vis., P.L.S., N.S.W. (2), ii, 1888, p. 811.

Hab. Q.

OEDURA MAYERI Garm.

Oedura mayeri Garm., Bull. Mus. Comp. Zool. xxxix, (1), 1901, p. 3, pl. ii, figs. 2-2c.

Hab. Q.

OEDURA MONILIS De Vis.

Oedura monilis De Vis, P.L.S., N.S.W. ii, 1888, p. 811. Fry, P.R.S. Q. xxvii, 1915, p. 86, pl. iii, fig. 2.

Hab. Q., N.S.W.

THECADACTYLUS Cuv. Reg. Anim. ed. 1, ii, 1817, p. 48.

THECADACTYLUS AUSTRALIS Gunth.

Thec dactylus australis Gunth., A.M.N.H. (4) xix, 1877, p. 414. Bouleng., B.M.C. i, 1885, p. 112, pl. xi, fig. 1.

Hab. Islands of Torres Straits.

HEMIDACTYLUS Cuv. Reg. Anim. ed. 1, ii, 1817, p. 47.

HEMIDACTYLUS FRENATUS Dum. and Bibr.

Hemidactylus frenatus Dum. and Bibr., Erp. Gen. iii, 1836, p. 366. Bouleng., B.M.C. i, 1885, p. 120. Fauna Brit. India, 1890, p. 87. Strauch, Mem. Akad. St. Petersb. xxxv, 1887, p. 31. Boettg., Ber. Offenb. Ver. Natur. 1885, p. 135. Journ. Linn. Soc. xxi, 1887, p. 383. Mocquard, Mem. Cent. Soc. Phil. Paris, 1888, p. 113. Weber, Zool. Ergebn. Reise Niederl. Ind. i, 1890. Werner, Jahresber. Naturf. Ver. Magdeburg, 1896. Flower, P.Z.S. 1899, p. 618. Mitt. Zool. Samml. Mus. Naturk. Berlin i, 1900, p. 30, fig. 3.

Hab. Indo-China, Malay Peninsula, S. India, islands of the Western Pacific and Indian Oceans, Monte Bello Islands, W.A., St. Helena.

HEMIDACTYLUS BROOKII Gray.

Hemidactylus brookii Gray, Cat. 1845, p. 153. Bouleng., B.M.C. i, 1885, p. 128. Woodward, W.A. Yearbook, 1900-01, p. 266.

Hab. W.A.

PEROPUS (non Gray) Wiegman (= GEHYRA Gray).

Nova Acta Acad. Caes. Leop.-Carol xvii, 1835, p. 238.

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Hab. W.A., S.A., C.A., N.T., Torres St. Is.

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Hab. Moluccas, New Guinea, Polynesia, N.T.?, Lord Howe Is.

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Perochirus mestoni De Vis, P.L.S., N.S.W. iv, 1890, p. 1035.

Hab. Q.

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LEPIDODACTYLUS PUSILLUS Cope.

Peropus pusillus Cope, Proc. Acad. Philad. 1868, p. 319.

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Hab. S.W.A.

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Hab. N. Zealand, Tasmania.

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Hab. N.Q.

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Hab. W.A., C.A., V., T.

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Pygopus schraderi Bouleng., A.M.N.H. (8), xvi, 1915, p. 64.

Hab. Q.

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Hab. W.A.

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Hab. N.S.W.

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Hab. W.A.

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Hab. W.A., S.A., C.A., Q., N.S.W., V.

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Hab. V.

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Hab. Q.

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Hab. Q.

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Hab. Q.

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(n. ser.) ix, 1897, p. 54.

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Hab. W.A., S.A., V.**LIALIS Gray, P.Z.S., 1834, p. 134.****LIALIS BURTONII Gray.***Lialis burtonii* Gray, *l.c.*, Bouleng. B.M.C. i, 1885, p. 247; McCoy, *Prod. Zool.**Vict.* ii, 1888, p. 229, pl. clxi; Lucas and Frost, P.R.S., V. (n. ser.) vi, 1894,

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Hab. W.A., S.A., C.A., N.T., Q., N.S.W., V.

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Hab. W.A.

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Hab. W.A.

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Hab. Q., N.S.W.

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Hab. Q.

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Hab. Q.

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Hab. W.A., N.T.

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Hab. W.A., S.A., C.A.

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Hab. W.A., S.A.

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Hab. W.A., S.A., C.A.

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Amphibolurus ornatus Bouleng. B.M.C. i, 1885, p. 385; Lonnb. and And. Kungl. Sv. Vet. Akad. Handl. lii, 1913, p. 7.

Hab. W.A.

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Hab. W.A., S.A., C.A.

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Hab. W.A.

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Hab. W.A.

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Hab. S.A.

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 ii, 1896, p. 129, pl. x, fig. 1.
Hab. W.A., S.A., C.A., V.

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Hab. W.A., S.A., C.A.

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Hab. C.A.

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Hab. W.A., S.A., V., T.

AMPHIBOLURUS DIEMENSIS Gray.

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Hab. W.A., N.S.W., V., T.

AMPHIBOLURUS MURICATUS Shaw.

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Hab. W.A., S.A., Q., N.S.W., V., T.

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Hab. W.A., S.A., C.A., Q., N.S.W., V.

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Hab. Q.

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Hab. W.A., N.T., Q., N.G.

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Diporophora australis, Bouleng., B.M.C. i, 1885, p. 394, and iii, 1887, p. 499; Woodward, W.A. Yearbook, 1900-01, p. 267; Longman, Mem. Q. Mus. v, 1916, p. 51.

Hab. N.W.A., N.T., Q.

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Diporophora bennettii Bouleng., B.M.C. i, 1885, p. 395, pl. xxxi, fig. 2.

Hab. W.A.

DIPOROPHORA WINNECKEI Lucas and Frost.

Diporophora winneckeii Lucas and Frost, P.R.S., V. (n. ser.) viii, 1896, p. 3; Rep. Horn. Exp. ii, 1896, p. 132, pl. xi, fig. 5.

Hab. C.A.

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Diporophora amphiboluroides Lucas and Frost, P.R.S., V. (n. ser.) xv, 1902, p. 76.

Hab. W.A.

PHYSIGNATHUS Cuv. Reg. An., 2nd ed., 1829, p. 4.**PHYSIGNATHUS GILBERTI** Gray.

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Physignathus gilberti Bouleng., B.M.C. i, 1885, p. 396; Lonnb. and And. Kungl. Sv. Vet. Akad. Handl. lii, 1913, p. 8; Montague, P.Z.S., 1914, p. 641, pl. i, figs. 4-7.

Hab. W.A., Monte Bello Is., N.T.

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Hab. N.Q.

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Hab. W.A., C.A.

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Hab. W.A., N.T., N.G.

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Physignathus eraduensis Werner, Fauna Sudwest-Austr. ii, 1909, p. 275, pl. xv, figs. 13 and 14.

Hab. W.A.

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Hab. W.A., C.A., Q., N.S.W., V.

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Hab. W.A., N.T., Q.

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Hab. W.A., S.A., C.A.

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VARANUS SALVATOR Laur.

Hydrosaurus salvator Laur., Syn. Rept. 1768, p. 56.

Varanus salvator Bouleng., B.M.C. ii, 1885, p. 314.

Hab. Q., East Indies, Ceylon.

VARANUS GILLENII Lucas and Frost.

Varanus gilleni Lucas and Frost, P.R.S., V. (n. ser.) vii, 1895, p. 266, and Rep. Horn Exp. ii, 1896, p. 135, pl. viii, fig. 2.

Hab. W.A., C.A.

VARANUS EREMIUS Lucas and Frost.

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Hab. C.A.

VARANUS INDICUS Daud.

Tupinambis indicus Daud., Rept. iii, 1802-4, p. 46, pl. xxx.

Varanus indicus Bouleng., B.M.C. ii, 1885, p. 316; Boettg. Ber. Offenb. Ver. f. Naturk. 1892, p. 149; Bouleng. Ann. Mus. Genova, xviii, 1898, p. 697; Werner, Mitt. Zool. Samml. Mus. Naturk. Berlin, i, 1900, p. 50, fig. ii.

Hab. Q., Celebes, Moluccas, N.G., Polynesia.

VARANUS VARIUS Shaw.

Lacerta varia Shaw, in White's Voy. N.S.W., 1790, p. 246, pl. iii, fig. 2.

Varanus varius Bouleng., B.M.C. ii, 1885, p. 319; Woodward, W.A. Yearbook 1900-01, p. 267.

Hab. W.A., S.A., Q., N.S.W., V.

Varanus varius var. *bellii* Dum. and Bibr. Erp. Gen. iii, 1836, p. 493, pl. xxxv.

Varanus varius var. *bellii* Bouleng., B.M.C. ii, 1885, p. 320. Woodward, W.A. Yearbook, 1900-01, p. 267.

Hab. W.A.

VARANUS GIGANTEUS Gray.

Hydrosaurus giganteus Gray, Cat. 1845, p. 13.

Varanus giganteus Bouleng., B.M.C. ii, 1885, p. 320; Woodward, W.A. Yearbook, 1900-01, p. 267; Stirling, P.R.S., S.A. xxxvi, 1912, p. 26, pl. iv.

Hab. W.A., S.A., C.A., N.T.

VARANUS GOULDII Gray.

Hydrosaurus gouldii Gray, A.M.N.H. i, 1838, p. 394.

Varanus gouldii Bouleng. B.M.C. ii, 1885, p. 320; Stirling and A. Zietz, T.R.S., S.A. xvi, 1893, p. 169; Montague, P.Z.S. 1914, p. 642.

Monitor gouldi McCoy, Prod. Zool. Viet. ii, 1888, p. 195, pl. eli.

Hab. W.A., Monte Bello Is., C.A., N.T., Q., N.S.W., V.

VARANUS INGRAMI Bouleng.

Varanus ingrami Bouleng. A.M.N.H. (7), xviii, 1906, p. 440.

Hab. N.T.

VARANUS SPENCERI Lucas and Frost.

Varanus spenceri Lucas and Frost, P.R.S., V. (n. ser.), xv, 1903, p. 145.

Hab. C.A.

VARANUS PUNCTATUS Gray.

Odatia punctata Gray, A.M.N.H. i, 1838, p. 394.

Varanus punctatus Bouleng., B.M.C. ii, 1885, p. 322; Stirling and A. Zietz, T.R.S., S.A. xvi, 1893, p. 170; Fry, Rec. Austr. Mus. x, 1913, p. 17, figs. 8 and 10; Lombl. and And. Kungl. Sv. Vet. Akad. Handl. lii, 1913, p. 8.

Hab. W.A., C.A., N.T., Is. of Torres Straits.

Varanus punctatus var. *orientalis* Fry, Rec. Austr. Mus. x, 1913, p. 17, figs. 17-20.

Hab. Q.

VARANUS TIMORENSIS Gray.

Monitor timorensis Gray, in Cuvier (Griff.), A.K. ix, Syn. 1831, p. 26.

Varanus timorensis Bouleng., B.M.C. ii, 1885, p. 323.

Hab. N.T., Q., Is. of Torres Straits.

VARANUS ACANTHURUS Bouleng.

Varanus acanthurus Bouleng., B.M.C. ii, 1885, p. 324; De Vis, P.L.S., N.S.W. (2), ii, 1888, p. 813; Montague, P.Z.S. 1914, p. 642.

Hab. W.A., Monte Bello Is., C.A., N.T., Q.

VARANUS BREVICAUDUS Bouleng.

Varanus brevicaudus Bouleng., P.Z.S., 1898, p. 920, pl. lvi, fig. 2.

Hab. W.A.

VARANUS CAUDOLINEATUS Bouleng.

Varanus caudolineatus Bouleng., B.M.C. ii, 1885, p. 324, pl. xviii; Werner, Fauna Sudwest-Austr. ii, 1909, p. 276.

Hab. W.A.

FAMILY SCINCIDAE.

EGERNIA Gray, A.M.N.H. ii, 1838, p. 288.

EGERNIA LUCTUOSA Peters.

Cyclodus (Omolepida) luctuosus Peters, Mon. Akad. Berl. 1866, p. 90.

Egernia luctuosa Bouleng. B.M.C. iii, 1887, p. 135.

Hab. W.A., Q.

EGERNIA LAUTA De Vis.

Egernia lauta De Vis, P.L.S., N.S.W. (2), ii, 1888, p. 813.

Hab. Q.

EGERNIA WHITII Lacep.

Scincus whitii Lacep., Ann. Mus. Paris, iv, 1804, p. 192.

Egernia whitii Bouleng., B.M.C., iii, 1887, p. 135; Oudemans, in Semon, Jena Denkschr. viii, 1894, p. 138; Lucas and Frost, Rep. Horn Exp. ii, 1896, p. 138, pl. xi, figs. 3 and 4; F. R. Zietz, T.R.S., S.A. xli, 1917, p. 471.

Himulia whitei McCoy, Prod. Zool. Viet. ii, 1890, p. 329, pl. exci, fig. 1.

Egernia kintorei Stirling and A. Zietz, T.R.S., S.A. xvi, 1893, p. 171.

Hab. W.A., S.A., C.A., Q., N.S.W., V., T., also adjacent islands.

EGERNIA INORNATA Rosen.

Egernia inornata Rosen, A.M.N.H. (7), xvi, 1905, p. 139, fig. 3, pl. vii, fig. 2.

Hab. W.A.

EGERNIA DAHLII Bouleng.

Egernia dahlii Bouleng. A.M.N.H. (6), xviii, 1896, p. 233; Werner Mitt. Nat. Hist. Mus. Hamburg, 1909, p. 42.

Hab. N.W.A.

EGERNIA RUGOSA De Vis.

Egernia rugosa De Vis, P.L.S., N.S.W. (2), ii, 1888, p. 815.

Hab. Q.

EGERNIA DORSALIS Peters.

Tropidolepisma dorsale Peters, Mon. Akad. Berlin, 1873, p. 743.

Egernia dorsalis Bouleng. B.M.C. iii, 1887, p. 136.

Hab. Q.

EGERNIA MAJOR Gray.

Tropidolepisma major Gray, Cat. 1845, p. 107.

Tropidolepis major Gray, l.c., p. 272.

Egernia major Bouleng. B.M.C. iii, 1887, p. 137.

Hab. N.W.A., N.E.A., Is. of Torres Straits, Murray Is.

EGERNIA BUNGANA De Vis.

Egernia bungana De Vis, P.L.S., N.S.W. (2), ii, 1888, p. 814; Longman, Mem. Q. Mus. vi, 1918, p. 37, pl. xiii.

Hab. Q.

EGERNIA STRIOLATA Peters.

Tropidolepisma striolatum Peters, Mon. Akad. Berlin, 1870, p. 642.

Egernia striolata Bouleng. B.M.C. iii, 1887, p. 138; Stirling and A. Zietz, T.R.S., S.A. xvi, 1893, p. 172.

Hab. W.A., Q., N.S.W., V.

EGERNIA FREREI Gunth.

Egernia frerei Gunth. Nov. Zool. iv, 1897, p. 405.

Hab. Q.

EGERNIA KINGII Gray.

Tiliqua kingii Gray, A.M.N.H. ii, 1838, p. 290.

Egernia kingii Bouleng. B.M.C. iii, 1887, pp. 138 and 499; Werner, Fauna Sud-west-Austr. ii, 1910, p. 469, fig. 5.

Hab. W.A., Dirk Hartog Is., Houtman's Abrolhos.

EGERNIA PULCHRA Werner.

Egernia pulchra Werner, Fauna Sudwest-Austr. ii, 1910, p. 470, fig. 6.

Hab. S.W.A.

EGERNIA CUNNINGHAMI Gray.

Tiliqua cunninghami Gray, P.Z.S. 1832, p. 40.

Egernia cunninghami Bouleng. B.M.C. iii, 1887, p. 139; McCoy, Prod. Zool. Vict. ii, 1887, p. 157, pl. cxli; Woodward, W.A. Yearbook 1900-01, p. 267.

Hab. W.A., S.A., Q., N.S.W., V.

EGERNIA STOKESII A. Dum.

Silubosaurus stokesii A. Dum., Cat. Meth. Rept. 1851, p. 180.

Egernia stokesii Bouleng., B.M.C. iii, 1887, p. 140; Longman, Mem. Q. Mus. i, 1912, p. 25.

Hab. W.A., Dirk Hartog Is., Houtmann's Abrolhos, S.A., C.A., Q.

EGERNIA DEPRESSA Gunth.

Silubosaurus depressus Gunth., Zool. Ereb. and Terr. Rept. 1875, p. 15.

Egernia depressa Bouleng., B.M.C. iii, 1887, p. 141, pl. vi, fig. 1; Stirling and A. Zietz, T.R.S., S.A. xvi, 1893, p. 177; Rosen, A.M.N.H. (7), xvi, 1905, p. 140; Werner, Fauna Sudwest-Austr. ii, 1910, p. 471; Lonnb. and And. Kungl. Sv. Vet. Akad. Handl. lii, 1913, p. 8.

Hab. W.A.

TRACHYSAURUS Gray, in King's Voy. Austr. ii, 1827, p. 430.

TRACHYSAURUS RUGOSUS Gray.

Trachysaurus rugosus Gray, *l.c.*; Bouleng. B.M.C. iii, 1887, p. 143; Stirling and A. Zietz, T.R.S., S.A. xvi, 1893, p. 172; Lonnb. and And. Kungl. Sv. Vet. Akad. Handl. lii, 1913, p. 8; F. R. Zietz, T.R.S., S.A. xli, 1917, p. 471.

Trachydosaurus rugosus McCoy, Prod. Zool. Vict. ii, 1885, p. 3, pl. cii.

Hab. W.A., S.A., C.A., Q., N.S.W., V.

TILIQUA Gray, Ann. Phil. (2) x, 1825, p. 201.

TILIQUA SCINCOIDES Shaw.

Lacerta scincoides Shaw, in White's Journ. N.S.W., 1790, p. 242, pl.

Tiliqua scincoides Bouleng. B.M.C. iii, 1887, p. 145; Oudemans, in Semon (Jena Denkschr. viii), 1894, p. 139; Woodward, W.A. Yearbook, 1900-01, p. 267; Lonnb. and And., Kungl. Sv. Vet. Akad. Handl. lii, 1913, p. 8.

Hab. W.A., S.A., C.A., N.T., Q., N.S.W., V., T., Is. of Torres Straits.

TILIQUA NIGROLUTEA Gray.

Tiliqua nigroluteus Gray, in Cuvier (Griff.) A.K. ix, Syn. 1831, p. 68.

Tiliqua nigrolutea Bouleng. B.M.C. iii, 1887, p. 146; F. R. Zietz, Vict. Naturalist, xxxi, 1914, p. 36; T. S. Hall, *ibid.*, p. 47.

Cyclodus nigroluteus McCoy, Prod. Zool. Vict. ii, 1887, p. 119, pl. cxxxi.

Hab. S.A., N.S.W., V., T., Flinders Is., Bass Straits.

TILIQUA OCCIPITALIS Peters.

Cyclodus occipitalis Peters, Mon. Akad. Berlin, 1863, p. 231; McCoy, Prodr. Zool. Vict., ii, 1889, p. 259, pl. clxxi.

Tiliqua occipitalis Bouleng. B.M.C. iii, 1887, p. 147; Lucas and Frost, Rep. Horn Exp. ii, 1896, p. 140.

Hab. W.A., S.A., C.A., V.

TILIQUA ADELAIDENSIS Peters.

Cyclodus adelaidensis Peters, Mon. Akad. Berlin, 1863, p. 232.

Tiliqua adelaidensis Bouleng. B.M.C. iii, 1887, p. 148.

Hab. S.A.

MACROGONGYLUS Werner, Zool. Anz. xxiv, 1901, p. 298.

MACROGONGYLUS BRAUNI Werner.

Macrogongylus brauni Werner, *l.c.*, p. 299, figs. 1 and 2.

Hab. New Holland.

HEMISPHAERIODON Peters, Mon. Akad. Berlin, 1867, p. 24.**HEMISPHAERIODON GERRARDII** Gray.

Hinulia gerrardii Gray, Cat. 1845, p. 75.

Hemisphaeriodon gerrardii Bouleng. B.M.C. iii, 1887, p. 148; Oudemans, in Semon Jena Denkschr. viii, 1894, p. 139; Longman, Mem. Q. Mus. iii, 1915, p. 34.

Tiliqua longicauda De Vis, P.L.S., N.S.W. (2) ii, 1888, p. 816.

Hab. Q., N.S.W.

LYGOSOMA Gray, Zool. Journ. iii, 1828, p. 228.

SECTION HINULIA Gray, Cat. 1845, p. 74.

LYGOSOMA OCELLIFERUM Bouleng.

Lygosoma ocellatum (non Gray) Bouleng. A.M.N.H. (6), xviii, 1896, p. 233.

Lygosoma ocelliferum Bouleng., l.c., p. 342; Werner, Fauna Sudwest-Austr. ii, 1910, p. 474, fig. 7.

Hab. W.A.

LYGOSOMA COLLETTI Bouleng.

Lygosoma colletti Bouleng., A.M.N.H. (6), xviii, 1896, p. 234.

Hab. W.A.

LYGOSOMA TAENIOLATUM Shaw.

Lacerta taeniolata Shaw, in White's, Journ. Voy. N.S.W. 1790, p. 245, pl. xxxii, fig. 1.

Lygosoma taeniolatum Bouleng. B.M.C. iii, 1887, p. 227; F. R. Zietz, T.R.S., S.A. xli, 1917, p. 472.

Tiliqua cossingtonii Gray, Zool. Miscell. 1842, p. 51.

Lygosoma taeniolatum var. *coosingtonii* Bouleng., B.M.C. iii, 1887, p. 228.

Lygosoma taeniolatum var. *maculata* Rosen, A.M.N.H. (7) xvi, 1905, p. 140, pl. viii, fig. 2.

Lygosoma lesueurii Dum. and Bibr. Erp. Gen. v, 1839, p. 733; Bouleng. B.M.C. iii, 1887, p. 225; Broom, P.L.S., N.S.W., xxii, 1898, p. 642; Werner, Fauna Sudwest-Austr. ii, 1910, p. 475; Lonnb. and And. Kungl. Sv. Vet. Akad. Handl. lii, 1913, p. 8.

Hinulia lesueurii Lucas and Frost, Rep. Horn Exp. ii, 1896, pp. 113 and 140.

Hinulia inornata Gray, Cat. 1845, p. 78.

Lygosoma lesueurii var. *inornatum* Bouleng., B.M.C. iii, 1887, p. 226.

Himulia spaldingi Macleay, P.L.S., N.S.W. ii, 1877, p. 63 (= *Lygosoma dorsale* Bouleng.).

Lygosoma leae Bouleng., l.c., fig. 2; Stirling and A. Zietz, T.R.S., S.A. xvi, 1893, p. 172.

Lygosoma fischeri Bouleng., l.c. p. 228; Stirling and A. Zietz, l.c.

Lygosoma strauchii Bouleng. l.c. p. 229, pl. xii, fig. 3.

Hab. W.A., S.A., C.A., N.T., Q., N.S.W., V., N.G.

LYGOSOMA LABILLARDIERI Gray.

Tiliqua labillardieri Gray, A.M.N.H., ii, 1838, p. 289.

Lygosoma labillardieri Bouleng., B.M.C. iii, 1887, p. 229; Werner Sudwest-Austr. ii, 1910, p. 476.

Hab. W.A.

LYGOSOMA QUOYII Dum. and Bibr.

Lygosoma quoyii Dum. and Bibr., Erp. Gen. v, 1839, p. 728.

Lygosoma quoyi Bouleng., B.M.C. iii, 1887, p. 230. McCoy, Prod. Zool. Vict. ii, 1890, p. 331, pl. exci, fig. 2.

Hab. S.A., Q., N.S.W., V.

LYGOSOMA TRYONI Longman.

Iygosoma tryoni Longman, Mem. Q. Mus. vi, 1918, p. 38.

Hab. Q.

LYGOSOMA TYMPANUM Lonnb. and And.

Lygosoma tympanum Lonnb. and And., Kungl. Sv. Vet. Akad. Handl. lii, 1913, p. 9.

Hab. V.

LYGOSOMA TENUE Gray.

Tiliqua tenuis Gray, in Cuvier (Griff.) A.K. ix, Syn. 1831, p. 71.

Lygosoma tenue Bouleng., B.M.C. iii, 1887, p. 231. Garman, Bull. Mus. Comp. Zool. xxxix, 1901, p. 7.

Hab. Q., N.S.W.

LYGOSOMA TAMBOURINENSE Lonnb. and And.

Lygosoma tambourinense Lonnb. and And., Kungl. Sv. Vet. Akad. Handl. lii, 1915, p. 5.

Hab. N.Q.

LYGOSOMA MURRAYI Bouleng.

Lygosoma murrayi Bouleng., B.M.C. iii, 1887, p. 232, pl. xii, fig. 1.

Hab. N.T., Q.

LYGOSOMA PALLIDUM Gunth.

Hinulia pallida Gunth., Zool. Ereb. and Terr. Rept. 1875, p. 12.

Lygosoma pallidum Bouleng., B.M.C. iii, 1887, p. 233, pl. xiii, fig. 2.

Hab. N.W.A.

LYGOSOMA ISOLEPIS Bouleng.

Lygosoma isolepis Bouleng., B.M.C. iii, 1887, p. 234, pl. xv, fig. 1. Lonnb. and And., Kungl. Sv. Vet. Akad. Handl. lii, 1913, p. 9. Montague, P.Z.S. 1914, p. 642.

Hab. W.A., Q.

LYGOSOMA PARDALIS Macleay.

Hinulia pardalis Macleay, P.L.S., N.S.W. ii, 1877, p. 63. Bouleng., B.M.C. iii, 1887, p. 209 (footnote), and A.M.N.H. (7) xiv, 1904, p. 80.

Lygosoma (Hinulia) elegantulum Peters and Doria, Ann. Mus. Genova, xiii, 1878, p. 344. Bouleng., *l.c.* p. 235.

Hab. Q., Is. of Torres Straits, N.G.

LYGOSOMA DOMINA De Vis.

Hinulia domina De Vis, P.L.S., N.S.W. (2) ii, 1888, p. 818.

Lygosoma domina Lonnb. and And. Kungl. Sv. Vet. Akad. Handl. lii, 1915, p. 6.

Hab. Q.

LYGOSOMA ATROMACULATUM Garman.

Lygosoma atromaculatum Garman, Bull. Mus. Comp. Zool. xxxix, 1901, p. 8.

Hab. Q., Barrier Reef.

LYGOSOMA RICHARDSONII Gray.

Hinulia richardsonii Gray, Cat. 1845, p. 271.

Lygosoma richardsonii Bouleng., B.M.C. iii, 1887, p. 235.

Hab. W.A., Houtman's Abrolhos.

LYGOSOMA AMBIGUA De Vis.

Hinulia ambigua De Vis, P.L.S., N.S.W. (2) ii, 1888, p. 817.

Hab. S.W.Q.

LYGOSOMA FASCIOLATUM Gunth.

Himulia fasciolata Gunth., A.M.N.H. (3) xx, 1867, p. 47. Lucas and Frost, Rep. Horn Exp. ii, 1896, p. 142.

Lygosoma fasciolatum Bouleng., B.M.C. iii, 1887, p. 236, pl. xiv, fig. 1.

Hab. W.A., S.A., C.A., Q.

LYGOSOMA MONOTREPIS Bouleng.

Lygosoma monotrepis Bouleng., B.M.C. iii, 1887, p. 237, pl. xiv, fig. 2. Stirling and A. Zietz, T.R.S., S.A. xvi, 1893, p. 173.

Hab. W.A., S.A.

LYGOSOMA TIGRINA De Vis.

Lygosoma tigrina (*non de Jeude*) De Vis, P.L.S., N.S.W. (2) ii, 1888, p. 877.

Hab. Q.

LYGOSOMA BRACHYSOMA Lonnb. and And.

Lygosoma brachysoma Lonnb. and And., Kungl. Sv. Vet. Akad. Handl. lii, 1915, p. 7.

Hab. Q.

LYGOSOMA RUFUM Bouleng.

Lygosoma rufum Bouleng., B.M.C. iii, 1887, p. 239, pl. xv, fig. 3. Lonnb. and And., Kungl. Sv. Vet. Akad. Handl. lii, 1915, p. 5.

Hab. Q., Aru Is.

LYGOSOMA COMPRESSICAUDUM Werner.

Lygosoma compressicaudum Werner, S.B. Akad. Munchen, 1897, p. 210.

Hab. Australia.

(Not placed in sequence as description is not available.)

SECTION LIOLEPISMA Dum. and Bibr., Erp. Gen. v, 1839, p. 742.

LYGOSOMA DELICATA De Vis.

Mocca delicata De Vis, P.L.S., N.S.W. (2) ii, 1888, p. 820.

Hab. Q.

LYGOSOMA MUSTELINUM O'Shaughn.

Mocca mustelina O'Shaughn, A.M.N.H. (4) xiii, 1874, p. 299 and (5) iv, 1879, p. 300.

Lygosoma mustelinum Bouleng., B.M.C. iii, 1887, p. 267, pl. xix, fig. 2. Werner, Mitt. Nat. Hist. Mus. Hamburg, 1909, p. 44.

Hab. W.A., S.A., Q., N.S.W., V.

LYGOSOMA CHALLENGERI Bouleng.

Lygosoma challengeri Bouleng., B.M.C. iii, 1887, p. 268, pl. xix, fig. 3.

Hab. Q.

LYGOSOMA SPECTABILE De Vis.

Mococa spectabile De Vis, P.L.S., N.S.W. (2) ii, 1888, p. 819.

Lygosoma (Liolepisma) spectabile Longman, Mem. Q. Mus. vi, 1918, p. 38.

Hab. Q.

LYGOSOMA LICHENIGERUM O'Shaughn.

Mococa lichenigera O'Shaughn, A.M.N.H. (4) xiii, 1874, p. 298.

Lygosoma lichenigerum Bouleng., B.M.C. iii, 1887, p. 269, pl. xx, fig. 1.

Hab. N.S.W.

LYGOSOMA PSEUDOTROPIS Werner.

Lygosoma (Liolepisma) pseudotropis Werner, Zool. Anz. xxvii, 1903, p. 247.

Hab. N.S.W.

LYGOSOMA INFRAPUNCTATUM Bouleng.

Lygosoma infrapunctatum Bouleng., B.M.C. iii, 1887, p. 274, pl. xxi, fig. 1.

Hab. W.A.

LYGOSOMA ENTRECASTEAUXII Dum. and Bibr.

Lygosoma entrecasteauxii Dum. and Bibr., Erp. Gen. v, 1839, p. 717. Bouleng.,

B.M.C. iii, 1887, p. 276.

Hab. N.S.W., V., T.

LYGOSOMA TRILINEATUM Gray.

Tiliqua trilineata Gray, A.M.N.H. ii, 1838, p. 291.

Lygosoma trilineatum Bouleng., B.M.C. iii, 1887, p. 279, pl. xxi, fig. 2.

Hab. W.A., S.A., N.S.W., V., T.

LYGOSOMA METALLICUM O'Shaughn.

Mococa metallica O'Shaughn., A.M.N.H. (4) xiii, 1874, p. 299.

Lygosoma metallicum Bouleng., B.M.C. iii, 1887, p. 280, pl. xxii, fig. 1.

Hab. S.A., N.S.W., V., T.

LYGOSOMA GUICHENOTI Dum. and Bibr.

Lygosoma guichenoti Dum. and Bibr., Erp. Gen. v, 1839, p. 713. Bouleng.,

B.M.C. iii, 1887, p. 281. Lounb. and And., Kungl. Sv. Vet. Akad. Handl.

lii, 1913, p. 9.

Hab. W.A., Q., N.S.W., V.

LYGOSOMA PRETIOSUM O'Shaughn.

Mocoa pretiosa O'Shaughn., A.M.N.H. (4) xiii, 1874, p. 298.

Lygosoma pretiosum Bouleng., B.M.C. iii, 1887, p. 282, pl. xxii, fig. 2.

Hab. T.

LYGOSOMA OCELLATUM Gray.

Mocoa ocellata (*non* Bouleng.), part, Gray, Cat. 1845, p. 82.

Lygosoma ocellatum Bouleng., B.M.C. iii, 1887, p. 283.

Hab. T.

LYGOSOMA FUSCUM Dum. and Bibr.

Heteropus fuscus Dum. and Bibr. Erp. Gen. v, 1839, p. 759.

Lygosoma fuscum Bouleng., B.M.C. iii, 1887, p. 283. Boettger, Offenb. Ver.

Naturk. 1892, p. 150. Lidth de Jeude, Notes Leyden Mus. xviii, 1896, p.

252. Broom, P.L.S., N.S.W. xxii, 1897, p. 643. Werner, Mitt. Zool.

Samml. Mus. Naturk. Berlin i, 1900, p. 58, fig. 16. Bouleng., Trans. Zool.

Soc. xx, 1912-15, p. 24, and Ann. Mus. Genova viii, 1898, p. 700.

Hab. N.Q., Is. of Torres Straits, N.G., Moluccas, Barrow and Darnley Is.

LYGOSOMA LAEVE Oudemans.

Lygosoma laeve Oudemans, in Semon Jena Denkschr. viii, 1894, p. 144.

Hab. Q.

LYGOSOMA AERATUM Garman.

Lygosoma aeratum Garman, Bull. Mus. Comp. Zool. xxxix, 1901, p. 7.

Hab. Q.

LYGOSOMA WAITEI nom nov.

Heteropus vertebralis (*non* Hallow) De Vis, P.L.S., N.S.W. (2) ii, 1888, p. 821.

Hab. Q.

LYGOSOMA RHOMBOIDALE Peters.

Heteropus rhomboidalis Peters, Mon. Akad. Berlin, 1869, p. 446.

Lygosoma rhomboidale Bouleng., B.M.C. iii, 1887, p. 285.

Hab. Q.

LYGOSOMA ROSTRALE De Vis.

Heteropus rostralis De Vis, P.R.S., Q. i, 1884, p. 171, and P.L.S., N.S.W. (2)

ii, 1888, p. 822.

Hab. Q.

LYGOSOMA BICARINATUM Macleay.

Heteropus bicarinatus Macleay, P.L.S., N.S.W. ii, 1877, p. 68.

Heteropus albertisii Peters and Doria, Ann. Mus. Genova xiii, 1878, p. 362.

Lygosoma albertisii Bouleng., B.M.C. iii, 1887, p. 286.

Lygosoma (Liolepisma) bicarinatum Ogilby, Rec. Austr. Mus. i, 1890, p. 93.

Hab. N.Q., Is. of Torres Straits, N.G.

LYGOSOMA MUNDIVENSE Broom.

Lygosoma mundivense Broom, P.L.S., N.S.W. xxii, 1898, p. 643.

Hab. N.Q.

LYGOSOMA BLACKMANNI De Vis.

Heteropus blackmanni De Vis, P.R.S., Q. i, 1885, p. 168.

Heteropus peronii (non Fitz.) Dum. and Bibr., Erp. Gen. v, 1839, p. 760.

Lygosoma peronii Bouleng., B.M.C. iii, 1887, p. 286, and A.M.N.H. (8), xvi, 1915, p. 66.

Lygosoma blackmanni De Vis, P.L.S., N.S.W. (2), ii, 1888, p. 822.

Hab. Q.

LYGOSOMA DEVISII Bouleng.

Lygosoma devisii Bouleng., P.Z.S. 1890, p. 79.

Heteropus lateralis (non Dum. and Bibr.) De Vis, P.R.S., Q. i, 1885, p. 168.

Hab. Q.

LYGOSOMA PECTORALE De Vis.

Heteropus pectoralis De Vis, P.R.S., Q. i, 1885, p. 169.

Lygosoma pectorale Bouleng., B.M.C. iii, 1887, p. 287.

Hab. Q.

LYGOSOMA TETRADACTYLUM O'Shaughn.

Mocca tetradactyla (non Lucas and Frost) O'Shaughn., A.M.N.H. (5) iv, 1879, p. 300.

Lygosoma tetradactylum Bouleng., B.M.C. iii, 1887, p. 288, pl. xxii, fig. 3.

Hab. Q., V.

LYGOSOMA MACCOOEYI Ramsay and Ogilby.

Lygosoma maccooeiyi Ramsay and Ogilby, Rec. Austr. Mus. i, 1890, p. 8.

Hab. N.S.W.

LYGOSOMA MUNDUM De Vis.

Heteropus mundus De Vis, P.R.S., Q. i, 1885, p. 172.

Lygosoma mundum Bouleng., B.M.C. iii, 1887, p. 288.

Hab. N.T., Q.

LYGOSOMA? FOLIORUM De Vis.

Lygisaurus foliorum De Vis, P.R.S., Q. i, 1884, p. 77.

Lygosoma? foliorum Bouleng., B.M.C. iii, 1887, p. 289.

LYGOSOMA NOVAEGUINEAE Meyer.

Lygosoma (Carlia) novae-guinae Meyer, Mon. Akad. Berlin, 1874, p. 132.

Lygosoma novae-guinae Bouleng., B.M.C. iii, 1887, p. 289. Oudemans, in Semon Jena Denkschr. viii, 1894, p. 143.

Hab. Thursday Is., Is. of Torres Straits, N.G.

LYGOSOMA PAGENSTECHERI Lindholm.

Lygosoma pagenstecheri Lindholm, in Lampe, Jahrb. Nassau. Ver. Nat. liv, 1901, p. 214, pl. iii, figs. 3-5.

Hab. S.A.

(Not placed in sequence as description is not available.)

SECTION EMOA Girard, Acad. Nat. Sc. Proc. Philad., 1857, p. 195.

LYGOSOMA CYANOGASTER Lesson.

Scincus cyanogaster Lesson, Voy. Coquille, Zool. ii, 1828, p. 47, pl. iii, fig. 3.

Lygosoma cyanogaster Bouleng., B.M.C. iii, 1887, p. 292, and Ann. Mus. Genova xviii, 1898, p. 701. Werner, Zool. Anz. xxii, 1899, pp. 372 and 375.

Knecuxia dahlü Werner, Lc. xxi, 1898, p. 552, and Mitt. Zool. Samml. Mus. Naturk. Berlin, i, 1900, p. 64, fig. 19.

Hab. Is. of Torres Straits, Moluccas, N.G., Is. of the Pacific.

LYGOSOMA ATROCOSTATUM Lesson.

Scincus atrocostatus Lesson, Voy. Coquille, Zool. ii, 1828, p. 50, pl. iv, fig. 3.

Lygosoma atrocostatum Bouleng., B.M.C. iii, 1887, p. 295.

Hab. N.Q., Is. of Torres Straits, N.G., Philippines, etc.

LYGOSOMA NIGRUM Hombr. and Jacq.

Eumeces niger Hombr. and Jacq., Voy. Pole Sud (Astrolabe and Zelee), Rept. 1853, p. 11, pl. iv, fig. 2.

Lygosoma nigrum Bouleng., B.M.C. iii, 1887, p. 297.

Hab. Darnley Is., Caroline Is., N. Ireland, Solomon Is., Banks Is., Fiji, Samoa.

LYGOSOMA SPENCERI Lucas and Frost.

Emoa spenceri Lucas and Frost, P.R.S., V. (n. ser.) vi, 1894, p. 81, pl. ii, figs. 1 and 1a.

Hab. V.

SECTION RIOPA Gray, A.M.N.H. ii, 1839, p. 332.

LYGOSOMA ALBOFASCIOLATUM Gunth.

Eumeces albofasciolatus Gunth., A.M.N.H. (4) x, 1872, p. 370.

Lygosoma albofasciolatum Bouleng., B.M.C. iii, 1887, p. 302, pl. xxiv, and P.Z.S. 1888, p. 88. Boettger, Cat. Rept. Samml. Mus. Senckenb. i, 1893, p. 107.

Werner, Mitt. Zool. Samml. Mus. Naturk. Berlin, i, 1900, p. 66, fig. 21.

Riopa striatofasciatum Ogilby, Rec. Austr. Mus. i, 1890, p. 5.

Hab. N. Austr., N. Ireland, Duke of York and Solomon Is.

LYGOSOMA RUFESCENS Shaw.

Lacerta rufescens Shaw, Zool. iii, 1802, p. 285.

Lygosoma rufescens Bouleng., B.M.C. iii, 1887, p. 303.

Hab. Q., Coconut Is., Is. of Torres Straits, Hall Sound, Darnley Is., Murray Is., N.G.

SECTION OMOLEPIDA Gray, Cat. 1845, p. 87.

LYGOSOMA BRANCHIALE Gunth.

Himulia branchialis Gunth., A.M.N.H. (3), xx, 1867, p. 47.

Lygosoma branchiale Bouleng., B.M.C. iii, 1887, p. 321, pl. xxvi, fig. 2. Werner, Fauna Sudwest-Austr. ii, 1910, p. 479.

Lygosoma melanops Stirling and A. Zietz, T.R.S., S.A., 1893, p. 173, pl. vi, fig. 3. Werner, Fauna Sudwest-Austr. ii, 1910, p. 479.

Hab. W.A., S.A., C.A., St. Francis Is., Spencer's Gulf, S.A.

LYGOSOMA CASUARINAE Dum. and Bibr.

Cyclodius casuarinae Dum. and Bibr., Erp. Gen. v, 1839, p. 749.

Lygosoma casuarinae Bouleng., B.M.C. iii, 1887, p. 322.

Hemiphacriodon tasmanicum Frost and Lucas, P.L.S., N.S.W. (2), viii, 1894, p. 227. Lucas and Frost, P.L.S., N.S.W. xxi, 1896, pp. 282 and 283.

Hab. N.S.W., V., T.

LYGOSOMA AUSTRALE Gray.

Lygosoma australis Gray, A.M.N.H. ii, 1839, p. 332.

Lygosoma australe Bouleng., B.M.C. iii, 1887, p. 323. Werner, Fauna Sudwest-Austr. ii, 1910, p. 479.

Hab. W.A.

LYGOSOMA PUNCTULATUM Peters.

Lygosoma punctulatum Peters, Mon. Akad. Berlin, 1871, p. 646, pl. —, fig. 5.

Bouleng., B.M.C. iii, 1887, p. 324.

Hab. Q.

LYGOSOMA CRASSICAUDA A. Dum.

Lygosoma crassicaudum A. Dum., Cat. Meth. Rept. 1851, p. 172.

Lygosoma crassicauda Bouleng., B.M.C. iii, 1887, p. 325.

Hab. Q., Is. of Torres Straits, N.G.

LYGOSOMA MJOBERGI Lonnb. and And.

Lygosoma mjobergi Lonnb. and And., Kungl. Sv. Vet. Akad. Handl. lii, 1915,

p. 6.

Hab. N.Q.

LYGOSOMA PUMILUM Bouleng.

Lygosoma pumilum Bouleng., B.M.C. iii, 1887, p. 325, pl. xxvi, fig. 3. Lonnb.

and And., Kungl. Sv. Vet. Akad. Handl. lii, 1915, p. 7.

Hab. N.Q.

LYGOSOMA GASTROSTIGMA Bouleng.

Lygosoma gastrostigma Bouleng., P.Z.S., 1898, p. 922, pl. lvii, fig. 2.

Hab. W.A.

SECTION HEMIERGIS Wagl., Syst. Amph. 1830, p. 160.

LYGOSOMA INITIALE Werner.

Lygosoma initiale Werner, Fauna Sudwest-Austr. ii, 1910, p. 480.

Hab. W.A.

LYGOSOMA PERONII Fitz.

Seps peronii (non Dum. and Bibr.) Fitz., Neue Classif. Rept. 1826, p. 53.

Lygosoma peronii Bouleng., B.M.C. iii, 1887, p. 326.

Hemiergis peronii Lucas and Frost, P.R.S., V. (n. ser.) vi, 1894, p. 82.

Lygosoma quadridigitatum Werner, Fauna Sudwest-Austr. ii, 1910, p. 480.

Bouleng., A.M.N.H. (8), xvi, 1915, p. 66.

Hab. W.A., S.A., V.

LYGOSOMA WOODWARDI Lucas and Frost.

Hemiergis woodwardi Lucas and Frost, P.R.S., V. (n. ser.) xv, 1902, p. 77.

Hab. W.A.

LYGOSOMA DECRESIENSE Fitz.

Zygnis decresiensis Fitz., Neue Classif. Rept. 1826, p. 53.

Lygosoma decresiense Bouleng., B.M.C. iii, 1887, p. 327. Werner, Fauna Südwest-Austr. ii, 1910, p. 481.

Hab. W.A., S.A., N.S.W., V.

LYGOSOMA QUADRILINEATUM Dum. and Bibr.

Chelomeles quadrilineatus Dum. and Bibr., Erp. Gen. 1839, p. 774.

Lygosoma quadrilineatum Bouleng., B.M.C. iii, 1887, p. 328. Werner, Fauna Südwest-Austr. ii, 1910, p. 481.

Hab. W.A.

SECTION SIAPHOS Gray, A.M.N.H. ii, 1839, p. 333.

LYGOSOMA SCUTIROSTRUM Peters.

Lygosoma scutirostrum Peters, Mon. Akad. Berlin, 1873, p. 743, and *l.c.* 1874, p. 377, pl. —, fig. 6. Bouleng., B.M.C. iii, 1887, p. 330.

Hab. Q., N.S.W.

LYGOSOMA FLAVIVENTER De Vis.

Calyptotis flaviventer De Vis, P.R.S., Q. ii, 1886, p. 57. Longman, Mem. Q. Mus. v, 1916, p. 48 (*Lygosoma scutirostrum* Peters? *vide supra*).

Hab. Q., Macleay Is.

LYGOSOMA GRACILE Bavay.

Lygosoma gracilis Bavay, Cat. Rept. N. Caled. Mem. Soc. Normandie, xv, 1872, p. 24.

Lygosoma gracile Bouleng., B.M.C. iii, 1887, p. 331. Lonnb. and And. Kungl. Sv. Vet. Akad. Handl. lii, 1913, p. 9.

Hab. Q., N. Caledonia.

LYGOSOMA MACCOYI Lucas and Frost.

Siaphos maccoyi Lucas and Frost, P.R.S., V. (n. ser.) vi, 1894, p. 85, pl. ii, figs. 2 and 2a.

Lygosoma maccoyi Lonnb. and And., Kungl. Sv. Vet. Akad. Handl. lii, 1913, p. 10 (?variety of *Lygosoma gracile* Bavay).

Hab. Q., N.S.W., V.

LYGOSOMA GRACILOIDES Lonnb. and And.

Lygosoma graciloides Lonnb. and And., Kungl. Sv. Vet. Akad. Handl. lii, 1913, p. 10.

Hab. S.Q.

LYGOSOMA SCHARFFI Bouleng.

Lygosoma scharffi Bouleng., A.M.N.H. (8), xvi, 1915, p. 64.

Hab. Q.

LYGOSOMA AEQUALE Gray.

Seps aequalis Gray, Ann. Philos. (2) x, 1825, p. 202.

Lygosoma aequale Bouleng., B.M.C. iii, 1887, p. 332. Lonnb. and And., Kungl. Sv. Vet. Akad. Handl, lii, 1915, p. 7. Longman, Mem. Q. Mus. iii, 1915, p. 34.

Hab. Q., N.S.W.

LYGOSOMA SIMPLEX Cope.

Siaphos simplex Cope, Proc. Acad. Nat. Sc. Philad. 1864, p. 229.

Hab. Australia.

SECTION RHODONA Gray, A.M.N.H. ii, 1839, p. 335.

LYGOSOMA MICROTIS Gray.

Mocoo microtis Gray, Cat. 1845, p. 83.

Lygosoma microtis Bouleng., B.M.C. iii, 1887, p. 333.

Hab. W.A., S.A.

LYGOSOMA BOUGAINVILLII Gray.

Riofa bougainvillii Gray, A.M.N.H. ii, 1839, p. 332.

Lygosoma bougainvillii Bouleng., B.M.C. iii, 1887, p. 333.

Hab. S.A., Kangaroo Is., V.

LYGOSOMA FROSTI nom. nov.

Rhodona tetradactyla (*non Mocoo tetradactyla* O'Shaughn.) Lucas and Frost, P.R.S., V. (n. ser.) vii, 1895, p. 268, and Rep. Horn Exp. ii, 1896, p. 142, pl. xii, fig. 3.

Hab. C.A.

LYGOSOMA FRAGILE Gunth.

Rhodona fragilis Gunth., Journ. Mus. Godeffr. xii, 1876, p. 45.

Lygosoma fragile Bouleng., B.M.C. iii, 1887, p. 334, pl. xxvii, fig. 2. Stirling and A. Zietz, T.R.S., S.A. xvi, 1893, p. 174. Waite, Rec. Austr. Mus. iii, 1900, p. 220.

Hab. W.A., Q., N.S.W.

LYGOSOMA WALKERI Bouleng.

Lygosoma walkeri Bouleng., A.M.N.H. (6) viii, 1891, p. 405.

Hab. N.W.A.

LYGOSOMA PICTURATUM Fry.

Lygosoma picturatum Fry, Rec. W.A. Mus. i, 1914, p. 186, pl. xxxvii, fig. 3, and text figs. 5, a. and b.

Hab. W.A.

LYGOSOMA PLANIVENTRALIS Lucas and Frost.

Rhodona planiventralis Lucas and Frost, P.R.S., V. (n. ser.) xv, 1902, p. 78.

Hab. W.A.

LYGOSOMA MACROPISTHOPUS Werner.

Lygosoma (Rhodona) macropisthopus Werner, Zool. Anz. xxvi, 1903, p. 246.

Hab. Q.

LYGOSOMA GERRARDII Gray.

Rhodona punctata var. *gerrardii* Gray, P.Z.S. 1864, p. 296.

Lygosoma gerrardii Bouleng., B.M.C. iii, 1887, p. 335. Stirling and A. Zietz, T.R.S., S.A. xvi, 1893, p. 174.

Hab. W.A., C.A.

LYGOSOMA PUNCTATOVITTATUM Gunth.

Rhodona punctatovittata Gunth., A.M.N.H. (3) xx, 1867, p. 47.

Lygosoma punctatovittatum Bouleng., B.M.C. iii, 1887, p. 335.

Hab. Q., V., T.

LYGOSOMA LINEOPUNCTULATUM Dum. and Bibr.

Brachystopus lineopunctulatus Dum. and Bibr., Erp. Gen. v, 1839, p. 779.

Lygosoma lineopunctulatum Bouleng., B.M.C. iii, 1887, p. 336. Werner, Fauna Sudwest-Austr. ii, 1910, p. 482.

Hab. W.A.

LYGOSOMA MIOPUS Gunth.

Sordia miopus Gunth., A.M.N.H. (3) xx, 1867, p. 49.

Lygosoma miopus Bouleng., B.M.C. iii, 1887, p. 337, pl. xxxvii, fig. 4.

Hab. W.A.

LYGOSOMA BIPES Fischer.

Rhodona bipes Fischer, Arch. f. Nat. xlvi, 1882, p. 292, pl. xvi, figs. 10-15.

Lygosoma bipes Bouleng., B.M.C. iii, 1887, p. 337. Stirling and A. Zietz, T.R.S., S.A., xvi, 1893, p. 175. Montague, P.Z.S. 1914, p. 641.

Hab. W.A., Monte Bello Is., C.A.

Lygosoma bipes var. *concolor* Werner, Fauna Sudwest-Austr. ii, 1910, p. 483.

Hab. W.A.

LYGOSOMA PRAEPEDITUM Bouleng.

Lygosoma praepeditum Bouleng., B.M.C. iii, 1887, p. 337. Werner, Fauna Sudwest-Austr. ii, 1910, p. 484.

Hab. W.A.

SECTION LYGOSOMA Gray, Zool. Journ. iii, 1828, p. 228.

LYGOSOMA RETICULATUM Gunth.

Chelomcles reticulatus Gunth., A.M.N.H. (4), xii, 1873, p. 146.

Lygosoma reticulatum Bouleng., B.M.C. iii, 1887, p. 341, pl. xxviii, fig. 1.

Hab. N.S.W.

LYGOSOMA VERREAUXII A. Dum.

Anomalopus verreauxii A. Dum, Cat. Meth. 1851, p. 185.

Lygosoma verreauxii Bouleng., B.M.C. iii, 1887, p. 342.

Anomalopus lentiginosus De Vis, P.L.S., N.S.W. (2) ii, 1888, p. 823. Bouleng., Zool. Rec. xxv, 1888, Rept. p. 11.

Lygosoma verreauxii var. *biungulata* Oudemans, in Semon, Jena Denkschr. viii, 1894, p. 144.

Hab. Q., N.S.W.

LYGOSOMA BANKROFTI Longman.

Lygosoma bankrofti Longman, Mem. Q. Mus. v, 1916, p. 49.

Hab. Q.

LYGOSOMA TRUNCATUM Peters.

Coloscincus truncatus Peters, Mon. Akad. Berlin, 1876, p. 532, pl. —, fig. 1.

Lygosoma truncatum Bouleng., B.M.C. iii, 1887, p. 343. Longman, Mem. Q. Mus. v, 1916, p. 49.

Hab. Q.

LYGOSOMA OPHIOSCINCUS Bouleng.

Lygosoma ophioscincus Bouleng., B.M.C. iii, 1887, p. 343.

Ophioscincus frontalis De Vis, P.L.S., N.S.W. (2), 1888, p. 823.

Hab. Q.

ABLEPHARUS Fitz. Verh. Ges. Naturf. Fr. Berl. i, 1824, p. 297.

ABLEPHARUS BOUTONII Desjard.

Scincus boutonii Desjard. Ann. Sc. Nat. xvii, 1831, p. 298.

Ablepharus boutonii Bouleng., B.M.C. iii, 1887, p. 346.

Ablepharus boutonii var. *peronii* Cocteau, Etudes sur le Scincoid, 1836, p. 1.

Bouleng., *l.c.* p. 347 and Ann. Mus. Genova, xviii, 1898, p. 702.

Ablepharus boutonii var. *peroni* Werner, Fauna Sudwest-Austr. ii, 1910, p. 485.

Ablepharus boutonii var. *metallicus* Bouleng., *l.c.*

Ablepharus boutonii var. *eximius* Garman, Bull. Mus. Comp. Zool. xxxix, 1891, p. 10.

Hab. Australia, excepting Tasmania.

ABLEPHARUS VIRGATUS Garman.

Ablepharus virgatus Garman, Bull. Mus. Comp. Zool. xxxix, 1910, p. 10.

Hab. Q.

ABLEPHARUS BROOMENSIS Lonnb. and And.

Ablepharus broomensis Lonnb. and And., Kungl. Sv. Vet. Akad. Handl. lii, 1913, p. 11.

Hab. W.A.

ABLEPHARUS BOULENGERI Ogilby.

Ablepharus boulengeri Ogilby, Rec. Austr. Mus. i, 1890, p. 10.

Hab. N.S.W.

ABLEPHARUS LINEO-OCELLATUS Dum. and Bibr.

Ablepharus lineo-ocellatus Dum. and Bibr., Erp. Gen. v, 1839, p. 817. Bouleng., B.M.C. iii, 1887, p. 348. Werner, Fauna Sudwest-Austr. ii, 1910, p. 487.

Ablepharus lineo-ocellatus var. A. Bouleng., *l.c.*, p. 349.

Ablepharus lineo-ocellatus var. *anomalis* Gray, Cat. 1845, p. 65; var. B. Bouleng., *l.c.*

Ablepharus lineo-ocellatus var. *adclaidensis* Peters, Mon. Akad. Berlin, 1874, p. 376. var. *C. Bouleng., l.c.*

Ablepharus lineo-ocellatus var. *ruficandus* Lucas and Frost, P.R.S., V. (n. ser.) vii, 1895, p. 269, and Rep. Horn Exp. ii, 1896, p. 144, pl. x, fig. 3.

Hab. Australia.

ABLEPHARUS ORNATUS Broom.

Ablepharus ornatus Broom, A.M.N.H. (6), xviii, 1896, p. 342.

Hab. N.Q.

ABLEPHARUS TENUIS Broom.

Ablepharus tenuis Broom, A.M.N.H. (6), xviii, 1896, p. 342.

Hab. N.Q.

ABLEPHARUS TAENIOPLEURUS Peters.

Ablepharus (Morethia) taeniopleurus Peters, Mon. Akad. Berlin, 1874, p. 375.

Ablepharus taeniopleurus Bouleng., B.M.C. iii, 1887, p. 349. Werner, Fauna Sudwest-Austr. ii, 1910, p. 489.

Hab. W.A., Q.

ABLEPHARUS GREYII Gray.

Menetia greyii Gray, Cat. 1845, p. 66.

Ablepharus greyii Bouleng., B.M.C. iii, 1887, p. 349. Lucas and Frost, P.L.S., N.S.W. xxi, 1896, p. 282. Werner, Fauna Sudwest-Austr. ii, 1910, p. 490.

Hab. W.A., C.A., N.S.W., V.

ABLEPHARUS BURNETTII Oudemans.

Ablepharus burnettii Oudemans, in Semon, Jena Denkschr. viii, 1894, p. 145.

Hab. Q.

ABLEPHARUS HETEROPUS Garman.

Ablepharus heteropus Garman, Bull. Mus. Comp. Zool. xxxix, 1901, p. 9.

Hab. Great Barrier Reef, Q.

ABLEPHARUS DISTINGUENDUS Werner.

Ablepharus distinguendus Werner, Fauna Sudwest-Austr. ii, 1910, p. 490.

Hab. W.A.

ABLEPHARUS ORIENTALIS De Vis.

Miculia orientalis De Vis, P.R.S., Q. v, 1889, p. 160.

Hab. Q.

ABLEPHARUS ELEGANS Gray.

Miculia elegans Gray, Cat. 1845, p. 66.

Ablepharus elegans Bouleng., B.M.C. iii, 1887, p. 355. Werner, Fauna Sudwest-Austr. ii, 1910, p. 490.

Hab. W.A., S.A., C.A., N.S.W., V.

ABLEPHARUS MUELLERI Fischer.

Phanacropis muelleri Fischer, Arch. f. Nat. 1881, p. 236, pl. xii, figs. 13-15.

Ablepharus muelleri Bouleng., B.M.C. iii, 1887, p. 356. Werner, Fauna Sudwest-Austr. ii, 1910, p. 149. Fry, Rec. W.A. Mus. i, 1914, p. 189. Montague, P.Z.S., 1914, p. 641.

Hab. W.A., Monte Bello Is.

ABLEPHARUS LINEATUS Bell.

Lerista lineata Bell, P.Z.S. 1883, p. 99.

Ablepharus lineatus Bouleng., B.M.C. iii, 1887, p. 356.

Hab. W.A.

ABLEPHARUS TIMIDUS De Vis.

Ablepharus timidus De Vis, P.L.S., N.S.W. (2) ii, 1888, p. 824.

Hab. Q.

ABLEPHARUS RHODONOIDES Lucas and Frost.

Ablepharus rhodonoides Lucas and Frost, P.L.S., N.S.W. xxi, 1896, p. 281.

Cryptoblepharus rhodonoides Fry, Rec. W.A. Mus. i, 1914, p. 189.

Hab. W.A., N.S.W., V.

TROPIDOPHORUS Dum. and Bibr. Erp. Gen. v, 1839, p. 554.**TROPIDOPHORUS QUEENSLANDIAE De Vis.**

Tropidophorus queenslandiae De Vis, P.L.S., N.S.W. (2), iv, 1890, p. 1034.

Lonnb. and And., Kungl. Sv. Vet. Akad. Handl. lii, 1915, p. 4.

Hab. Q.

OREODEIRA Girard, Proc. Ac. Philad. 1857, p. 199, and U.S. Explor. Exped., Herp., p. 419.

? OREODEIRA GRACILIPES Gir.

Orcodeira gracilipes Gir., *Il.c.c.*; Bouleng., B.M.C. i, 1885, p. 413.

Hab. N.S.W.

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ARACHNIDA FROM LORD HOWE AND NORFOLK ISLANDS

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Plates xxviii-xxxii.

During December, 1915, and January, 1916, Mr. A. M. Lea, of the South Australian Museum, visited Lord Howe and Norfolk Islands. Among the material collected by him were one Opilionid and a number of Araneids. Naturally many known forms are included, but in addition to these, new ones, some of which are particularly interesting, occur.

[When the paper was being edited for the press it was discovered that the manuscript of the genus *Clubiona* was missing. As Mr. Rainbow had died in the meantime, inquiries for it were made in Sydney, but proved fruitless. Three species had been named and figured, and, as we possess the type specimens, Dr. Robert Pulleine kindly undertook to furnish the requisite descriptions: *Clubiona venatoria*, *C. asbolodes*, and *C. decora* will therefore stand under the authorship of Rainbow and Pulleine.

Types of all new species are in the South Australian Museum.

The letters L.H.I. and N.I., following the names of the species, indicate, respectively, Lord Howe and Norfolk Islands.—Ed.]

FAMILY TRIAENONYCHOIDÆ. *TRIAENONYX RAPAX* Sor. (L.H.I.)

FAMILY ULOBORIDÆ *DINOPIS INSULARIS* sp. nov. (L.H.I.)

(Pl. xxviii, figs. 1, 2.)

♂ Cephalothorax, 3.2 mm. long, 2 mm. broad; abdomen, 5.4 mm. long, 1.8 mm. broad.

Cephalothorax elongate, angular, acuminate in front, posterior angle truncated. Pars cephalica flat, sides declivious, narrowing off sharply towards the front, pale yellow above, sides smoky-yellow, pubescent, junction of cephalic and thoracic segments faintly defined; ocular area broader than long; clypeus narrow. Pars thoracica retreating rearwards, pale yellow down

the middle, sides gently sloping, pubescent, smoky-yellow; each side relieved by three moderately large and prominent black spots not one of which is absolutely round; each side has also at its lower angle a strongly defined black band; marginal band yellow. Legs long, yellow, tapering, pubescent, armed with short, fine, black spines. Relative lengths, 1, 2, 4, 3. Palpi concolorous, long, fine, similar in clothing and armature to legs, genital bulb nearly round, complicated and provided with a long spiral style. Falces long, not strong, tapering, arched, yellow, inner angle of each relieved by three nearly contiguous black spots, and the outer angles with one, apices divergent; fang short, well curved, yellow at base, thence wine red. Maxillae yellow and having a short, dark, median band running from the base and terminating near the apex. Labium pubescent, dark yellowish-grey. Sternum elongate, angular, truncated in front, acuminate posteriorly, slightly arched, nearly black, with a yellow elongate band running down the centre; this band is palest in front where it is moderately broad, and from whence it narrows off until the centre is reached, and from which point it suddenly broadens out again, finally narrowing off once more towards posterior extremity, where it becomes much darker. Abdomen cylindrical, gently tapering towards posterior extremity, slightly overhanging base of cephalothorax, arched; superior surface yellow, ornamented with an elongate leaf-like design, the outer angles of which are black and slightly broken in parts; running down to the centre there is an uneven and tapering yellowish-grey design; sides concolorous with black pencillings and spots; inferior surface yellow, with a long, broad, median sooty-black patch, the outer angles of which are waved; this patch, which has a smoky-yellow longitudinal median bar, terminates shortly in front of the cribellum.

Not one of the female examples is more than half-grown, but all agree in colour and ornamentation with the male. Mr. Lea supplies the following note with one of the specimens: "Taken on tree trunk at night. When the light was thrown on it, it remained motionless, standing high on its legs and looking more like a cast skin than a living spider. On attempting to catch it it dropped and assumed a most remarkable attitude on a piece of grass." Type, L. 11508.

MENNEUS TRINODOSUS sp. nov. (L.11.1.)

(Pl. xxviii, figs. 3, 4.)

♀ Cephalothorax, 4.1 mm. long, 2.6 mm. broad; abdomen, 5.8 mm. long, 4 mm. broad.

Cephalothorax obovate, dark brown, acuminate in front, truncated posteriorly. Pars cephalica gently arched, narrowing towards front, pubescent, segmental groove faintly distinct; ocular area broader than long; clypeus narrow, not deep. Pars thoracica gently arched, broadest at middle, from whence it gently narrows towards the front; marginal band moderately broad. Legs long, tapering, concolorous with cephalothorax, hairy, armed with short, fine spines. Relative lengths, 1, 2, 4, 3. Palpi moderately long, similar in colour and armature to legs. Falces hairy, yellow-brown, arched, apices divergent; upper margin of the furrow of each falx armed with four large teeth, and the lower with numerous small ones; fang strong, reddish-brown, long, and well curved. Maxillae hairy, pale yellow. Labium normal, sides dark brown, the middle smoky-yellow, apex pale yellow. Sternum elongate, very slightly arched, dark brown with a prominent yellowish patch near the front, anterior angle truncated, posterior extremity acuminate. Abdomen somewhat angular, slightly overhanging base of cephalothorax, arched, pilose, dark brown, spotted with yellow, terminating posteriorly with three large coniform lobes; inferior surface golden-yellow reticulated with dark brown. Epigynum flat, hairy, and having two small circular pits, the latter obscured by hairs. Type, I. 11509.

FAMILY DICTYNIDAE.

AMAUROBIUS ANNULIPES L. Koch (L.H.I.)

An immature specimen, sieved from fallen leaves.

AMAUROBIUS CANDIDUS L. Koch (N.I.)

AMAUROBIUS FREQUENS sp. nov. (L.H.I.)

(Pl. xxviii, figs. 5, 6.)

♀ Cephalothorax, 4·2 mm. long, 2·8 mm. broad; abdomen, 6·3 mm. long, 4·6 mm. broad.

Cephalothorax obovate, yellowish-grey, with dusky lateral markings, and clothed with dusky hairs. Pars cephalica raised, strongly arched, marked down the middle with a strongly defined black line, sides declivous, segmental groove distinct; ocular area broader than long; clypeus broad, deep. Pars thoracica arched, broad, radial grooves and thoracic fovea distinct; marginal band broad, pale yellow. Eyes in two rows of four each, yellow and ringed with black; front row slightly procurved, rear row slightly recurved; front median eyes close to each other but not touching; rear median eyes separated from each other by a space equal to once their individual diameter, and each

again from its lateral neighbour by a similar space; lateral eyes elliptical, contiguous, and placed obliquely, the anterior one being directed strongly inwards. Legs strong, not long, hairy and bespined, tapering; coxae and trochanters pale yellow; all other joints dusky brown, streaked with yellow. Relative lengths, 1, 4, 2, 3. Palpi moderately long; strong, similar in colour, clothing and armature to legs. Falces strong, well arched, tapering, apices divergent, moderately hairy, reddish-brown, slightly projecting; margins of the furrow of each falx armed with strong teeth; fang long, well curved, and concolorous with falces. Maxillae long, arched, yellow, nearly parallel, clothed with long, black hair. Labium similar in colour and clothing to fore-going, arched, longer than broad, sides parallel, apex nearly straight. Sternum yellow, arched, shield-shaped, clothed with long black hairs. Abdomen ovate, overhanging base of cephalothorax, strongly arched, clothed with long coarse hair or bristles, dull yellowish-grey with dark brown somewhat obscure markings. Epigynum rather small, yellow, surrounded with reddish hairs, and having two rather deep pits. Cribellum pale yellow, bisected. Spinnerets compact, cylindrical, yellowish-grey, apices pale yellow.

Several specimens were obtained, some of which were immature. The matured forms display differences in the scheme of ornamentation and in size. Type, I. 11510.

CALLEROPHTHALMUS (?) ALBUS Keys (L.H.I.)

One specimen: it differs from Keyserling's description and figure, chiefly in abdominal ornamentation. The epigynum, however, agrees exactly with the description and figure, and so for the present I prefer to leave it as above.

FAMILY OONOPIDAE.

OONOPS LEAI sp. nov. (L.H.I.)

(Pl. xxviii, figs. 7, 8.)

♀ Cephalothorax, 1.2 mm. long, 0.9 mm. broad; abdomen, 2 mm. long, 1.3 mm. broad.

Cephalothorax ovate, smooth, yellow, narrowest in front. Pars cephalica arched; ocular area broader than long, and occupying entire width of cephalic segment; clypeus narrow. Pars thoracica strongly arched, grooved down the centre; marginal band narrow. Eyes six, large, oval, diurnal, ringed with black. Legs long, tapering, yellow, pilose. Relative lengths, 4, 1, 2, 3. Palpi short, similar in colour and clothing to the legs.

Falces concolorous with cephalothorax, conical. Maxillae and labium concolorous also. Sternum concolorous with foregoing, large, oval, smooth, and terminating between fourth pair of coxae. Abdomen ovate, arched, slightly overhanging base of cephalothorax, pilose, pinkish-grey.

Taken from *Kentia* palm. Spiders of the genus *Oonops* are always small, varying in length from 2 to 3 mm. *O. leai*, allowing for overlapping of the abdomen, is exactly 3 mm. long. Type, I. 11511.

GAMASOMORPHA LORICATA L. Koch. (L.H.I.).

Sieved from fallen leaves.

FAMILY DYSDERIDAE.

DYSDERA AUSTRALIENSIS Rainb. (N.I.).

ARIADNA MONTANA sp. nov. (L.H.I.).

(Pl. xxviii, figs. 9, 10.)

♀ Cephalothorax, 5 mm. long, 2·8 mm. broad; abdomen, 5 mm. long, 2·8 mm. broad.

Cephalothorax elongate, almost parallel-sided, slightly broader posteriorly, mahogany-brown, sparingly hairy.

Pars cephalica strongly arched, sides declivious, narrowest in front, segmental groove distinct; ocular area broader than long; clypeus deep, inclining inwards. Pars thoracica strongly arched, sloping somewhat abruptly towards posterior angle, radial grooves very faintly indicated; marginal band broad, yellowish. Eyes diurnal, oval, ringed with black, arranged in three series of 2; each pair contiguous. Legs moderately long, robust, hairy; first pair much the strongest; of this pair the coxa, femur, patella and tibia are yellow, and the metatarsus and tarsus dark brown; all the others yellow throughout; inner angle of femora I and II armed with two dark brown, powerful and moderately long spines; tibiae I, II, and III each armed on the underside with twelve long, dark brown spines, those on the first pair much the longest and strongest, and those on the third pair much the weakest; tibia IV free from spines; each metatarsus is also armed with twelve long spines, those on the first and second pairs being the longest and strongest, and those on the third pair the shortest and weakest; each tarsus is also armed with strong adpressed spines; claws, 3; superior claws long, well curved, powerful and armed with long strong teeth. Relative lengths, 1, 2, 4, 3. Palpi moderately long, strong, yellow, tarsi dark brown, hairy, spined. Falces concolorous with cephalothorax, coniform, projecting, strongly arched; fang

short. Maxillae long, tapering, arched, broadest at heel from whence the palpi arise, yellow, clothed with long dark hair. Labium elongate, parallel-sided, arched, yellow, clothed with long, dark hair, apex slightly curved, the base strongly so. Sternum elongate, elliptical, narrowest in front, yellow, arched, moderately hairy. Abdomen elliptical, yellow, not overhanging base of cephalothorax, strongly arched, densely clothed with long hair.

Taken from dead leaf-stem of tree-fern, on Mount Lidgbird. Type, I. 11812.

FAMILY DRASSIDAE.

HEMICLOEA PLUMEA L. Koch. (L.H.I.).

HEMICLOEA SUNDEVALLI Thor. (L.H.I.).

PRYNUS FULVUS L. Koch. (L.H.I.).

DRASSODES SIGNATUS sp. nov. (N.I.).

(Pl. xxviii, figs. 11-13.)

♂ Cephalothorax, 4 mm. long, 2.8 mm. broad; abdomen, 5.4 mm. long, 2.8 mm. broad.

Cephalothorax ovate, shining, reddish-brown. Pars cephalica strongly arched, segmental groove distinct; clypeus moderately deep, sloping forward; ocular area broader than long. Pars thoracica strongly arched, clothed with scattered black bristles, radial grooves and median fovea distinct; marginal band broad. Eyes in two rows of four each; anterior row shortest, noticeably recurved, posterior row very slightly procurved; anterior median eyes largest, the laterals elliptical and placed obliquely; posterior eyes evenly distributed. Legs robust, concolorous with cephalothorax, pilose, armed with rather long spines; anterior pair longest and strongest. Relative lengths, 1, 4, 2, 3. Palpi short, similar in colour, clothing and armature to legs; genital bulb large, pear-shaped, inner angle lobed, complicated. Falces concolorous with cephalothorax, hairy, coniform, apices slightly divergent, hairy; superior margin of the furrow of each falx armed with three prominent teeth, and the inferior with two small ones; fang rather long, well curved. Maxillae concolorous with cephalothorax. Labium concolorous with foregoing, long, truncated at apex, grooved laterally and in front. Sternum elongate, arched, truncated in front, acuminate posteriorly and terminating between fourth pair of coxae, arched, shining, yellow, anterior and lateral angles dark brown. Abdomen ovate, arched, superior surface yellow with dark brown markings; sides fuscous; inferior surface yellowish-grey, finely pencilled with two long parallel lines and two short ones; the former are close together, commence

at the rima epigasteris and terminate shortly in front of spinnerets where they converge and meet; the two shorter ones are also in front of the spinnerets.

Two males and four females were obtained. One of the males and all of the females were immature, but all agree in colour and ornamentation. All taken from old tree ferns. Type, I. 11513.

DRASSODES EXCAVATUS sp. nov. (L.H.I.)

(Pl. xxviii, figs. 14, 15.)

♀ Cephalothorax, 2.6 mm. long, 2 mm. broad; abdomen 5 mm. long, 2.7 mm. broad.

Cephalothorax ovate, yellow, pilose. Pars cephalica strongly arched, smooth, segmental groove distinct; ocular sac occupying nearly entire width; clypeus narrow. Pars thoracica strongly arched, smooth, radial grooves faintly indicated; median fovea distinct. Eyes of equal size, distributed over two rows of four each; anterior row short, slightly procurved, the laterals oval and arranged obliquely. Legs straw-yellow, long, strong, pubescent, armed with rather long, fine, black spines. Relative lengths, 4, 1, 2, 3. Palpi similar in colour, clothing, and armature to legs. Falces yellow, darker than cephalothorax, coniform, slightly projecting; superior angle of the furrow of each falx armed with three large teeth, and the inferior with two; fang concolorous with falces. Maxillae reddish-yellow, long, arched, dilated, inner apical angles pale yellow, truncated, fringed with coarse hairs or bristles; inner lateral angles excavated; surface furnished with a few short bristles. Labium concolorous with foregoing, apex truncated and slightly hollowed at middle; the surface furnished with a few short bristles. Sternum elongate, straw-yellow, arched, shining, uneven, anterior extremity truncated, posterior extremity obtusely pointed, and terminating between fourth pair of coxae. Abdomen obovate, very slightly overhanging base of cephalothorax, yellowish-grey, pilose. Epigynum small, transverse, slightly raised, thickly clothed with short, dark hairs, and having two small circular pits placed closely together. Spinnerets cylindrical, hairy; superior mammillae longer than inferior. Type, I. 11514.

ADELPHODRASSUS gen. nov.

Cephalothorax obovate. Pars cephalica arched, cephalic segment distinct; ocular area occupying nearly the entire width of the segment; clypeus narrow, not broader than anterior median eyes. Pars thoracica broad, strongly arched, radial grooves distinct; median fovea a moderately long, narrow slit or groove. Eyes eight, arranged in two rows of four each, the anterior group being

slightly recurved and the posterior strongly procurved; side eyes linked together. Legs strong, moderately long, bespined. Relative lengths, 4, 1, 2, 3. Palpi rather long, bespined. Falces rather long, arched, parallel; superior margin armed with three teeth, and the inferior with two. Maxillae long, dilated, similar to *Drassodes*. Labium longer than broad, somewhat parallel-sided, apex obtuse. Sternum cordate, posterior extremity acuminate, and terminating between fourth pair of coxae. Abdomen ovate. Spinnerets compactly grouped, cylindrical, long, truncated; inferior mammillae shorter and stouter than superior.

This genus comes closest to *Leptodrassus*, even more so than *Drassus debilis*. In *Leptodrassus* the front median eyes are much the largest, whilst in *Adelphodrassus* they are of equal size. In both genera, however, the side eyes are contiguous. The sternum and leg formulas conform to those of *D. debilis*.

ADELPHODRASSUS INORNATUS sp. nov. (N.I.)

(Pl. xxviii, figs. 16-18.)

♀ Cephalothorax, 2.2 mm. long, 1.8 mm. broad; abdomen, 3.2 mm. long, 2.5 mm. broad.

Cephalothorax obovate, orange-yellow, shining, sparingly pubescent. Pars cephalica strongly arched, thoracic segment distinct; ocular area broad, occupying nearly the entire breadth of the cephalic segment; clypeus narrow, not broader than anterior median eyes. Pars thoracica broad, strongly arched, radial grooves and median fovea distinct; marginal band broad, slightly paler in colour than cephalothorax. Eyes of nearly equal size, in two rows of four each; front median pair rather more than once their individual diameter apart, and the rear median eyes separated by a space equal to once their individual diameter; lateral eyes contiguous and elliptical. Legs moderately long and rather strong, tapering, straw-yellow, pubescent, armed with long black spines, tarsi furnished with tenant hairs and provided with two claws. Relative lengths, 4, 1=2, 3. Palpi moderately long, not strong, similar in colour, clothing, and armature to legs. Falces as detailed above; concolorous with cephalothorax. Maxillae and labium also as detailed above; pale yellow. Sternum concolorous with foregoing, arched, impressed laterally, surface moderately clothed with short black hairs. Abdomen ovate, slightly overhanging base of cephalothorax, pubescent and impressed at middle with four small but distinct punctures. Epigynum very slightly raised, somewhat ovate, hairy, rather darker than the abdomen, and having two small, dark circular pits; at anterior extremity there is a dark crescent-like mark partly surround-

ing a pale balloon-like design; below this again there are two small pale-coloured discs; immediately between the circular pits and the rima epigasteris there are two other small discs. Type, I. 11515.

FAMILY ZODARIIDAE.

STORENA FORMOSA Thor. (L.H.I.)

STORENA LEUCOSEMA sp. nov. (L.H.I.)

(Plate xxviii, figs. 19-22.)

♀ Cephalothorax, 3.5 mm. long, 2.4 mm. broad; abdomen, 3.9 mm. long, 2.7 mm. broad.

Cephalothorax ovate, shining, dark brown, nearly black. Pars cephalica strongly arched, obtuse, thoracic groove present, but not distinct; ocular area broader than long; clypeus exceedingly deep, inclining slightly inwards. Pars thoracica strongly arched, radial grooves and median fovea present, but not distinct; marginal band broad. Eyes nearly equal in size, arranged in two procurved rows; posterior row longer and more strongly curved; anterior eyes slightly smaller than those of the posterior series. Legs not very long, strong, tapering, yellow with smoky suffusions, pubescent, armed with short strong spines. Relative lengths, 4, 1, 2, 3. Palpi short, strong, similar in colour, clothing, and armature to legs. Falces concolorous with cephalothorax, arched, coniform, inclined backwards; fang short. Maxillae not long, arched, inclined inwards, smoky-yellow. Labium concolorous, longer than broad, coniform. Sternum somewhat cordate, slightly arched, terminating obtusely between fourth pair of coxae, yellow, clothed with short black hairs. Abdomen ovate, very slightly overhanging base of cephalothorax, hairy, arched, superior surface black with creamy-white markings, the latter reticulated, sides black; inferior surface buff-yellow, reticulated. Epigynum small, with two black, shining elliptical eminences; the latter excavated so as to form pits, the lower extremity of each of which touches the edge of the rima epigasteris.

One adult female, and three very young forms sieved from fallen leaves; two other female examples, one adult and one immature, taken from moss at the summit of Mount Gower. Type, I. 11516.

STORENA COLOSSEA sp. nov. (L.H.I.)

(Pl. xxviii, figs. 23-25.)

♀ Cephalothorax, 7.2 mm. long, 4.5 mm. broad; abdomen, 8.9 mm. long, 6 mm. broad.

Cephalothorax obovate, smooth, shining, dark brown, nearly black. Pars cephalica raised, strongly arched, obtuse in front, segmental groove distinct; ocular area broader than long, occupying entire width of cephalic segment in front; clypeus deep, fringed with long bristles. Pars thoracica strongly arched, radial grooves and median fovea present, but obscure; marginal band broad, white. Eyes in two strongly procurved rows of four each; anterior median eyes largest and separated from each other by a space equal to fully once their individual diameter; anterior lateral and posterior median eyes the smallest; the latter pair are also the closest together. Legs moderately long, strong, tapering, pubescent, and armed with short but very strong spines; dark brown, with exception of patellae and tibiae which are shining red. Relative lengths, 4, 1, 2, 3. Palpi short, strong, similar in clothing and armature to legs, dark brown. Falces concolorous with cephalothorax, arched, coniform; fang short. Maxillae and labium concolorous with falces. Sternum shield-shaped, moderately arched, reddish-brown, shining, hairy, apex obtusely pointed and extending between posterior coxae; anterior and lateral angles fringed with white pubescence. Abdomen ovate, hairy, slightly overhanging base of cephalothorax, black, flecked with numerous minute yellow spots; towards anterior extremity there are two moderately large but obscure transverse oval patches, and below these again an almost circular reddish-brown disc narrowly edged with yellow; on either side of this disc there is a distinct concolorous spot; at posterior extremity two small but distinct creamy-yellow patches are present; sides and inferior surface chocolate-brown, finely spotted with yellow; the chitinous plate in front of rima epigasteris shining, reddish-brown, and impressed with two large and distinct sigilla. Epigynum a transverse, irregularly oval or broadly triangular plate, the outline of which is wavy, and having a raised marginal ridge; it is broadest posteriorly, from whence it slopes both laterally and anteriorly, thereby forming a deep and irregular lateral and anterior groove; coarse bristles surround the organ, and a few are present at the middle of the sloping plate.

Ova-sac white, elliptical, plano-convex, closely woven, 16 mm. long, 11 mm. broad, and 7 mm. high.

Three females and one ova-sac. Type, I. 11517.

FAMILY PHOLCIDAE.

PHOLCUS LITORALIS L. Koch. (L.H.I. and N.I.)

From the "Jew's-ear" fungus, *Herneola auricula-judae*.

FAMILY THERIDIIDAE.

ARIAMNES COLUBRINUS Keys. (L.H.I.)**ARGYRODES ANTIPODIANA** O. P. Camb. (L.H.I.)**ARGYRODES GRACILIS** L. Koch. (L.H.I.)**ARGYRODES GEMMATA** sp. nov. (L.H.I.)

(Pl. xxviii, figs. 26, 27.)

♂ Cephalothorax, 1 mm. long, 0·7 mm. broad; abdomen, 1·4 mm. long, 0·7 mm. broad.

Cephalothorax ovate, black, shining, arched. Pars cephalica ascending, sides declivous; ocular area broader than long; clypeus somewhat produced, but not cleft. Pars thoracica broad, normal grooves distinct; marginal band narrow. Eyes of equal size. Legs long, yellow, tapering, pubescent, armed with long weak spines. Relative lengths, 1, 4, 2, 3. Palpi short, pubescent, darkish-yellow with exception of genital bulb, which is almost black; the bulb complicated, pear-shaped, and hairy. Falces darkish-yellow, shining, pubescent. Maxillae and labium dark yellow, shining, normal. Sternum hairy, concolorous with foregoing. Abdomen somewhat gibbous, elongate, slightly overhanging base of cephalothorax, arched, pubescent, dark-brown, nearly black; superior surface ornamented at the middle with a bright, silvery, diamond-shaped design, in the centre of which is a distinct black spot; surface furnished with fine long hairs. Type, I. 11518.

MONETA AUSTRALIS Keys. (N.I.)

(Pl. xxviii, figs. 28, 29.)

Three specimens of this species were obtained—two immature females and one mature male. Up to the present time the female only has been known, the male is therefore described hereunder.

♂ Cephalothorax, 1·3 mm. long, 1 mm. broad; abdomen, 1·8 mm. long, 1 mm. broad.

Cephalothorax similar in colour, form, and marking to female. Eyes also as in the female. Legs long, tapering, yellow, with smoky-brown annulations. Relative lengths, 1, 2, 4, 3. Palpi long, fine, yellow, genital bulb large, complicated, hairy. Maxillae, labium, and sternum, similar to female. Abdomen elongate, truncated in front, not overhanging base of cephalothorax, slightly arched, sides parallel for two thirds their length, then rapidly narrowing off and terminating obtusely; superior surface yellow, with dark-brown markings and furnished with two small, white tubercles in front; inferior surface yellowish-grey.

MONETA VARIABILIS sp. nov. (L.H.I.)

(Pl. xxviii, figs. 30-34.)

♂ Cephalothorax, 1.2 mm. long, 1 mm. broad; abdomen, 2.8 mm. long, 1.3 mm. broad.

Cephalothorax ovate, yellow, with smoky patches, obtuse in front, sides well rounded, thoracic groove distinct. Pars cephalica arched, sloping forward; ocular area occupying almost entire width of cephalic segment; clypeus narrow. Pars thoracica broad, arched, radial grooves present but indistinct; marginal band narrow. Legs long, yellow, with smoky annulations, tapering, very finely pubescent. Relative lengths, 1, 4, 2, 3. Palpi as long as cephalothorax, concolorous with legs, finely pubescent, genital bulb large, pear-shaped, complicated, hairy. Falces pale yellow, small, weak, parallel. Maxillae concolorous with foregoing, arched, short, wide at base, apices attenuated and strongly inclined inwards. Labium concolorous with maxillae, longer than wide, arched, apex attenuated and truncated. Sternum pale yellow, lateral angles smoky-yellow, very slightly arched, pubescent, elliptical, briefly attenuated in front, posterior extremity broadly obtuse, and terminating between fourth pair of coxae. Abdomen elongate, arched, anterior angle strongly indented, not overhanging base of cephalothorax, widest just beyond the middle, from whence it narrows off, terminating obtusely; superior surface and sides yellowish-grey, spotted and streaked with yellow-brown; inferior surface pale-yellow, laterally with faintly distinct darker yellow markings; at the middle there is a large, smoky-yellow patch; this latter commences immediately below the rima epigasteris and terminates in an acute point in front of spinnerets; the area in front of the rima epigasteris is smoky-yellow also, with paler lateral and median marks; in addition to these there is a somewhat large and prominent black median spot; petiole pale yellow.

♀ Cephalothorax, 1.5 mm. long, 1.1 mm. broad; abdomen, 3.5 mm. long; anterior angle, 1.1 mm. broad; breadth at widest point, 2.1 mm.

Cephalothorax, falces, maxillae, labium and sternum, similar to those of the male. Eyes as in the latter. Legs long, concolorous with those of the male, but proportionately shorter. Relative lengths, 1, 4, 2, 3. Palpi short, weak, concolorous with legs. Abdomen not overhanging cephalothorax, narrow in front, where it is deeply indented, ascending to just beyond the middle, where it is much the broadest, and from whence it narrows off, terminating in an obtuse point; arched, sides declivous; superior surface creamy-yellow, reticulated with yellow-brown; running down the middle for about one-half its length there is a broad median bar, the outline of which is

uneven; in addition to this there are some dark markings and spots, whilst the highest point is surrounded by a small tubercular eminence; sides creamy-yellow, reticulated with yellow brown; inferior surface dull yellow-grey down the median line, flanked with irregular black markings; laterally cream-yellow, reticulated with yellow-brown. Epigynum small, slightly raised, and having two somewhat pear-shaped pits.

Several specimens were obtained, in various stages of development. Mature forms, however, differ in size and in intensity of colouration, the abdomen in some instances having very large black patches. Type, I. 11519.

THERIDION ALBOSTRIATUM L. Koch. (N.I.)

THERIDION EXTRILADUM Keys. (N.I.)

THERIDION MUNDULUM L. Koch. (L.H.I.)

THERIDION PROPERUM Keys. (L.H.I. and N.I.)

This is a most variable species in colour, ornamentation, and size. Some of the specimens agree exactly with Keyserling's description and figures, while others are so dark that the median abdominal marking is lost. Then, again, others have the prominent median abdominal marking edged with snowy-white in addition to scattered lateral white patches. The variation is so great that no two examples are exactly alike. The male, of which only one specimen was collected, has the cephalothorax yellow, with dark longitudinal band as figured in the female by Keyserling; the legs and palpi are yellow with fuscous annulations, and the abdomen has the median patch edged with black, and then with snowy-white; the sides are grey with black and white markings. Some of the specimens were immature.

THERIDION NIGRODECORATUM sp. nov. (L.H.I.)

(Pl. xxviii, figs. 35-37.)

♀ Cephalothorax, 1·8 mm. long, 1·4 mm. broad; abdomen, 2·3 mm. long, 1·7 mm. broad.

Cephalothorax obovate, yellow, with a dark brown median bar running from ocular area to median fovea, pubescent. Pars cephalica arched, pubescent, thoracic groove distinct; ocular area broader than long; clypeus narrow. Pars thoracica strongly arched, radial grooves and median fovea distinct, lateral and posterior angles pencilled with dark brown; marginal band yellow. Eyes normal. Legs moderately long, yellow, tapering, hairy, armed with long, fine spines. Relative lengths, 1, 4, 2, 3. Palpi long, similar in colour, clothing and armature to legs. Falces rather long, yellow, arched, parallel;

fang, short, weak. Maxillae yellow, normal. Labium concolorous with fore-going, longer than broad, obtusely truncated. Sternum shield-shaped, yellow, very slightly arched, hairy, and terminating in an obtuse point between fourth pair of coxae. Abdomen large, hairy, strongly arched, obovate, overhanging base of cephalothorax; superior surface and sides, dull-yellow, ornamented with black markings; inferior surface yellow-grey. Epigynum a small, slightly elevated eminence, with two lateral, elliptical pits.

Two specimens were collected, both from the same immediate locality, the summit of Mount Gower. From these examples it would appear that the species is variable, as in one the black abdominal markings are interrupted, while in the other they are almost complete, by anterior, posterior, and lateral yellow-grey markings and spots. Type, I. 11520.

THERIDION TEPIDARIORUM C. Koch. (N.I.)

THERIDION DIVERSIPES sp. nov. (N.I.)

(Pl. xxviii, fig. 38; xxix, figs. 39-42.)

♂ Cephalothorax, 1 mm. long, 0.7 mm. broad; abdomen, 1.3 mm. long, 0.7 broad.

Cephalothorax ovate, yellow, clouded with fuscous. Pars cephalica arched, smooth, obtuse in front, thoracic groove distinct; ocular area broad, occupying nearly the entire width of the front; clypeus narrow. Pars thoracica strongly arched, moderately broad, radial grooves and median fovea distinct; marginal band narrow. Legs yellow, long, tapering; the first pair are much the longest, and have the femora enormously developed; each is clothed with long fine hairs, and armed with short, fine spines. Relative lengths, 1, 2, 4, 3. Palpi short, yellow, hairy, genital bulb small, pear-shaped, complicated. Falces short, concolorous with legs, weak. Maxillae and labium concolorous also. Sternum shield-shaped, yellow, shining, slightly arched, and terminating obtusely between fourth pair of coxae. Abdomen oval, slightly overhanging base of cephalothorax, strongly arched, pilose, yellow, ornamented laterally by two short, rather broken, slightly curved bands, which commence in front, and terminate midway; between these bands there are several irregularly formed silvery spots; at posterior extremity there is a large black patch, wavy in outline, and broadest in front; sides and inferior surface yellow.

♀ Cephalothorax, 1.2 mm. long, 0.9 mm. broad; abdomen, 1.6 mm. long, 1 mm. broad.

Cephalothorax ovate, yellow, smooth, not suffused with fuscous as in the male, to which in all other respects, except the slight difference in size, it is

similar. Eyes as in the male. Legs long, yellow, tapering, hairy, armed with short fine spines. Relative lengths, 1, 4, 2, 3. Palpi short, similar in colour and armature to foregoing. Falces, maxillae, labium and sternum as in the male. Abdomen ovate, arched, slightly overhanging base of cephalothorax, yellow, pubescent; superior surface ornamented with white and fuscous patches; sides and inferior surface yellow. Epigynum slightly raised, oval, and having two large circular discs; the latter ringed with black, and situated close together.

Three examples of this species were collected—two males and one female. One of the former has lost its anterior pair of legs. Judging by the specimens before me the male at any rate is variable in its abdominal decoration. In one example there is a large and prominent black patch at the posterior extremity of the abdomen, while in the other it is absent, and has in its place a broken, wavy transverse bar. The outstanding feature in the perfect male is the greatly developed femora of the first pair of legs. Type, I. 11521.

THERIDION EPICOSMUS sp. nov. (L.H.I.)

(Pl. xxix, figs. 43, 44.)

♀ Cephalothorax, 1 mm. long, 0·8 mm. broad; abdomen, 2 mm. long, 1·6 mm. broad.

Cephalothorax ovate, smooth, yellow, with a broad median fuscous band running the entire length. Pars cephalica arched, obtuse in front, thoracic groove distinct; ocular area broad, occupying nearly the entire width of the front; clypeus narrow. Pars thoracica strongly arched, radial grooves and median fovea distinct; marginal band narrow. Legs moderately long, tapering, yellow, clothed with fine hairs, and armed with fine, short spines. Relative lengths, 1, 4, 2, 3. Palpi short, similar in colour, clothing, and armature to legs. Falces yellow, arched, parallel, rather long; fang, short, weak. Maxillae and labium yellow. Sternum shield shaped, yellow, shining, arched, terminating obtusely between fourth pair of coxae, moderately clothed with fine pubescence. Abdomen ovate, overhanging base of cephalothorax, pilose, brown, superior surface and sides marked with snow-white; inferior surface greyish-yellow. Epigynum a small, transverse, slightly raised plaque, having two elliptical pits, the upper extremities of which meet. Type, I. 11522.

CYLOGNATHUS SUBTILIS L. Koch. (L.H.I.)

ULESANIS ROTUNDA Keys. (L.H.I.)

(Pl. xxix, fig. 45.)

Four specimens of what I take to be the above species were collected, two males and two females. Keyserling's example came from Peak Downs,

Queensland, and was a female. The island form, while differing somewhat in abdominal ornamentation, appears specifically inseparable from Keyserling's species. The male is described as follows:

♂ Cephalothorax, 0.6 mm. long, 0.5 mm. broad; abdomen, 1.1 mm. long, 1 mm. broad; total length, 1.6 mm.

Cephalothorax obovate, reddish brown, with a dark median band running the entire length; thoracic segment distinct. Pars thoracica ascending, strongly arched, obtuse; ocular area broader than long, and occupying entire width of cephalic segment; clypeus deep. Pars thoracica strongly arched, broad. Eyes in two rows of four each, the anterior series being strongly recurved, and the posterior procurved; lateral pairs small, and nearly contiguous. Legs short, strong, yellow, with dark-brown annulations, pubescent. Relative lengths, 1, 4, 2, 3. Palpi short, similar in colour and clothing to legs; genital bulb very large, nearly round, complicated. Falces small, arched, vertical, yellowish; fang long. Maxillae concolorous with foregoing, short, arched, narrow, apices inclining inwards, and nearly touching. Labium also concolorous, short, broad, semicircular. Sternum shield-shaped, broad, concolorous with labium, shining, attenuated posteriorly, and continued between fourth pair of coxae. Abdomen broad, nearly round, overhanging base of cephalothorax, hairy, indented in front, coriaceous, moderately arched, reddish-brown with several large and prominent black spots, the superior surface and sides distinctly impressed with numerous depressions or punctures.

From *Kentia* palms.

ULESANIS CHELYS L. Koch. (L.H.I.)

An adult female and several immature examples from the summit of Mount Gower.

LATRODECTUS HASSELTII Thor. (L.H.I.)

TENTANA GROSSA C. Koch. (N.I.)

FAMILY ARGIOPIDAE.

NERIENE (?) ANALIS Sim. (L.H.I.)

Both sexes were collected, and these are alike both in size and colour. I think there can be little doubt that the examples are identical with Simons species. In fact, the only difference in the forms before me and that of Simons is that the former have the abdomen somewhat darker than the type.

BATHYPHANTES HUMILIS sp. nov. (L.H.I.)

(Pl. xxix, figs. 46-48.)

♂ Cephalothorax, 0.6 mm. long, 0.4 mm. broad; abdomen, 1 mm. long, 0.5 mm. broad.

Cephalothorax obovate, smooth, dull yellow. Pars cephalica strongly arched, narrowest in front, segmental groove distinct; ocular area occupying almost total width of cephalic segment; clypeus narrow. Pars thoracica broad, strongly arched, radial grooves and median fovea distinct; marginal band narrow. Eyes in two rows of four each, the anterior row being recurved and the posterior procurved; anterior median eyes minute and separated from each other by a space equal to about once their individual diameter, and again from their lateral neighbours by the same space. Legs long, moderately strong, tapering, yellow, hairy, armed with short weak spines. Relative lengths, 1, 4, 2, 3. Palpi moderately long, not strong, pubescent, concolorous with legs; genital bulb large, complicated. Maxillae and labium concolorous with foregoing. Sternum cordiform, slightly longer than wide, yellow-brown, shining. Abdomen ovate, arched, slightly overhanging base of cephalothorax, pubescent, yellow-brown.

♀ Cephalothorax, 0.8 mm. long, 0.6 mm. broad; abdomen, 1.2 mm. long, 1 mm. broad.

Cephalothorax obovate, but more obtuse in front than in the male, which latter it resembles in every other particular. Eyes and legs as in the male. Palpi short, similar in colour and armature to male. Falces concolorous with palpi, arched, moderately long, coniform, apices divergent. Sternum concolorous with foregoing, broadly cordate. Abdomen ovate, pubescent, overhanging base of cephalothorax, strongly arched, yellow-brown. There is present on the upper surface, though only faintly discernible a longitudinal yellowish bar, and three or four transverse chevrons; sides concolorous, inferior surface yellowish-grey. Epigynum a large and prominent reddish-brown, nearly semi-circular plaque, with a short, somewhat tongue-like process.

Sieved from fallen leaves. There is a slight variation noticeable among the female examples, some being darker and smaller than the others. A few immature examples were among the material collected. Type, I. 11523.

LINYPHIA PHAEOCHORDA sp. nov. (N.I.)

(Pl. xxix, figs. 49, 50.)

♀ Cephalothorax, 1.4 mm. long, 1 mm. broad; abdomen, 2.5 mm. long, 1.6 mm. broad.

Cephalothorax obovate, yellow, smooth. Pars cephalica obtuse in front, ascending, strongly arched, thoracic groove distinct; ocular area broader than long; clypeus deep. Pars thoracica broad, strongly arched, radial grooves and median fovea distinct; marginal band broad. Eyes large, arranged in two rows of four each; anterior row noticeably recurved, rear row straight, lateral eyes conjoined. Legs not long, tapering, yellow, hairy, armed with long, fine spines. Relative lengths, 1, 4, 2, 3. Palpi concolorous with legs, moderately long, and similar to them in armature and clothing. Falces long, strong, conical, arched, yellow, upper ridge armed with four strong teeth, and the lower with five; fang long. Maxillae and labium yellow, but rather darker than falces. Sternum concolorous with foregoing, shield-shaped, and terminating obtusely between fourth pair of coxae. Abdomen ovate, strongly arched, hairy, overhanging base of cephalothorax, yellow-brown, superior surface marked with a median dusky bar, and chevrons. Epigynum a large, moderately arched, dark brown transversely wrinkled plaque having two circular pits.

I place this species with the genus *Linyphia* for the present, although the legs, owing to their shortness, would seem to exclude it. Type, I. 11524.

TETRAGNATHA NITENS Aud. (N.I.)

TETRAGNATHA (?) PANOPEA L. Koch. (L.H.I.)

A number of specimens in various stages of development were collected, and they agree fairly well with Koch's description and figures. The species is evidently somewhat variable.

TETRAGNATHA CYLINDRICA Walck. (L.H.I.)

TETRAGNATHA DEMISSA L. Koch. (L.H.I.)

TETRAGNATHA MACILENTA L. Koch. (N.I.)

META INSULARIS Keys. (L.H.I.)

Several specimens of this species were obtained from the summit of Mount Gower. It differs slightly from Koch's description and figures, but I think there can be little doubt as to its identity.

LEUCANGE CELEBESIANA Walck. (L.H.I. and N.I.)

NEPHILA FLAGELLANS L. Koch. (L.H.I.)

NEPHILA VICTORIALIS L. Koch. (L.H.I.)

CYRTOPHORA MOLUCCENSIS Dol. (N.I.)

LARINIA PHTHISICA L. Koch. (L.H.I.)

LARINIA TABIDA L. Koch. (L.H.J. and N.I.)

A dozen examples of this species were obtained from *Kentia* palms, and they show considerable variation. One immature male only was in the collection from Norfolk Island.

LARINIA DELICATA sp. nov. (L.H.I.)

(Pl. xxix, figs. 51-54.)

♂ Cephalothorax, 1.9 mm. long, 1.5 mm. broad; abdomen, 3.2 mm. long, 1.5 mm. broad.

Cephalothorax longer than broad, obovate, sparingly pubescent.

Pars cephalica arched, deeply grooved laterally; ocular area broader than long; clypeus not deep. Pars thoracica arched, deeply grooved down the middle, the groove extending from base of cephalic segment to posterior angle, radial grooves distinct; marginal band narrow. Eyes eight, disposed in three series of 2, 4, 2, black, prominent; the median group forms a trapezium, the eyes of which are of equal size; of these the anterior pair are separated from each other by a space equal to rather more than once their individual diameter, and the posterior by a space equal to rather less than the diameter of an eye; lateral eyes contiguous, and smaller than those of the median series, from which they are widely removed. Legs long, tapering, concolorous with cephalothorax, pubescent, armed with long, fine, almost black spines. Relative lengths, 1, 2, 4, 3. Palpi short, hairy, armed with three or four long, dark spines; genital bulb large, sub-globose, complicated; yellow with exception of outer angle of bulb, where it is fuscous. Falces pale yellow, pubescent, long, arched, apices slightly divergent. Maxillae and labium concolorous with falces. Sternum cordate, somewhat flat, concolorous with foregoing. Abdomen elliptical, arched, projecting over base of cephalothorax, pubescent, yellow, superior surface marked with six distinct spots, arranged in pairs; sides and inferior surface somewhat lighter in tint than the superior.

♀ Cephalothorax, 2.1 mm. long, 1.6 mm. broad; abdomen, 4.2 mm. long, 1.9 mm. broad.

Except in point of size, the sexual characters, and the ornamentation of the superior surface of the abdomen, there is little visual difference in the sexes. The anterior part of the superior surface is finely reticulated, whilst the median area is ornamented with an elongated T-shaped design, the sides of which are uneven and branched laterally near posterior extremity. In addition to this design there are three small spots in front, and three lateral pairs conforming to those of the male. Of the latter the front pair are situated

within and at the outer extremity of the cross-bar to the T. Epigynum transversely oval, with lateral pits, and a short, broad, and arched median process. Type, I. 11525.

ARANEUS VERRUCOSUS Walck. (L.H.I.)

A considerable number of specimens of this species was collected, and they display some variation.

ARANEUS VIRIDIPIES Dol. (L.H.I.)

ARANEUS NIGROPUNCTATUS sp. nov. (L.H.I.)

(Pl. xxix, figs. 55, 56.)

♀ Cephalothorax, 3.9 mm. long, 2.5 mm. broad; abdomen, 4.7 mm. long, 3.8 mm. broad.

Cephalothorax obovate, yellow, ornamented with minute black spots, some of which are isolated, and some disposed in groups. Pars cephalica strongly arched, segmental groove profound; ocular area normal; clypeus deep. Pars thoracica broad, arched, median and radial grooves distinct; marginal band yellow. Eyes black, prominent, arranged in three groups of 2, 4, 2. Of these the four comprising the median group form a trapezium, and are the largest; lateral eyes small, contiguous. Legs strong, yellow, spotted with black, tapering, pubescent, and armed with fine moderately long black spines. Relative lengths, 1, 4, 2, 3. Palpi short, strong, similar in colour and armature to legs. Falces yellow, arched, apices slightly divergent. Maxillae and labium very pale-yellow. Sternum concolorous with foregoing, shield-shaped, slightly arched, pubescent. Abdomen ovate, strongly arched, overhanging base of cephalothorax, moderately hairy, yellow, spotted with black; superior surface ornamented in front with a median longitudinal dark bar composed of large and minute dark spots, and at posterior extremity with a delicate scheme of tracery; near the middle there are two dark and moderately deep pits; sides ornamented with dark markings, and a series of large, dark spots; inferior surface pale yellow. Epigynum slightly raised, longer than broad, complicated; front part waved laterally and wrinkled transversely; posterior part broad, wrinkled laterally, and having at the centre two dark elongated pits.

Two specimens were obtained from Mount Gower and they differ in abdominal ornamentation, the fore part of the superior surface of one being free from the median longitudinal spotted bar of the other. Type, I. 11526.

GASTERACANTHA WESTRINGI Keys. (N.I.)**GASTERACANTHA (?) MASTOIDEA** L. Koch. (L.H.I.)

Three specimens of what is, possibly, this species were collected. Koch's example was immature, and, singularly, so are those collected by Mr. Lea. The smallest of the three from Lord Howe Island, agrees fairly well with the description and figure, but the larger and more matured forms are more quadrilateral, and have the posterior lateral projections or tubercles much more produced, and of a lighter colour. Mr. Lea's material may, of course, ultimately prove to be undescribed, but for the present I prefer to let the matter rest with a query. Koch's specimen came from Viti Levu.

POLTYSPENCILLATUS sp. nov. (L.H.I.)

(Pl. xxix, fig. 57.)

♀ Cephalothorax, 5.5 mm. long, 4 mm. broad; abdomen, from apex to spinnerets, 11.8 mm., breadth, 8.5 mm.

Cephalothorax ferruginous, hairy. Pars cephalica elongate, tapering, arched, obtusely acuminate in front, clothed with long yellowish hairs, thoracic groove strongly defined; ocular area rather longer than broad; clypeus narrow, deep, retreating. Pars thoracica broad, strongly arched, clothed with long yellowish hairs, deeply grooved down the middle, radial grooves strongly defined, dark brown; marginal band broad. Legs long, strong, tapering, femora ferruginous, pilose and armed with a few long, strong spines; patellae, tibiae, meta-tarsi and tarsi pilose, yellowish; inner angles of tibiae and meta-tarsi i and ii armed with numerous short, strong spines. Relative lengths, 1, 2, 4, 3. Palpi moderately long, yellow, hairy, and armed with a few short, fine spines. Falces reddish-brown, straight, arched, obtusely acuminate. Maxillae and labium with bases reddish-yellow, apices pale yellow. Sternum reddish-yellow, flat, impressed laterally, and terminating in an almost acute point between fourth pair of coxae. Abdomen gibbous, massive, pubescent, slightly overhanging base of cephalothorax; superior surface and sides golden yellow, pencilled and spotted with dark brown; anterior angle dark brown at base; surface of posterior angle uneven, impressed, and displaying a delicate scheme of tracery at lower extremity; apical extremity ridged, pencilled with dark brown; a few small tubercles are present on the apical ridge, and a few are also scattered over the superior surface. Type, I. 11527.

ARCHEMORUS CICATROSUS sp. nov. (L.H.I.)

(Pl. xxix, fig. 58.)

♀ Cephalothorax, 1.5 mm. long, 1.3 mm. broad; abdomen, 2.6 mm. long, 2.5 mm. broad

Cephalothorax longer than broad, yellow, with dark brown markings, surface shagreened and clothed with fine, white, adpressed hairs. Pars cephalica pilose, broad, arched, truncated in front, indented behind lateral eyes; ocular area broader than long; clypeus broad, deep, wavy. Pars thoracica broad, arched, radial grooves not defined; marginal band broad. Eyes arranged in three groups of 2, 4, 2, front median pair rather small, and separated from each other by a space equal to once their individual diameter; rear median pair large, seated well back, and separated from each other by a space equal to fully twice their own individual diameter; side eyes small, contiguous, and placed at the extremity of lateral angles. Legs short, strong, yellow, annulated, moderately hairy, tibiae and metatarsi i and ii armed on their inner angles with long, strong spines. Relative lengths, 1, 2, 4, 3. Palpi short, stout, yellow, moderately hairy, and armed with a few small, strong spines. Falces short, strong, arched, dark brown. Maxillae short, stout, rather longer than broad, arched, yellow, inner angles straight. Labium concolorous with foregoing, short, broad, arched, obtusely triangular. Sternum cordate, dark brown, almost flat, and terminating in an obtuse point between fourth pair of coxae. Abdomen yellowish-brown, overhanging base of cephalothorax, broad in front where it is highest and strongly arched, retreating laterally and sloping towards posterior extremity, where it terminates in two large, slightly reflexed and coniform lateral tubercles, and one small median one; in front there are cicatrose marks, some of which are moderately large, and some very small; two small yellow tubercles are also present; from the centre and running down the middle there is a keel or ridge which later widens out suddenly towards its posterior extremity, thence it retreats inwards, and terminates in a somewhat acute point; immediately in front of each lateral terminal tubercle there is a small yellow nodule; inferior surface dark brown down the middle, relieved by four distinct yellow spots; sides yellow, relieved by dark brown spots and pencillings; there are also, on each side, two prominent, pale yellow nodules, one towards the middle, and one near spinnerets.

Several specimens were obtained, and these show considerable colour variation. In the younger examples the posterior terminal lateral tubercles are not nearly so pronounced as those of the more mature forms. Type, I. 11528.

DOLOPHONES (?) PELTATA Keys. (L.H.I.)

FAMILY THOMISIDAE.

THARPYNA SPECIOSA sp. nov. (L.H.I.)

(Pl. xxix, figs. 59-62.)

♂ Cephalothorax, 1.4 mm. long, 1.3 mm. broad; abdomen, 1.7 mm. long, 1.3 mm. broad.

Cephalothorax dark brown, rather flat, sides steep. Pars cephalica truncated, segmental groove not defined; ocular area broader than long, occupying entire width of cephalic segment, fringed with rather long hairs, clypeus tawny, broad, deep. Pars thoracica broad, radial grooves not defined; marginal band broad. Eyes black, mounted on yellowish tubercles. Legs long, moderately strong, hairy, armed with long and slender spines; femur i dark brown, flecked with yellow, all other joints of leg i smoky-yellow; legs ii, iii, and iv., pale yellow; relative lengths, 1, 2, 3=4. Palpi short, dark brown, hairy; genital bulb moderately large, dark brown above, yellowish underneath, complicated. Falces concolorous with cephalothorax. Maxillae large, robust, base and sides dark brown, apices yellowish. Sternum cordate, flat, smooth, dark brown, terminating in a somewhat acute point between fourth pair of coxae. Abdomen obovate, hairy, not overhanging base of cephalothorax, superior surface dark brown, ornamented with creamy-white markings and surrounded by a creamy-white band; sides dark brown; inferior surface dull yellowish, margined laterally and apically with an irregular band of dark brown.

♀ Cephalothorax, 1.6 mm. long, 1.4 mm. broad; abdomen, 2.5 mm. long, 2.2 mm. broad.

Cephalothorax flat, sides steep, shining, dark brown, ornamented with yellow lateral markings. Pars cephalica broad, segmental groove yellow; ocular area broader than long, and occupying entire width of caput; clypeus broad, deep, yellow, thinly fringed with long black hairs. Pars thoracica broad, sides steep, radial grooves yellow, interrupted; marginal band, broad, dark brown. Legs long though relatively shorter than those of the male, hairy, and armed with long, fine black spines. Leg i has the femur shining dark brown, the upper angle flecked with creamy-white, and ringed with same at junction of patella; patella dark, shining, brown, and ringed with creamy-white at junction of tibia; tibia dark, shining brown, not ringed with white; meta-tarsi and tarsi reddish-brown; leg ii has the femur pale straw-yellow above, dark brown underneath, and ringed at junction of patella with a band of dark brown, and then one of creamy-white; patella dark brown, ringed with creamy-white at junction of tibia; tibia yellowish-brown above, dark

brown beneath; metatarsus and tarsus yellow brown; legs iii and iv straw-yellow, ringed with creamy-white at junction of patella, tarsus, and metatarsus, respectively; tarsus iv straw-yellow. Relative lengths, 2, 1, 4, 3. Palpi short, strong, yellow, similar in clothing and armature to legs. Falces concolorous with cephalothorax. Maxillae and labium concolorous with falces. Sternum cordate, rather flat, surface shining dark brown, straw-yellow laterally, and terminating obtusely between fourth pair of coxae. Abdomen broadly obovate, slightly overhanging base of cephalothorax, moderately arched, fringed with a few rather long, fine hairs, superior surface dark brown ornamented with chalky-white markings; sides dark brown, ornamented with chalky-white pencillings and spots; inferior surface chalky-white, laterally ornamented with brown spots, median area yellow-brown. Epigynum, a small faintly discernable plaque with two moderately large shallow pits, the outer angles of which are fringed with long hairs.

A number of examples of this pretty little spider were obtained, and very little, if any, variation in colour and ornamentation is displayed. Type, I. 11529.

DIAEA ALBICERIS L. Koch (L.H.I.)

DIAEA RUBROPUNCTATA sp. nov. (L.H.I.)

(Pl. xxix, figs. 63-66.)

♂ Cephalothorax, 2 mm. long, 1.6 mm. broad; abdomen, 3.6 mm. long, 1.3 mm. broad.

Cephalothorax longer than broad, pale yellow, smooth, glabrous. Pars cephalica moderately arched, thoracic groove faintly defined; ocular area broader than long, occupying the entire width of the cephalic segment; clypeus deep. Pars thoracica broad, moderately arched, radial grooves faintly defined; marginal band broad. Eyes disposed in two rows of four each, both of which are strongly recurved; the anterior row is much the shorter, and each eye is separated from its neighbour by a space equal to rather more than once its own individual diameter, and mounted upon a small yellow tubercle; the posterior row is the more strongly recurved, and each eye is mounted upon a small greyish tubercle and ringed with yellow; the median eyes of this row are separated from each other by a space equal to fully once their individual diameter; lateral eyes widely separated. Legs yellowish-green, armed with long black spines; first and second pairs very long. Relative lengths, 1=2, 4, 3. Palpi short, similar in colour and armature to legs; genital bulb large, round, complicated. Falces moderately long, arched, concolorous with cephalothorax. Maxillae and labium straw-yellow. Sternum

concolorous with foregoing, cordate, slightly arched, apex terminating obtusely between fourth pair of coxae. Abdomen elongate, slightly overhanging base of cephalothorax, arched, truncate in front, pubescent, superior surface yellow, ornamented with numerous small red spots; inferior surface pale yellow.

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

Except in point of size and sexual modifications the male and female are in general appearance almost exactly alike. Epigynum a faintly discernible, pale yellow, almost flat, bilobed plaque, with an elliptical depression between the lobes. Type, L. 11530.

STEPHANOPSIS FISSIFRONS sp. nov. (L.H.I.)

(Pl. xxix, figs. 67, 68.)

♀ Cephalothorax, 3·7 mm. long, 3 mm. broad; abdomen, 4·5 mm. long, 3·8 mm. broad.

Cephalothorax obovate, moderately arched, pubescent, tawny-yellow, darker down the middle and laterally near posterior angle. Pars cephalica narrow, ascending, arched, cleft, and rounded at summit; ocular area broader than long; clypeus broad, deep, impressed. Pars thoracica arched, radial grooves present, but not distinct. Eyes arranged in two recurved rows of four each, and surrounding cephalic projection; anterior median eyes minute; anterior lateral eyes largest of the entire series. Legs strong, concolorous with cephalothorax, pilose; legs i and ii rugose; leg i much the strongest; tibiae and meta-tarsi i and ii armed with powerful spines; femur i tuberculate, and armed on underside with two short, strong spines; tibiae i and ii have each, on their upper angle, a small median tubercle. Relative lengths, 1, 2, 4, 3. Palpi short, strong, slightly rugose, concolorous with legs, pilose and spined. Falces concolorous with cephalothorax. Maxillae and labium also concolorous. Sternum oval, impressed laterally, tawny-yellow, hairy. Abdomen pilose, overhanging base of cephalothorax, anterior angle excavated, wavy, truncated, narrower than thoracic segment; surface impressed, rugose, becoming gradually wider to near posterior extremity, where it is dilated and produced into two lateral sub-acute points, tawny-yellow with dark brown markings; posterior angle declivous, transversely wrinkled; sides slightly rounded, concolorous, wrinkled longitudinally and obliquely, rugose; inferior surface concolorous also, flecked with dark brown spots, and having, in addition, immediately below the rima epigasteris a broad, transverse, dark

brown band which latter is uneven in outline, and deepest in the middle. Epigynum an indented, slightly arched plaque with two lateral pits.

A large number of specimens, the majority of which were immature, were obtained. Some were sieved from fallen leaves, and others from *Kentia* palms. Three were obtained from the summit of Mount Gower, and one from Mount Lidgbird. Type, I. 11531.

CLUBIONA VENATORIA sp. nov. Rainb. and Pull. (L.H.I.)

(Pl. xxix, fig. 69.)

♀ Total length, 9 mm.

Cephalothorax uniform dark reddish-brown, nearly smooth, truncate-pyriform, moderately elevated with well-marked dark central line extending from eye area nearly to posterior margin. Eye area not elevated, occupies more than three-fourths of frons; posterior laterals larger than posterior medians, the four equidistant and forming an apparently straight line. Falces concolorous, clothed with fine dark hairs, tridentate; fang attenuate, darker than falces. Legs warm reddish-brown, clothed with few dark stiff hairs. Palpi similarly coloured and armed. Maxillae pale, small, ovoid, fringed with white hairs along inner margins. Labium small, square, concolorous. Sternum round, ovoid, well pointed behind, hardly sinuate, pale yellow clothed with fine black depressed hairs. Petiole well marked in type. Abdomen long, ovoid, uniform pale olive without pattern. Spinnerets of darker shade. Lung sacs well marked.

CLUBIONA ASBOLODES sp. nov. Rainb. and Pull. (L.H.I.)

(Pl. xxix, fig. 70.)

♀ Total length, 5.5 mm.

Cephalothorax pale amber, smooth and almost polished except for a few darker depressed hairs at the posterior margin; longer than broad; pars cephalica elevated, short, dark, central foveal line in posterior third. Maxillae rhomboidal, pale amber, clothed thinly with dark hairs. Labium half length of maxillae, dark reddish-amber, nearly smooth. Sternum broad, ovate, sinuate, with marginal clothing of fine depressed dark hairs. Legs concolorous with, but paler than cephalothorax; sparsely armed with dark spines. Palpi similar in colour and armature to ambulatory limbs. Eyes occupying three-fourths of widths of pars cephalica, forming a narrow transverse crescent, which shows up darkly against the amber coloured background. Abdomen ovoid, covered densely with fine depressed bronze-coloured hairs with a metallic

sheen. Lower surface similarly clothed with lighter hairs, paler still on either side of the epigynum.

CLUBIONA DECORA sp. nov. Rainb. and Pull. (L.H.I.)

(Pl. xxix, figs. 71, 72.)

♀ Total length, 6 mm.

Cephalothorax reddish-brown, strongly and uniformly convex, sparsely clothed with fine hairs. Median fovea short, black, situate far back. Frons not elevated. Anterior median, and anterior and posterior lateral eyes forming a flattened procurved arch; all nearly equal in size and equidistant. The anterior and posterior laterals appear to be connected by a dark line. Posterior median eyes the largest and about twice their own diameter apart. Falces dark reddish-brown, clothed with stiff whitish hairs. Maxillae pale reddish-brown, markedly constricted in the middle. Labium square, concolorous, but darker than maxillae and half as long. Sternum pale yellow with dark sinuate margin, ovoid, truncate in front, pointed behind. Coxa and femur paler than sternum, remaining joints darker and armed with stiff black spines. Palpi concolorous with ambulatory limbs. Abdomen ovoid, with almost imperceptible clothing of fine iridescent hairs, greenish-grey or olive coloured with well defined dorsal pattern in black. Under surface uniform, olive tint throwing dark epigynal area into marked relief. Spinnerets small, lemon-coloured, with two diverging lines of short black hairs spreading half way up the abdomen.

CHIRACANTHIUM CRUCIGERUM sp. nov. (N.I.)

(Pl. xxx, figs. 73, 74.)

♀ Cephalothorax, 2.5 mm. long, 2.1 mm. broad; abdomen, 4.5 mm. long, 2.6 mm. broad.

Cephalothorax yellow, smooth, shining. Pars cephalica high, well arched, segmental groove distinct, two short, fine dark brown lines extend from rear of hinder median eyes to near the middle; clypeus narrow, inclined inwards. Pars thoracica broad, radial grooves shallow, finely pencilled with dark brown; marginal band narrow. Eyes in two rows of four each; the posterior median eyes are sensibly the largest of the group; lateral eyes of both rows just touching each other; front row slightly recurved, and the rear slightly procurved; each eye surrounded by a black ring. Legs concolorous with cephalothorax, fine, yellow, tapering, thinly clothed with fine hairs; spines weak. Relative lengths, 1, 2, 4, 3. Palpi rather long, concolorous with legs.

sparingly clothed with fine hairs, tarsal joint stoutest. Falces yellow, arched, tapering; inferior margin of each falx armed with three teeth, and the inferior with two. Maxillae long, yellow, arched, glossy, deeply constricted near the base. Labium concolorous, arched, longer than broad. Sternum concolorous also, somewhat shield-shaped, arched, shining, sides indented and uneven, apex acuminate. Abdomen large, ovate, arched, very slightly overhanging base of cephalothorax, finely pilose; superior surface dullish-yellow relieved with bright-yellow spots; at the middle there is a faintly discernible cruciform impression; sides and inferior surface dull yellow. Epigynum as in figure. Type, I. 11532.

CHIRACANTHIUM EXCAVATUM sp. nov. (N.I.)

(Pl. xxx, figs. 75-78.)

♀ Cephalothorax, 4.1 mm. long, 3.2 mm. broad; abdomen, 6.8 mm. long, 4.8 mm. broad.

Cephalothorax yellow, smooth, shining, truncated in front. Pars cephalica arched, segmental groove distinct, two short, finely pencilled lines extend from rear of posterior median eyes to near the middle, where they meet; clypeus narrow. Pars thoracica arched, radial grooves distinct, marginal band narrow, pale yellow. Eyes in two rows of four each, the front being slightly recurved, and the rear moderately procurved; lateral eyes just touching; the anterior and median pairs form a trapezium. Legs straw-yellow, fine, long, tapering, sparingly pilose, weakly spined; meta-tarsus and tarsus finely scopulated. Relative lengths, 1, 2, 4, 3. Palpi concolorous with legs, fine, moderately pilose, tarsus scopulated. Falces concolorous with cephalothorax, robust; tapering, apices dark brown; at the base of each falx there is a prominent coniform protuberance, from the extremity of which a distinct channel or excavation extends the entire length; inferior ridge of the furrow of each falx armed with three teeth, and the superior with two. Maxillae straw-yellow, long, arched, sharply constricted near base. Labium yellow, dark laterally, arched, longer than broad, apex excavated. Sternum shield-shaped, arched, smooth, straw-yellow, pencilled with dark brown laterally. Abdomen ovate, arched, overhanging base of cephalothorax, superior surface dull yellow, flecked with white spots at the middle, where there is also a faintly discernible scheme of tracery; sides and inferior surface dull yellow. Epigynum a simple tongue-like plaque. Spinnerets yellow; superior pair longest, cylindrical, very fine, biarticulate, apical segment shortest; inferior pair coniform, robust. Type, I. 11533.

?CHIRACANTHIUM PALLIDUM sp. nov. (L.H.I.)

(Pl. xxx, figs. 79-82.)

♂ Cephalothorax, 2.7 mm. long, 2.4 mm. broad; abdomen, 3.2 mm. long, 1.8 mm. broad.

Cephalothorax obovate, arched, pale yellow, pilose. Pars cephalica narrow in front, truncated, arched, slightly raised, segmental groove distinct; clypeus narrow. Pars thoracica broad, radial grooves distinct; median stria short; marginal band narrow. Eyes black with pearl-grey centres, of almost equal size, in two rows of four each; front row slightly recurved, and the rear slightly procurved. Legs long, tapering, not strong, concolorous with cephalothorax, moderately pilose, armed with fine, long, smoky-brown spines; meta-tarsus and tarsus finely scopulated. Relative lengths: 1, 2, 4, 3. Palpi concolorous with legs, and similar to them in clothing and armature, moderately long; tibial segment furnished with a small apophysis; tarsus coniform, spiral as in figure. Falces moderately long, robust, concolorous also, shining; inferior ridge of the furrow of each falx armed with three teeth, and the superior with two. Maxillae very pale, almost white, arched, rather long, slightly constricted near the base. Labium concolorous with foregoing, arched, apex straight, not much longer than broad. Sternum concolorous also, shield-shaped, rather broad. Abdomen ovate, not overhanging base of cephalothorax, arched, superior surface and sides concolorous with cephalothorax, inferior surface concolorous with sternum.

♀ Cephalothorax, 3.2 mm. long, 2.4 mm. broad; abdomen, 4 mm. long, 2.4 mm. broad.

Cephalothorax ovate, pale yellow, smooth, shining, arched. Pars cephalica moderately high, sloping forward, truncated in front, segmental groove faintly distinct; clypeus narrow. Pars thoracica narrow, radial grooves faintly indicated; median stria very short; marginal band narrow. Eyes black with pearl-grey centres, in two rows of four each; front row slightly recurved, and the rear slightly procurved. Legs long, weak, tapering, concolorous with cephalothorax, moderately pilose, armed with long but weak smoky-brown spines; scopula smoky-brown. Relative lengths, 1, 2, 4, 3. Palpi not long, similar in colour, clothing, and armature to legs. Falces concolorous with cephalothorax, stout at base, tapering; inferior ridge of the furrow of each falx armed with three and the superior with two teeth. Maxillae long, arched, club-shaped, constricted at base, pale yellow, almost white. Labium concolorous with foregoing, long, arched, apex slightly excavated. Sternum concolorous with labium, long, narrow, arched, shining, shield-shaped. Ab-

domen ovate, arched, not overhanging base of cephalothorax, finely pilose, pale yellow, almost white; no design on superior surface. Epigynum simple, with two elliptical discs.

The species described above will, no doubt, ultimately have to be placed in a new genus, as both sexes display certain peculiarities. In the male, for instance, the labium should be longer; its tarsal segment is not strictly in accord with other species of the genus. Then in respect of the female the sternum is rather narrow, and the armature of the legs too pronounced, the spines being not only longer, but unusually numerous. Type, I. 11534.

CHIRACANTHIUM GILVUM L. Koch (L.H.I.)

Four immature examples of what is, in all probability, this species.

DORYMETAECUS gen. nov.

Cephalothorax obovate, arched, broad, narrow in front. Pars cephalica sloping forward, not higher than thoracic segment; segmental groove faintly distinct; clypeus narrow. Pars thoracica broad, radial grooves defined; median stria short but well defined. Eyes in two rows of four each; eyes of rear row larger, both rows close together. Legs long, strong; tibiae and meta-tarsi i and ii armed with long and strong spines; legs i and ii stoutest; relative lengths, 4, 1, 2, 3. Palpi short. Falces weak. Maxillae short, stout, somewhat constricted near base, apices inclined inwards. Labium short, broadest at base, apex rounded. Sternum cordate, terminating obtusely between fourth pair of coxae. Abdomen ovate. Spinnerets short biarticulate; superior pair slightly the longer, cylindrical, apical segment short; inferior pair stout, coniform, apical segment minute.

This genus would appear to fall between groups Miturgeae and Zorae. The meta-tarsi and tarsi are devoid of scopula, but the tibial and metatarsal segments of legs i and ii are heavily and powerfully spined. The cephalothorax is broad, obovate and well arched, and the lateral margins reflexed; the segmental and radial grooves are faintly distinct, and the thoracic stria short, but well defined. The eyes in two rows of four each, those constituting the posterior series being the larger. The maxillae are rather short, stout, and inclined inwards, and the labium short, broad at the base and uniform. The sternum is broad, arched, cordate, and terminates in a somewhat acute point between the fourth coxae. The superior spinnerets are fine, short, cylindrical, and biarticulate; the inferior pair are also biarticulate, and are short, stout, and coniform.

DORYMETAECUS SPINNIPES sp. nov. (L.H.I.)

(Pl. xxx, figs. 83-87.)

♀ Cephalothorax, 1.5 mm. long, 1 mm. broad; abdomen, 2.1 mm. long, 4 mm. broad.

Cephalothorax obovate, broad, well arched, yellow, with two dark-brown wavy lines behind the eyes, and with black lateral margins, close to which are smoky-brown patches. Pars cephalica not raised, sloping gently forward, narrow in front, truncated, segmental groove faintly distinct; clypeus narrow. Pars thoracica sloping rearwards, radial grooves moderately defined; median stria short, distinct, lateral margins slightly reflexed; marginal band narrow. Eyes in two recurved rows of four each, close together, rear median ones widest apart; front row shorter, close to edge of clypeus; posterior eyes larger. Legs yellow, long, robust, bespined; first and second pairs longest and strongest; tibiae i and ii armed with seven pairs of long, strong yellow spines, and meta-tarsi of same with four pairs; bases of spines large, black; spines on legs iii and iv short and weak. Relative lengths, 4, 1, 2, 3. Palpi concolorous, moderately long, armed with a few rather long spines. Falces yellow, short, arched, not strong; inferior ridge of each falx armed with two very small teeth, and the superior with two even smaller ones; fang short, weak. Maxillae short, robust, arched, yellow, apices inclined inwards, constricted near base. Labium concolorous, arched, short, broad, about as long as width of base; apex rounded. Sternum cordate, broad, yellow, arched, terminating obtusely between fourth pair of coxae. Abdomen ovate, arched, slightly overhanging base of cephalothorax, yellow; superior surface ornamented with smoky-brown markings. Epigynum a moderately large plaque, the margin of which is dark brown and raised. Spinnerets yellow, short; superior pair cylindrical, biarticulate, terminal segment shortest; inferior pair rather stout; coniform, biarticulate, apical segment minute, dome-shaped. Type, I. 11535.

On *Kentia* palms.

FAMILY AGLENIDAE.

NANNONYMPHAEUS gen. nov.

Cephalothorax obovate. Pars cephalica elongate, raised, arched, obtuse in front, segmental groove distinct; ocular area broad; clypeus narrow. Pars thoracica arched, radial grooves distinct; median stria distinct. Eyes in two rows of four each; front row recurved, and the rear procurved. Legs rather long, tapering; relative lengths, 4, 1, 2, 3. Palpi in the male moderately long, tarsal bulb simple. Falces rather strong, coniform; fangs short, weak.

Maxillae short, stout, apices inclined inwards. Labium longer than broad, somewhat coniform, apex truncated. Sternum large, nearly round, not impressed, terminating abruptly between fourth pair of coxae, where it is distinctly truncated; posterior coxae wide apart. Abdomen ovate, arched; posterior spiracle seated slightly in front of spinnerets. Spinnerets elongate, cylindrical, placed in a transverse row: lateral pairs only extending just beyond the tip of abdomen; apical segment of spinnerets i, ii, v, and vi long, but shorter than the basal; intermediate pair shortest of the series, their apical segment minute and dome-shaped.

NANNONYMPHAEUS PUSILLUS sp. nov. (L.H.I.)

(Pl. xxx, figs. 88-91.)

♂ Cephalothorax, 1 mm. long, 0.6 mm. broad; abdomen, 1.5 mm. long, 1 mm. broad.

Cephalothorax obovate, yellow, lateral margins nearly white, arched. Pars cephalica elongate, raised, segmental groove distinct; ocular area broad; clypeus narrow. Pars thoracica broad, radial grooves distinct, marked laterally with smoky-brown patches; median stria distinct, marginal band narrow. Eyes in two rows of four each, the front row being slightly recurved, and the rear strongly procurved; front row of eyes contiguous but not touching; lateral pairs slightly elliptical, touching; median eyes of rear row largest of the series, and each separated from its neighbour by a space equal to that of once its own diameter. Legs rather long, yellow, tapering, first and second pairs strongest, each armed with a few weak spines. Relative lengths, 4, 1, 2, 3. Palpi similar in colour and armature to legs, tarsal segment somewhat pear-shaped; bulb simple. Maxillae short, stout, arched, yellow, apices inclined inwards. Labium dark yellowish-grey, arched, broader than long, somewhat coniform; apex slightly truncated. Sternum yellow, broad, arched, nearly round, obtusely truncated between coxae, which latter are widely separated. Abdomen ovate, arched, not overhanging base of cephalothorax; superior surface yellow-grey, relieved by smoky-brown markings; sides and inferior surface pale yellow; posterior spiracle prominent, procurved, smoky-brown, seated immediately in front of spinnerets, the latter as described above.

Taken from Kentia palms. Type, I. 11536.

FAMILY LYCOSIDAE.

LYCOSA STRENUA sp. nov. (N.I.),

(Pl. xxx, figs. 92, 93.)

♀ Cephalothorax, 7.5 mm. long, 5.5 mm. broad; abdomen, 10.6 mm. long, 6.5 mm. broad.

Cephalothorax obovate, arched, yellow-brown, with dark-brown and yellow markings, surface moderately pilose. Pars cephalica densely hairy in front, segmental groove distinct; clypeus broad. Pars thoracica broad, radial grooves feeble; median stria profound; marginal band yellowish-grey, broad. Eyes in three rows of 4, 2, 2; the four constituting the anterior row small, close together, and forming a slightly procurved line; the pair comprising the second row are the largest of the group, and are separated from each other by a space equal to that of once their own diameter; posterior pair seated well back, and widely separated from each other. Legs moderately long, yellow, femora faintly annulated with brown, hairy, and armed with long, strong spines; meta-tarsi and tarsi scopulated. Relative lengths, 4, 1, 2, 3. Palpi rather longer than cephalothorax, yellow, tibial and tarsal segments darkest, hairy, and armed with rather strong spines. Falces dark-brown, well arched, densely hairy; inferior margin of the furrow of each falx armed with three teeth. Maxillae dark reddish-brown, apices broad and inclined inwards. Labium darker than maxillae, and about one half the length of the latter, truncated, apical corners slightly rounded off. Sternum shield-shaped, slightly arched, moderately hairy, orange-yellow, margins pallid. Abdomen ovate, pilose, overhanging base of cephalothorax, arched, superior surface yellow, ornamented with an uneven, median, longitudinal bar of dark-brown which is broadest in front, and from which, again, irregular oblique lateral bars depend; median and lateral bars spotted with yellow; inferior surface yellow. Epigynum, an elliptical plaque with two elongated lateral channels, the latter curving outwards at posterior extremity. Type, I. 11537.

LYCOSA GLORIOSA sp. nov. (L.H.I.)

(Pl. xxx, figs. 94, 95.)

♀ Cephalothorax, 4 mm. long, 3.4 mm. broad; abdomen, 4.6 mm. long, 3.4 mm. broad.

Cephalothorax obovate, hairy, yellow, with dark brown markings. Pars cephalica arched, fringed in front with long black bristles, and between second and third row of eyes with a thick mat of hoary hairs, segmental groove distinct; clypeus broad. Pars thoracica broad, well arched, radial grooves faint; median stria profound; marginal band broad, yellow. Eyes in three rows of 4, 2, 2; anterior eyes small, close together, and forming a slightly procurved line; eyes of second row largest of the series, and less than once their individual diameter apart; posterior eyes widely separated. Legs moderately long, strong, yellow, annulated with dark brown, hairy, armed with

long, strong spines. Relative lengths, 4, 1, 2, 3. Palpi not as long as cephalothorax, similar in colour, clothing, and armature to legs. Falces yellow, arched, hairy; lower margin of the furrow of each falx armed with a row of three strong teeth. Maxillae arched, yellow, narrowest at base, apices broad and inclined inwards. Labium concolorous with maxillae, slightly arched, truncated, rather more than half as long as maxillae. Sternum shield-shaped, arched, hairy, yellow, margins pallid. Abdomen obovate, slightly overhanging base of cephalothorax, arched, pilose; superior surface yellow, relieved by dark-brown markings and spots; sides yellow, spotted with dark brown; inferior surface also spotted with dark brown, and having, in addition, two broad, concolorous bars extending from the rima epigasteris to near the spinnerets; these bars are uneven in outline and widest apart in front. Epigynum a transversely oval, dark-brown plaque with two oblique pear-shaped pits. Type, 1. 11538.

CYCLOSTENUS VITTATUS sp. nov. (L.H.I.)

(Pl. xxx, figs. 96-99.)

♀ Cephalothorax, 4.6 mm. long, 3.8 mm. broad; abdomen, 8.8 mm. long, 5 mm. broad.

Cephalothorax obovate, pilose, arched, yellow with dark-brown markings and pencillings. Pars cephalica parallel-sided, narrow, truncated, segmental groove distinct. Pars thoracica broad, radial grooves faintly defined; median stria profound; marginal band yellow. Eyes in two well recurved rows of four each; intermediate pair of second row larger than the anterior intermediate pair, and the largest of the group; front lateral eyes smallest of the group, elliptical and obliquely placed; posterior lateral eyes as large as the anterior medians, and widely apart; median eyes of each row separated from each other respectively by a space equal to that of fully once their own individual diameter. Legs moderately long and strong, yellow above, dark brown beneath, clothed with fine hairs, and armed with long, moderately strong spines. Relative lengths, 4, 1, 2, 3. Palpi as long as cephalothorax; concolorous with legs, hairy, and armed with long, strong spines. Falces moderately long, yellow, arched, not very strong, hairy; inferior margin of the furrow of each falx armed with two strong teeth. Maxillae short, broad, arched, furnished with a few black, bristly hairs, yellow, inner angles pallid; scopula yellowish. Labium short, broader than long, arched, truncated, parallel-sided, yellow, apex pallid; surface furnished with a few short, black bristly hairs. Sternum rounded, rather large, arched, clothed with black

bristly hairs, smoky-yellow with a clear yellow median band running down the middle for two-thirds its length, margin pallid. Abdomen oval, somewhat pentagonal, pilose, strongly arched, slightly overhanging base of cephalothorax, ascending from anterior extremity for two-thirds of its length, at which point it is widest, and from whence it narrows off and slopes somewhat precipitously towards the spinnerets; superior surface yellow, finely reticulated with yellow-brown; it is further ornamented with a broad median yellow-brown band with dark-brown wavy margins; this band commences in front and terminates at the highest and broadest point, or about one-third the distance from the spinnerets; sides yellow with yellow-brown reticulations and fine dark-brown pencillings; inferior surface chrome-yellow. Epigynum a slightly raised, somewhat coniform plaque, broadly channelled down the middle, the groove being widest towards the front, and narrowest towards the rear. Type, I. 11539.

FAMILY SALTICIDAE.

LIGONIPES FLAVIPES sp. nov. (N.I.)

(Pl. xxx, figs. 100-102).

♀ Cephalothorax, 2 mm. long, 1.3 mm. broad; abdomen, 3 mm. long, 1.5 mm. broad.

Cephalothorax rhomboidal, narrow in front and exceedingly attenuated in arrear, moderately clothed with hoary hairs. Pars cephalica flat, truncated, narrowest in front, sides declivous, dark brown, nearly black, but having a golden tinge, reddish-yellow laterally, junction of cephalic and thoracic segments indicated by a narrow but distinct depression; ocular area longer than broad, and occupying the entire length of cephalic segment; clypeus rather broad, inclined inwards. Pars thoracica dark reddish-yellow, strongly arched, uneven, sloping sharply rearwards, where it is very attenuated; marginal band narrow, dark brown, reflexed. Anterior row of eyes recurved and of unequal size, the median pair being much the largest; the pair constituting the second row minute, and seated near to their lateral neighbour of the anterior row; posterior row placed laterally, and at the extremity of the cephalic segment; they are larger than the lateral eyes of the front row. Petiolus short, broad, the superior lorum formed of two unequal segments. Legs short, pale yellow; anterior pair shortest, and the rear pair longest; tibia of legs i and ii short, and armed with three pairs of long stout spines, and the metatarsi with two pairs of long stout spines; legs iii and iv have a few rather long, fine, bristle-like spines. Relative lengths, 4, 2, 3, 1. Palpi

short, almost white. Falces yellow, and armed on the inferior ridge of the furrow of each falx with three subcontiguous teeth. Maxillae yellowish, arched, apices broad, not inclined inwards. Labium concolorous, arched, rather longer than broad, apex rounded. Sternum dark brown, shining, arched, elliptical. Abdomen oblong, oval, arched, not overhanging base of cephalothorax; smoky-brown. Epigynum a slightly raised plaque with elliptical lateral depressions, between and at the base of which there is a slightly raised transversely elliptical tubercle. Type, I. 11540.

SAITIS NIGRICEPS Keys (L.H.I.)

SAITIS TAENIATA Keys (N.I.)

SAITIS INSULANUS sp. nov. (L.H.I.)

(Pl. xxxi, figs. 103-106.)

♂ Cephalothorax, 1.7 mm. long, 1.5 mm. broad; abdomen, 2 mm. long, 1.1 mm. broad.

Cephalothorax obovate, reddish-brown, clothed with white scale-like hairs, which latter are clearly distinct when the animal is dry, and only partly visible when submerged in alcohol. Pars cephalica high, sloping gently forward, sides declivous; clypeus fringed with long white hairs. Pars thoracica sloping towards posterior angle, sides declivous. Front row of eyes slightly recurved, large with brilliant green reflections; anterior median pair largest: the pair constituting the second row minute, and placed much closer to rear eyes (which latter are as large as the anterior laterals) than to those of the front row; all eyes ringed with black, and surrounded by hoary hairs. Legs yellowish, robust, and armed with strong spines; anterior pair stoutest. Relative lengths, 1, 4, 2, 3. Palpi concolorous, short, hairy; tibia furnished with a small apophysis; genital bulb large, obliquely truncated at base, attenuated apically, and furnished with a short style. Falces, maxillae, and labium yellow. Sternum elliptical, brown, shining, arched, broadest at the middle. Abdomen ovate, hairy, arched, not overhanging base of cephalothorax, yellow with dark brown markings.

♀ In point of coloration and clothing the two sexes are much alike. The cephalothorax of the female is rather narrower than that of the male, and more parallel-sided. The anterior pair of legs are not nearly so robust as those of the male. The abdomen is oblong-ovate, and slightly overhanging base of cephalothorax, and its epigynum is rather horse-shoe shaped.

Examples of both sexes show some little variation in size. Type, I. 11541

JOTUS INSULANUS sp. nov. (L.H.I.)

(Pl. xxxi, figs. 107-109.)

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

Cephalothorax somewhat obovate. Pars cephalica dark brown, surrounded with golden hairs, high, gently arched, sides steep, arched, sloping gently forward; ocular area occupying nearly entire length of cephalic segment; clypeus narrow. Pars thoracica well arched, sloping rearwards, sparingly clothed with golden-yellow hairs, central space golden-brown, sides dark brown. Front row of eyes slightly recurved; intermediate pair of anterior row largest; the pair constituting the second row minute, and very nearly equidistant between first and third rows, indeed they are, if anything, slightly nearer to the latter than the former; posterior eyes smaller than the anterior laterals. Legs strong, reddish-brown, hairy, spined; first and second pairs the most robust, and armed with the largest spines; all tarsi yellow. Relative lengths, 4, 1, 2, 3. Palpi moderately long, not strong, similar in colour and clothing to legs; each tarsus furnished with a thick tuft or scopula of long, fine hairs. Falces reddish-brown, arched; inferior angle of the furrow of each falx armed with one strong tooth, and the superior with three. Maxillae reddish-brown also, apices pale yellow, arched, narrowest at base. Labium concolorous, arched, longer than broad, apex gently rounded. Sternum concolorous also, arched, longer than broad, truncated in front, widest between second pair of coxae, posterior extremity obtuse. Abdomen ovate, slightly overhanging base of cephalothorax, arched, moderately clothed with dark brown hairs; superior surface yellow, with a smoky-brown patch at posterior extremity; there are also four small, elliptical, orange-red spots arranged in pairs, one pair of which is seated near the front, and one pair at the middle, the latter being the widest apart; sides concolorous; inferior surface smoky-brown with wavy longitudinal markings. Epigynum a large, slightly raised uneven plaque with two prominent, black, slightly depressed discs at the posterior extremity.

This species is apparently subject to some variation. In one example the cephalothorax, legs, and palpi are of a much lighter colour than described above, the caput is smoky-brown, and the thoracic segment merely tinged with smoky-brown. The abdomen has a yellow, median band running down the middle, whilst the sides are smoky-brown, pencilled with yellow; the two median pairs of orange-red spots are present as in the typical form. Type, I. 11542.

OCRISIONA INVENUSTA L. Koch (L.H.I.)
OCRISIONA COMPLANATA L. Koch (L.H.I.)
CLYNOTIS GRATIOSUS sp. nov. (L.H.I.)

(Pl. xxxi, figs. 110-113.)

♂ Cephalothorax, 2.4 mm. long, 1.6 mm. broad; abdomen, 2.6 mm. long, 1.6 mm. broad.

Cephalothorax elongate, parallel-sided, reddish-brown, squamose. Pars cephalica flat, sloping very gently forward, sides declivous. Pars thoracica sloping sharply to posterior angle, sides declivous. Anterior row of eyes well recurved; of those constituting this row, the laterals are slightly smaller than their median neighbours; eyes of intermediate row minute, and situated midway between anterior and posterior rows; posterior eyes equal in size to the anterior lateral eyes; anterior eyes showing bright green reflections. Legs normal; anterior pair longest and most robust; laterally the femora are concolorous with cephalothorax, but above and below they are yellowish; the tibia has three pairs of strong spines underneath, and two pairs laterally, and the meta-tarsus two pairs underneath. Relative lengths, 1, 4, 2, 3. Palpi short, yellow, hairy; tibia furnished with an acute apophysis; bulb large. Falces concolorous with cephalothorax, short, stout, arched, not dentated; fang long, strong, well curved. Maxillae concolorous with falces, short, arched, club-shaped, apices divergent. Labium concolorous also, much longer than broad, arched, glabrous, apex rounded. Sternum oblong-ovate, arched, yellow, moderately hairy, attenuated in front. Abdomen elliptical, slightly overhanging base of cephalothorax, arched, pilose; superior surface and sides greyish with dark markings; inferior surface greyish.

♀ Cephalothorax, 2.4 mm. long, 1.6 mm. broad; abdomen, 3.1 mm. long, 1.8 mm. broad.

Cephalothorax elongate, almost parallel-sided. Pars cephalica high, fuscous, sloping gently forward, clothed with hoary hairs, sides declivous. Pars thoracica reddish-yellow, suffused with fuscous, pubescent, sloping sharply to posterior angle, sides declivous. Eyes as in male. Legs not long, similar in colour, clothing and armature to male, anterior pair moderately robust. Relative lengths, 1, 4, 2, 3. Palpi short, yellow, hairy. Falces short, arched, stout, yellowish; one small tooth on inferior margin but none on superior. Maxillae reddish-yellow, club-shaped, arched. Labium longer than broad, fuscous, arched, apex rounded, and fringed with long hairs. Sternum somewhat shield-shaped, arched, fuscous, truncated in front, posterior extremity acuminate. Abdomen ovate, arched, slightly overhanging

base of cephalothorax, similar in colour and ornamentation to male. Epigynum rather large and broad, and having two somewhat pyriform plaques, between which there is at the base a somewhat oval tubercle.

From the summit of Mount Gower. Type, I. 11543.

HYPOBLENUM ALBOVITTATUM Keys (L.H.I.).

PALPELIUS DEARMATUS Thor. (L.H.I.)

CYTAEA CLAROVITTATA Keys (L.H.I.)

CYTAEA ALBURNA Keys (L.H.I.)

PLOTIUS ?CHRYSOSTEMUS Keys (L.H.I.)

TRITE LONGULA Thor. (L.H.I.)

TRITE CONCINNA sp. nov. (L.H.I. and N.I.)

(Pl. xxxi, figs. 114-119.)

♂ Cephalothorax, 1·8 mm. long, 1·3 mm. broad; abdomen, 2·2 mm. long, 1·3 mm. broad.

Cephalothorax elongate, slightly narrowed in front, fuscous with golden-yellow design on caput, and clothed with hoary hairs. Pars cephalica flat, sloping forward, sides declivous. Pars thoracica sloping sharply rearward, sides declivous. Front row of eyes well recurved, not touching, median pair much the largest; those of the second row minute, and placed nearer to lateral anteriors than to posterior eyes; the latter rather large. Legs short, robust; anterior pair much the stoutest and fuscous; second, third, and fourth pairs yellow with fuscous annulations. Relative lengths, 4, 1, 2, 3. Palpi yellow, short, moderately hairy; patella shorter than tibia; apophysis acuminate; bulb long, obtuse, bilobed, apex fringed with long hairs. Falces short, arched, apices divergent, inferior angle of the furrow of each falx armed with a single, simple tooth; two small teeth present on superior margin. Maxillae dark-brown, arched, shining, uneven, apices broad, inner and outer angles obtuse. Labium concolorous, arched, longer than broad, surface uneven. Sternum concolorous also, shining, elongate, attenuated in front, posterior extremity obtuse. Abdomen oblong-ovate, slightly overhanging base of cephalothorax, arched, superior surface grey with dark-brown markings; sides concolorous; inferior surface with dark-brown down the middle, creamy-white laterally, reticulated with dark-brown. Spinnerets dark-brown.

♀ Cephalothorax, 2·5 mm. long, 1·9 mm. broad; abdomen, 2·7 mm. long, 1·9 mm. broad.

Cephalothorax obovate, clothed with hoary hairs, reddish-brown with bright yellow patch at summit, within which there are two dark-brown spots. Pars cephalica flat, sloping gently forward, sides declivous. Pars thoracica broad, sloping sharply to posterior extremity, sides declivous. Eyes similar to male. Anterior pair of legs robust, yellow, suffused with fuscous; legs ii, iii and iv yellow with fuscous annulations. Relative lengths, 1, 4, 2, 3. Falces reddish-brown, strong, arched, apices divergent; inferior ridge of the furrow of each falx fissidentate, and the superior bidentate; fang long. Maxillae and labium concolorous with foregoing; similar to male. Sternum smoky-yellow, shining, attenuated in front, broadest between second and third pairs of coxae; posterior extremity obtuse. Abdomen slightly overhanging base of cephalothorax, arched; typical examples broadly ovate, others elongate-ovate; superior surface and sides yellow, ornamented with median and lateral dark-brown markings; inferior surface dull-yellow down the middle, dark-brown laterally, pencilled with yellow. Epigynum broad, with large elliptical discs, at the summit of each of which there is, in addition, a small spherical one.

This species appears to be somewhat common. It is variable in colour, ornamentation and size. Some examples are broad and obese; others, even when matured, narrow and attenuated. The cephalothoraces, male and female, whilst varying in size and width, have the same characteristic colouring and ornamentation, though in some examples the yellow patch with dark markings on the cephalic segment is very suggestive of a skull and cross-bones. Again the abdomen is either ovate or oblong-ovate, and differs considerably in tint and ornamentation. Some examples are chalky-white on the superior surface with a median scheme of delicate yellowish tracery, and yellowish reticulations; the sides are also chalky-white with yellowish reticulations and pencillings, whilst the underside has a broad median longitudinal band of yellowish-grey, and is chalky-white laterally with yellowish reticulations. Type, I. 11544.

OPISTHONCUS BITAENIATUS L. Koch. (L.H.I.)

OPISTHONCUS SERRATO-FASCIATUS Keys. (L.H.I.)

OPISTHONCUS DELECTABILIS sp. nov. (L.H.I.)

(Pl. xxxi, figs. 120-122.)

• Cephalothorax, 3.1 mm. long, 2.2 mm. broad; abdomen, 3.1 mm. long, 1.6 mm. broad.

Cephalothorax broad, moderately long, ovate, sides well rounded. Pars cephalica high, convex, sloping forward, shining, dark-brown with golden

reflections, clothed with long dark hairs, sides declivous. Pars thoracica broad, sloping sharply to posterior extremity, clothed with hoary hairs, median area yellow, posterior area fuscous. Legs yellow, clothed with dark hairs and armed with long, strong, dark spines, coxae and trochanters pallid; legs i and ii robust. Relative lengths, 4, 3, 1, 2. Palpi short, hairy, coxa, trochanter, femur and patella pallid; tibia and tarsus yellow; tibia furnished with an acutely pointed apophysis; bulb elongate, obtuse. Falces yellow, arched; inferior ridge of the furrow of each falx furnished with one broad, wedge-shaped tooth; only one small isolated tooth visible on superior ridge; fang, short, strong. Maxillae club-shaped, arched, lateral angles obtuse, pale yellow, inner angles pallid. Labium rather longer than broad, arched, yellow, apex pallid; at the base there is, on each side, an oblique groove, shaped somewhat like an isosceles triangle. Sternum pallid, elongate, arched, attenuated in front. Abdomen oval, slightly overhanging base of cephalothorax, arched, hairy, yellow; superior surface and sides pencilled with dark-brown; posterior extremity obtusely acuminate; inferior surface pale-yellow, unmarked. Spinnerets yellow, hairy, cylindrical. Type, ♀, 11545.

SIMAETHA TENUIDENS Keys. (N.I.)

PSEUDOMAEVIA gen. nov.

Cephalothorax elongate, flat, sides curved, somewhat declivous. Pars cephalica elongate, narrow in front. Pars thoracica short, narrowest posteriorly. Eyes in three rows of 4, 2, 2. Front row recurved, contiguous, lateral eyes smaller than the medians, second row minute, and placed nearest to anterior row; third row placed well back, and larger than the anterior laterals. Anterior pair of legs robust and armed with powerful spines; no spines on legs ii, iii, and iv. Relative lengths, 1, 4, 2, 3. Palpi short, not strong; genital bulb simple. Falces short, strong, arched; inferior margin of each falx fissidentate. Maxillae club-shaped, elongate. Labium elongate, narrow, coniform. Sternum elongate, narrow, truncated in front, acuminate posteriorly; lateral angles excavated in front, and at rear to receive anterior and posterior coxae. Abdomen elongate.

PSEUDOMAEVIA COGNATA sp. nov. (L.H.I.)

(Pl. xxxi, figs. 123-127.)

♂ Cephalothorax, 4.2 mm. long, 2.5 mm. broad; abdomen, 5.4 mm. long, 2.3 mm. broad.

Cephalothorax elongate, ovate, flat, reddish-brown. Pars cephalica not raised, truncated in front, where it is decidedly narrowest, sides declivous, two dark patches midway between front and rear eyes; eyes surrounded with black, segmental groove distinct. Pars thoracica smooth, retreating toward posterior angle, sides declivous; marginal band narrow, black. Front row of eyes recurved, median pair largest of the series; those of the intermediate row minute, and placed rather closer to anterior lateral eyes than the posterior pair; rear eyes larger than anterior laterals; eyes surrounded by long hoary hairs. Legs concolorous with cephalothorax, except tarsi ii, iii, and iv, which are yellow; anterior pair stout, and longer than the fourth, and armed with powerful spines; other legs not spined; each leg clothed with cilia; third pair slightly shorter than second. Relative lengths, 1, 4, 2, 3. Palpi concolorous with legs, ii, iii, and iv, short, weak, sparingly hairy; genital bulb small, simple; tibial segment with an apophysis at its apex. Falces short, stout, concolorous with cephalothorax, arched, apices divergent; inferior margin of each falx fissidentate; the superior armed with three large teeth. Maxillae concolorous with falces, elongate, club-shaped, arched. Labium concolorous also, elongate, slightly arched, apex somewhat concave. Sternum yellow, smooth, elongate, slightly arched, truncated in front, acuminate posteriorly. Abdomen elongate, cylindrical, arched, slightly overhanging base of cephalothorax, pubescent; superior surface and sides yellow with brownish lateral markings; inferior surface yellowish grey with a broad, somewhat undulating smoky-brown median band running the entire length. Spinnerets yellow, short, coniform, compactly grouped. Type, I. 11546.

Explanation of Plates xxviii to xxxi.

Plate xxviii.

Fig.			Fig.		
1.	<i>Dinopis insularis</i>	Rainb.	20.	<i>Storena leucosema</i>	Rainb. eyes
2	" "	" abdomen	21	" "	" abdomen
3.	<i>Menneus trinodosus</i>	" "	22.	" "	" epigynum
4	" "	" epigynum	23.	" <i>colossea</i>	" "
5.	<i>Amaurobius frequens</i>	" "	24	" "	" eyes
6.	" "	" epigynum	25.	" "	" epigynum
7.	<i>Oonops leai</i>	" "	26.	<i>Argyrodes gemmata</i>	" palpus
8	" "	" eyes	27.	" "	" abdomen
9.	<i>Ariadna montana</i>	" "	28.	<i>Moneta australis</i>	Keys
10	" "	" eyes	29.	" "	" palpus
11.	<i>Drassodes signatus</i>	" "	30.	<i>Moneta variabilis</i>	Rainb.
12	" "	" eyes	31.	" "	" palpus
13	" "	" maxillae and labium	32.	" "	" "
14	" <i>excavatus</i>	" eyes	33.	" "	" abdomen
15.	" "	" maxillae and labium	34.	" "	" epigynum
16.	<i>Adelphodrassus inornatus</i>	" "	35.	<i>Theridion nigrodecoratum</i>	" "
17	" "	" eyes	36.	" "	" var. abdomen
18	" "	" epigynum	37.	" "	" epigynum
19.	<i>Storena leucosema</i>	" "	38.	" <i>diversipes</i>	" "

Plate xxix.

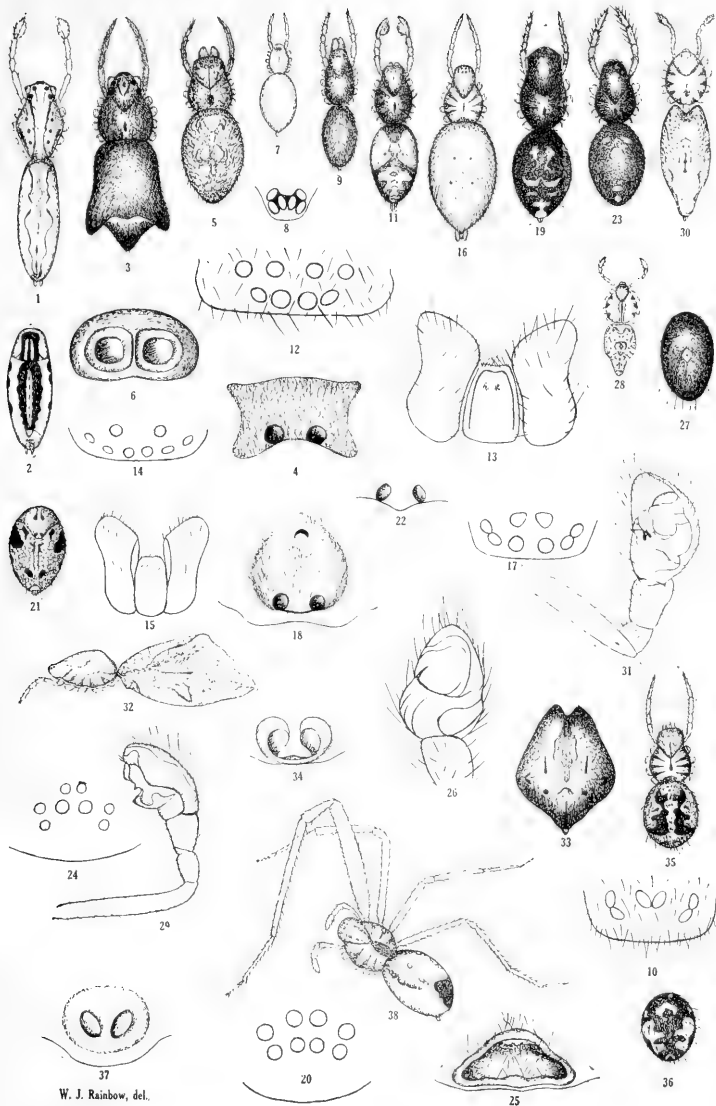
39.	<i>Theridion diversipes</i>	Rainb.	palpus	56.	<i>Araneus nigropunctatus</i>	Rb.	epigynum
40.	" "	" "	var.	57.	<i>Polytes pencillatus</i>	" "	
41	" "	" "	" "	58.	<i>Archemorus cicatrosus</i>	" "	
42.	" "	" "	epigynum	59.	<i>Tharpyna speciosa</i>	" "	abdomen
43	" <i>epicosmus</i>	" "	" "	60.	" "	" "	palpus
44.	" "	" "	epigynum	61.	" "	" "	" "
45.	<i>Ulesanis rotunda</i>	Keys	" "	62.	" "	" "	epigynum
46.	<i>Bathypantes humilis</i>	Rainb.	" "	63.	<i>Diaea rubropunctata</i>	" "	" "
47	" "	" "	palpus	64.	" "	" "	palpus
48.	" "	" "	epigynum	65.	" "	" "	" "
49.	<i>Linyphia phaeochorda</i>	" "	" "	66.	" "	" "	epigynum
50.	" "	" "	epigynum	67.	<i>Stephanopsis fissifrons</i>	" "	" "
51.	<i>Larinia delicata</i>	" "	" "	68.	" "	" "	epigynum
52.	" "	" "	palpus	69.	<i>Clubiona venatoria</i>	Rb. & Pull.	" "
53.	" "	" "	" "	70.	" <i>asbolodes</i>	" "	epigynum
54	" "	" "	epigynum	71.	" <i>decora</i>	" "	abdomen
55.	<i>Araneus nigropunctatus</i>	" "	" "	72.	" "	" "	epigynum

Plate xxx.

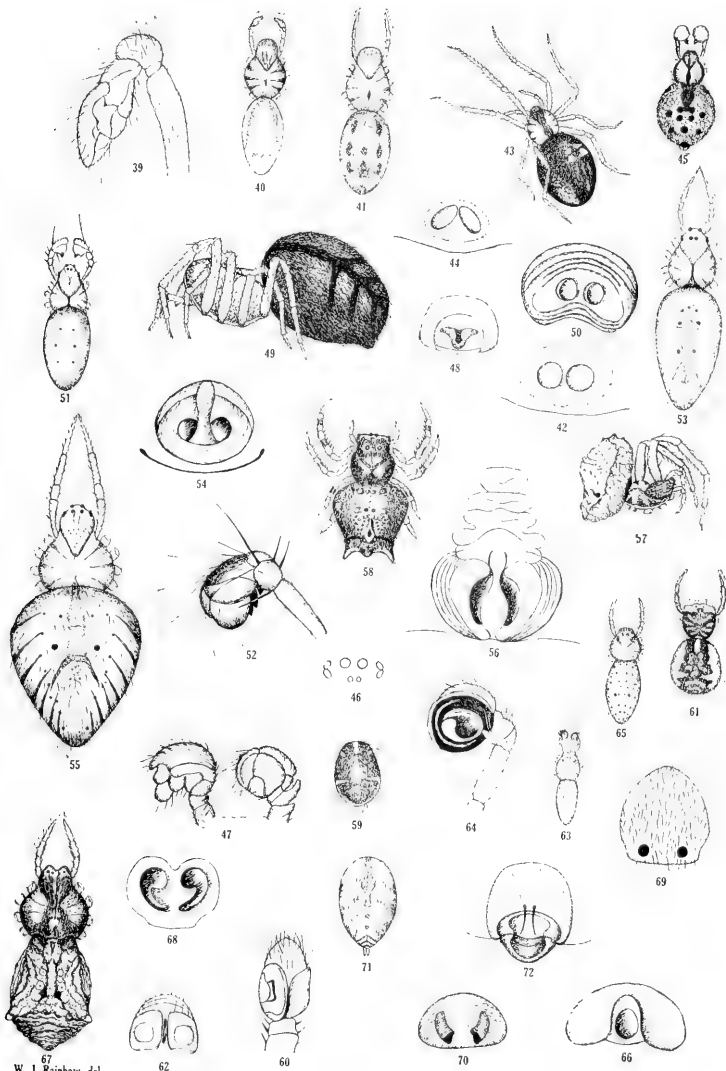
73. <i>Chiracanthium crucigerum</i> Rainb.		88. <i>Naunonymphaeus pusillus</i> Rainb.	
74. epigynum		89. eyes	
75. .. excavatum ..		90. palpus	
76. falx		91. spinnerets.	
77. epigynum		92. <i>Lycosa strenua</i> ..	
78. abdomen		93. epigynum	
79. .. pallidum .. eyes		94. .. gloriosa ..	
80. palpus		95. epigynum	
81. eyes		96. <i>Cycloctenus vittatus</i> ..	
82. epigynum		97. eyes	
83. <i>Dorvmetaeus spinnipes</i> ..		98. abdomen	
84. eyes		99. epigynum	
85. tibia and metatarsus		100. <i>Ligonipes spinnipes</i> ..	
86. maxillae and labium		101. front row of eyes	
87. epigynum		102. epigynum	

Plate xxxi.

103. <i>Saitis insulanus</i> Ramb.		117. <i>Trite concinna</i> Rainb	
104. abdomen		118. fissentate tooth	
105. epigynum		119. epigynum	
106. epigynum		120. <i>Opisthoncus delectabilis</i> ..	
107. <i>Jotus insulanus</i> ..		121. palpus	
108. epigynum		122. falces, maxillae and labium	
109. var.			
110. <i>Clynotis gratusus</i> ..		123. <i>Pseudomaevia cognata</i> ..	
111. palpus		124. cephalo-thorax	
112. epigynum		125. palpus	
113. epigynum		126. falx	
114. <i>Trite concinna</i> ..		127. maxillae, labium and sternum	
115. palpus			
116. maxillae and labium			



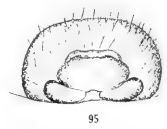
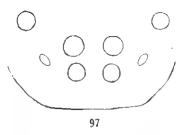
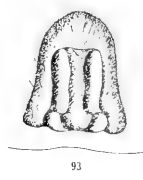
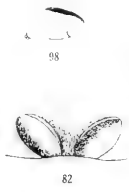
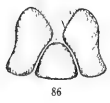
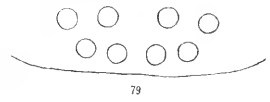
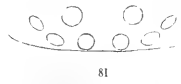
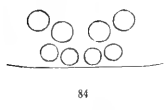
W. J. Rainbow, del.



W. J. Rainbow, del.

ARACHNIDA.





74
Hazel Howe, del.

ARACHNIDA.



103



104



105



108



111



106



107



109



110



117



112



113



114



115



117'



116



119



121



125



120



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123



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124

Hazel Howe, del.

ARACHNIDA.

ON AUSTRALIAN COLEOPTERA.

BY ARTHUR M. LEA, F.E.S., ENTOMOLOGIST, S.A. MUSEUM.

FAMILY BYRRHIDAE

PART II.

Plate xxxii.

SINCE the date of the publication of my catalogue of the Australian Byrrhidae (1) only two new species of the family have been described, namely:

Microchaetes bryophilus Lea, Proc. Linn. Soc. N.S. Wales, xxxvi, 1911, p. 462.

Chelonarium australicum Lea, Rec. S. Aust. Mus. i, 1918, p. 87, pl. i, fig. 3.

In January, 1918, Mr. H. J. Carter and I paid considerable attention to moss in the western parts of Tasmania, and obtained several new and beautiful species of *Pedilophorus*, and other moss-frequenting species; these are herein described, together with other members of the family. Of the total species now known almost half have only been taken in Tasmania, but this can be simply because moss has been worked to a greater extent there than on the mainland; when it has been more fully examined in New South Wales and Queensland, many additional beautiful species of the family will doubtless be recorded.

The Australian genera, disregarding some of the more certain but less easily seen characters, may be thus distinguished:

- A. Eyes concealed with head at rest *Microchaetes*
- AA. Eyes not concealed
 - B. Head entirely concealed from above *Chelonarium*
 - BB. Head not entirely concealed from above
 - C. Mandibles concealed with head at rest
 - a. Base of prothorax and of elytra
 - strongly sinuous *Byrrhinus*
 - aa. Base less strongly sinuous *Linnichus*
 - CC. Mandibles not concealed with head at rest
 - D. Apterous *Pedilophorus*
 - DD. Winged
 - E. Eyes very prominent *Aspidiphorus*
 - EE. Eyes but little prominent *Morychus*

(1) Lea, Trans. Ent. Soc., 1907, pp. 135-146.

MICROCHAETES FASCICULARIS Macl.

Microchaetes solidus Blackb.

There was a specimen in the Blackburn collection standing under the name of *Microchaetes solidus*, although the type, now in the British Museum, was noted as unique in his collection; but there was no specimen labelled as *Microchaetes fascicularis*, probably indicating that he had discovered that the specimen he formerly had so named, and *Microchaetes solidus*, were synonymous, as appears to be the case.

MICROCHAETES MINOR King.

Mr. B. A. Feuerheerd and I obtained fairly numerous specimens of this species at Lucindale (South Australia); those in perfect condition usually have numerous feeble spots of grey or whitish scales on the elytra, and similar scales on the sides of the prothorax, on one specimen there are two distinct discal spots on the prothorax. King described the tarsi as tetramerous, but they are really pentamerous, although it is necessary to examine them under a fairly high power, in a good light, to see the joints clearly; the fourth is small and closely applied to the fifth.

MICROCHAETES BRYOPHILUS Lea.

Mr. Carter and I took numerous specimens of this species from moss at Strahan (Tasmania); when the moss was examined over white paper scarcely any were found, but when it was thrown aside the specimens were seen clinging to the paper.

MICROCHAETES SPHAERICUS Hope.

Microchaetes coloratus Blackb., var.

Microchaetes nigrovarius Blackb., var.

Numerous specimens from Lucindale, Mount Lofty, Mount Compass, Port Lincoln, and Kangaroo Island (South Australia), and some cotypes from Adelaide, appear to indicate that *Microchaetes nigrovarius*, as well as *Microchaetes coloratus*, can only be regarded as varietal forms of *Microchaetes sphaericus*; the fascicles vary greatly in number, are frequently numerous, well-defined, and extend to the seventh interstice, or they may be split up into abundant but mostly isolated setae; or there may be a few fascicles, not extending beyond the fifth or even the third interstice; on the pronotum the setae are nearly always isolated, even when abundant, but occasionally there are a few loosely compacted fascicles on it.

MICROCHAETES TUBERCULATUS sp. nov.

Black, some parts obscurely reddish. Densely covered with muddy-brown scales and fascicles.

Head (when at rest) immersed in prothorax with eyes, mouth parts and antennae concealed. *Prothorax* strongly sculptured, about four times as wide as long. Length, 4—4.25 mm.

Hab. South Australia: Penola, Gawler, Mount Lofty, under stones, logs and dried cowdung (A. M. Lea). Type, I. 10707.

About the size and at first glance somewhat the appearance of *Microchaetes fascicularis*, but the sides of the prothorax turn upwards, the sub-basal fascicles are supported on conspicuous tubercles, and on abrasion the punctures are seen to be different. The fascicles are larger, more sharply defined and regular than on any other known species of the genus, this being due mostly to the fact that they are supported on larger and more regular tubercles. Many specimens are so encrusted with mud that all or most of the clothing is concealed, and it is difficult to remove the mud without some of the clothing. Even the largest punctures are normally concealed, but scales have been almost completely abraded from several specimens, and these are seen to have the head with crowded and rather coarse punctures; the prothorax with somewhat coarser punctures, and with a series of four strong equi-distant tubercles, transversely placed near the base; the apex has two more obtuse tubercles (the fascicles crowning these before abrasion are shorter and more loosely compacted than the sub-basal ones), and each side has a slightly upturned ridge, appearing as a long loose fascicle; the scutellum is small but distinct, sometimes concealed before abrasion; the elytra have series of large deep punctures, and the interstices are densely punctate; the fascicles are supported by distinct tubercles and short ridges, of which those about the summit of the apical slope are larger than the others; the under-surface and legs have crowded punctures, somewhat smaller than on the prothorax. There is a large sub-circular cavity, but with somewhat sinuous outlines, common to each side of the prosternum, mesosternum and metasternum, in which the front and middle legs and the antennae are received when at rest; when the legs have been forced out of the cavity a small portion of the eye becomes visible, and the antennae may be seen almost touching the side. The antennae are thin and reddish, with a small, loose, three-jointed and darker club. The outlines of the elytra are more or less sinuous.

MICROCHAETES SETOSUS sp. nov.

Black, some parts obscurely brownish. Densely clothed with muddy brown and whitish scales, with numerous thin upright setae, in places compacted to form feeble fascicles.

Head gently convex, with crowded concealed punctures. *Prothorax* more than thrice as wide as long, sides strongly and almost evenly narrowed from base to apex; with crowded and rather small, normally concealed punctures. *Elytra* almost evenly convex, with sides rather strongly rounded; with rows of large, deep, concealed punctures. *Under-surface* with crowded punctures, scarcely larger on metasternum than on adjacent coxae. Length, 3.5 mm.

Hab. Western Australia: Cue, from a nest of *Odontomachus coriarius* (H. W. Brown). Type (unique), I. 10708.

The type being unique and in good condition it has not been specially abraded for description, but several parts were partly abraded when it was acquired. The clothing of the head and prothorax is of an almost uniform pale muddy-brown, on the elytra there are numerous pale spots, giving the surface a speckled appearance. The setae are stiff and erect, and thinner than on the other larger species of the genus, they do not form fascicles on the prothorax, and but few and feeble ones on the elytra; on each of these there is an oblique one at the summit of the apical slope on the second interstice (this is the most distinct of all, but even it is small), two feeble ones on the third interstice, before and about the middle, and two or three on the fifth, beyond the middle. In Blackburn's table the species would be associated with *Microchaetes nigrovarius*, from which it differs in its fewer fascicles, and by the considerably longer setae; on that species the setae are shorter, thicker and usually subclavate.

MICROCHAETES HYSTRICOSUS sp. nov.

Black, some parts obscurely reddish. With dense muddy-brown clothing, mixed with numerous long erect setae, in places condensed into loose fascicles.

Head gently convex; punctures dense and normally concealed. *Prothorax* almost four times as wide as long, apex less than half the width of base; punctures normally concealed. *Elytra* with sculpture concealed. *Under-surface* with crowded concealed punctures. Length, 2.3 mm.

Hab. Tasmania: Strahan, in moss (A. M. Lea). Type (unique), I. 10711.

Intermediate in size between the larger and smaller species of the genus, with the erect setae unusually long and numerous. The clothing is so dense as to entirely conceal the derm, the prothorax is without fascicles, but on each elytron the long setae are condensed into three or four loose ones on each interstice; on abrasion the elytra are seen to have narrow punctures in moderately deep striae, and to have the fascicles supported by tubercles, but of these the only distinct one on each elytron is the one crowning the summit of the apical slope.

BYRRHINUS Mots.⁽²⁾**BYRRHINUS PUNCTIPENNIS** Macl. (formerly **TRINODES**).

Transferred by Arrow⁽³⁾ to the Byrrhidae from the Dermestidae. Macleay described the elytra as "coarsely punctured in irregular rows"; on the basal half of the elytra the punctures are very irregular on the sutural half, but towards the sides the rows of large punctures become almost regular; they greatly decrease in size posteriorly. In addition to the type locality the species occurs at Cairns, South Johnstone River, Little Mulgrave River (Queensland), Darwin (Northern Territory), and Upper Ord River (North-western Australia); and it varies in size from 2.25 to 3.5 mm.

BYRRHINUS NOCTIVAGUS sp. nov.

Dark piceous-brown, sometimes almost black; under-surface and legs of a dull red, antennae dull red, but apical half more or less infuscated. Moderately densely clothed with short, sub-depressed, pale pubescence, becoming denser and more depressed on abdomen.

Head with rather dense and minute punctures, becoming crowded in front. *Prothorax* more than thrice as wide as long, sides strongly and evenly rounded; with dense and rather small, but sharply defined punctures. *Elytra* almost parallel-sided to beyond the middle, outlines continuous with those of prothorax, base strongly trisinate; with rows of fairly strong punctures in shallow striae, becoming smaller posteriorly, interstices with dense and small punctures. *Under-surface* with dense and minute punctures. Length, 1.8—2 mm.

Hab. Queensland: Cooktown, Mulgrave River (H. Hacker), Mackay (C. French from R. E. Turner), Cairns, Rockhampton (A. M. Lea); Northern Territory: Darwin (N. Davies); North-western Australia; Port George the Fourth (J. R. B. Love). Type, I. 10712.

A comparatively narrow oblong-elliptic species, which is frequently attracted to lights. The antennae are moderately long and the apical joints are compressed so that from some directions they appear thinner than the preceding ones, and from other directions wider.

Variety A. Eleven specimens, all from Queensland, differ in being slightly larger, upper-surface uniformly reddish, and seriate punctures of elytra smaller.

BYRRHINUS PUBIVENTRIS sp. nov.

Black, shining; most of under-surface obscurely diluted with red, legs, palpi and basal half of antennae of a dull red. Upper-surface glabrous, except for

(2) Mots., *Etud., Ent.*, 1858, p. 50; Arrow, *Ann. Mag. Nat. Hist.*, iv (ser. 8), 1909, p. 195.

(3) Arrow, *Ann. Mag. Nat. Hist.*, xv (Ser. 8), 1915, p. 450.

sparse pubescence on head, sides of prothorax and tips of elytra; abdomen and sides of sterna with dense pubescence.

Head with moderately dense and small, but sharply defined punctures at base, becoming crowded in front. *Antennae* rather long and thin. *Prothorax* almost four times as wide as long, sides strongly rounded and finely margined; punctures as on base of head. *Scutellum* triangular; with distinct punctures. *Elytra* with gently rounded sides continuous with those of prothorax; with dense and rather coarse punctures on sutural half to about the middle, elsewhere with minute ones. *Under-surface* with crowded and rather small but sharply defined punctures. Length, 3.5 mm.

Hab. North-western Australia: Upper Ord River (R. Helms). Type, I, 10713.

A rather wide, elliptic species, closely allied to *Byrrhinus punctipennis*, but the elytral punctures not in distinct rows, and becoming very minute on the basal sides, as well as beyond the middle. The specimens are possibly somewhat abraded, but the clothing is alike on the three specimens under examination.

LIMNICHUS AUSTRALIS Er.

This species is widely distributed, as specimens before me, many of which were attracted to lights, are from Launceston (Tasmania), Blue Mountains (New South Wales), Brisbane, Mount Tambourine, Dalby, Gayndah, Cairns (Queensland), Port George the Fourth (North-western Australia), and Lucindale (South Australia); these range from 2 to 2.5 mm. in length.

Var. 1. Some specimens differ in being considerably smaller (1.25—1.6 mm.), but I can find no other differences between them and normal specimens. They are from Cairns, Stewart River (Queensland), and Darwin (Northern Territory).

Var. 2. Some specimens are slightly wider than the typical form, but of the same average length, and have denser clothing, some of which is waved on the elytra, as on many species of small hairy *Coccinellidae*. They are from Gayndah, Cunnamulla, Cairns (Queensland), Junction of the Fitzroy and Margaret Rivers (North-western Australia), Murray River (South Australia), Mulwala and Albury (New South Wales).

Var. 3. A specimen from Longreach (Queensland) appears to have the elytral clothing multimaculate, this appearance being mainly due to its waviness, as the spots vary from almost every point of view. In size and shape it is like var. 2, but the elytral punctures are certainly much finer than on any other specimen of the species before me. Possibly it represents a distinct but allied species.

Two other specimens from Dalby (Queensland) combine the small size of var. 1, with the denser clothing of var. 2.

LIMNICHUS CASTANEUS sp. nov.

Castaneous, antennae palpi and tarsi flavous. Rather densely clothed with short, pale, sub-depressed pubescence.

Head with dense, small punctures. Antennae rather long and thin. *Prothorax* about four times as wide as long, sides strongly rounded and much wider at base than at apex, base with a scutellar lobe but otherwise almost straight; punctures much as on head. *Scutellum* narrow, highly polished and impunctate. *Elytra* with sides gently rounded and continuous with those of prothorax; punctures about base less crowded than on prothorax, and slightly larger, elsewhere smaller and less crowded. *Under-surface* with crowded and small punctures, less distinct on middle of metasternum than elsewhere. Length, 2.75—3.25 mm.

Hab. Queensland: Mount Tambourine (A. M. Lea), Cairns district (F. P. Dodd). Type, I. 10714.

An oblong-elliptic species, with elytra about six times the length of prothorax, and unusually narrow scutellum; some specimens are darker than others, and the abdomen is usually paler than the rest of the under surface.

LIMNICHUS ATER sp. nov.

Black, palpi and parts of antennae and of legs more or less reddish. Moderately clothed with ashen pubescence of two kinds; short and depressed, and slightly longer and semi-erect; under-surface with dense, depressed pubescence.

Head with rather small and crowded punctures. Eyes prominent. Antennae thin. *Prothorax* more than thrice as wide as long, strongly convex in front, sides finely margined and much wider at base than at apex, middle with an obtuse scutellar lobe, hind angles acute; punctures rather dense and small, becoming subsperate at sides and apex. *Scutellum* rather short and triangular. *Elytra* almost parallel-sided to beyond the middle, outlines subcontinuous with those of prothorax; with dense and small punctures. *Under-surface* with crowded and small punctures. *Legs* long and thin. Length, 2.5—2.75 mm.

Hab. Northern Queensland (Blackburn's collection). Type, I. 10715.

About the size and with outlines much as in *Limnichus castaneus*, but darker, eyes more prominent, situation of base of elytra more pronounced (although much less than in *Trinodes punctipennis*), and clothing different. On abrasion the prothorax and elytra are seen to have larger, but still small, punctures, scattered amongst the others, but they are not seriate in arrangement.

LIMNICHUS ELLIPTICUS sp. nov.

Black, parts of antennae and of legs obscurely reddish. Rather densely clothed with depressed ashen pubescence, slightly paler on under than on upper-surface.

Head with small, dense punctures. Antennae rather long and thin. *Prothorax* almost four times as wide as long, sides strongly rounded, hind angles almost rectangular, scutellar lobe feeble; punctures minute. *Elytra* with sides moderately rounded, and continuous with those of prothorax; with dense and small punctures, indistinct before abrasion but sharply defined after, nowhere seriate in arrangement. *Under-surface* with scarcely visible punctures on metasternum, and very small elsewhere. Length, 1.25—1.4 mm.

Hab. Queensland: Hamilton—Upper North Pine, January, 1890 (C. J. Wild). Type, I. 10716.

A small elliptic species, about the size of the small variety of *Limnichus australis*, but decidedly narrower and with uniform clothing. The legs are almost entirely black.

ASPIDIPHORUS HUMERALIS Blackb.

The elytra of this species vary from a dingy light-brown almost to black, but the shoulders are always conspicuously paler than the adjacent parts. It was described from Tasmania, but extends to Queensland.

ASPIDIPHORUS GLOBOSUS Macl. (formerly **TRINODES**).

The general appearance of this species is as that of a small dark *Aspidiphorus humeralis*, without the pale shoulders; it may be readily distinguished from all other species before me by the elytral punctures, these being mostly in geminate series. One of the specimens was sieved from rotting leaves at Mount Tambourine, and others are from Dalby (Queensland) and Sydney (New South Wales).

ASPIDIPHORUS NIGRICLAVUS sp. nov.

Pale castaneous, club of antennae blackish. Moderately clothed with depressed, whitish pubescence.

Head with numerous but mostly concealed punctures. Antennae short; club large and three-jointed. *Prothorax* strongly transverse, sides strongly narrowed from base to apex; with dense and minute punctures. *Elytra* scarcely longer than wide, sides and apex strongly rounded; with rows of conspicuous punctures in shallow striae, the interstices minutely punctate. *Metasternum* rather strongly convex and (except at base) impunctate in middle; with rather

coarse crowded punctures at sides. Basal segment of *abdomen* with fairly dense, sharply defined punctures, the other segments each with a distinct basal row. Length, 1.5—1.75 mm.

Hab. Queensland: Cairns (Macleay Museum and E. Allen). Type, I. 10704.

A small subglobular species, in size and shape close to *Aspidiphorus humeralis*, but body uniformly pale, and elytral punctures comparatively coarse. There are many smaller specimens (1.05—1.25 mm.) before me, but I can find no other structural differences between them and the larger ones.

ASPIDIPHORUS HOWENSIS sp. nov.

Black, with a slight bronzy gloss; muzzle and tip of abdomen obscurely diluted with red, legs and antennae reddish, club lightly infuscated. Moderately clothed with depressed, ashen pubescence. Length, 1.3—1.6 mm.

Hab. Lord Howe Island (A. M. Lea). Type, I. 10705.

The structure is as described in the preceding species, except that the metasternum is rather less convex, and has a few punctures in the middle; but the colour and clothing are different.

ASPIDIPHORUS SPISSUS sp. nov.

Black, shining; muzzle and abdomen obscurely diluted with red, legs somewhat paler. With sparse, ashen pubescence, and with a few scattered hairs.

Head shining in middle, and then with fine longitudinal striae near eyes. *Prothorax* more than thrice as wide as long, sides strongly diminishing in width from base to apex; with fairly dense and rather small, but sharply defined punctures. *Elytra* with sides moderately and apex strongly rounded; punctures denser and somewhat coarser than on prothorax. *Under-surface* with dense and rather coarse punctures. Four apical segments of abdomen transversely impressed at base from side to side. Length, 1.25 mm.

Hab. South Australia: Port Lincoln (No. 276 of Blackburn's collection). Type (unique), I. 10706.

The antennae of the type are missing, but as the species is a distinct one it has been described; it may be readily distinguished from all previously known species by the fairly large non-seriate punctures of elytra.

Following is a table of the species:

A.	Elytral punctures not in regular series	...	...	<i>spissus</i>
AA.	Elytral punctures in geminate series	...	...	<i>globosus</i>
AAA.	Elytral punctures in single series			

- B. Shoulders paler than the adjacent parts ... *humeralis*
 BB. Shoulders not paler than the adjacent parts
 C. Upper-surface castaneous ... *nigriclavus*
 CC. Upper-surface black ... *howensis*

PEDILOPHORUS RAUCUS Blackb.

Two specimens from the old collection, without locality labels, appear to belong to this species, but they have the clothing of a uniform rusty-red, much brighter than on some cotypes and other specimens in the Museum. As, however, they had been caked with gum for many years before they were cleaned for examination the clothing is probably not of its natural colour. In addition to the type locality the species occurs in New South Wales (Galston) and South Australia (Lucindale).

PEDILOPHORUS BRYOPHAGUS Lea.

Additional Tasmanian localities for this species are Sheffield and Mount Horror.

PEDILOPHORUS MIXTUS Lea.

Additional localities for this species are Waratah, Bruni Island (Tasmania), Emerald (Victoria), and Adelaide (South Australia).

PEDILOPHORUS GEMMATUS sp. nov.

Metallic-green; elytra with numerous brassy-red tubercles; antennae, palpi, and parts of under-surface black; most of under-surface and legs with a greenish gloss. Upper-surface glabrous, under-surface and legs almost so.

Head with small but sharply defined punctures; clypeal suture well-defined towards sides, but obsolete in middle. Eyes small and lateral. Antennae not very long, first joint stout, second slightly longer than fourth, third slightly longer than fourth and fifth combined, seventh-eleventh with sensitized pubescence, seventh-tenth each about as wide as long, eleventh about as long as ninth and tenth combined. *Prothorax* strongly and evenly convex; punctures much as on back part of head. *Scutellum* small and triangular. *Elytra* strongly convex, surface finely shagreened and punctate; with large, more or less rounded, glossy tubercles. Length, 5-7 mm.

Hab. Tasmania; Cradle Mountain, Waratah, Strahan, in moss (H. J. Carter and A. M. Lea). Type, I. 10690.

Differs from *Pedilophorus carissimus* in being somewhat shorter, tubercles larger, more convex, with much less conspicuous punctures, and less than half as numerous, the punctures on the shagreened parts are also less conspicuous,

the scutellum is smaller, and the prothorax is shinier, with much smaller punctures. The tubercles on each elytron are usually fourteen in number, but occasionally thirteen or fifteen, the sutural row usually consists of five tubercles, but occasionally of six, owing to the division of the basal one. On many specimens there is a vague remnant of a median line on the prothorax. The basal joint of the antennae has a greenish gloss, the second joint and the claws are usually reddish. Some of the specimens were obtained by breaking up and sieving moss in the ordinary way, but others were taken on logs where the moss had been pulled from off them.

PEDILOPHORUS NODIPENNIS sp. nov.

Colour and clothing much as in preceding species.

Head and *prothorax* with somewhat denser and stronger punctures, but otherwise much as in preceding species. *Elytra* shagreened, and with numerous small asperate punctures, with numerous convex, more or less rounded tubercles. Length, 6 mm.

Hab. Tasmania: West Coast (Simson's collection from T. Moore). Type (unique), I. 10696

On one elytron there are twenty-two tubercles, on the other twenty-three; the sutural row on the left consists of eight tubercles, and nine on the right (counting the small apical one that belongs as much to the third row as to the first). The type is the specimen that the late A. Simson showed the late Rev. T. Blackburn and myself, and not having it for comparison when I described *Pedilophorus carissimus*, and, judging from memory, presumed to be that species. It differs, however, in having the elytral tubercles raised almost as conspicuously as in *Pedilophorus gemmatus*, but more numerous, although less numerous than in *Pedilophorus carissimus*; the three species may be thus distinguished:

<i>Pedilophorus carissimus.</i>	<i>Pedilophorus nodipennis.</i>	<i>Pedilophorus gemmatus.</i>
More than thirty tubercles on each elytron.	Between twenty and thirty on each elytron.	Less than twenty on each elytron.
Tubercles feebly elevated and with conspicuous punctures.	Strongly elevated and with	feeble punctures.
Punctures on shagreened parts fairly coarse.		Rather fine.
Prothorax with dense and sharply defined punctures of moderate size.		With much smaller and sparser punctures.

PEDILOPHORUS CARINATICEPS sp. nov.

Head and prothorax black, with a bronzy gloss; elytra metallic-green, or greenish-purple, under-surface, legs, antennae and palpi more or less reddish. Upper-surface with long, thin, erect hairs, head and prothorax with rather dense and more or less golden pubescence, becoming sparser on elytra; the latter in addition with blackish pubescence; under-surface with very short pubescence.

Head with dense, partially concealed punctures, and with a short medio-basal carina. Antennae short, third joint thin, the others regularly increasing in width, eighth-tenth each much wider than long, eleventh almost circular. *Prothorax* strongly convex, much wider than long, sides greatly decreasing in width from base; with small, crowded, partially concealed punctures. *Elytra* at base the width of base of prothorax, slightly dilated to beyond middle, and then strongly narrowed to apex; with crowded and small subasperate punctures. *Under-surface* with fairly dense punctures, larger on sterna than elsewhere. Length, 2.25—2.75 mm.

Hab. Tasmania: Waratah, Cradle Mountain, in moss (A. M. Lea). Type, I, 10697.

A beautiful, hairy species, associated with *multicolor* on account of its clothing, but the two species have little else in common. The golden clothing on the elytra is distinct, but sparser than on the rest of the upper-surface; on each elytron of the largest of three specimens there are two short, oblique patches, where the derm is shinier than elsewhere, but clothed with short black pubescence; on the other specimens the patches are less conspicuous; on the largest specimen also some of the clothing at the base of the prothorax is of a rusty-red. The five apical joints of the antennae are flattened, so that, with the exception of the apical one, they appear to be much wider than long, but from other directions the length and width are almost equal. From some directions the sides of the prothorax appear to be flanged at the base; on each side of the under-surface at the junction of the prosternum and elytra there is a cavity for the reception of the antennal club when at rest; beyond this, and invisible from above, there is a short semi-circular prolongation of the elytral epipleurae.

PEDILOPHORUS MACULATIPES sp. nov.

Testaceous-brown, some parts darker; legs and antennae flavous, femora and tibiae each with a dark median or sub-median spot. Under-surface with very short pubescence, upper-surface glabrous.

Head large, with fairly dense, sharply defined punctures of moderate size; clypeal suture not traceable except at sides. Antennae moderately long, joints,

after the third, gradually increasing in width, eleventh about as long as ninth and tenth combined. *Prothorax* strongly convex, sides very narrowly margined, and oblique from apex to base, with fairly numerous and small, but sharply-defined punctures. *Scutellum* minute. *Elytra* short, outlines sub-continuous with those of prothorax, and with punctures somewhat smaller and sparser; epipleurae wide, and with coarse punctures at base, terminating level with apex of second abdominal segment. *Under-surface* with somewhat denser and larger punctures than on prothorax. Length, 3·3·5 mm.

Hab. Tasmania: Strahan, in moss (A. M. Lea). Type, I. 10698.

The general outlines are much as in *Pedilophorus simplicicornis*, but the finer sculpture of the head, and the colours are different. The four specimens before me have the suture and base of elytra pale, on two of them resembling the letter T. Parts of the head are almost flavous; on the prothorax the sides are more or less deeply infuscated; on the elytra variable portions of the suture, base, and apex are pale, the darker parts varying to almost black; on the under-surface the elytral epipleurae and parts of the abdomen are paler than the other parts; the spots on the legs are darker on some specimens than on others, but appear to be always distinct. There are two feeble elevations, scarcely more than obsolete granules, on the head, between and slightly posterior to the eyes. Some of the specimens have a feeble median line on the head.

PEDILOPHORUS DISCICOLLIS sp. nov.

Piceous-brown with a bronzy gloss; sides of prothorax, under-surface and legs flavous; antennae and palpi deeply infuscated. *Upper-surface* with rather short, pale pubescence, and with a few scattered, longer hairs; under-surface with very short and indistinct pubescence.

Head with numerous small punctures; clypeal suture indistinct. Antennae short, five apical joints forming a conspicuous club. *Prothorax* strongly convex, fully thrice as wide as the median length; sides very narrowly margined and decreasing in width from base to apex; punctures inconspicuous. *Scutellum* scarcely visible. *Elytra* with outlines continuous with those of prothorax; punctures fairly dense, but even smaller than on prothorax; epipleurae fairly wide at base, strongly narrowed to base of abdomen, and then very narrow to apex. *Abdomen* with dense and fairly distinct punctures, becoming smaller on sterna. Length, 1·75 mm.

Hab. South Australia: Mildura (Blackburn's collection). Type (unique), I. 10699.

A small species, with sparser clothing than on *Pedilophorus raucus*, *Pedilophorus multicolor*, etc., but denser than on *Pedilophorus atronitens*. It is not very close to any previously described species. The outlines form a perfect oval. The pale parts of the prothorax are conspicuous, but not sharply limited. On the type there is a medio-basal transverse depression on the head, but as it is not quite symmetrical it is probably due to accident.

PEDILOPHORUS FASCICULATUS sp. nov.

Black; parts of legs and of antennae obscurely diluted with red. Upper-surface densely but irregularly clothed, under-surface with short pubescence.

Head wide, finer sculpture concealed. *Antennae* short, with a conspicuous three-jointed club. *Prothorax* widely transverse, sides flattened out, with distinct but mostly concealed punctures. *Elytra* short, outlines continuous with those of prothorax; with rather numerous and, where not concealed by clothing, sharply-defined punctures; epipleurae rather wide at base and suddenly terminated at abdomen. *Legs* short; tibiae dilated from base to beyond middle, and then obliquely narrowed to apex. Length, 2 mm.

Hab. Tasmania: Strahan, in moss (A. M. Lea). Type (unique), I. 10700.

The tibiae and clothing are at variance with other species of the genus, but the type being unique and parts of the mouth not clearly visible, I have not ventured to propose a new generic name for it; with its head at rest the eyes, mouth-parts and antennae are quite concealed; it is a male, as it has a protruding aedeagus. The clothing of the under-surface is ashen, of the upper-surface of a dingy rusty-brown; on the head it is fairly dense, on the prothorax dense, but condensed into four loose fascicles across the middle, and two at apex; on the elytra there are numerous rather long erect hairs; about the base there are four loose fascicles, and elsewhere the clothing is rather short and sparse. Each side of the prosternum and base of the elytral epipleurae is excavated for the reception of the antennae; the intercoxal process of the prosternum is wide in front and acutely triangular where it rests in the mesosternal notch. The punctures of the under-surface are rather coarse but mostly concealed.

PEDILOPHORUS VIRIDINITENS sp. nov.

Bright metallic-green; under-surface of a dingy red, legs, antennae and palpi paler. Under-surface with very short and sparse pubescence, upper-surface glabrous.

Head wide, with fairly coarse punctures in front, becoming smaller at base. *Antennae* short, three or four apical joints forming a loose club. *Prothorax* strongly convex, scarcely twice as wide as the median length, sides very finely

margined and decreasing in width from base to apex; with minute punctures in front, becoming sharply defined in the front angles, absent or extremely minute elsewhere. *Scutellum* very minute. *Elytra* short, base truncate, outlines (as seen from above) continuous with those of prothorax; with very minute punctures; epipleurae wide on basal half, and traceable to beyond middle of abdomen, shallowly depressed at base. *Abdomen* and parts of prosternum with dense and sharply-defined punctures of moderate size, much smaller on rest of under-surface. Length, 2—2.5 mm.

Hab. Tasmania (A. Simson, No. 3523). Type, I. 10701.

An oval, highly-polished green species, in general appearance close to *Pedilophorus bryophagus*, but elytra with scarcely visible punctures, and none on most of prothorax; the under-surface and legs are paler, and the depression on the base of the elytral epipleurae much shallower.

PEDILOPHORUS POLYCHROMUS sp. nov.

Head and prothorax coppery-green, the former diluted with red in front; elytra coppery-purple, with a slight greenish gloss; under-surface, legs, antennae, and palpi more or less flavous. Upper-surface moderately clothed with golden pubescence, mixed with longer and darker hairs; under-surface and legs with very short, pale pubescence.

Head with crowded, partially concealed punctures. *Antennae* short, club three-jointed. *Prothorax* strongly convex, about thrice as wide as long; with crowded and (when not concealed by clothing) sharply-defined punctures, becoming subconfluent on parts of sides. *Elytra* with outlines continuous with those of prothorax; punctures smaller and less crowded; epipleurae not distinct beyond middle of metasternum. Length, 2 mm.

Hab. New South Wales: Dorrigo (W. Heron). Type (unique), I. 10702.

A beautiful species with variegated colour and clothing, although not as in *Pedilophorus multicolor* or *Pedilophorus carinaticeps*; it is the first brightly metallic species of the family recorded from the mainland, although many are now known from Tasmania. The elytra have a vaguely spotted appearance, owing to irregularity of clothing due to several semi-nude spaces; their punctures are considerably sparser and smaller than on the prothorax, although some of them are subasperate. The abdomen is missing from the type, but the punctures on the rest of the under-surface are fairly dense and sharply defined.

PEDILOPHORUS ATRONITENS sp. nov.

Black and shining, front of prothorax and abdomen obscurely reddish; legs, antennae and palpi paler, but seventh-ninth joints of antennae infuscated.

Upper-surface sparsely clothed with depressed golden pubescence; under-surface and legs with very short pubescence.

Head rather large, with dense, sharply-defined punctures, becoming of moderate size and rather crowded in front; clypeal suture distinct only on sides. Antennae moderately long, joints after the sixth increasing in width and forming a loose club; eleventh joint briefly ovate. *Prothorax* strongly convex, about thrice as wide as long, sides very narrowly margined and decreasing in width from base to apex; punctures fairly numerous but very small, sharply-defined only in front angles. *Scutellum* apparently absent. *Elytra* short, outlines continuous with those of prothorax; punctures numerous but small and inconspicuous; epipleurae wide adjacent to metasternum, then narrowed to middle of sides of abdomen. *Under-surface* with rather small punctures, denser and smaller on abdomen than on sterna. Length, 2.25 mm.

Hab. Victoria: Lorne, (October, 1918 (F. E. Wilson). Type (unique), I. 10703.

With the general outlines of *Pedilophorus bryophagus* and *Pedilophorus simplicicornis*, but upper-surface with distinct clothing; the clothing, however, is sparse and depressed, and from parts of the elytra altogether absent. The apical joint of the palpi is large, but flat and truncated.

Table of the Australian species of *Pedilophorus*.

- | | | | |
|------------------------------------|---|--------|---------------------|
| A. Elytra tuberculate | | | |
| a. | Prothorax with numerous short ridges | ... .. | <i>divès</i> |
| aa. Prothorax without ridges | | | |
| b. | More than thirty tubercles on each elytron | | <i>carissimus</i> |
| bb. | Less than thirty | | |
| c. | Sutural row of tubercles five in number (rarely six) | ... .. | <i>gemmatus</i> |
| cc. | Sutural row of tubercles more than six in number | ... .. | <i>nodipennis</i> |
| AA. Elytra nontuberculate | | | |
| B. Upper surface entirely glabrous | | | |
| d. | Prothorax without punctures on most of surface | ... .. | <i>viridinitens</i> |
| dd. | Prothorax punctured throughout | | |
| e. | Elytra with suture and base conspicuously paler than adjacent parts | ... .. | <i>maculatipes</i> |
| ee. | Elytra with suture and base not paler | | |

- f. Under surface black ... *bryophagus*
- ff. Under surface reddish
 - g. Antennal joints gradually increasing in width ... *simplicicornis*
 - gg. Antennae with apical joints forming a distinct club ... *griffithi*
- BB. Upper surface not entirely glabrous
 - C. Prothorax fasciculate ... *fasciculatus*
 - CC. Prothorax nonfasciculate
 - D. Sides of prothorax much paler than middle
 - h. Prothorax with inconspicuous punctures ... *discicollis*
 - hh. Prothorax conspicuously punctate and granulate ... *multicolor*
 - DD. Sides of prothorax no paler than middle
 - E. Upper surface sparsely clothed ... *atronitens*
 - EE. Upper surface densely clothed
 - F. Derm not green
 - i. Clothing of uniform colour ... *raucus*
 - ii. Clothing not of uniform colour ... *mixtus*
 - FF. Prothorax or elytra green
 - G. Elytral clothing of two kinds ... *polychromus*
 - GG. Elytral clothing of three kinds ... *carinataiceps*

FAMILY CERAMBYCIDÆ

BATOCCERA WALLACEI Thoms. (4)

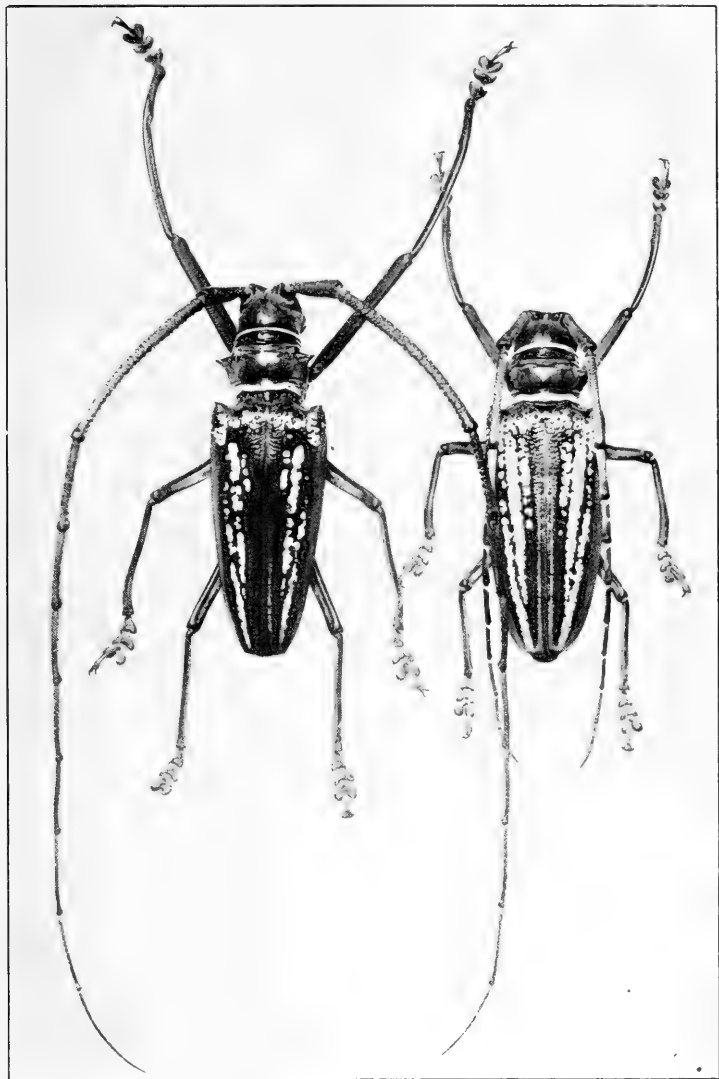
Plate xxxii.

Although not previously recorded from Australia, this fine species is in most of the larger Australian collections of Coleoptera, from various Northern Queensland localities. A male taken by Mr. Walter Dodd, at the Coen River, measures seventeen inches across the expanded antennae.

Explanation of Plate xxxii.

Batocera wallacei Thoms, male and female, natural size.

(4) Thomson, Arch. Ent., i, p. 447. Pascoe, Longic. Malay., in Trans. Ent. Soc. Lond., iii (3 ser.), p. 267.



H. M. Hale, Photo.

BATOCERA WALLACEI Thomson

NOTE ON RADIOGRAPHS OF TWO MICE.

By EDGAR R. WAITE, F.L.S., DIRECTOR, S.A. MUSEUM.

(Plate xxxiii.)

It is said that if two goats meet on a narrow mountain path, wide enough for one only, the resulting problem is solved by one of the animals lying down, the other then passing over its back⁽¹⁾.

Here is another problem: When two mice meet in a pipe whose diameter is sufficient for the passage of one only, what happens? What may happen and what has happened, is revealed by the accompanying radiographs.

Two mice had entered an old piece of iron pipe from opposite ends, and, being unable to pass each other, died in the pipe; that they had made strenuous efforts to pass is evident from the fact that they were almost abreast, the head of each mouse having reached beyond the pelvic region of the other.

On first thoughts it might be presumed that both animals were stubborn and that neither would give way and retreat; it is questionable, however, if such action were possible; when once wholly within the pipe the long hinder limbs would be almost useless for retrogression in the confined space and a real hindrance, while the ruffled fur, pressed against the rusty walls of the pipe, would also interfere with a rearward action.

The mass into which the mice were compacted was removed from the pipe prior to being photographed, and the darker portions seen in the prints are due to iron rust which adhered to the fur.

The specimens were brought to my notice by Mr. E. W. Leunig, of the Adelaide Botanic Gardens; and the skiagraphs were kindly taken by Sergt. Arthur R. Riddle, Radiographer to the local Military Hospital.

Explanation of Plate xxxiii.

Two radiographs each of two mice that died while attempting to pass in a length of iron pipe. Natural size.

(1) Garrod, Cassell's Natural History, iii, p. 10.

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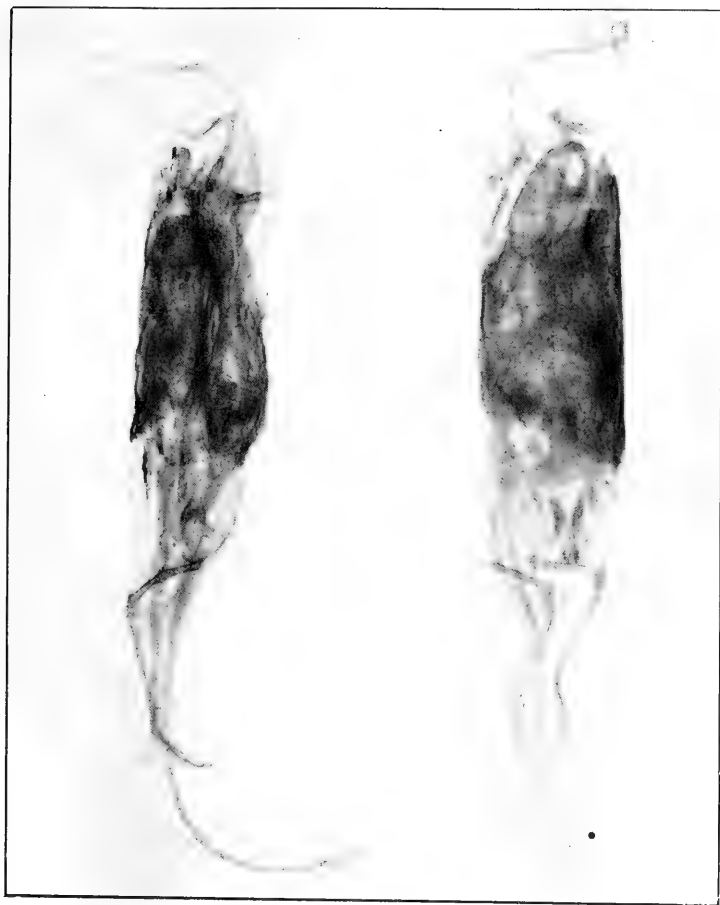
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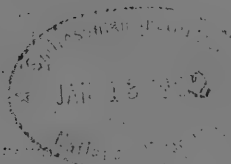
A. R. Biddle, *Radiog.*

RADIOGRAPHS OF TWO MICE.

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OF THE
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CONTENTS

	PAGE
Review of the Lophobranchiate Fishes (Pipe-fishes and Sea-horses), of South Australia - - - - -	Edgar R. Waite and Herbert M. Hale - 293
Observations on a Series of Artificially Distorted Skulls - - - - -	R. W. Cilento - 325
A Review of the Cephalopod Genera Sepio- loidea, Sepiadarium, and Idiosepius - -	S. Stillman Berry - 347
A List of the Tabanidae (Diptera) in the South Australian Museum, with Descriptions of New Species - - -	E. W. Ferguson - 365
On Australian Coleoptera - - - - -	Arthur M. Lea - 381
<hr style="width: 20%; margin: 10px auto;"/>	
Contents of Vol. 1 - - - - -	iii
List of Contributors - - - - -	v
Index - - - - -	411

REVIEW OF THE LOPHOBRANCHIATE FISHES
(PIPE-FISHES AND SEA-HORSES) OF SOUTH AUSTRALIA.

BY EDGAR R. WAITE, F.L.S., DIRECTOR,

AND

HERBERT M. HALE, ASSISTANT, SOUTH AUSTRALIAN MUSEUM.

Text figs. 39-56.

IN preparing this paper we have examined all the cognate material preserved in the South Australian Museum, a large proportion of which was dredged at various times in St. Vincent Gulf, by Sir Joseph Verco, President of the Royal Society of South Australia.

This material was used by A. H. C. Zietz (¹) in listing the Syngnathoids of South Australia: as our determinations differ considerably from those by Zietz, we indicate in the following table the relative findings, the first column indicating the species as listed and now determined as shown in the second column.

<i>Syngnathus curtirostris</i> Cast.	<i>Syngnathus curtirostris</i> Cast.
<i>Syngnathus semifasciatus</i> Günth.	<i>Histiogamphelus rostratus</i> sp. nov.
<i>Syngnathus poecilolaemus</i> Peters.	<i>Syngnathus poecilolaemus</i> Peters.
<i>Syngnathus pelagicus</i> Linn.	<i>Stigmatopora nigra</i> Kaup.
<i>Syngnathus olivacea</i> Cast.	<i>Stigmatopora argus</i> Rich.
<i>Syngnathus argus</i> Rich.	<i>Stigmatopora argus</i> Rich.
<i>Ichthyocampus filum</i> Günth.	<i>Syngnathus vercoi</i> sp. nov.
<i>Leptoichthys castelnaui</i> Macleay.	<i>Leptoichthys fistularius</i> Kaup.
<i>Doryichthys heterosoma</i> Bleek.	<i>Histiogamphelus rostratus</i> juv.
<i>Solenognathus spinosissimus</i> Günth.	<i>Solenognathus robustus</i> McCull.
<i>Phyllopteryx foliatus</i> Shaw.	<i>Phyllopteryx foliatus</i> Shaw.
<i>Phyllopteryx eques</i> Günth.	<i>Phyllopteryx eques</i> Günth.
<i>Hippocampus novae-hollandiae</i> Steind.	<i>Hippocampus novae-hollandiae</i> Steind.
<i>Hippocampus breviceps</i> Peters.	<i>Hippocampus breviceps</i> Peters.

The complete list of the South Australian members of the Order Lophobranchii, as now determined, stands as follows:

(1) Zietz, Trans. Roy. Soc. S.A., xxxii, 1908, p. 298, 299.

SYNGNATHINAE

- Syngnathus poccilolaemus* Peters.
 .. *phillipi* Lucas.
 .. *vercoi* sp. nov.
 .. *curtirostris* Castelnau.
Leptonotus costatus sp. nov.
Histiogamphelus rostratus sp. nov.
Ichthyocampus cristatus McCulloch and Waite.
Lissocampus caudalis gen. et sp. nov.
Leptoichthys fistularius Kaup.
Stigmatopora argus Richardson.
 .. *nigra* Kaup.

HIPPOCAMPINAE

- Solegnathus robustus* McCulloch.
Phyllopteryx foliatus Shaw.
 .. *eques* Günther.
Accentronura australe sp. nov.
Hippocampus abdominalis Lesson.
 .. *nozae-hollandiae* Steindachner.
 .. *breviceps* Peters.

All the species are figured, mostly from photographs of specimens in this Museum taken by H. M. Hale. It should be noted that in such as are bent to economise space, it has not been possible to maintain the dorsal side of the tail uppermost. Three of the illustrations have been previously published by McCulloch or Waite.

The numbers of fin rays and annuli, as expressed at the head of the descriptions, indicate the variations found in specimens examined by us; the figures within brackets show the wider range recorded by others.

Writers have frequently used the term "South Australia" in the sense of Southern Australia, and species taken in Port Philip, for example, have been thus subsequently included in the fauna of our State. Such an instance we believe to be furnished by *Leptonotus semistriatus* Kaup, which so far as we know does not occur here, its place being taken by *L. costatus*, though "South Australia" is given as the type locality for the former species.

SYNGNATHUS Linnaeus, 1758 (acus).

We have not here used *Corythoichthys* (*κορυθος-ιχθυσ*) as distinct from *Syngnathus*. Kaup, who founded the genus, does not give satisfactory generic

characters, a lack which others have attempted to supply. Jordan and Snyder⁽²⁾, who perpetuate the spelling of the word as *Corythoichthys* ("κορθοπος-ιχθες") place in that genus those forms which, in contradistinction to *Syngnathus* are rather robust and have the opercle crossed by a horizontal ridge. Duncker⁽³⁾ separates the genera on characters of the egg-pouch and ascribes *Corythoichthys* to himself. Jordan⁽⁴⁾ points out that the genus is synonymous with *Hippichthys* Bleek⁽⁵⁾, of which Günther⁽⁶⁾ wrote, in effect, "The generic name *Hippichthys* is proved to be useless."

Authors recognizing the validity of the genus *Corythoichthys* would, of the four following species, place *S. poccilolaemus*, *S. phillipi* and *S. vercoi* therein, and *S. curtirostris* in *Syngnathus* if determined by the presence or absence of an opercular ridge.

We find that an opercular ridge is developed in the young of *Histiogamphelus rostratus* and *Stigmatopora argus*, but is not to be found in the adults, a fact that greatly minimizes the value of a character largely used in the classification of the Lophobranchiates. At best it can scarcely be employed for divisions higher than species.

Günther⁽⁷⁾ records "many specimens" of *Syngnathus pelagicus*, from South Australia, presented to the British Museum by Sir G. Grey. Among the extensive series of Syngnathoids preserved in this Museum, there is none that we can associate with this species, and the examples so identified by Zietz prove to be of *Stigmatopora nigra*. *S. pelagicus* is not by us included in the fauna of this State. It may also be noted that specimens therewith identified from New Zealand have been referred to another species⁽⁸⁾.

a. Opercular ridge present.

b.	Snout more than half the head..	..	..	..	<i>poccilolaemus</i>
bb.	Snout half the head ..	..	..	..	<i>phillipi</i>
bbb.	Snout less than half the head..	..	..	..	<i>vercoi</i>
aa.	No opercular ridge, snout short..	..	..	..	<i>curtirostris</i>

SYNGNATHUS POECILOLAEMUS Peters.

Syngnathus poccilolaemus Peters, Monatsb. Akad. Wiss. Berlin, 1869, p. 458;

(2) Jordan & Snyder, Proc. U.S. Nat. Mus., xxiv, 1901, p. 7.

(3) Duncker, Fauna Südwest Aust., ii, 1909, p. 237.

(4) Jordan, Genera of Fishes, ii, 1919, p. 253.

(5) Bleeker, Verh. Bat. Genootsch., xxii, 1849, p. 15.

(6) Günther, Cat. Fish. Brit. Mus., viii, 1870, p. 173.

(7) Günther, *loc. cit.* p. 166.

(8) Waite, Rec. Cant. Mus., i, 1912, p. 318.

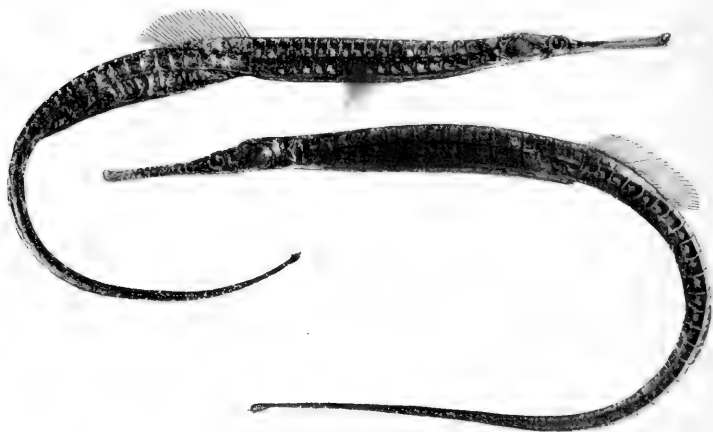
- Dum., Hist. Nat. Poiss., ii, 1870, p. 552; Günth., Cat. Fish. Brit. Mus., viii, 1870, p. 174; Macl., P.L.S., N.S.W., vi, 1881, p. 290.
Syngnathus paecilolaemus Cast., P.Z.S., Vict., ii, 1873, p. 78.
Syngnathus modestus Sauv., Bull. Soc. Phil. (7) iii, 1879, p. 209 (not of Günth).
Syngnathus poecilolaemus Dunck., Fauna Südwest Aust., ii, 1909, p. 245.
Corythoichthys poecilolaemus McCull., Rec. W. Aust. Mus., i, 1912, p. 82, fig. 2.

Fig. 39.

D.26-29: P.12 (11): A.3: C.10: Annuli 19-20+44-49: sub-dorsal annuli 1-2+5-6: brood annuli 0 (i)+16-18.

Head 1.4 in the trunk and 7.4 in the total length: trunk 2.4 in the tail: snout 1.75 in the head: eye 4.5 in the snout and 8.0 in the head.

Snout nearly twice as long as the post-orbital portion of the head, with a low median crest which extends on to the interorbital space: another from the top of the snout extends nearly to the nostrils, supraorbital ridge commences at

Fig. 39. *Syngnathus poecilolaemus*, male and female.

a point in advance of the eye equal to its diameter and is continued behind the eye for the same distance, occipital and nuchal ridges low: opercle with slightly raised reticulating lines and a prominent median ridge. Body a little deeper than broad with the ridges well defined: upper ridge continued on to the sixth caudal scute: median lateral ridge terminates on the last body scute below the

origin of the upper caudal ridge, which commences on the side and attains the dorsal angle at the sixth caudal scute: lower lateral ridge continuous: a ventral body ridge. Pectoral and caudal fins as long as the eye. Many specimens from Spencer and St. Vincent Gulfs, dredged by Sir Joseph Verco, the longest being 270 mm.

Colours. *Male:* Head light, yellowish brown, with irregular, vertical bars or mottlings on the snout: underside of snout and head pale. Body brown, darker above, with about thirteen large, dark brown spots on the back between the nape and the caudal fin. Front edge of the anterior caudal scutes with a large, dark brown mark, the intensity of which diminishes backwards and disappears at the eighth or ninth caudal scute: other irregular and scattered markings on the tail. Ovisac milky white with two dark streaks on each side.

Female. From the examination of thirteen male and eleven female specimens it appears that, in the female, the lower half of the snout, the throat and the neck are invariably marked with series of small, dark brown dots: such are absent in the male.

Hab. South and Western Australia.

SYNGNATHUS PHILLIPI Lucas.

Syngnathus phillipi Lucas, P.R.S., Vict., iii (n.s.), 1891, p. 12; Dunck., Fauna Südwest Aust., ii, 1909, p. 245.

Corythoichthys phillipi McCull., Endeavour Res., i, 1911, p. 26, fig. 10.

Fig. 40.

D.22-25 (28): P.10 (11-12): A.2-3: C.10: Annuli 18-20+41-43 (40-48): sub-dorsal annuli 1 (2)+5-6; brood annuli 0 (1)+16 (15-18).

Head 2.0 in the trunk and 8.0 in the total length: snout 1.9 in the head: eye 3.4 in the snout and 7.9 in the head: trunk 2.4 in the tail.

Snout as long as the rest of the head, narrow, with a low median crest extending on to the interorbital space: a low ridge from the end of the snout to the first nostril: interorbital space concave: the strongly marked supraorbital ridges extend behind the eye to a distance equal to its diameter or to below the origin of the upper body ridge: opercle with granular, radiating striae and a prominent median keel. A long occipital ridge and a nuchal ridge extending to the posterior edge of the second body scute. Body deeper than wide, its depth equal to twice the diameter of the eye. Ridges well defined: upper ridge terminates on the fifth caudal scute: median lateral ridge extends on to the last body scute, beneath the origin of the upper caudal ridge: lower lateral ridge continuous: a strong ventral keel terminating at the anus. Anal fin minute. Length

130 mm.: several examples dredged in Spencer Gulf by Sir Joseph Verco, and a single specimen collected in St. Vincent Gulf by Mr. P. Geisler.

Colours. *Male:* Head and snout brown above with white mottlings: opercular ridge with five dots along its length, decreasing in size backwards: chin opalescent with white markings. Body brown above, ventral surface lighter: back with about sixteen pairs of irregular, whitish spots between the nape and the end of the tail: upper half of each lateral body scute with a brown bar: anterior part of lower lateral ridge with a row of seven white spots decreasing in size backwards: ventral ridge black. Brood-pouch whitish, streaked with brown: sub-caudal scutes light brown with a dark brown spot on each side of the anterior edges. Caudal fin dusky.

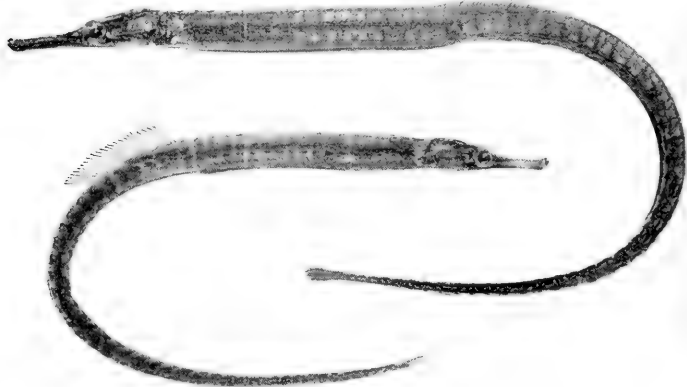


Fig. 40. *Syngnathus phillipi*, male and female

Female. The colouration of the head differs somewhat from that of the male. Upper side of the head and snout pale brown, darker on the occiput: underside with a row of dark brown dots on each side, extending from the anterior portion of the snout to the termination of the opercular ridge: two dots below the lower posterior edge of the eye. Three irregular rows of dark spots on the anterior ventral surface of the body.

Hab. Western and South Australia and Victoria.

SYNGNATHUS VERCOI sp. nov.

Ichthyocampus flum Zietz, T.R.S., S.A., 1908, p. 298 (not of Günth.).

Fig. 41.

D.20: P.10: A.2: C.10: Annuli 16+43: sub-dorsal annuli 0+5: brood annuli 0+14.

Head 2.5 in the trunk and 10.3 in the total length: trunk 2.6 in the caudal: snout 2.5 in the head: eye 2.0 in the snout and 5.0 in the head.

Snout as long as the postorbital portion of the head; a median crest extends from its tip on to the interorbital space and is thence continued as an occipital and a nuchal crest on to the first body ring: another ridge on each side from the top of the snout to the first nostril: a strong, median opercular keel: supraorbital ridges prominent and sub-continuous with the upper body ridges. Body one and one-half times deeper than wide, the angles well defined: upper ridge terminates on the fourth caudal scute: median lateral ridge extends on to the first caudal



Fig. 41. *Syngnathus vercoi*, male and female.

scute below the origin of the upper caudal ridge: lower lateral ridge continuous: ventral surface of trunk V-shaped and ridged. Pectoral and caudal fins each a little longer than the eye: anal fin minute. Described from a male 103 mm. in length, dredged in Spencer Gulf by Sir Joseph Verco.

Colours. Head brown, with a dark mark across the occiput and another on the nape: snout and opercles with small white spots: underside of snout pale: chin dark brown with white markings. Body brown with four narrow whitish bars across the back, continued on the sides, which are crossed by dark bars, one on each body scute: the ventral surface lighter. Tail with about ten whitish bars

above and on the sides but no dark bars. Back and sides of the body and lower surface of tail with numerous small white dots. Ovisac brown, largely streaked with white, a large irregular, white blotch below each scute.

Several other examples from the same locality yield the following variation in the formulae:

D.18-20: Annuli 16-17+41-43; sub-dorsal annuli 0-1+4-5.

The eggs are placed in two rows in the ovisac.

Hab. South Australia.

SYNGNATHUS CURTIROSTRIS Castelnau.

Syngnathus curtirostris Cast., P.Z.S., Vict., i, 1872, p. 243 and ii, 1873, p. 79; Macl., P.L.S., N.S.W., vi, 1881, p. 290; Dunck., Fauna Südwest Aust., ii, 1909, p. 244; McCull. and Waite, Rec. S.A. Mus., i, 1918, p. 39, pl. v, fig. 1.

Fig. 42.

D.21-24 (20): P.8-9: A.3: C.10: Annuli 18-19+43-44 (42): sub-dorsal annuli 0-1+4-5: brood annuli 0+16.

Snout 2.5 to 2.7 in the head: eye 1.8 in the snout and 5.0 in the head: head 3.0 to 3.5 in the trunk and 11.2 in the total length. (In describing this species Castelnau remarks: "Snout . . . only once and a half in the orbit": this should be read as: orbit 1.5 in the snout.)

Snout about as long as the postorbital portion of the head, with a low crest: interorbital space slightly concave, convex on the median line: head with reticu-

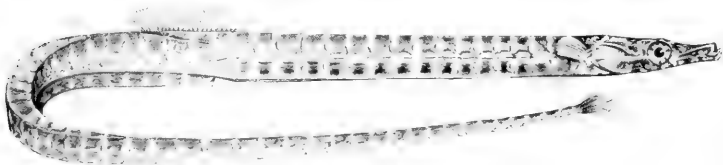


Fig. 42. *Syngnathus curtirostris*.

lating raised lines: opercle with radiating series of raised lines but no keel: supraorbital, occipital and nuchal ridges feeble. Body a little deeper than wide, its depth equal to the length of the snout: angles well defined: upper body ridge extends to below the hinder part of the dorsal fin: median ridge terminates above the vent, below the origin of the upper caudal ridge: lower lateral ridge continuous: ventral surface a little wider than that of the dorsal. Caudal fin rounded, longer than the eye. Specimens collected from Spencer Gulf by Sir

Joseph Verco; St. Vincent Gulf, Mr. A. G. Edquist; Glenelg River, near Mount Gambier, Mr. W. B. Poole; Kangaroo Is., Waite. Longest example 164 mm. long.

Colours. An adult male is brown, the head with a broad cross-band on the occiput and another between the eyes; lower surfaces with irregular brown bars radiating from the eye and enclosing white interspaces. Body with slightly darker cross-bars on the back; light oval spots encircle the lateral ridge on each ring and also the junctions of the rings; large dark spots on the lower half of each segment of the trunk. Tail and egg-pouch variegated with brown, reticulating lines.

In a female the ground colour is dark brown: the snout and opercles mottled with white and a series of white dots encircles the eye: interorbital space with a white bar connecting the front edges of the eyes; a few white marks on the occiput. Sides of body and tail with irregular grey marks: underside of trunk light brown with white mottlings. Dorsal fin pale with small brown spots: caudal fin brown.

Hab. South Australia.

LEPTONOTUS Kaup, 1853 (*blainvillianus*).

Differs from *Syngnathus* in that the females have the dorsal profile conspicuously elevated and the ventral surface acute.

- a. Size larger: opercle without ridge, dorsal rays 38 (*semistriatus*)
 aa. Size smaller: opercle with basal ridge, dorsal rays 24-32.
 b. Sub-dorsal annuli 1+5 (*caretta*)
 bb. Sub-dorsal annuli 5-6+3-4 *costatus*

LEPTONOTUS COSTATUS sp. nov.

Fig. 43.

D:28; P:10; A:2; C:10; Annuli 17+37; sub-dorsal annuli 6+4.

Snout 2.6 in the head and 1.2 in the post-orbital portion: eye 2.5 in the snout and 6.5 in the head: head 2.5 in the trunk and 9.2 in the total length: trunk 2.2 in the tail.

Snout short, with a median crest which bifurcates posteriorly to form the strongly marked supra-orbital ridges: another ridge on each side from the top of the snout to the front edge of the eye: interorbital space concave: opercle with radiating striae and a ridge on the anterior half: distinct occipital and nuchal ridges. Body less than one-third as broad as deep, with the ridges well defined: back nearly flat and the whole ventral surface acute and keeled: upper ridge terminates on the third caudal scute: upper lateral ridge extends on to the last body

scute, below the origin of the caudal ridge: lower lateral ridge continuous with that of the tail. Pectoral and caudal fins about as long as the eye: anal fin minute.

Described from an example 119 mm. in length, one of two females dredged in Spencer Gulf by Sir Joseph Verco.

Several other specimens collected from St. Vincent Gulf by Mr. P. Geisler. In these the variation of the formulae is as follows: D.29-32: Annuli 16-17+37-38: sub-dorsal annuli 5-6+3-4: brood annuli 0-11. In a male the breadth of the body is two-thirds its depth.

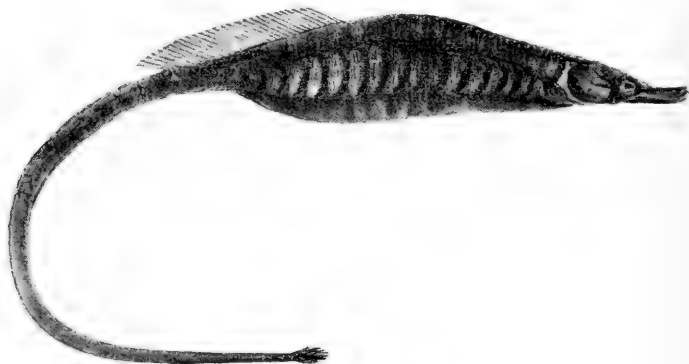


Fig. 43. *Leptonotus costatus*.

Colours. *Female:* A dark bar from snout to eye, thence to pectoral. Body olive-green above: sides opalescent, each scute with a vertical, crescent-shaped bar, the convexity directed forward. Tail olive with a few darker bars anteriorly. *Male:* Ground colour darker and the markings not so well defined: brood pouch sooty.

Hab. South Australia.

This species differs from *L. semistriatus* Kaup in having a shorter snout, the front half of the opercle with a ridge, the vent placed posterior to the middle of the dorsal, which has a smaller number of rays, and the annuli in smaller number. It is apparently also a smaller species, being adult at half the recorded size of *L. semistriatus*. The type of the latter is stated by Günther to be from "South Australia," for which we would read Southern Australia, the known habitat being Victoria and Tasmania.

Duncker⁽⁹⁾ suggests that *Syngnathus caretta* Klunz. is a synonym of *S. semifasciatus* Günth. (= *L. semistriatus* Kaup), and we therefore presume it to be referable to the genus *Leptonotus*. We would say that it is more nearly approached by the species here described, which agrees with it in size and in having the basal half of the opercle keeled. *S. caretta* differs from *L. costatus* in having the dorsal fin mainly on the tail, also in the relative length of the trunk, it being half the total length, whereas in *L. costatus* it is less than one-third. The former species is from Victoria, the latter from South Australia.

HISTIOGAMPHELUS McCulloch, 1914 (*briggsii*).

- a. Dorsal rays 23-24, on 5+2 rings.
 b. Annuli 18+27; snout? (*cristatus*)
 bb. Annuli 22+36; snout short (*briggsii*)
 aa. Dorsal rays 32-33, on 1-3+7-8 rings.
 Annuli 25-26+44; snout long *rostratus*

HISTIOGAMPHELUS ROSTRATUS sp. nov.

Syngnathus semifasciatus Zietz, T.R.S., S.A., xxii, 1908, p. 298 (not of Günth.).

Doryichthys heterosoma Zietz, *loc. cit.*, p. 299 (not of Bleek).

Fig. 44.

D.33: P.12: A.2: C.10: Annuli 25+44: sub-dorsal annuli 3+7.

Head 1.9 in the trunk and 6.3 in the total length: snout 1.5 in the head: eye 7.4 in the snout and 10.9 in the head. Trunk 1.7 in the tail and 3.2 in the total length.

Snout very long, twice the length of the rest of the head, deep and much compressed; the anterior portion deepest, more than twice as deep as wide: a high, elevated, knife-like, median crest which bifurcates to form the supraorbital ridges; the distance between the fork and the front edge of the eyes equal to the diameter of the eye: top of head with reticulating raised lines: sides of snout and opercles with radiating striae: occipital and nuchal ridges low. Body a little deeper than wide: ridges well defined, very prominent on the hinder part of the tail: upper ridge continued on to the sixth caudal scute: median lateral ridge terminates on the last body scute, below the origin of the upper caudal ridge, which commences on the side and attains the dorsal angle at the eighth caudal scute: lower ridge continuous. Ventral surface a little wider than that of the dorsal. Length of caudal fin equal to the depth of the body: a minute anal fin.

Described from an example 240 mm. in length, from Spencer Gulf.

(9) Duncker, Fauna Südwest Aust., ii, 1909, p. 244

Colours. Head brown with white markings edged with dark brown, more pronounced in the neighbourhood of the eye. Body and tail brown, darker above with about sixteen light cross bars between the nape and the caudal fin: lower half of the lateral surfaces with fine white mottlings; ventral surface of trunk with large white markings; that of tail without markings, the edges of the scutes darker. Caudal fin black, tipped with white.

The variation in the formulae of four adult specimens is as follows: D. 32-33. Annuli 25-26+44: sub-dorsal annuli 1-3+7-8.

Six specimens are known, namely two adults and one young dredged in Spencer Gulf by Sir Joseph Verco, one from Whidbey Is., Eyre Peninsular, one

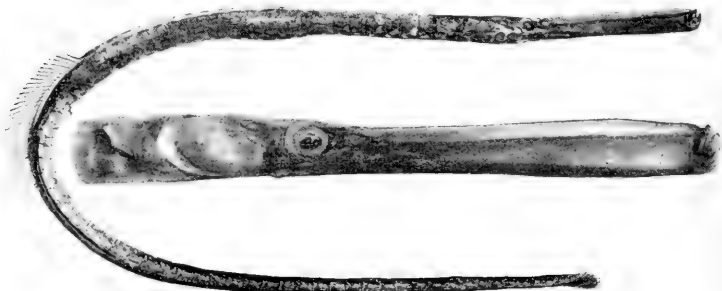


Fig. 44. *Histiogamphelus rostratus*.

taken by Waite on a dredging excursion of the Field Naturalists' Section of the Royal Society of South Australia in February, 1917, and one collected by Mr. E. Le G. Troughton at Kangaroo Is., 1920. Longest specimen 283 mm.

The young example referred to is 128 mm. in length, it has a distinct median keel on the anterior half of the opercle and all the body and tail ridges are spinigerous, both these features being absent in the adult. Zietz's record of *Doryichthys heterosoma* is based on this specimen, his determination being doubtless influenced by the facts that in that species each ring terminates in a spine and the operculum is ridged, as in the young of *H. rostratus*.

Hab. South Australia.

ICHTHYOCAMPUS Kaup, 1853 (belcheri).

ICHTHYOCAMPUS CRISTATUS McCulloch & Waite.

Ichthyocampus cristatus McCull. & Waite, Rec. S.A. Mus., i, p. 40, fig. 26.

Fig. 45.

D.26-27; P.12; C.8; Annuli 19-20+40-41; sub-dorsal annuli 1-2+5; brood annuli 0+13.

Snout 3.4 in the head; eye 1.3 in the snout and 4.7 in the head; head 3.6 to 4.4 in the trunk and 13.3 to 15.3 in the total length; trunk 1.8 to 2.1 in the tail.

Snout much shorter than the postorbital portion of the head, with an elevated, obtuse crest which bifurcates to form very feeble supraorbital ridges; these are continued backwards on each side of the head to behind the eyes; interorbital space flat, with a low median ridge, sub-continuous with the rostral crest and the indefinite nuchal ridge; opercle with granular radiating striae and a low median ridge. Occiput and nape slightly elevated; head and body uniformly granular; body as deep as broad, with well defined angles; back slightly concave, upper

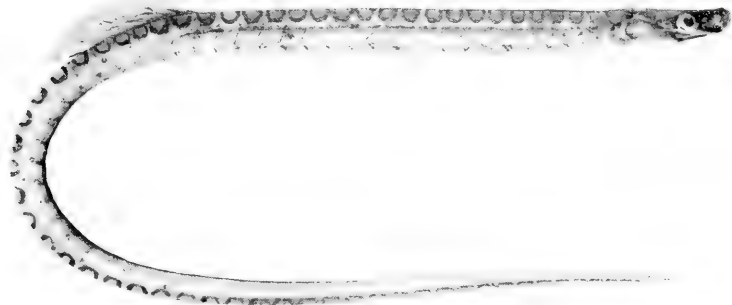


Fig. 45. *Ichthyocampus cristatus*.

and lower ridges continuous; lateral body ridge extends on to the two anterior tail rings and is deflected downwards on the second; ventral ridge low. Anal fin minute. Described from four examples from Spencer and St. Vincent Gulfs, the longest being 214 mm. in length. The type was dredged in Spencer Gulf by Sir Joseph Verco and is "completely bleached": the colour description and the illustration are made from a specimen collected in August, 1920, at Glenelg by Messrs. Zietz and Hale.

Colours. Ground colour creamy; snout with sooty marks; each scute on the upper half of the body from the nape to the end of the tail with a grey ring, which touches its fellow in the median dorsal line, the upper angle bisecting the

rings: lower half of trunk with brown, diamond-shaped outlines, alternating with the rings above.

Hab. South Australia.

LISSOCAMPUS gen. nov.

Body smooth, without ridges, the angles scarcely defined: dorsal fin short: pectorals present. Tail long, with fin. Allied to *Nannocampus* Günth.

LISSOCAMPUS CAUDALIS sp. nov.

Fig. 46.

D.11: P.5?: C.10: Annuli 12+60: sub-dorsal annuli 1+2.

Snout 3.1 in the head: eye 2.0 in the snout and 6.2 in the head: head 2.5 in the trunk and 15.5 in the total length. Trunk 4.8 in the tail which is 1.3 in the total.

Head and body smooth: snout compressed, with an obtuse, elevated crest, which terminates on the interorbital space: a ridge on each side from the tip of the snout to the first nostril: occipital and nuchal ridges feeble. Body one-third deeper than wide, without ridges and the angles rounded: back convex and the ventral surface V-shaped but without keel. Tail almost round and very long, almost four-fifths of the total length. The dorsal fin commences on the posterior edge of the last body ring; it is very short and is situated on an elevation; the



Fig. 46. *Lissocampus caudalis*

longest ray is equal in length to the base of the fin, which is as long as the snout: pectoral as long as the snout; caudal fin a little longer than the pectoral: a minute anal fin.

Described from an example 97 mm. in length, one of two female specimens collected by Mr. Rumball at Kangaroo Is. in 1901; the other measures 102 mm.

Colours. Head brown, finely marked with white. Body light brown, with five large white spots on the back between the nape and the origin of the dorsal fin: similar, but less distinct spots on the caudal: dark brown bands encircle the body at about every fourth ring throughout the length; on the trunk the lighter interspaces are mottled with white.

Hab. South Australia.

LEPTOICHTHYS Kaup, 1853 (*fistularius*).

LEPTOICHTHYS FISTULARIUS Kaup (*Bibron*).

Leptoichthys fistularius Kaup, Arch. f. Naturg., xix, 1853, p. 232, and Cat. Lophob., 1856, p. 52; Dum., Hist. Nat. Poiss., ii, 1870, p. 580; Günth., Cat. Fish. Brit. Mus., viii, 1870, p. 187; Cast., P.Z.S., Vict., ii, 1873, p. 77; Macl., P.L.S., N.S.W., vi, 1881, p. 295; Dunck., Fauna Südwest Aust., ii, 1909, p. 234.

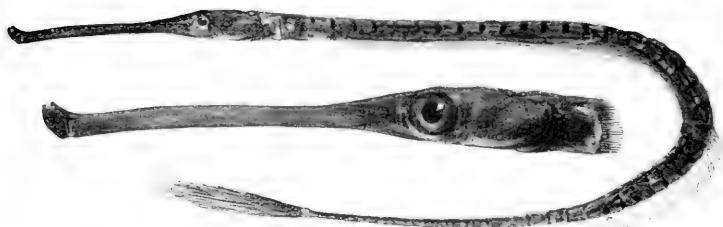
Leptoichthys castelnaui Macl., P.L.S., N.S.W., vi, 1881, p. 295.

Fig. 47.

D.35-37 (34-38): P.22 (21-23): A.4: C.10 (11): Annuli 25-26 (28)+20 (23-27): sub-dorsal annuli 3-4+5-6: brood annuli 19-23+0.

Head 2.0 to 2.5 in the trunk and 5.3 to 6.0 in the total length: snout 1.4 in the head: eye 7.1 in the snout and 10.0 in the head. Trunk 2.3 in the length.

Snout very long, four times as long as the post-orbital portion of the head, compressed but not deep: a rudimentary crest and very feeble supraorbital ridges: snout with reticulating raised lines; rest of head and body uniformly granular: opercles with additional radiating striae but no median keel. Indication of a nuchal ridge. Body a little wider than deep: ventral surface wider than that of the dorsal: trunk longer than the tail. Ridges moderately well defined: upper ridge continued on to the fifth caudal scute, below the origin of the ridge, which commences on the side and attains the dorsal profile at the sixth ring: lower ridge continuous. Caudal fin rather large and long, the median rays longest, nearly as long as the snout: a minute anal fin. Longest example 360 mm., dredged by Sir Joseph Verco in Spencer Gulf. Also taken in St. Vincent Gulf by Capt. J. J. Hughes.

Fig. 47. *Leptoichthys fistularius*.

Colours. Head light brown, opercles opalescent below. Body brown, darker above, with some indications of markings: a dark brown marking on the anterior edges of each scute; ventral surface of trunk opalescent, that of tail light brown.

Hab. Victoria, South Australia, and south coast Western Australia.

STIGMATOPORA Kaup, 1853 (argus).

- a. Sub-dorsal annuli 7-10+8-12: no opercular keel in adult; body of female depressed *argus*
- aa. Sub-dorsal annuli 10-12+6-7: an opercular keel: body of female depressed and expanded *nigra*

STIGMATOPORA ARGUS Richardson.

Syngnathus argus Rich., P.Z.S., 1840, p. 29 and T.Z.S., iii, 1849, p. 183, pl. vii, fig. 2.

Stigmatopora argus Kaup, Arch. f. Naturg., xix, 1853, p. 233.

Stigmatophora argus Kaup, Cat. Lophob., 1856, p. 53; Dum., Hist. Nat. Poiss., ii, 1870, p. 583; Günth., Cat. Fish. Brit. Mus., viii, 1870, p. 189; Cast. P.Z.S., Vict., ii, 1873, p. 77; Macl., P.L.S., N.S.W., vi, 1881, p. 297; Dunck., Fauna Südwest Aust., ii, 1909, p. 239.

Stigmatophora olivacea Cast., P.Z.S., Vict., i, 1872, p. 244 and ii, 1873, p. 77; Ogil., Mem. Qld. Mus., i, 1912, p. 36.

Gastrotokeus gracilis Klunz., Arch. f. Naturg., xxxviii, 1872, p. 44.

Stigmatophora unicolor Cast., Res. Fish. Aust., 1875, p. 49.

Stigmatophora depressiuscula and *gracilis* Macl., P.L.S., N.S.W., vi, 1881, p. 299.

Stigmatophora argus var. *brevicaudata* Lucas, P.R.S., Vict., iii (n.s.), 1891, p. 14.

Syngnathus olivacea and *Syngnathus argus* Zietz, T.R.S., S.A., xxxii, 1908, p. 298.

Fig. 48.

D.43-50 (55): P.16 (14-17): A.3 (2-4): Annuli 18-22 (17)+78-90 (68): sub-dorsal annuli 9-10 (7)+8-10 (12): brood annuli 0 (1)+18-20 (16).

Head 1.3 in the trunk and 5.2 to 6.4 in the total length: snout 1.5 in the head: eye 6.2 to 7.6 in the snout and 9.9 to 10.9 in the head. Trunk 1.7 to 2.8 in the tail and 3.5 to 4.8 in the total.

Snout long and slender, more than twice as long as the rest of the head, with a low median crest which terminates in advance of the eyes: the supraorbital ridges commence on the posterior third of the snout, but do not extend to behind the eyes: a lateral ridge from the angle of the mouth to the lower part of the front edge of the eye: low ridges define the lower margins of the snout, one on each side of a median ventral ridge, which bifurcates below the front margins of the eyes: head finely pitted; opercles with additional radiating striae: a feeble opercular ridge in young examples. Body depressed, widest at the middle of the trunk, one and two-fifths to one and one-half times wider than deep in the male, rather more depressed in the female and one and three-fifths to one and four-fifths times wider than deep: dorsal surface slightly convex. Upper and lower ridges continuous, much more distinct on the tail; the lateral ridge extends on to about the sixth caudal scute or terminates in the skinny folds of the brood pouch: ventral ridge terminates at the anus. Tail about half of the total length, a little longer in the male. Longest example 250 mm.

Colours. The colours and markings are subject to considerable variation: the following descriptions result from the examination of many specimens from Spencer and St. Vincent Gulfs and Fowler's Bay.



Fig. 48. *Stigmatopora argus*, female and male.

Male. Head and snout dark green, opercles opalescent below. Body olive green above with a narrow whitish bar across each ring, becoming less distinct on the tail; bars sometimes present on the snout also. Underside of trunk dusky, the sutures of the scutes darker: ventral surface of tail lighter, often with bars: caudal ridges black. Brood pouch whitish, or pink when containing young, with longitudinal black streaks. A few examples have the snout and head light brown and the upper surface of the body and tail yellowish brown: numerous black dots, edged with white, on the trunk where additional faint, white transverse bars are often present. Underside sometimes pale without markings.

Female. Snout and head dusky; opercles opalescent: body dusky olive, darker above, with numerous black, white-edged dots between the nape and the first third of the tail: tail much lighter posteriorly. Others have the ground colour light yellowish brown and some have indications of the white transverse bars usually associated with the male.

The dotted back is a fairly constant feature of the female, but also, though more rarely, occurs in the male: these dots are sometimes placed in regular series or they may be scattered or irregular.

Hab. New Guinea, Australia, Queensland excepted, and Tasmania.

One of the characters of the genus *Stigmatopora* is the absence of a caudal fin, the tail gradually tapering to a very fine point. It happens, however, that this attenuated tail is very rarely preserved in its entirety and knowing that no fin is developed, writers have presumed their specimens to be complete and so stated the caudal rings at varying figures short of the full number. The figures here given are believed to represent the variations of the complete member. We have examined a large number of specimens preserved in this Museum, including series labelled *S. argus* and *S. olivaceus*; it happens that all the latter are males with approximately complete tails, and this leads us to refer to the question of sexual colouration. As mentioned above the markings for the sexes are not absolutely constant, tending in a small proportion of examples to assume the markings of both sexes in the same individual. Thus the spotted females may possess faint bars, and the barred males develop spots also. We have no hesitation in pronouncing normally barred examples (*S. olivaceus*) to be males of *S. argus*. Ogilby⁽¹⁰⁾ examined two specimens of the genus from South Australia preserved in the Queensland Museum and identifying them with *S. olivacea* wrote: "The species is certainly valid." It may be noticed that at the time, he was recording an example of *S. nigra*, from which, of course, the South Australian specimens are distinct. It is sufficiently significant that he did not mention *S. argus*.

(10) Ogilby, Mem. Queenl. Mus. i, 1912, p. 36.

STIGMATOPORA NIGRA Kaup.

Stigmatopora nigra Kaup, Arch. f. Naturg., xix, 1853, p. 233?

Stigmatopora nigra Kaup, Cat. Lophob., 1856, p. 53; Dum., Hist. Nat. Poiss., ii, 1870, p. 583; Günth., Cat. Fish. Brit. Mus., viii, 1870, p. 190; Cast. P.Z.S., Vict., i, 1872, p. 201 and ii, 1873, p. 39 and Res. Fish. Aust., 1875, p. 48. and P.L.S., N.S.W., iii, 1879, p. 355; Macl., P.L.S., N.S.W., vi, 1881, p. 297; Dunck., Fauna Südwest Aust., ii, 1909, p. 239; Ogil., Mem. Qld. Mus., i, 1912, p. 36; McCull., Aust. Zool., i, 1914, p. 29, text fig. 1, 2, 3 (incomplete).

Stigmatopora hoops Cast., P.Z.S., Vict., i, 1872, p. 203; Macl., P.L.S., N.S.W., vi, 1881, p. 298.

Syngnathus pelagicus Zietz, T.R.S., S.A., xxxii, 1908, p. 298 (not of Linn.).

Fig. 49.

D.35-41 (43): Annuli 17-18 (16)+70 (58-72): sub-dorsal annuli 10-12+6-7: brood annuli 0+14.

Head 1.6 in the trunk and 5.4 to 6.8 in the total length: snout 1.6 to 1.7 in the head: eye 5.0 to 6.3 in the snout and 8.0 to 10.0 in the head. Trunk 1.6 to 2.2 in the tail and 3.2 to 4.2 in the total.

Snout long and slender, twice as long as the postorbital portion of the head, with a low median crest and other ridges similar to those of *S. argus*: head finely pitted: opercles with radiating striae below the well defined keel. Body a little

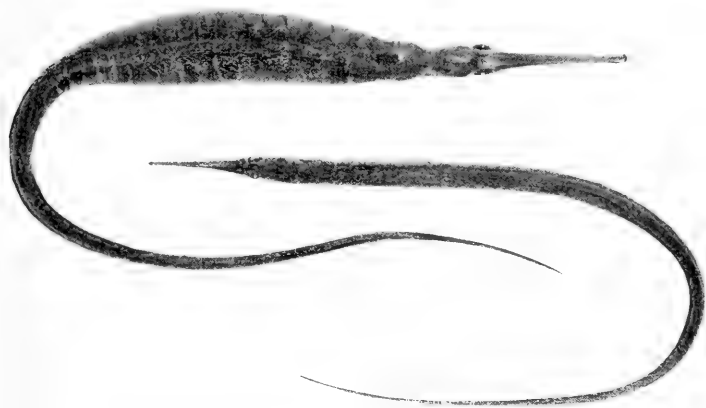


Fig. 49. *Stigmatopora nigra*, female and male.

wider than deep in the male and more than twice as wide as deep in the female: dorsal surface slightly convex. Upper and lower body ridges continuous: the lateral ridge extends on to the anterior caudal scute and, in the female, is produced to form a sharp edge to the greatly expanded body. Tail about half of the total length in the female, longer in the male. Vent situated under the posterior half of the dorsal fin. Several females dredged in Spencer and St. Vincent Gulfs by Sir Joseph Verco and two males collected by Mr. P. Geisler from St. Vincent Gulf: longest example 108 mm.

Colours. Snout dusky. Body light green, with a great number of tiny black dots, massed on the underside to form a dark bar on each scute.

Hab. New South Wales, Victoria, Tasmania, South Australia.

SOLEGNATHUS Swainson, 1839 (hardwickii).

SOLEGNATHUS ROBUSTUS McCulloch.

Solenognathus spinosissimus Zietz, T.R.S., S.A., xxxii, 1908, p. 299 (not of Günth.).

Solegnathus robustus McCull., Endeavour Res., i, 1911, p. 28, pl. ix, fig. 2.

Fig. 50.

D.29-31 (34); P.24-25; A.3; Annuli 27 (26)+48-53; sub-dorsal annuli 0+10.

Head 2.7 in the trunk and 6.4 in the total length: snout 1.9 in the head, its depth equal to one-fifth of its length; eye 3.9 in the snout and 7.4 in the head; narrowest interorbital space less than half the diameter of the eye. Body very deep, 1.7 times deeper than wide. Tail about 2.4 in the total length, its depth behind the dorsal fin 2.75-3.0 in the base of that fin. The last 26-30 tail rings constitute the prehensile portion.



Fig. 50. *Solegnathus robustus*.

McCulloch says that the dorsal fin occupies 10 "body rings", caudal rings being meant; he also gives the length of the head as "3.7 in the trunk", but his drawing shows 2.7 to be intended. The term "broad" used in connection with the character of the snout should probably be read as "deep."

The length of the tail is subject to slight variation; in two of our examples it is less than the distance between the vent and the pectoral fin, in a third it is

as long as the trunk. Specimens are known from Corney Point, Pt. Lincoln, and Flinders Is., the longest being 364 mm.

Hab. South Australia.

PHYLLOPTERYX Swainson, 1839 (foliatus).

- a. Profile of body slightly angular; ventral segmental spines short;
foliate appendages usually simple *foliatus*
aa. Profile of body extremely angular; ventral segmental spines long;
foliate appendages multifid *eques*

PHYLLOPTERYX FOLIATUS Shaw.

Syngnathus foliatus Shaw, Gen. Zool., v, 1804, p. 456, pl. clxxx.

Syngnathus taeniopterus Lacep., Ann. Mus., iv, 1804, p. (184-211), pl. lviii, fig. 3.

Phyllopteryx foliatus Swains., Nat. Hist. Fish., ii, 1839, p. 332, fig. 109; Kaup. Cat. Lophob., 1856, p. 21; Günth., P.Z.S., 1865, p. 327, pl. xiv and Cat. Fish. Brit. Mus., viii, 1870, p. 196; Dum., Hist. Nat. Poiss., ii, 1870, p. 532; Macl., P.L.S., N.S.W., vi, 1881, p. 301; McCoy, Prod. Zool. Vict., dec. vii, 1882, pl. lxx, fig. 1; Dunck., Fauna Südwest Aust., ii, 1909, p. 236.

Phyllopteryx elongatus Cast., P.Z.S., Vict., i, 1872, p. 243 and ii, 1873, p. 70.

Phyllopteryx altus McCoy, Prod. Zool. Vict., dec. vii, 1882, p. 20.

Fig. 51.

D.27-33 (36): P.20-23 (24): A.4: Annuli 17-18+32-37: sub-dorsal annuli 1-2+5-6 (7): brood annuli 0+17-19.

Snout 1.4 in the head: eye 7.1 in the snout and 10.1 in the head in adult examples. Tail 2.5 in the total length.

Snout very long, three and one-half times as long as the postorbital portion of the head, with a pair of small spines on the upper surface behind the middle of its length: a small spine on the front edge of the orbit: supraorbital ridges convergent before the eyes: two spines over each eye, the anterior one being directed backwards, the other laterally: a small patch of bristle-like spines below the hinder part of the orbit and a row of spines on the lower edge of the eye occasionally present: occiput much elevated, terminating in a blunt spine which bears a single appendage: opercles granulated, with raised lines radiating from one or two small spines: a pair of spines in front of the lower half of each pectoral base. A long nuchal spine bearing an appendage: a similar pair on the back behind the middle of the trunk and another pair midway between the ends of the pectoral fins and the vent: a short, blunt spine on each side at the commencement of the dorsal fin: four pairs of compressed and often serrated spines with appendages at equal intervals on the tail behind the dorsal fin: one spine

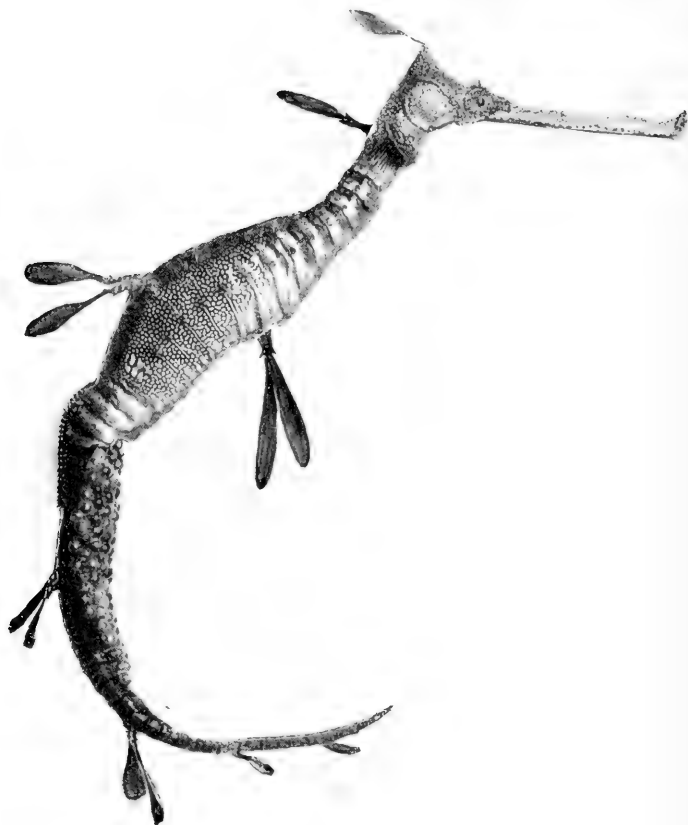


Fig. 51. *Phyllopteryx foliatus*.

from each of the two last pairs is usually missing: each of the appendage-bearing spines terminates in two sharp spikes. Body ridges with series of small, thorn-like spines, those on the dorsal ridge strongest alongside the fin and almost obsolete on the dorsal arch: upper caudal ridge commences on the last two body rings and attains the dorsal profile at the termination of the dorsal fin; the spines on this ridge are strongest anteriorly. Body much compressed in adults, being

three and one-fourth times as deep as wide in a large female, lower in the male: in young examples the body is only one and four-fifths times deeper than wide.

The eggs are large, being about 4.5 mm. in diameter, 120 were attached to the male here illustrated.

Adult examples are 350 mm. in total length.

Life Colours. Back of body dark olive: head and sides of abdomen yellow, with dark lines, forming a fine network, snout brown with round white dots, tip yellow: sides of thorax hyaline, with seven oblique purple bars, similar bars on the abdomen, in outline only. Three purple spots on each side of the vent, the middle spot large. Throat and lower part of trunk deep lemon yellow. Back of tail reticulated like sides of abdomen, sides plain yellow, terminal third wholly black. Spines coloured like the snout, appendages purple with black edges, dorsal and pectoral fins pink. Eggs on male, taken December 6, 1920, ruby coloured. The small tags, as figured by McCoy, beneath the snout, are not present in any specimen we have seen.

Hab. Southern Australia from New South Wales to Western Australia and Tasmania.

PHYLLOPTERYX EQUUS Gunther.

Phyllopteryx equus Günth., P.Z.S., 1865, p. 327, pl. xv and Cat. Fish. Brit. Mus., viii, 1870, p. 107; Dum., Hist. Nat. Poiss., ii, 1870, p. 533; MacL., P.L.S., N.S.W., vi, 1881, p. 302; Dunck., Fauna Südwest Aust., ii, 1909, p. 237.

Phycodurus equus Gill, Proc. U.S. Nat. Mus., xviii, 1895, p. 150.

Fig. 52.

D.35-37: P.21 (19-20): A.4: Annuli 18 (19)+36-40: sub-dorsal annuli 0.1+11: brood annuli, caudal 4th-23rd.

Snout 1.6 to 1.7 in the head: eye 4.8 to 5.1 in the snout and 8.0 to 8.5 in the head: head 1.3 in the trunk, which is 3.3 in the total length.

Snout long, more than twice as long as the postorbital portion of the head: a small spine on the posterior third of each of its upper edges: a pair of small branched filaments beneath the lower jaw and another pair of trilobed appendages behind the middle of the lower edge of the snout: forehead produced forwards and upwards into a sub-quadrangular crest, overhanging the posterior third or fourth of the snout: a pair of spines over the eyes: a bifurcate spine projects laterally from the upper margin of each orbit: occiput much elevated, with two blunt spines on its summit bearing bunches of narrow, branched appendages: a long and slender or feeble spine on the upper angle of the opercle. Nape with a strong spine, the lower half of which is dilated and compressed to form a ribbed

crest with serrated edges; top of spine with two sharp spikes and a long bi- or tri-lobed appendage; a pair of slender spines in front of the lower half of each pectoral base; body compressed, two and one-third to two and two-third times deeper than wide; dorsal profile of body arched; ventral profile with three deep indentations; vent situated in the last. As described by Günther the many spines differ in character and there are three sorts: (a) strong and much compressed,



Fig. 52. *Phyllopteryx eques*.

the base being in some instances equal to the height: such spines terminate in a pair of sharp points and bear long bi- or tri-lobed foliaceous appendages: they are situated as follows: one pair on the arch of the dorsal profile; another pair on each of the abdominal dilations: three to five pairs on the upper edges of the tail, the first pair at the posterior fourth of the dorsal fin: two to three single spines

with appendages near the termination of the tail: (b) long, compressed, flexible, lanceolate (some of them spatulate in old examples), without appendages and often with finely serrated edges: these occur in pairs along the edges of the dorsal surface as far as the second third of the dorsal fin and singly along the middle of the ventral surface between the neck and the vent. Three pairs of very broad compressed spines on the anterior part of the ventral surface of the tail: (c) small sharp spines, situated singly along the lateral line and terminating a short distance beyond the vent: these may be somewhat scattered and in old examples some of them are spatulate with serrated edges; another series along each of the lateral abdominal edges. Tail about half of the total length. Anal fin as high as the eye. The egg-bearing area occupies the ventral and lateral surfaces of three-fourths of the length of the tail: each egg is about 4 mm. in diameter. Adult examples are about 300 mm. in total length.

Colours. Pale brown in spirit, darker above: sides with a white or silvery, dark-edged stripe across each body scute: foliaceous appendages dusky.

Hab. South Australia.

ACENTRONURA Kaup, 1856 (*gracilissima*).

ACENTRONURA AUSTRALE sp. nov.

Fig. 53.

D.15: Annuli 12+38: sub-dorsal annuli 3+1: brood annuli 0+12.

Female. Snout 2.0 in the head: eye 1.8 in the snout and 5.3 in the head: head 2.0 in the trunk and 6.8 in the total length: trunk 2.0 in the tail.

Snout shorter than the postorbital portion of the head: supraorbital spines blunt, triangular, each bearing a tufted filament longer than the snout and converging before the eyes where they form a small spike: occiput elevated, much compressed, a tufted filament on its summit and one on each side of the base posteriorly: a low nuchal ridge, highest anteriorly: opercles smooth, without spines or ridges. Body deepest anteriorly, being nearly twice as deep as wide: ridges rather feebly raised, but the angles well defined: the upper body ridge terminates below the middle of the dorsal fin and above the origin of the caudal ridge, which forms the upper angle of the tail: the tail is quadrangular in section: median lateral ridge continuous with lower caudal ridge: lower lateral and ventral ridges terminate at the vent: a very feeble spine at the intersection of these ridges with the faintly raised margins of the scutes: about every third spine bears a tufted filament. Base of dorsal fin elevated: a minute anal fin.

Described from an example 54.5 mm. in total length from St. Vincent Gulf.

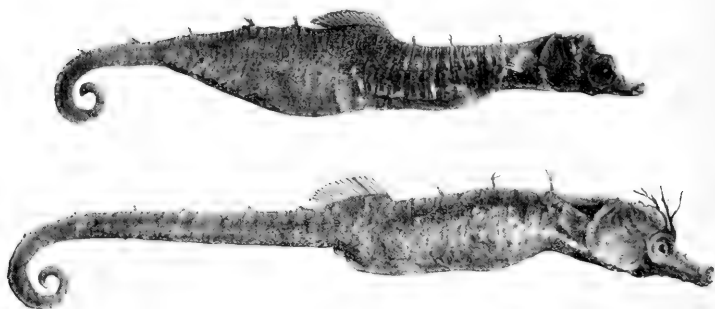


Fig. 53. *Acentronura australe*, male and female.

Male. Snout 3.2 in the head; eye 1.5 in the snout and 5.0 in the head; head 1.7 in the trunk, which is 1.4 in the tail.

Snout two-thirds as long as the postorbital portion of the head, supraorbital spines triangular, compressed, sharp, without filaments; spine in front of the eyes extremely small; a few filaments on the body and tail spines but none on the head. Upper lateral ridge on one side of the body continuous with upper caudal ridge; that on other side not continuous and terminating below the middle of the dorsal fin as in the female example. Body three times as deep as wide.

An example 46 mm. in total length from the same locality?

Colours. The colours of both specimens are completely bleached after long immersion in spirit.

The genus was named from specimens obtained in Japan and was recognized from India by Day, who identified his specimens with the same species (*A. gracilissima*). It may be doubted if the species are identical. Ours appears to be different, the dorsal edges being not continuous with the tail whereas in *A. gracilissima* they are said to be unbroken; the number of body rings is perhaps also different.

Hab. South Australia.

HIPPOCAMPUS Rafinesque, 1810 (hippocampus).

- | | | | | | | |
|-----|---------------------------------------|----|----|----|----|-------------------------|
| a. | Dorsal rays 26-31 on about 7 annuli | .. | .. | .. | .. | <i>abdominalis</i> |
| aa. | Dorsal rays 16-22 on 3 to 5 annuli | | | | | |
| | b. Snout long, half the head | .. | .. | .. | .. | <i>novae-hollandiae</i> |
| | bb. Snout shorter, one-third the head | .. | .. | .. | .. | <i>breviceps</i> |

HIPPOCAMPUS ABDOMINALIS Lesson.

Hippocampus abdominalis Less. in Ferussac, Bull. Sci. Nat., xi, 1827, p. 127; Kaup, Cat. Lophob., 1856, p. 17, pl. iii, fig. 3; Dum., Hist. Nat. Poiss., ii, 1870, p. 524; Günth. Cat. Fish. Brit. Mus., viii, 1870, p. 199; MacL. P.L.S., N.S.W., vi, 1881, p. 304; Waite, Rec. Cant. Mus., i, 1907, p. 15 and 1911, p. 175, pl. xxviii; Dunk., Fauna Südwest Aust., ii, 1909, p. 247; McCull., Endeavour Res., i, 1911, p. 29, pl. vi, fig. 1 and 2, 1914, p. 94.

Hippocampus graciliformis McCull., Endeavour Res., i, 1911, p. 29, pl. vi, fig. 2.

Fig. 54.

D.28 (26-31): P.16 (14-17): A.(4). Annuli 11 (13)+47 (44-49): sub-dorsal annuli + (3-5)+3 (5): brood annuli 0 (1)+5 (7).

Snout 2.5 in the head: eye 2.5 in the snout and 6.0 in the head. Head 1.7 in the trunk and 6.8 in the total length: trunk 2.6 in the tail.

Snout as long as the postorbital portion of the head: a pair of simple supra-orbital spines converges before the eyes to form a very short and high crest on the proximal portion of the snout: narrowest interorbital space equal to half the diameter of the eye: occiput elevated, compressed, with some low knobs: a simple spine on the upper angle of the opercle and three others at equal intervals on the hinder margin: opercle with raised lines radiating from a low knob behind the eye. Body two and one third times deeper than wide: the upper ridge terminates below the end of the dorsal fin: caudal ridge commences on the last second body scute and forms the upper angle of the tail, which is quadrangular in section: median lateral ridge continuous with the lower caudal ridge: lower lateral ridge terminates in advance of the vent: abdomen with a keel: edges of each scute raised and produced as blunt spines or knobs where they intersect the ridges. Tail more than twice as long as the trunk. A single male from the Coorong 140 mm. in length. McCulloch also records two specimens from Investigator Strait.

Colours. Completely bleached: a female example collected by Mr. Harold Sexton from Devonport, Tasmania, is beautifully marked as follows: Snout pale yellow, with dark, circular spots on the posterior half and others almost encircling the eye: opercles and occiput darker, the former with dark brown spots. Back of body dark brown: sides dusky with dark brown, semicircular marks: abdominal keel, spines and ridges lighter. Tail dusky, darker above, with about twelve light yellow rings. Dorsal fin pale, irregularly mottled with dark brown.

Hab. New South Wales, Victoria, South Australia, and Tasmania.

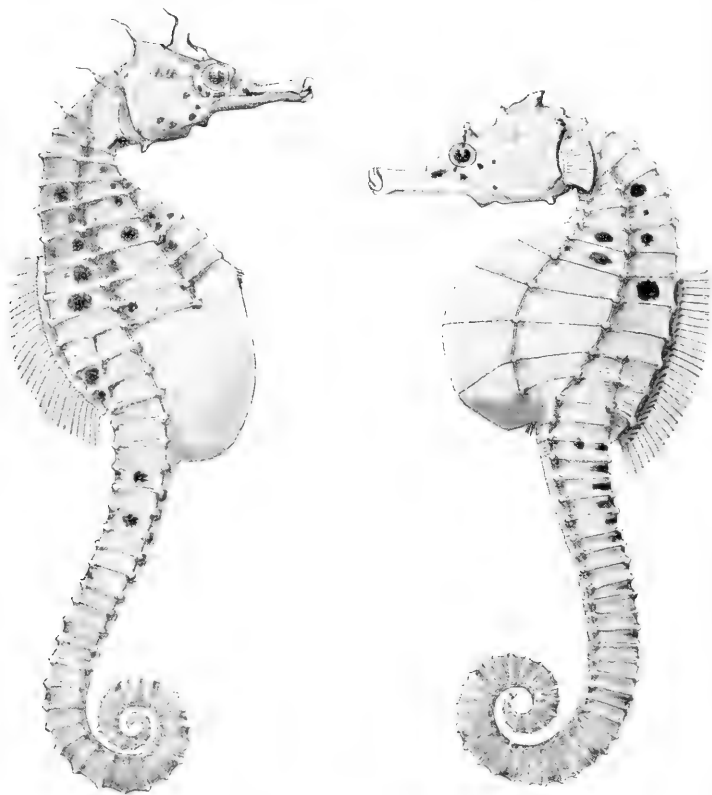


Fig. 54. *Hippocampus abdominalis*, male and female.

HIPPOCAMPUS NOVAE-HOLLANDIAE Steindachner.

Syngnathus hippocampus Shaw in White's Voy. N.S.W., 1790, p. 295, pl. 1, fig. 2 (not of Linn.).

Hippocampus novae-hollandiae Steind., Sitzb. Akad. Wiss. Wien, liii, 1866, p. 474, pl. i, fig. 2; Dum. Hist. Nat. Poiss., ii, 1870, p. 517; Günth., Cat. Fish. Brit. Mus., viii, 1870, p. 201; Cast., P.Z.S., Viet., i, 1872, p. 197; MacL. P.L.S., N.S.W., vi, 1881, p. 305; Dunck., Fauna Südwest Aust., ii, 1909, p. 248.

Fig. 55.

D.17 (16): P.16 (15): A.4: Annuli 11+34-36 (33): sub-dorsal annuli 3 (2)+1: brood annuli 1+4.

Head 1.2 in the trunk and 5.3 in the total length: snout 2.0 in the head: eye 3.5 in the snout and 7.0 in the head. Trunk 4.3 in the total.

Snout as long as the rest of the head: the supra-orbital ridges converge to form a slight elevation in front of the eyes and each terminates posteriorly in a low, blunt spine over the hinder margin of the eye: narrowest interorbital space equal to half the diameter of the eye: one or two low protuberances on the anterior profile of the compressed occiput: coronet with five or six blunt points: opercle with faintly raised lines radiating from a knob behind the eye, a blunt spine on the upper angle and three others on the hinder margin. Nuchal crest high. Body three and one-third times deeper than wide: the upper body ridge terminates below the end of the dorsal fin: upper caudal ridge commences on the ninth or tenth body scute and forms the upper angle of the tail, which is quadrangular in section: median lateral ridge continuous with lower caudal ridge: lower lateral and ventral ridges terminate at the vent. Edges of each scute ridged, the ridges produced as blunt spines or protuberances at the points of intersection with the angles of the body: every third or fourth spine on the dorsal profile more pronounced: in old examples all the spines are markedly obtuse. Spencer Gulf.

Colours. Specimens examined bleached.

Hab. South Australia, Victoria, and New South Wales.

HIPPOCAMPUS BREVICEPS Peters.

Hippocampus breviceps Peters, Mon. Akad. Wiss. Berlin, 1869, p. 710; Dum., Hist. Nat. Poiss., ii, 1870, p. 521; Günth., Cat. Fish. Brit. Mus., viii, 1870, p. 200; Cast., P.Z.S., Vict., i, 1872, p. 168; MacL., P.L.S., N.S.W., vi, 1881, p. 305; McCoy, Prod. Zool. Vict., dec. vii, 1882, pl. lxx, fig. 2; Dunck., Fauna Südwest Aust., ii, 1909, p. 247.

Hippocampus tuberculatus Cast., Res. Fish. Aust., 1875, p. 48.

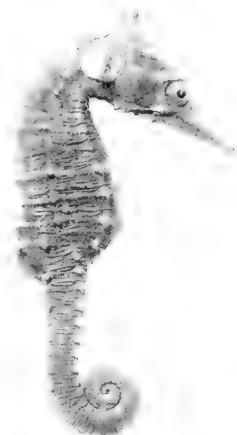


Fig. 55. *Hippocampus novae-hollandiae*.

Fig. 56.

D.19-21 (22): P.14 (15): A.4: Annuli 11+38+42: sub-dorsal annuli 3-4+1: brood annuli 1-2+3-4.

Snout 3.0 in the head: eye 2.1 in the snout and 6.5 in the head: head about 1.5 in the trunk.

Snout short, about two-thirds as long as the postorbital portion of the head: the supraorbital ridges converge to form an elevation in front of the eyes and each terminates posteriorly in a blunt spine over the middle of the eye: eye almost encircled with a series of low tubercles: a small spine in advance of the elevated occiput, which has some blunt knobs on its summit: a small spine at the upper

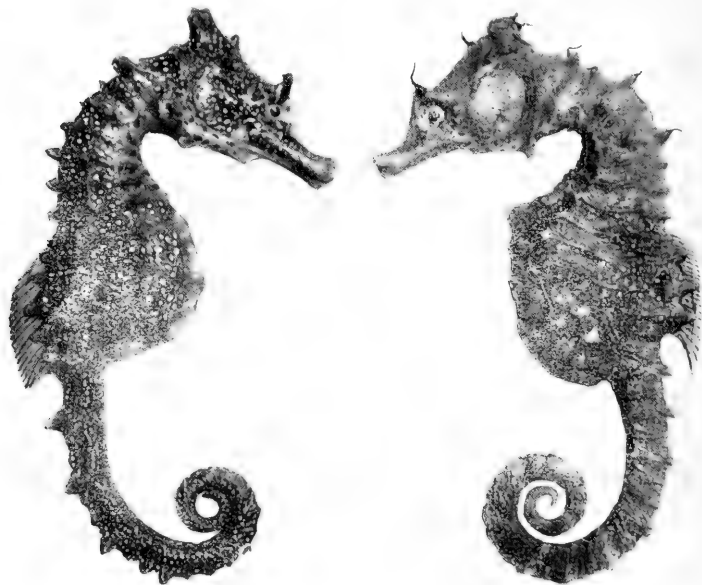


Fig. 56 *Hippocampus breviceps*, male and female

angle of the opercle and two or three others on its hinder margin: opercles with raised, radiating lines. Base of dorsal fin elevated. The upper body ridge terminates below the end of the dorsal fin: the upper angle of the tail, which is quadrangular in section, commences on one of the last two body scutes: median lateral ridge continuous with lower caudal ridge: lower lateral ridge terminates opposite

the vent. Edges of each scute ridged, the ridges produced as spines or protuberances at the points of intersection with the angles of the body: every alternate or third spine on the dorsal aspect more pronounced, those on each side of the fin often strongly produced upwards: an examination of a large series of specimens indicates that the filaments attached to the spines vary greatly in length, number and character, irrespective of age or sex; some of the variations are as follows: (a) no traces of filaments: (b) simple filaments as long as, or longer than, the snout, situated on the supraorbital, occipital, upper opercular and anterior dorsal spines and five or six on the coronet: (c) tufted, branched or simple filaments, occurring on all spines excepting the ventrals. In the male the body is considerably produced above the large brood pouch, where it is more than twice as deep as wide: several examples have the pouch tightly packed with ova, easily seen through the semi-transparent skin. In the female the body is not so deep. Largest specimen 70 mm. in length, dredged in St. Vincent Gulf by Sir Joseph Verco. Examples also from Spencer Gulf.

Colours. Head dark purplish brown, with numerous white, dark-edged ocelli: opercles with additional brown spots: underside of snout and chin pale with dark brown markings: several white lines running through the eye or the latter encircled by a series of brown dots. Body and tail dark purplish brown, with numerous small, white, dark-edged ocelli: underside of trunk pale, with darker markings anteriorly. Tail with about thirteen lighter cross bars below, or with indications of lighter rings.

Hab. South and Western Australia, New South Wales, Victoria, Tasmania

RECENT LITERATURE.

Duncker listed the literature of the Australian Syngnathidae up to 1909; additions to his list are given below. Castelnau's "Researches on the fishes of Australia," which perhaps Duncker had not seen, and which title in any case does not convey the following information, was published in 1875, for the Philadelphia Centennial Exhibition, 1876.

- Duncker, *Fauna Südwest Australiens*, ii, Pisces, 1909, p. 233-250.
 Günther, *Fische d. Südsee*, iii, 1910, p. 428-436.
 McCoy, *Prod. Zool. Viet.*, dec. vii, 1882, pl. lxx.
 McCulloch, *Rec. Aust. Mus.*, vii, 1909, p. 317, 318.
 .. *Endeavour Res.*, i, 1911, p. 26-29, and ii, 1914, p. 94.
 .. *Rec. W.A. Mus.*, i, 1912, p. 82, 83.
 .. *Aust. Zool.*, i, 1914, p. 29-31.

McCulloch & Waite, Rec. S.A. Mus., i, 1918, p. 39, 40.

Ogilby, Mem. Queensl. Mus., i, 1912, p. 34-36.

Waite, Rec. Cant. Mus., i, 1911, p. 173-175.

Zietz, A., Trans. Roy. Soc. S. Aust., xxxii, 1908, p. 298, 299.

OBSERVATIONS ON A SERIES OF ARTIFICIALLY DISTORTED SKULLS.

By R. W. CILENTO, M.B., B.S., CAPT. A.A.M.C.,

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UNIVERSITY OF ADFLAIDE.

Plates xxxiv-xlii, and Text figs. 57-63.

Topinard (¹⁶), *a propos* of artificial deformation, very truly said that "Man is an intelligent animal, but also a very whimsical one. The structure of his brain incites him to the noblest deeds as well as to the most ridiculous practices, such as cutting off the little finger, scorching the soles of the feet, extracting the front teeth, or deforming the head, simply because others have done so before him." Whatever the cause that originally incited primitive man to deliberate skull distortion, the practice became an extraordinarily widespread one, and once established, habit and usage so firmly fixed the custom that even to-day we find evidences of it throughout the world.

First described by Herodotus and Hippocrates (¹⁷) among the Macrocephales near the Sea of Azoff (where one occasionally discovers instances still), the practice also engaged the attention of Aristotle, Strabo, and Pliny; and observers of the last century have noted its occurrence in ancient and contemporaneous skulls of the most widely varied races and periods.

Specimens have been obtained in France (¹) (*déformation Toulousaine*) in Limousin, Normandy, and Brittany; in Holland on Marken Is. (²); in Russia, especially in the Caucasus and the Crimea; in Lower Hungary; Switzerland; Belgium; West Germany; Burgundy; Silesia; Italy; England; Asia Minor; Africa (e.g. among the Monbuttu or Mangbetu); in India (in the Punjab) and elsewhere.

The chief centre, however, lies in America (¹¹), where, in the pre-Columbian period, skull-distortion was especially widespread throughout Peru, North Mexico, among the old cliff-dwellers and mound-builders, in the Southern States, the Mississippi valley, Florida, the Caribbean Isles, and throughout the Argentine. To-day it is still widely practised among the Apaches, Navajos, all the Pueblo tribes, the flathead Indians of the Northwest Coast, and in scattered areas of Central and South America.

There exists a secondary centre of importance in our own South Seas, especially in those districts where custom insists on some particular method (19), Waigiou Is., and as far north as Borneo, the Celebes, and Mindanao.

In very many cases the deformity is unintentional and is produced, especially in those districts where custom insists on some particular method of cradling, such as that of many nomadic tribes who bind the infants fast to a board with strips of hide, and thus induce marked occipital flattenings. Even a hard resting place such as the earth (Korea) is sufficient to slightly flatten the back of the head, while bonnets that are bound beneath the chin or the nape of the neck, and certain methods of coifing are frequent factors in producing a flattening of the vertex. Neuhaus (12) figures a deformation of the vertex resulting from the pressure of the headband that supports the weight of baskets carried native-fashion; and the absence of any frontal depression or deformity in many of the ancient deformed skulls suggests that these may often be the unintentional results of a particular decubitus.

The methods by which the deformities are deliberately produced vary according to the tribe and family, and modifications in the consequent distortions have led to the distribution of the skulls among a number of types. Gosse (7) has described sixteen varieties, subsequently reduced to five; Lunier (10) seven. Topinard, from further investigation, is content to admit two types only, "the one, dressé; the other couché," and in the opinion of the writer this moderate classification is sufficient to include the remaining varieties, which may be regarded as local gradations and modifications requiring no separate distinction.

Topinard says: "In the first kind, more or less forcible pressure and counter-pressure, varying also in height and in extent, have been exerted at the two extremities of the skull, thus shortening the antero-posterior and lengthening the vertical and frequently the transverse diameter. In the second the length is, on the contrary, increased. Whether the deformations be symmetrical or asymmetrical is immaterial; sometimes we should expect the latter, but most frequently this would be unintentional, and the result of a badly-conducted operation. When in the first kind, the dressé, the most continuous pressure was exerted on a great extent of the occiput, while at the forehead there was only slight counter-pressure, the result was simple occipital deformation, or a vertical occiput. This is observed on the coasts of Peru, among some Puelchas, in one of the tribes of the Vancouver Archipelago, in Malacca, and even in France. If the sides of the skull were at the same time compressed or supported, we should get the quadrangular deformation met with in South America and among the Paws mentioned by Morton.

The pressure on the occipital being increased, and that of the forehead being continued, we should arrive at the raised cuneiform deformation (*déformation cunéiforme relevée*) of Gosse, which is characteristic of the Nahuas, their descendants, the Natchez, certain of the Chinooks, and in another part of the world, the Tahitians. The most celebrated variety is the *déformation trilobée*, in the form of a trefoil, of the Island of Sacrificios, in the Gulf of Mexico, which is produced by a supplementary band beginning at the occiput, passing up over the mid-line and bifurcating in the middle of the sagittal suture to reach the temporal fossae. Things remaining thus, if the frontal pressure is made higher the middle lobe disappears, and we have the cordiform deformity and not the bilobed.

"In the second kind, or *couché*, the frontal pressure was greater, it being exerted over the whole surface of the bone, while the counter-pressure was exerted lower, was very slight, or none at all (the *point d'appui* then passed through the vertebral column): the skull therefore became elongated behind without obstruction. In the generality of cases, however, a supplementary pressure was made on the vertex. Hence we find on the upper surface of these skulls from before backwards: (1) a frontal depression or flattening, (2) a bregmatic projection, (3) a post-bregmatic depression, (4) a swelling formed by the whole mass of the receding skull.

"The flattening of the forehead—which is sometimes immoderately receding—took the name among certain peoples, of deformation of courage (*déformation du courage*). In the kind termed *dressé*, the forehead was more frequently widened and more elevated; in this, it is usually narrower, longer and lower. One of the consequences of this is that the roof of the orbits is depressed and that the eyeballs are prominent by being made to project. There are three species of this deformation or distortion: (1) the cuneiform deformation (*déformation cunéiforme couchée*) of Gosse, which is very marked in the Caribs of the Antilles, the northern Guaranis, and some North American tribes near Vancouver Island. The majority of the Chinooks, and other flatheads (*têtes plates*) from the Columbia River, described by Morton, are in the same category. (2) The elongated symmetrical deformation (*déformation symétrique allongée*) of Morton, in use among the ancient Aymaras. (3) The macrocephalic deformation (*déformation macrocéphale*) of Europe, which in France has given origin to the annular (*annulaire*) variety of Foville, and the bilobed (*bilobée*) of Lunier—observed in the departments of the Lower Seine and the two Sèvres—and to the simple frontal or 'Toulousaine' variety, so named from the country in which it has been specially noticed.

"In the annular, the band extends from a point behind the bregma vertically below the chin, by crossing a circular furrow which divides the head into two portions, these being less decided in the annular than in the bilobed variety. In the 'Toulousaine' the line starts from the occiput, reaches the forehead obliquely, and there exerts its principal pressure. The macrocephalic unites the two systems, so that the frontal depression of the Toulousian and the post-bregmatic depression of the annular exist there, the two being separated by a bregmatic projection."

In the one kind, then, the dressé, we have a shortening of the antero-posterior diameter and a lengthening of the vertical and transverse, thus tending to produce in dolichocephalic skulls a condition of brachycephaly, and to render brachycephals ultra-brachycephalic.

In the other, the couché, there is a lengthening of the anteroposterior diameter causing ultra-dolichocephaly or, at least, such a tendency.

So marked is the change, as compared with the skull-form in untreated individuals of the same race, that one cannot but speculate as to whether, by a long course of distortion extending over hundreds of years, permanent dolichocephalic and brachycephalic subdivisions may not have arisen from an original mesaticephalic stock. Although such a possibility is regarded as highly improbable it is interesting to recollect that many primitive races are mesaticephalic, and one notes, in this connection, the assertion of Talbot (44) that even among negroes dolichocephaly is tending to disappear under present conditions, while brachycephaly is similarly tending toward mesaticephaly. Whether or not this is due (if the statement is true) to altered living conditions, a mixture of races, or, indeed, to a gradual return to an original normal type, cannot here be discussed. Topinard was inclined to believe that at least some races of brachycephals may thus have originated; while Hippocrates, in his reference, remarks:

"I will pass over the smaller differences among the nations, but will now treat of such as are great either by nature, or custom, and first concerning the Macrocephali. There is no other race of men which have heads in the least resembling theirs. At first, usage was the principal cause of the length of their head, but now nature co-operates with usage. They think those the most noble who have the longest heads. It is thus with regard to the usage: immediately after the child is born and while the head is still tender they fashion it with their hands and constrain it to assume a lengthened shape by applying bandages and other suitable contrivances whereby the spherical shape of the head is destroyed and it is made to increase in length. Thus at

first usage operated, so that this constitution was the result of force, but in the course of time, it was formed naturally so that usage had nothing to do with it."

As mentioned above, however, it is usually asserted that the deformity never becomes hereditary.

Among the varied races that inhabit the Islands of the Pacific, both the types of deformity referred to are common, often existing side by side, and it is intended to demonstrate by means of the series of skulls described below, and by papers elsewhere, the main differences resulting from the practice.

Permission to describe these specimens was obtained through the courtesy and kindness of the Board of Governors of the South Australian Museum, and of the Director, Mr. Edgar R. Waite, who, himself, collected in New Britain in 1918 and took some of the photographs herein reproduced.

The specimens comprise: 5 skulls from New Britain; 1 from Mallicollo, New Hebrides; and, for purposes of contrast, 1 from North America. All but one are skulls of males.

In New Britain, where the majority of the skulls were collected, the method of compression is a very simple one. The heads of the newly born male infants, at that time as easily moulded as wax, are tightly bound round with a bandage of coconut-nut fibre, which may or may not include the superciliary ridges, anteriorly, and which exerts its pressure posteriorly, on the occipital bone. (Plate xxxiv.).

The result, as one would expect, is the production either of a markedly conical head; or, in cases where the pressure falls principally on the anterior and posterior poles, a vertical occiput. This form is chiefly seen among the Tahitians, Malays, some of the New Hebrideans, and the inhabitants of Waigiou Is. and Warrior Is.

The process is a long one, the bandages often being retained until the child is able to walk, and not infrequently it is fatal. Kane, in his "Wanderings," says: "It might be supposed that from the extent to which this is carried, that the operation would be attended with great suffering, but I never heard the infants crying or moaning, although I have seen their eyes seemingly starting out of the sockets from the great pressure. But, on the contrary, when the thongs were loosened and the pads removed I have noticed them cry until they were replaced. From the apparent dulness of the children whilst under the pressure, I should imagine that a state of torpor or insensibility is induced and that the return to consciousness by its removal must naturally be followed by a sense of pain."

Where the child survives, opinions are divided as to whether or not the distortion of skull and brain has a direct influence on the intelligence of the individual.

Wilson (²⁰) says of the Koskimos of Vancouver Is.: "The process seems neither to affect the intellect nor the courage of the people, who are remarkable for cunning as well as fierce daring, and are the terror of the surrounding tribes"; and later, "The evidence that cranial deformation leaves the intellect unimpaired rests on more absolute proof. The flathead tribes are in the constant habit of making slaves of the neighbouring roundheaded Indians, whom they treat with great barbarity and though living among them they are not allowed to flatten or modify the form of their infants' heads, that being a distinguishing mark of freedom and the badge of aristocratic descent. They look accordingly, on the whites with contempt, as a people who bear in the shape of their heads, the hereditary mark of slaves. They are, moreover, acute, and intelligent, generally drive a hard bargain in the sale of their furs, possess singular powers of mimicry and have been noted for very retentive memories—being capable of repeating passages of some length with considerable accuracy when recited in their hearing.

"It would seem, indeed, that alike in the time of Hippocrates and in our own day an idea has prevailed among those that used this strange barbaric practice, that they thereby not only conferred an added grace to the form but contributed to the mental superiority of those who acquired this peculiar symbol of aristocracy."

In this view Wilson is supported by common opinion; Morton and Catlin agreeing except in so far as the practice results in premature synostosis of sutures.

Torquemada (¹⁷) says: "As to the custom of appearing fierce in war, it was in some provinces ordered that the mothers or their attendants, should make the faces of their children long and rough, and the foreheads broad, as Hippocrates and Galen relate of the Macrocephali, who had them moulded by art into the conical and elevated form."

It will be recollected that the ferocious hordes of Attila practised this deformation, as did also the Avars who succeeded them, and unreasoning ferocity is indeed characteristic of many tribes that practise cranial distortion. It was from this attribute of its inhabitants that Warrior Is. obtained its name. An excerpt from Captain Moresby's "Discoveries in New Guinea" (1876) states that "though not more than 2 miles in circumference, Warrior Is. is the home of one of the most powerful tribes in Torres Straits,

The natives build themselves formidable war canoes 50 to 60 feet long, and the powerful men that man them are armed with 6-foot bows, and send the poisoned arrows true to the mark at 80 yards. They cultivate the soil for yams, taros, and sweet potatoes. In former years they attacked a man-of-war when becalmed near the island and were with difficulty driven off. They have always been an aggressive people." Animal ferocity, however, can be advanced quite as well as an evidence of degeneration, as of intellect, and many writers entirely disagree with the common opinion.

Gray (8) from personal experience says: "As a general thing the tribes that have followed the practice of flattening the skull are inferior in intellect, less striving and enterprising in their habits, and far more degraded in their morals than other tribes," while Domenech (5), supported by Cox (3), Thornton (15), Strickland (13), Townsend (18), and others, affirms that flat-heads are more subject to apoplexy than others. Foville (6), dealing with the French districts, declares that not only cranial irregularities of all types but also epilepsy, idocy, and insanity, were exceedingly frequent.

Personal observation of a few cases has led the writer to the conclusion that the power of concentration, attention, and the sense of responsibility are deficient in natives so treated, and a high rate of epilepsy may explain the great esteem in which the natives in many areas hold the associated practice of trephining. It is freely admitted that observations on these points were too meagre and haphazard to justify a general deduction.

The cranial peculiarities now to be dealt with, however, are more constant and more easily demonstrable.

The Registration Numbers are those of the South Australian Museum.

SPECIMEN 1.

Plates xxxv and xxxvi, and Fig. 57.

Skull. Adult, aet. c. 25. Hypsi-steno-dolichocephalus artificialis.

Prognathous, mesoseme-megaseme, leptorrhine, dolichuronic.

Capacity—1340 cc.

Papuo-melanesian: Ablinghi, S. Coast New Britain. Reg. A. 11425. (*Coll.* Captain G. W. Mostyn.)

This is a magnificent specimen of the typical "pinhead" skull.

From in front one is struck by the long horizontally extended outline, while from above the skull has the form of an exceedingly narrow ellipsoid. The frontal bone is greatly flattened and obliquely receding; concavo-convex from

before backwards and from side to side. Anteriorly, there is no evidence of the metopic suture, and the glabella and superciliary ridges are markedly developed. The coronal suture is sharply inclined posteromedially, very slightly dentated in its *pars bregmatica*, and somewhat more so in its *pars complicata*. At either stephanion, irregular stellate Wormian bones have been developed, and at the left pterion is a large "Os epiptericum." The parietal eminences have been completely obliterated, the greatest width falling below the squamosoparietal suture. In the sagittal suture at the obelion there appears one large median parietal foramen.

The occipital bone, narrow, elongated, and flat, meets the parietals in a very denticulated lambdoid suture, marked by a Wormian on the right side, and, well up in the angle included by the converging arms of the suture (slightly to the left of the midline) presents a flattened circular exostosis 1 to 2 cm. in diameter.

A small drop-like exostosis appears on the posterior aspect of the right mastoid.

Grooves of compression are obvious, and proceed from the frontal to the occipital bones continuously. From before backwards one notes the frontal depression, the bregmatic swelling, and the post-bregmatic depression, already referred to as appearing in distorted skulls of the couché type. Midway between the lambda and the mastoids on either side is a marked groove broad and shallow, tending to disappear posteriorly.

The orbits vary in width, being 3.8 cm. (right) and 4.1 cm. (left), while the height of each is 3.4 cm.

The superior orbital margin recedes slightly, exposing the fossa for the lacrimal canal; on either side there is a very narrow lacrimo-ethmoidal suture marking a strong tendency towards a fronto-maxillary union. The lacrimal bones are continued forward to the anterior aspect of the inferior orbital margin by means of an interposed ossicle.

On the left the supraorbital notch is present, on the right a tri-radiate foramen, the infraorbital suture is ossified on both sides. The malar bone enters into the formation of the inferior orbital fissure laterally; the zygomata are widely separated from the infratemporal fossae, the skull being phaenozygous.

The nasal aperture is pyriform and its lower margin infantile. A prominent nasal spine overhangs small praenasal fossae. All but five teeth have been lost post mortem; these are sound, well-rooted, and are free from disease, as is also the alveolar margin.

In *norma basilaris* there are several points of interest. The palate is elliptical, there are remains of the intermaxillary suture a few mm. in extent; the palatine suture posteriorly is irregularly cruciform (one palate bone being slightly wider than the other); and a torus takes the place of the usual postnasal spine.

The basilosphenoid suture is almost entirely fused; the pharyngeal spine replaced by a pit.

At the anterior border of the oval foramen magnum is a distinct facet for articulation with the odontoid of the axis.

The coronal, sagittal and lambdoid sutures are patent throughout.

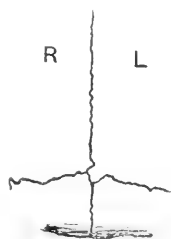


Fig. 57
Palatomaxillary sutures

SPECIMEN 2.

Plate xxxvii and Figs. 58, 59.

Skull. Adolescent, aet. c. 18-20. Dolichocephalic; Prognathous; mesosemic; leptorrhine; dolichuronic.

Capacity—1190 cc.

Papuo-melanesian: Ablinghi, S. Coast New Britain, Reg. A. 11426. (Coll. Dr. A. C. Magarey.)

This specimen has been stained dark brown, probably by smoke, and although its deformation is not so extreme as that of Specimen 1, it is of a very general type.

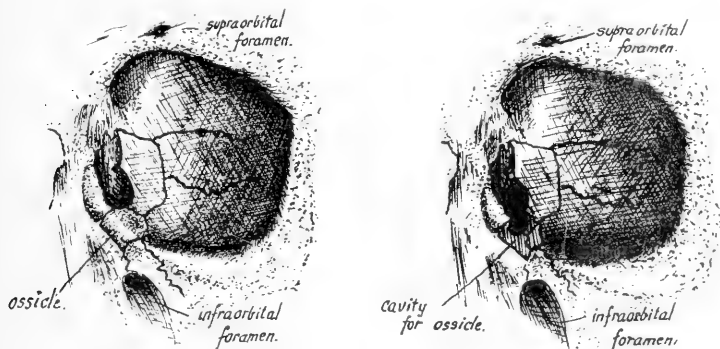


Fig. 58. Left orbit showing aberrant ossicle, present also on right side and in Specimen 1

Laterally, the bregmatic projection is well marked, and the narrow ellipsoidal character of the skull is very noticeable from above. The frontal bone resembles the frontal of Specimen 1, but its distinctive abnormalities are not so well developed. The coronal suture is markedly serrated in the *pars complicata*. The left pterion presents two superimposed epipteric bones, and possibly the remains of a third (fused).

By means of this fusion there exists a left squamosofrontal suture.

The parietal eminences are present to a slight degree, and one parietal foramen exists on the right parietal bone. The sagittal suture is well dentated. The lambdoid suture is extremely irregular, and contains a number of Wormian bones, with indications of the previous presence of others. They are specially marked on the right side. There is a strong occipital torus. The grooves of compression are present as in Specimen 1.

The orbits are equal in breadth and in height, the ratios being 3.9 W. 3.3 H. The infraorbital suture is present on both sides, and the malar bones are very slightly included in the inferior orbital fissure, the area on the right being but a pin-point: that on the left only a few mm. This non-inclusion of the malar bones in the inferior orbital fissure in cases where the infraorbital suture persisted, has been noted in many other skulls.

The lacrimo-ethmoidal suture is of normal width.

The right supraorbital notch is duplicated, and on the left is replaced by a single foramen.

The lacrimal bones are continued forward to the inferior margin of the orbit by means of an interposed bony ossicle (see fig. 58).



Fig. 59. Palato-maxillary sutures.

The inferior border of the nasal aperture is infantile, and small subnasal fossae are present below and lateral to a well-marked subnasal spine.

Of the teeth only 11 remain, the rest having been lost post-mortem. The upper third molars are just descending; the lower have attained their full development. No caries is present.

There is little of importance in the norma basilaris. The anterior border of the foramen magnum has been broken away; a post-condyloid canal exists on the right; none is present on the left.

The sutures of the skull are everywhere patent, including the basi-sphenoid, which is beginning to show early signs of fusion. Fig. 59.

SPECIMEN 3.

Plate xxxviii, and Fig. 60.

Skull. Adolescent, act. c. 18-20.

Dolichocephalic.

Capacity—1185 cc.

Papuo-melanesian; Ablinghi, S. Coast New Britain. Reg. A. 11427. (Coll. Dr. A. C. Magarey.)

This skull is an exceedingly light one, and less marked in the extent of its deformation than either of the previous specimens.

In *norma verticalis* it is a medium ovoid, and in *norma lateralis* presents the bregmatic swelling between two depressions already described for 1 and 2. The bony ridges are poorly marked; the sutures open. A right-angled bend in the coronal suture at the bregma indicates an original articulation between the right parietal and the left frontal. Epipteric bones are developed in both pterionic angles. On either side at least three epipteric laminae are superimposed, those on the left side being the larger.

The parietal eminences are strongly marked and their prominence accentuated by the marked compression grooves passing on either side from the post-bregmatic area to the occipital bone midway between the lambda and the mastoids. One exceedingly small right-sided parietal foramen is present; the main blood return probably having been by means of a large median foramen in the squama of the occipital bone that emptied into the torcular Herophili.

The lambdoid suture is extremely serrated, and encloses several large Wormian bones more or less symmetrically disposed.

There is no torus occipitalis.

The orbits are unequal in size, being 3.5 W, 3.2 H (right) and 3.4 W, 3.2 H (left). The supraorbital ridges and glabella are slight. The supraorbital notch is duplicated on the right, and on the left there is a broad shallow groove surmounted by a foramen. Infraorbital sutures are present on both sides, and the malar bones are excluded from the inferior orbital fissure by frontosphenoidal sutures. The lacrimo-ethmoidal sutures are very narrow. The nasal aperture is pyramidal and sharp edged. A prominent subnasal spine overhangs small praenasal depressions, and is continued down as a slight median ridge.

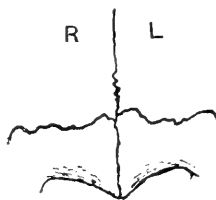


Fig. 60
Palatomaxillary sutures.

The palatine suture is irregularly cruciform (Fig. 60). The vomer consists still of two partly fused plates, and presents a V-shaped subsphenoidal cleft. The basisphenoid suture is partially synostosed; the foramen magnum is almost circular, and there are post-condyloid canals on both sides, that on the left being the larger.

SPECIMEN 4.

Plate xxxix, and Fig. 61.

Skull. Adult, aet. c. 35-45.

Dolichocephalic; plagiocephalic.

Capacity—1315 cc.

Melanesian: Mallicollo, New Hebrides. Reg. A. 265. (*Pres.* — Hume, Esq.)

This skull—a very heavy specimen—presents several differences from the deformed skulls already described. The occiput is considerably more vertical than in the New Britain skulls, owing to a slightly different method of producing the distortion, and for the same reason the bregmatic projection is less marked, as are also the grooves that bound it anteriorly and posteriorly. The curve from the obelion downwards is more nearly a straight line from obelion to inion, and is met at an angle slightly more than a right angle, by another straight line from inion to opisthion. In comparison, the outline of Specimen 1 from obelion to opisthion is the arc of a circle of which the centre is at the bregma.

The specimen is plagiocephalic; a line drawn along its central points being concave to the right.

In *norma verticalis* one notes the flatness of the frontal, and the elevation of the parietal bones. The coronal suture, largely synostosed, presents the remains of Wormian bones at either *pars complicata*, and at the pterionic angles a well-marked left epiptereric bone, and at the right what is probably the remains of an epiptereric bone fused with the temporal squame. By means of this fusion there exists a frontosquamosal suture in place of the usual sphenoparietal.

The parietal eminences are marked, and bounded below by the groove produced by the compressing bands. The greatest cranial width falls below the squamosoparietal suture. One parietal foramen is seen to the left of the obelion.

The lambdoid suture is markedly denticulated, and several Wormian bones occur in the suture and also at the points corresponding to the mastoid fonticuli in the infant.

A very prominent occipital torus is present.

Anteriorly, the superciliary ridges and the glabella are pronounced; there is no evidence of a metopic suture. A supraorbital foramen is present on either side.

The orbits are equal, their ratios being 4.2 W, 3.3 H. There are traces of both infraorbital sutures, especially of the left one, and the malar bones are excluded from the inferior orbital fissure both on the right and the left sides. The infraorbital foramina are duplicated on each side.

The basal aspect presents little of interest. The palate is normal, all the teeth are missing—some ante-, some post-mortem. The palatine suture is irregularly cruciform (Fig. 61), the left palate bone being somewhat the wider. On the right side of the almost circular foramen magnum is a posterior condylaid canal.

There is partial synostosis of the sagittal, coronal, and lambdoid sutures.

SPECIMEN 5.

Plate xl, and Fig. 62.

Skull. Adult, aet. c. 25-35.

Dolichocephalic, Prognathous; Mesoseme; Leptorrhine; Dolichuranic.

Capacity—1345 cc.

Papuo-melanesian; New Britain. Reg. A. 11428. (*Pres.*, Mrs. A. C. Magarey.)

In *norma verticalis* this skull is long and oval, and laterally resembles the skulls previously described. The more anterior of the two grooves of compression is slight and hardly visible; the other is quite definite, and the bregmatic swelling included between the two is in consequence somewhat ill-defined.

The coronal suture is marked at the *pars complicata* by several small Wormian bones, and at the pterionic angle on each side is an epipterice bone—that on the right being practically fused, and so producing a frontosquamous articulation. The parietal eminences are slightly marked.

In the lambdoid suture are several Wormian bones (partially obliterated), more or less symmetrically disposed. The occipital bone is almost flat, from lambda to opisthion.

In *norma frontalis* the glabella and superciliary ridges stand out very prominently—more so than

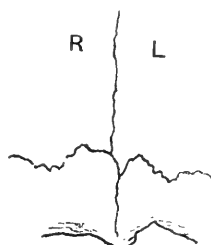


Fig. 61.
Palatomaxillary sutures

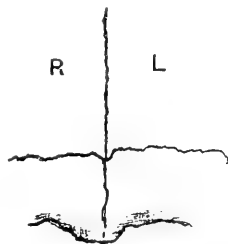


Fig. 62.
Palatomaxillary sutures

in the previous specimens. There is a supra-orbital notch on each side, and several subsidiary foramina are noticeable, especially on the right.

The infraorbital foramina are large and duplicated.

No traces of infraorbital sutures persist, but the malar bones are excluded from the inferior orbital fissures, completely on the left, and in all but the extent of a pinpoint on the right.

The inferior nasal margins are markedly rounded, giving the aperture a pithecoïd appearance; the right side is distinguished by a pathological guttering, beginning on the floor of the inferior meatus of the nose in relation with the nasal septum, which is strongly deflected to the same side.

There is some sub-nasal prognathism.

The teeth, of which nine remain (the others having been lost post-mortem) are sound, stained black by betel-nut, only slightly worn, and surround a broad, deep, long, horseshoe-shaped palate.

In *norma basilaris* the pterygoids are seen to be exceedingly broad and winged; the palatine suture irregularly cruciform (Fig. 62); the basilosphenoid suture ossified; and on either side of the foramen magnum (which is symmetrical) are post-condyloid canals; that on the left being subdivided into two by a bony spicule.

SPECIMEN 6.

Plate xli, and Fig. 63.

Skull. Adolescent aet. c. 15-17.

Dolichocephalic; plagiocephalic; mesoseme; leptorrhine; dolichuronic.

Capacity: 1260 cc.

Melanesian: Gazelle Peninsula, New Britain. Reg. A. 11430.

The specimen here described is one in which an accidental deformation has produced a plagiocephaly, associated with the formation of numerous Wormian bones in the lambdoid suture and a large single right epipterice bone.

The skull is light, small, probably that of an adolescent female. The ridges for muscular attachment are slight, the mastoid processes, glabella and superciliary ridges very small; the angular process of the malar bone narrow.

In *norma verticalis* it is a short ovoid in outline and irregular, a line drawn through the middle points being concave to the left and convex to the right.

In *norma lateralis* one notes the low but rounded frontal bone, the absence

of the bregmatic projection characteristic of the deliberately distorted skulls, and of the grooves of compression.

The coronal suture is not inclined posteriorly, and at the right pterion is the large epipteric bone already mentioned.

The parietal eminences are marked.

The sagittal suture is very denticulated, and at the lambda are two large Wormian bones, flanked on the right by four others, and on the left by a single companion. At each asterion a small Wormian bone is developed, and still another is seen at the angular junction of the superior borders of the squamous and mastoid portions of the temporal bone.

The occipital bone is not flattened; there is no torus occipitalis. In *norma occipitalis* the skull is pentagonal in section, the sidelines falling sharply in from the parietal eminences and showing a marked flattening above and behind the mastoids.

In *norma facialis* one notes the presence of a supraorbital foramen on the left, and a notch on the right. Infraorbital sutures are present on both sides, and the malar bones are excluded on each side from participation in the formation of the inferior orbital fissure. The lachrymo-ethmoidal sutures are very narrow.

On the floor of the right orbit exists a large semilunar opening communicating with the antrum of Highmore near its superoposterior angle.

The orbits are unequal in size being respectively 3:7 W, 3:0 H (right), and 3:6 W, 3:1 H (left).

There is a marked subnasal prognathism; the nasal aperture is incomplete inferiorly tending to the infantile type. The nasal bones are flask-shaped, and the right overlaps the left so as to exclude it from the frontonasal suture except at a pinpoint.

In *norma basilaris* there is little of importance.

The left maxilla articulates with the right palatine bone (Fig. 63); the basilosphenoid suture is wide; the foramen magnum rounded and irregular; post-condyloid canals exist on either side.

The left side of the skull is smaller throughout.

The teeth are all present and perfect. On both sides of the upper jaw the third molar is descending, in the lower jaw it is already fully erupted.

The sutures are everywhere patent.

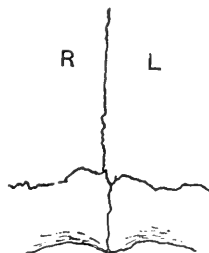


Fig. 63.
Palatomaxillary sutures

SPECIMEN 7.

Plate xlii.

Skull. Adult aet. c. 40-50.

Brachycephalic.

Capacity: 1290 cc.

Chinook: North America. Reg. A. 11431.

This skull is introduced only for the sake of comparison. In *norma verticalis* the specimen is a broad oval in shape, the long axis being transverse. In *norma lateralis* one sees, not the long horizontally drawn out cranium, but a wedge-shaped outline. The steeply ascending frontal contrasts sharply with the long low slope of the previous specimens, and is succeeded by an almost equally abrupt downward curve. The anteroposterior diameter is thus considerably shortened, while the transverse is lengthened. The parietal eminences are greatly exaggerated.

The skull shows only slight muscular ridges; the glabella and superciliary margins are faintly marked.

The sutures are almost entirely ossified, and present along their course the remains of numerous Wormian bones. In the coronal suture there are two small epipteric bones at the right pterion, and some possible evidences (fused) at the left. The lambdoid suture shows traces of what may have been an "Os Incae bipartitum."

In *norma frontalis* one notes especially the broad flat frontal surface reaching a maximum breadth and height at the parietal eminences. On either side is a supraorbital notch, and also a supraorbital foramen laterally placed. The orbits are large and quadrangular; the malar bones are included in the inferior orbital fissure, which is unusually wide.

The nasal bones are long and prominent; the left has been broken and repaired during life. The infraorbital foramina are exceedingly large, and on the right side duplicated.

The lower border of the nasal aperture is sharp-edged and single; the subnasal spine prominent.

In *norma basilaris* there are few points of importance; the foramen magnum is a rounded oval. The teeth are small and peg-like, with evidences of medium attrition. The palatine suture is irregularly cruciform; the vomer is bifid at its point of articulation with the sphenoid. There is a marked pharyngeal spine, and post-condyloid canals are present on either side.

COMPARATIVE SKULL MEASUREMENTS in mm.

Specimen.	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
Maximum length ...	19'5	17'9	16'9	18'3	18'7	16'35	15'85
Antero-post							
Iniac length ...	16'3	16'0	15'35	17'3	16'3	15'35	15'4
			11'0	12'5	12'0	13'4	
Greatest Cranial width	11'75	12'25	11'8	13'5	12'8	13'8	15'9
Cranial height							
(a) Auriculo-bregmatic	12'7	12'5	11'7	13'25	13'0	12'0	12'7
(b) Basilo-bregmatic	13'85	12'8	12'5	13'2	14'1	13'2	12'7
Minimum frontal ...	9'2	9'2	8'0	9'7	7'8	9'8	10'0
Maximum frontal ...	10'4	11'0	10'0	11'4	11'0	11'45	13'4
Bizygomatic ...	12'7	12'7	11'4	14'0	13'5	12'0	14'5
Max. bimastoid ...	11'5	12'0	11'0	13'1	12'0	11'5	13'4
Nasobasilar (Basinasal)	10'0	9'5	8'8	10'0	9'75	8'9	9'5
Alveolo-basilar ...	10'8	10'0	9'3	10'5	10'55	9'0	9'9
Naso-alveolar ...	6'5	6'7	5'65	7'0	6'3	5'75	7'35
Nasal height ...	5'1	5'35	4'3	5'7	4'8	3'9	5'?
Nasal width ...	2'4	2'4	2'1	2'55	2'55	2'4	2'4
Interorbital width ...	2'7	2'8	2'0	2'4	2'2	2'3	2'15
Orbital width							
left	4'1	3'9	3'4	4'2	3'6	3'6	4'1
right	3'85	3'9	3'5	4'2	3'6	3'7	4'?
Orbital height							
left	3'4	3'3	3'2	3'3	3'1	3'1	3'8
right	3'4	3'3	3'2	3'3	3'1	3'0	3'7
Width Sup-alv. border	6'6	6'4	5'7	6'7	6'7	6'3	6'1
Height Alv. curve ...	5'75	5'7	5'1	6'1	6'1	5'?	5'6
Osseous Palate							
Length vault ...	4'8	4'7	4'4	4'4	5'05	4'9	4'9
Width vault ...	4'4	4'0	3'7	3'5	4'4	4'3	4'1
Orbito-alv. height ...	3'85	3'7	2'85	4'3	3'55	3'1	4'0
Foram. magnum							
Length ...	3'7	3'5	2'9	3'25	3'4	3'1	3'4
Width ...	2'6	2'5	2'9	2'9	3'0	2'85	3'25
Sagittal curve							
Frontal ...	13'3	12'3	12'15	12'2	13'3	11'7	11'4
Parietal ...	14'7	12'8	13'8	13'2	14'1	12'2	10'?
Occipital ...	11'1	10'9	10'0	11'5	10'7	11'0	10'7
Total curve ...	39'1	36'0	35'95	36'9	38'1	34'9	32'3
Cubic capacity in cc ...	1310	1190	1185	1315	1345	1260	1290

GENERAL CHARACTERISTICS.

As a whole, the skulls of the North-West Pacific Islanders, who practise the simple annular method of head distortion, present the following general characteristics.

The bones of the skull are thick; the muscular ridges well-marked; the teeth sound and good; the alveolar margins well-developed.

A strongly-marked annular constriction is seen, produced by bandaging in infancy, and resulting in the production of certain abnormal depressions and elevations. These are obvious in any norma, but are best seen in lateral and vertical projections.

In *norma lateralis* one notes moderate subnasal prognathism. The nasal bones are fairly long and saddle-shaped, the root of the nose deeply set; the frontal bone receding at an acute angle.

A broad, shallow depression extends from the midpoint of the frontal bone obliquely downwards and backwards to the occiput, grooving in its passage the frontal, parietal, and occipital bones. It ends anteriorly and posteriorly by becoming continuous with its fellow of the opposite side. A second groove begins posterior to the bregma, and joins the former groove at an acute angle somewhere along its backward course.

The glabella and the superciliary ridges may or may not be included within the area of compression, and their prominence depends upon the extent of their exclusion.

The frontal eminences disappear; the median outline of the bone pursues an almost straight, flattened, slowly ascending, course upward to the region of the bregma, which is occupied by a distinct swelling. This in turn is succeeded by the depression at the point of origin of the second groove mentioned above, and behind this again lies the main mass of the receding skull.

The ascent reaches a maximum in the region of the obelion, from which point, or its neighbourhood, the outline bends suddenly downwards and ultimately forwards along the course of the obliquely flattened occipital bone.

The medial portions of the coronal and lambdoid sutures are displaced backwards, and doubtless the fissure of Rolando, the motor and sensory areas, etc., are correspondingly inclined posteriorly.

At the regions occupied in the new-born infant by the sphenoidal and mastoidal fonticuli there are, as a rule, *ossa suturarum*, as evidences of ossific activity. Of these the *ossa epiptERICA* are the more constant, being, it is ventured to state, a universal feature of much-distorted skulls. A reference to the

scanty literature (²¹) at the writer's command confirms this observation, not only for skulls distorted in New Britain, but in every instance in which reference can be found to skulls deformed in this particular way, no matter what their source. Skulls of the type of the flathead Indian, where the pressure is from behind forward, present, as a rule, a greater degree of variation (¹) in the region of the lambdoid suture, although in these, too, epipteric bones are not uncommon.

The younger the skull of the New Britain Islander the more marked the epipteric bones both in definition and in number. As age advances they tend to fuse with one another, and then with the bones in the vicinity, ossifying sooner on the right side than on the left in right-handed individuals. On the left side they persist separate to a late age.

The lambdoid suture almost always shows Wormian bones, and as stated above, the more marked the fronto-occipital flattening—as in the American skulls referred to—the greater the tendency to the formation of *ossa suturarum*; until in some a distinct "os Incae," bipartite, tripartite, or quadripartite, may be seen.

There seems no doubt that in both cases the origin of these bones lies in a reaction to a condition of increased intracranial pressure (cf. hydrocephalus), produced as a result of the pressure from without, with a consequent splaying apart of the bones of the skull, and an attempt of the bony tissues to fill these aberrant gaps, with successive laminae of bone. That there is an increased ossific activity is evidenced, firstly, by the production of the numerous Wormian bones, and, secondly, by the frequency of bony exostoses, which are common in American skulls, and not uncommon in these. On this basis, the presence of the epipterics, and especially their persistence on the left or more actively developed side of the brain cavity, is readily explicable.

Where epipterics are developed on the right side, or are seen in skulls not artificially distorted, some plagiocephaly will, in the experience of the writer, always be found to bear an explanatory relationship.

In *norma verticalis* the skull appears as a narrow ovoid, or even ellipsoid. The parietal eminences tend to disappear, and the level of the greatest width falls below the line of the squamosoparietal suture. In some instances the supramastoid prominences are outlined in an orthogonal projection; the malar bones and the zygomata always stand out well; the skulls being definitely phaenozygous.

In *norma occipitalis* the skull shows as a sharply-arched vault, with weakly diverging sidelines below.

In *norma facialis* the frontal bone appears low and sharply receding; the orbits are medium-sized and quadrangular; the superior orbital margin is somewhat more posteriorly situated than the inferior. The lacrimal bones are, as a rule, produced forward beneath the opening of the lacrimal canal, to take part in the formation of the inferior orbital margin, sometimes with the interposition of a small, distinct, bony ossicle. (See fig. 58.) Posteriorly, the orbit is well closed closed in, and the inferior orbital fissure narrow. Frequently one finds the malar bones excluded from the fissure by a frontosphenoidal suture, and this is always the case where the infraorbital suture is patent—a not uncommon condition.

On both sides of the prominent subnasal spine are usually shallow praenasal fossae, and the lower margins of the nasal aperture are definitely double with an infantile appearance, or may even be pithecoïd. The alveolar margins arch forwards and outwards to overhang the broad, deeply-set palate.

Norma basilaris: The foramen magnum is large and oval; the pterygoid processes broad and low; the postnasal spine short and broad; the palatine suture irregularly cruciform; the palate itself long, broad, deep, and horseshoe-shaped.

In other words the *norma basilaris* appears to be not at all influenced by the deforming process that so grossly changes the skull as seen in its lateral and vertical projections.

The skull capacity does not appear to differ from that of normal specimens, the disposition of the contents merely being altered, so that the excess in height and length is made up at the expense of the frontal and occipital prominences.

The skull is brought finally to a condition of hypsisteno-dolichocephalus artificialis, but as age advances tends more and more to regain the shape from which it was originally distorted.

The main indices are:

Cephalic: (1) 60·2, (2) 68·4, (3) 69·7, (4) 73·7, (5) 68·3.

Gnathic: (Flower), 106·4

Orbital: 85·9.

Nasal: 47·5.

Palato-maxillary: 85·1.

In general, then, the skulls are:

Hypsistenedolichocephalus artificialis, prognathous, mesosème, leptorrhine, and dolichuronic, with a cranial capacity ranging between 1185 cc. and 1340 cc.

In conclusion I wish to thank Prof. F. Wood-Jones, of the University of Adelaide, for great assistance both in the examination of material and in the reading of the proofs.

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Explanation of Plate xxxiv.

Natives of New Britain.

- Fig. 1. Mother and child, showing the swathing of the head of the babe.
 Fig. 2. Young man, showing the facial defect of distortion of the skull.
 Fig. 3. Three young men, showing the effect of distortion, in profile.

Explanation of Plate xxxv.

Photograph of skull of Native of New Britain. Specimen 1.

Explanation of Plates xxxvi to xli.

Skulls of Natives of New Britain.

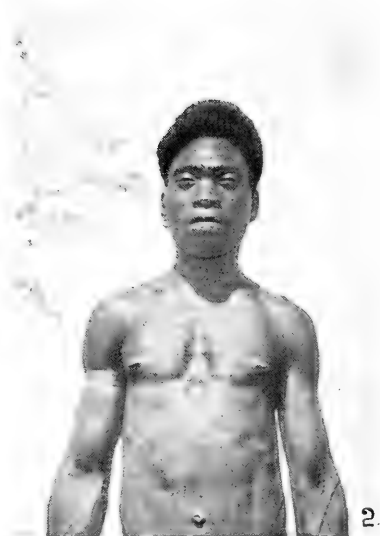
Plate xxxvi.	Specimen No. 1.	Plate xxxix.	Specimen No. 4.
Plate xxxvii.	Specimen No. 2.	Plate xl.	Specimen No. 5.
Plate xxxviii.	Specimen No. 3.	Plate xli.	Specimen No. 6.

Explanation of Plate xlii.

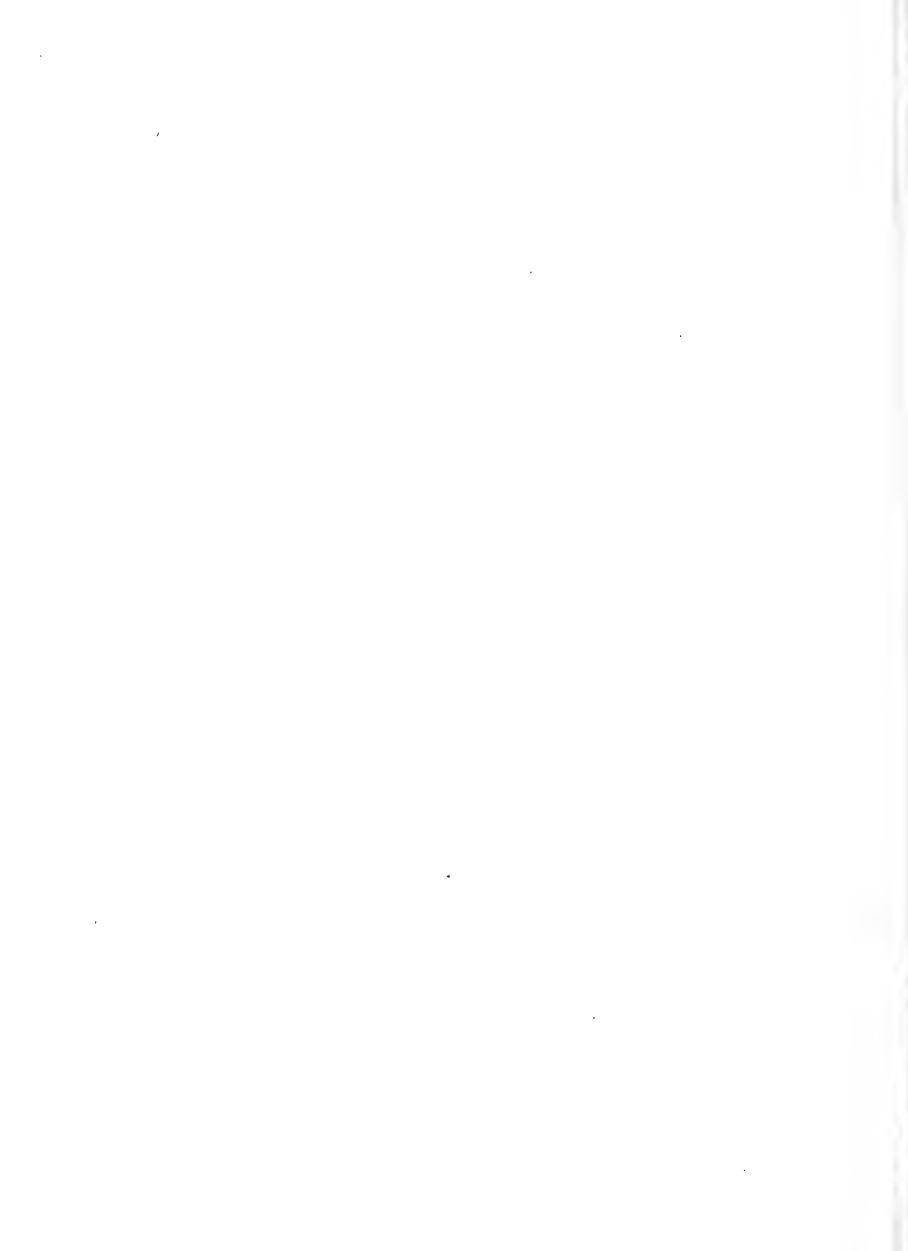
Skull of Chinook Indian. Specimen No. 7.

Note.—Plates xxxvi to xlii are drawn on the Diopetrograph; the letters indicate the presentations as below:

- | | |
|----------------------|---------------------|
| a. Norma verticalis. | c. Norma lateralis. |
| b. „ frontalis. | d. „ occipitalis. |

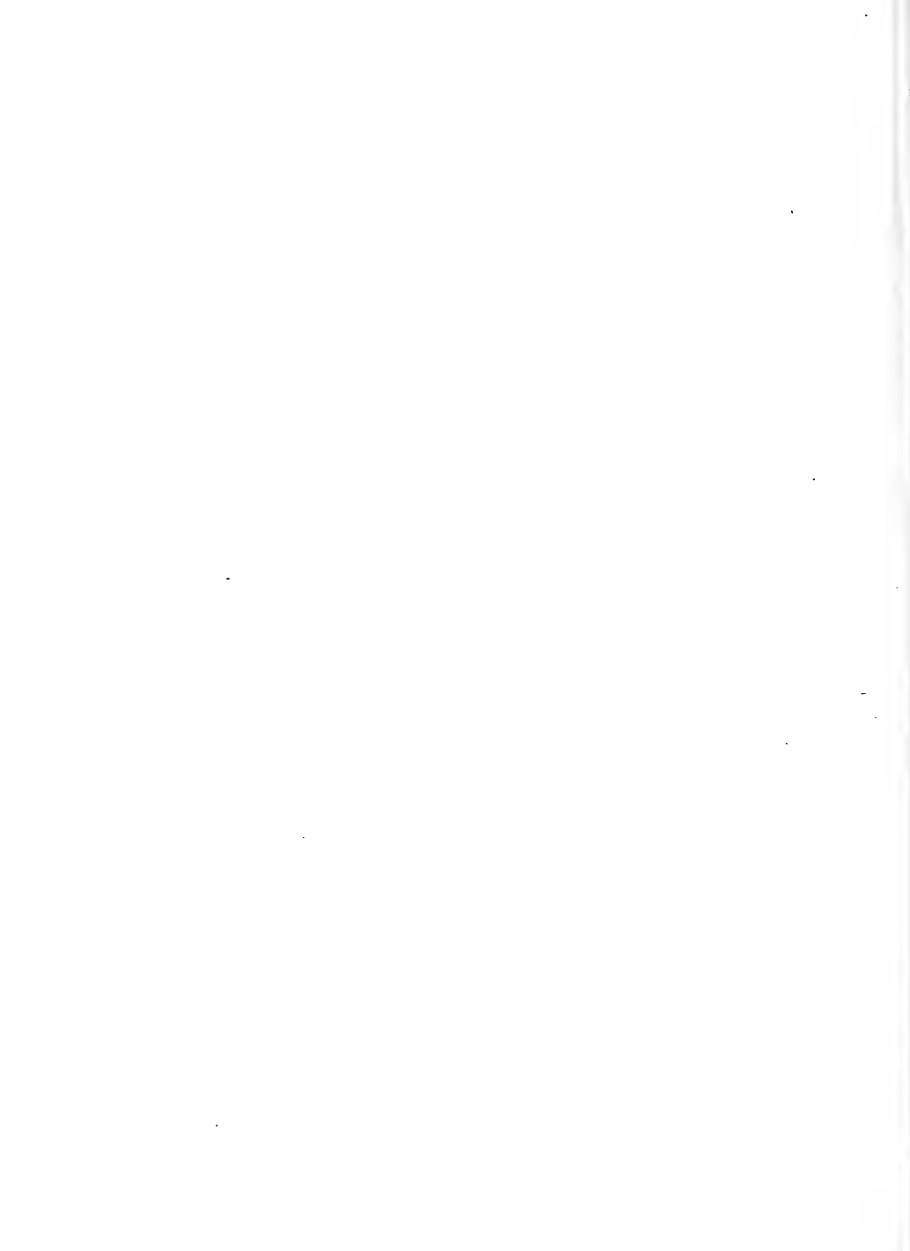


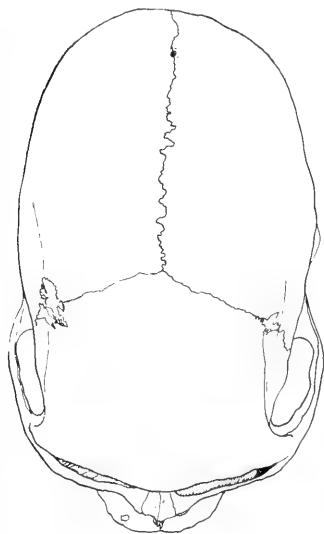
NATIVES OF NEW BRITAIN



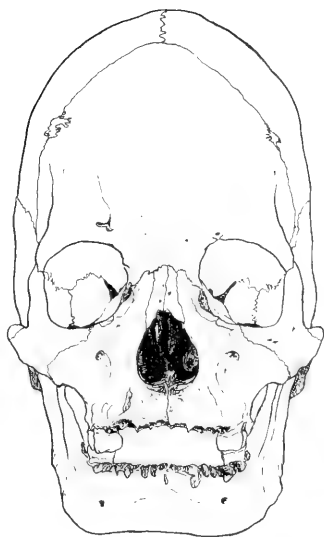


*PHOTOGRAPH OF SKULL OF NATIVE OF NEW BRITAIN.
SPECIMEN NO. 1*

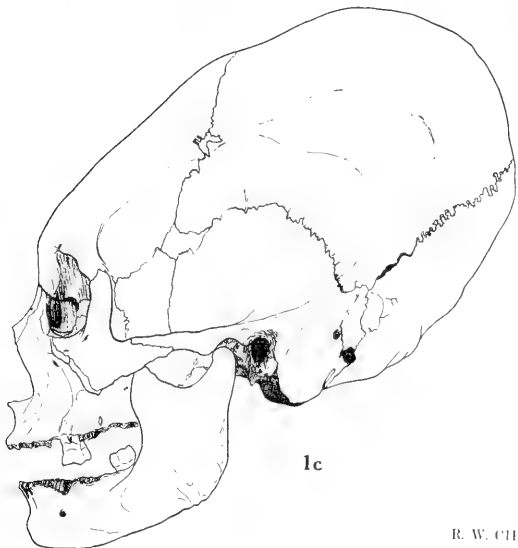




1a



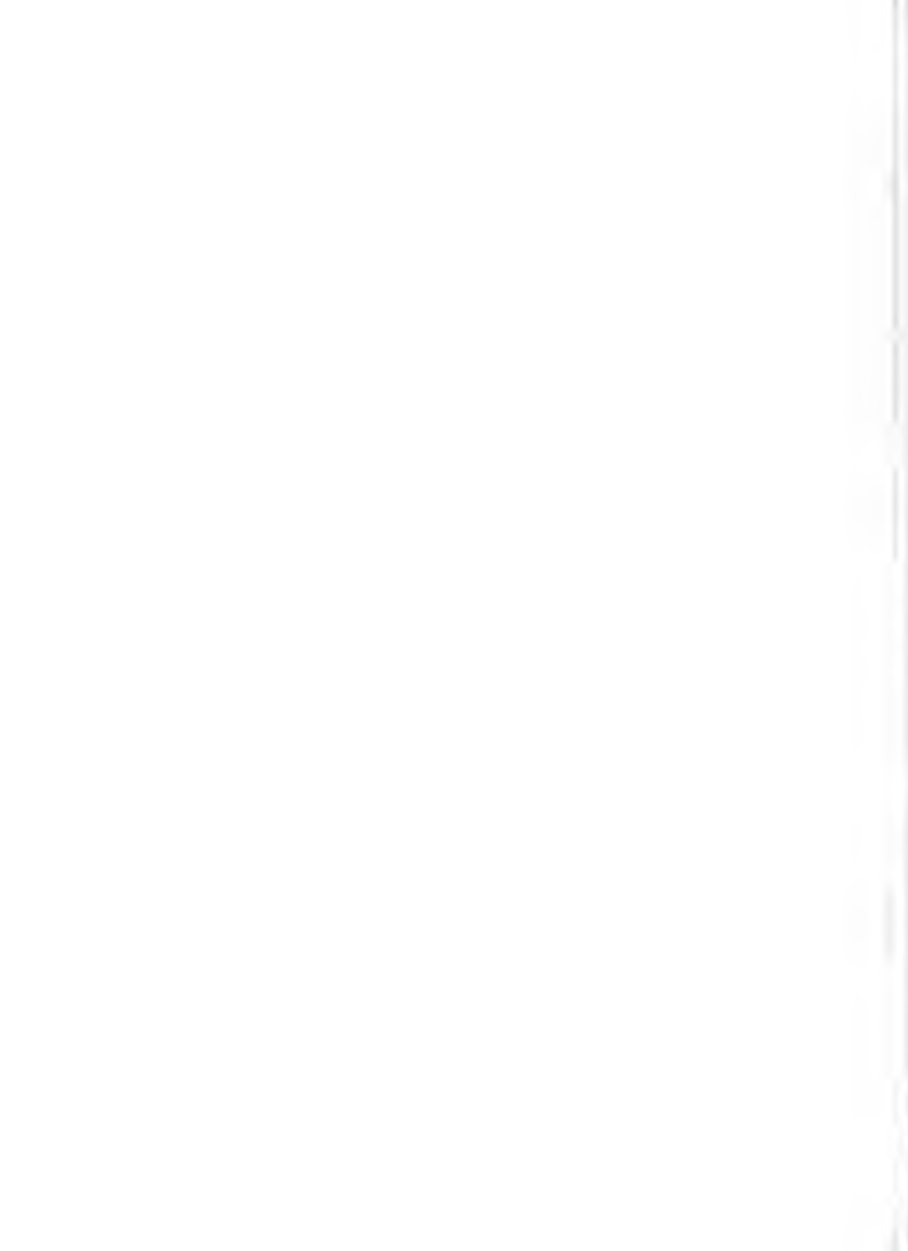
1b

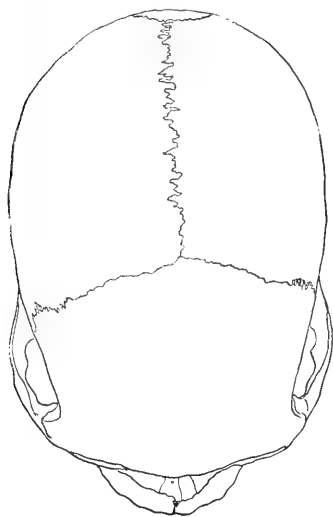


1c

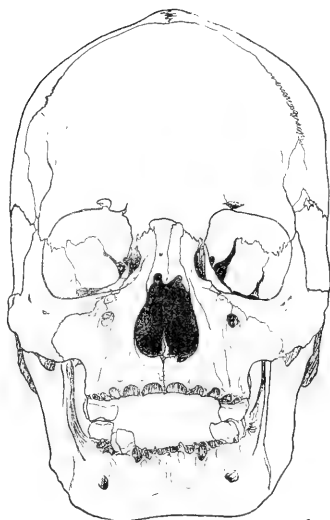
R. W. CILENTO *det.*

SKULL OF NATIVE OF NEW BRITAIN. SPECIMEN NO. 1

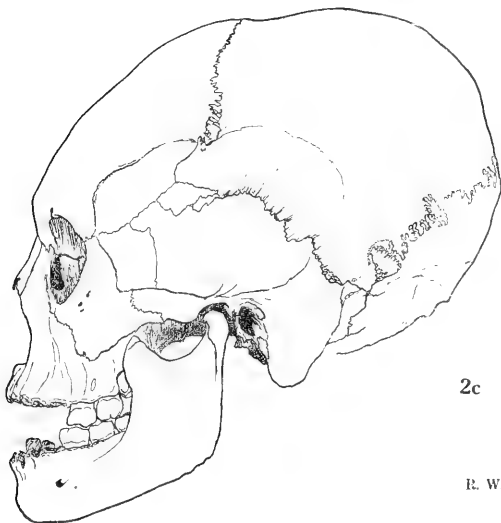




2a



2b

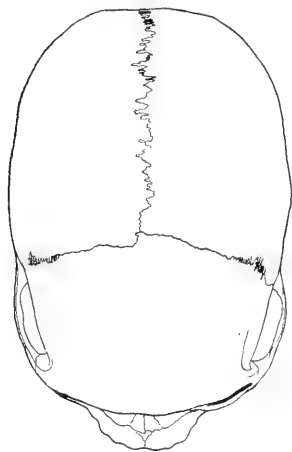


2c

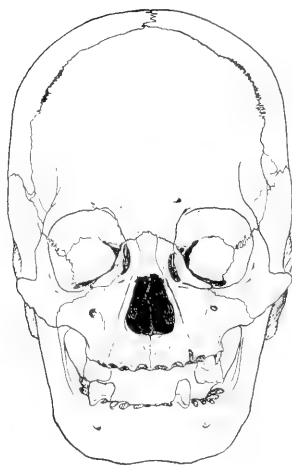
R. W. CILENTO, *det.*

SKULL OF NATIVE OF NEW BRITAIN. SPECIMEN NO. 2

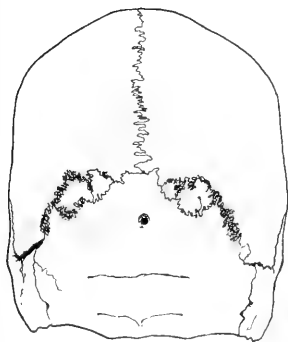




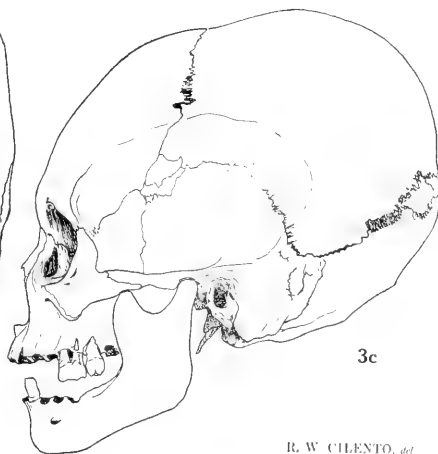
3a



3b



3d



3c

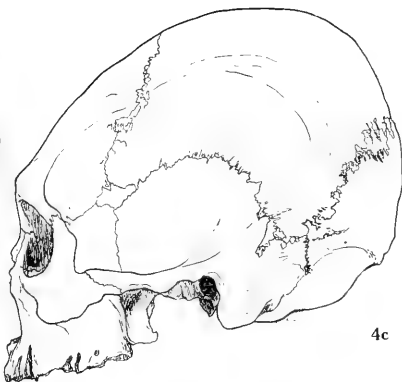
R. W. CILENTO, *del.*

SKULL OF NATIVE OF NEW BRITAIN. SPECIMEN NO. 3

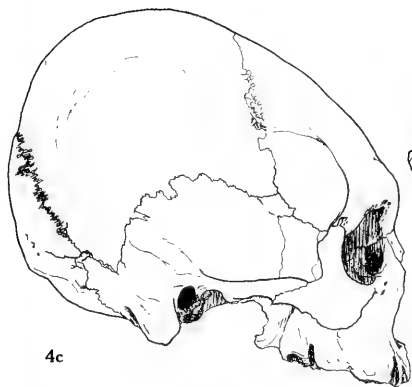




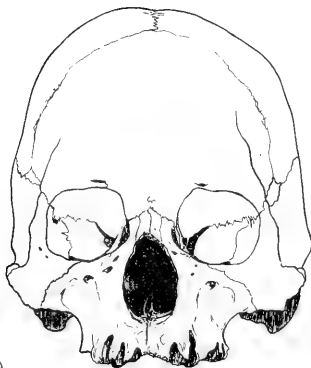
4a



4c



4c

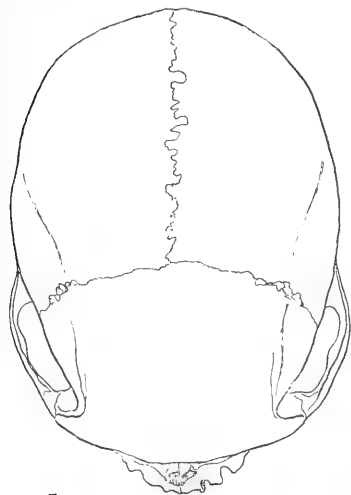


4b

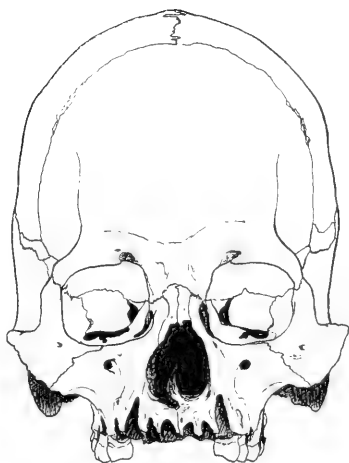
R. W. CILENTO, *del.*

SKULL OF NATIVE OF NEW BRITAIN. SPECIMEN NO. 1

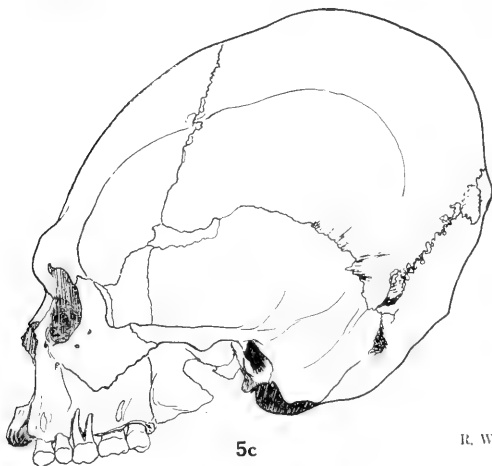




5a



5b

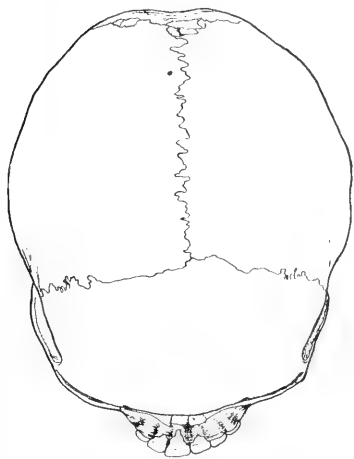


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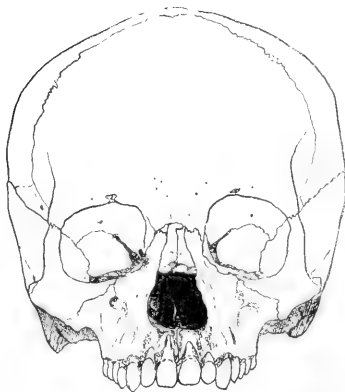
R. W. CILENTO, *sc.*

SKULL OF NATIVE OF NEW BRITAIN. SPECIMEN NO. 5

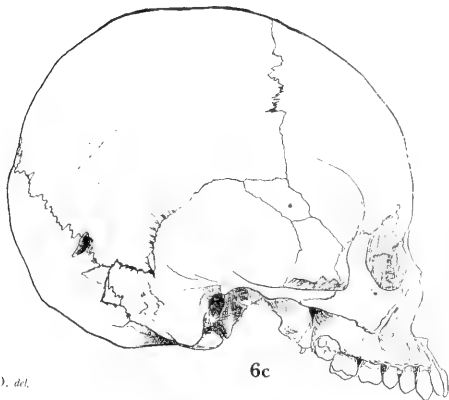




6a



6b



6c

R. W. CILENTO, *del.*

SKULL OF NATIVE OF NEW BRITAIN. SPECIMEN NO. 6

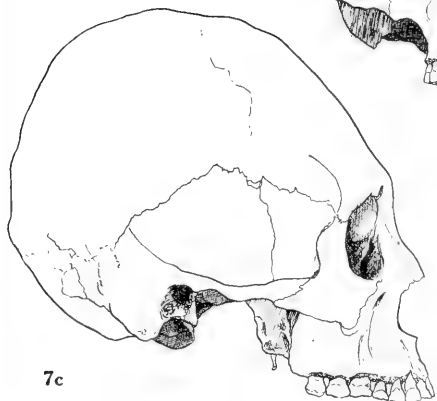




7a



7b



7c

R. W. CILENTO, *del.*

SKULL OF CHINOOK INDIAN. SPECIMEN NO. 7



A REVIEW OF THE CEPHALOPOD GENERA SEPIOLOIDEA, SEPIADARIUM, AND IDIOSEPIUS.

By S. STILLMAN BERRY, REDLANDS, CALIFORNIA.

Charts 10, 11, and Text Figs. 64-67.

THE receipt, a short time since, of some interesting material of the cephalopod genera, *Sepioloidea*, *Sepiadarium*, and *Idiosepius*, from the Board of Governors of the Public Library, Museum, and Art Gallery of South Australia, has caused me to review the literature of these aberrant sepioliform squids as critically as possible. One of the genera, *Idiosepius*, is new to the Australian fauna, where it is represented by a hitherto unnoticed species. A South Australian *Sepiadarium* also appears to be new. Pending the appearance of the more complete report in which they, with other species, are to have detailed treatment, short preliminary diagnoses of both species are here offered, together with a brief review of the previously described forms of similar affinities, which it is hoped will prove convenient to other students, even though this portion of the paper perforce contains little that is truly original. Tentative keys to the species are likewise added.

Note.—The figures following authors' names refer to the bibliography, those within brackets to the pagination of reprints.

FAMILY SEPIOLIDAE.

SUB-FAMILY SEPIADARIINAE.

Sepio-Loliginei, sub-fam. **Sepiadarii** Steenstrup, 1881, p. 233, 239 (23, 29).

Sepiadariidae Fischer, 1882, p. 350.

Sepioladae, sub-fam. **Sepiadarii** Appellöf, 1898, p. 623.

Sepiolidae, sub-fam. **Sepiadarinae** Naef, 1912, p. 246, 248.

The earliest discovered member of this group was the "*Sepiola lincolata*" Quoy and Gaimard (1832). The very peculiar features by which this unique creature differs from the true *Sepiola* were recognized a few years later, and it was made by d'Orbigny (1839), the type of his genus *Sepioloidea*.

For many years nothing of special consequence was added to our knowledge of the group, until in 1881 the genus *Sepiadarium* Steenstrup was founded for the accommodation of another peculiar small sepioliform squid, specimens of

which were in Professor Steenstrup's hands from the Indian Ocean, China, and Japan, and which thereupon received from him the name *Sepiadarium kochii*. Steenstrup recognized the evident relationship of his new genus with the earlier *Sepioloidea*, and since he was a devoted believer in the all-sufficiency of the hectocotylyzed arm in matters of classification, he placed both genera, along with *Sepia*, *Idiosepius*, and *Spirula*, et al., in his family *Sepio-Loliginei*, comprising all myopsids having the ventral arms the ones affected by hectocotylyzation. Their obvious differences from the other members of this group he recognized by placing them in a special sub-family, *Sepiadarii*, which he allocated between the true *Sepias* (*Eusepii*) on the one hand, and the *Idiosepii* on the other.

The same year Verrill (1881, p. 417), in noting the publication of Steenstrup's monograph, suggested the affinity of the new genus with *Loligo*, rather than with *Sepia*.

Fischer (1882, p. 350) was evidently impressed with the difficulties attendant upon either suggested treatment, for he removed both *Sepioloidea* and *Sepiadarium* to a new family, the *Sepiariidae*. He wrote: "Les Céphalopodes de cette famille ont plus d'affinité avec les *Sepiidae*, les *Spirulidae* et les *Loliginidae* qu'avec les *Sepiolidae*, dont ils présentent toutefois la forme générale." Fischer, therefore, although adopting an essentially modern arrangement, differs from Steenstrup merely in his expression of the facts, not his understanding of their meaning.

With the next student, Brock (1884), it is quite otherwise. Vigorously assailing the position of Steenstrup, he flatly denied the *Allmacht* of the hectocotylus, and writes (p. 108): "Wir müssen uns entscheiden ob für die Bestimmung der Verwandtschaft die Hectocotylyzation oder alle übrige vergleichend-anatomische Merkmale massgebend sein sollen"; and, again (p. 110): "Es erhellt aus diesen Beispielen also genugsam, dass die Hectocotylyzation weder in Bezug auf die Zahl und Reihenfolge der umgebildeten Arme, noch in Bezug auf den Modus der Umbildung selbst sich irgendwie mit den übrigen verwandtschaftlichen Beziehungen deckt, und ich stehe daher nicht an, im Gegensatz zu Steenstrup zu behaupten, dass die Hectocotylyzation trotz ihres hohen morphologischen und physiologischen Interesses für die Erkenntniss der natürlichen Verwandtschaft von keiner oder ganz untergeordneter Bedeutung ist." He therefore referred not only *Sepiadarium* and *Sepioloidea*, but *Idiosepius* as well, outright to the *Sepiolidae*.

The unconvinced Steenstrup, however, maintained his position in a spirited reply (1887) to Brock.

The next contribution of consequence is that of Appellöf (1898). Working on material from the island of Ternate in the Moluccas, he showed many reasons

for relating *Scpioloidea* and *Scpiadarium* to the sepiolids rather than to the sepioids, and hence placed them in a sub-family, *Scpiadarii*, of his family *Scpiolidae*. Unfortunately most of his group names are not formed according to modern etymological rules, so cannot now be used.

Naef (1912, p. 248) places both genera in a sub-family *Scpiadarinae* of the *Scpiolidae*, which arrangement therefore stands as the most recent treatment of the group.

It is easy to pick flaws in the argument of almost any of these writers. In fact each view advanced seems to find its strongest support in attacking the weak points of opposing views, only Steenstrup and Appellöf succeeding in adding many new facts to the discussion. In fairness it must be said that the more recent taxonomic work on other groups of cephalopods has tended to bear out in the main the faith of Steenstrup in the tactical value of the hectocotylized arm as a criterion of systematic relationship. On the other hand it is always easy to overstress any single feature, especially where, as in this instance, our embryological and anatomical knowledge is still scanty. Certainly no present-day student would place either of these genera under the *Scpiidae*, or under the *Loliginidae*, groups which are now known to lie rather far apart phylogenetically instead of closely linked as Steenstrup understood them. Very conceivably some such splitting of the old families as that proposed by Fischer must ultimately be adopted, but in the lack of so much of the essential evidence, the ends of the present paper will no doubt be served best by following the weight of opinion, which brings us into essential agreement with the principles, if not the names, of Appellöf.

The number of species in the sub-family is few. *Scpioloidea* contains but the single species upon which it was founded. Since the description of *S. kochii*, the type species of *Scpiadarium*, the only species added to the genus has been Robson's *auritum* in 1914. The third species here brought to light is not so very different from the other two. The distribution of *Scpioloidea* is wholly Australian as far as we know from the published records. *Scpiadarium* is a more characteristic member of the Indo-Malayan fauna, reaching from Ceylon and southern Japan to South Australia.

KEY TO GENERA OF THE SUB-FAMILY SEPIADARIINAE.

- a. Mantle not fused with funnel, but articulating therewith by a cartilaginous socket and nodule; body strongly papillose on the sides and with conspicuous longitudinal colour bands dorsally; mantle margin strongly lacinate near nuchal commissure. . . . *Scpioloidea*, p. 350

- aa. Mantle firmly fused with base of funnel on each side;
 no evident papillation or conspicuous colour pattern;
 mantle margin entire (?) or weakly digitate near the
 nuchal commissure *Scpiadarium*, p. 351

SEPIOLOIDEA d'Orbigny, 1839.

- Scpioloidea* d'Orbigny, 1839, p. 240; 1845, p. 242.
 .. Steenstrup, 1881, p. 224, 232, 233, 238, 239 (14, 22, 23, 28, 29).
 .. Fischer, 1882, p. 350.
 .. Brock, 1884, p. 105-114.
 .. Steenstrup, 1887, p. 67-75, 116 (21-29, 70).

SEPIOLOIDEA LINEOLATA Quoy & Gaimard, 1832.

1832. *Scpiola lineolata* Quoy & Gaimard, Voy. Astrolabe, ii, p. 82, Moll., pl. v,
 fig. 8-13.
 1839. Gervais & Van Beneden, Bull. Acad. Belg., v, p. 426.
 1839. *Scpioloidea lineata* d'Orbigny, in d'Orbigny and Férussac, Céph. acét., p.
 240; Sépioles; pl. iii, fig. 10-18.
 1845. d'Orbigny, Moll., iv, foss., p. 242, pl. ix.
 1849. *Scpiola lineata* Gray, Ceph. Brit. Mus., p. 95.
 1875. *Scpioloidea lineolata* Steenstrup, Vid. Selsk. Skr., (5), nat. math., x, p. 472
 (10) (brief note).
 1879. *Scpiola lineolata* Tryon, Man. Conch., (1), i, p. 157, pl. lxvi, fig. 242; pl.
 lxvii, fig. 240, 241, 243.
 1881. *Scpioloidea lineolata* Steenstrup, K. d. Vid. Selsk. Skr., (6), i, p. 214, 224
 (4, 14).
 1882. Fischer, Man. Conch., p. 350.
 1884. Brock, Zeitschr. wiss. Zool., xl, p. 105, fig. (hectoc-
 tylus).
 1892. Brazier, Cat. Ceph. Austral., p. 9.
 1909. Meyer, Ceph. S.W. Austral., p. 329, 330, fig. 3.

Chart No. 10.

Type Locality. Jervis Bay, New South Wales (Quoy & Gaimard).

Recorded Distribution. New South Wales: Port Stephens (Brazier); Port Jackson and Sydney (Brazier, Brock); Jervis Bay (Quoy & Gaimard). South Australia: St. Vincent Gulf (Meyer); Spencer and St. Vincent Gulfs (South Australian Museum). Western Australia (Meyer).

Remarks. This beautiful, extremely interesting, and yet little known species would appear to be a not uncommon inhabitant of the waters of the southern portion of the Australian continent. Careful ecological and anatomical work is badly needed, and the latter would do much to clear up its decidedly uncertain relationships. Whether the species is photogenic would likewise be an interesting point to establish.

The description by d'Orbigny eighty years ago still remains the most complete account of the species that we have.

SEPIADARIUM Steenstrup, 1881.

- Sepiadarium* Steenstrup, 1881, p. 214 (4).
 .. Verrill, 1881, p. 417 (suggests relationship to *Loligo*).
 .. Fischer, 1882, p. 350.
 .. Brock, 1884, p. 105-114.
 .. Steenstrup, 1887, p. 67-72, 116, 120, 121 (21-26, 70, 74, 75).
 .. Appellöf, 1898, p. 570, with figs.

KEY TO THE SPECIES OF SEPIADARIUM.

- a. Fins narrow, nearly four-fifths as long as the mantle .. *auritum*, p. 354
 aa. Fins less than half as long as the mantle I
 1. Dorsal arms longest; tentacle clubs with extremely minute suckers in 8 or more rows (if we may judge by Steenstrup's figure); hectocotylized arm of male armed with a series of grooved, transverse, pad-like lamellae on distal portion, bounded by a fold-like membrane *kochii*, p. 351
 1'. Lateral arms longest; tentacle clubs with about 6 rows of small suckers on widest portion and a wide keel; hectocotylized arm of male armed with a series of conical lamellae on distal portion, not bounded by distinct folds or continuous membranes.. .. . *austrinum*, p. 354

SEPIADARIUM KOCHII Steenstrup, 1881.

1881. *Sepiadarium kochii* Steenstrup, K.D. Vid. Selsk. Skr. (6), i, p. 218, 235 (8, 25), pl. i, fig. 1-10.
 1887. .. *kochii* Brock, Zool. Jahrb., Syst., ii, p. 595 (recorded from Amboina).

1896. *Sepiadarium kochii* Goodrich, Trans. Linn. Soc., (2), Zool., vii, p. 3
(recorded from off Ceylon and Andaman Islands).
1898. " *kochii* Appellöf, Ceph. Ternate, p. 593, pl. xxxii, fig. 9-10;
pl. xxxiii, fig. 19, 21; pl. xxxiv, fig. 23, 25, 27.
1904. " *kochii* Hoyle, Ceph. Ceylon, p. 187, 198 (recorded from off
Pt. de Galle, Ceylon).
1913. " *kochii* Sasaki, Zool. Mag. Tokyo, p. 247, 398, fig. 2 (in
Japanese).
1914. " *kochii* Sasaki, Annot. Zool. Japon., viii, p. 597.

Chart No. 10.

Type Locality. Deep Water Bay, Hong Kong (Steenstrup).

Recorded Distribution. Japan: Enoura, Suruga (Sasaki); off Nukumi, Satsuma (Sasaki); Beppu, Bungo (Sasaki); Kurihama, Musashi (Sasaki); Nagasaki, Hizen (Sasaki). China: Hong Kong (Steenstrup). India: 32 fathoms, 6° 6' 30" Lat. N., 81° 23' Long. E., off south coast of Ceylon (Goodrich); 16-30 fathoms, south of Point de Galle, Ceylon (Hoyle); Andaman Islands (Goodrich). East Indies: Near Banda Islands (Steenstrup); Ternate (Appellöf); Amboina (Brock).

Remarks. The special features of *S. kochii*, as figured by Steenstrup, are the very numerous and minute suckers of the narrowly keeled tentacle club, the arm formula 1, 3, 4, 2 (possibly somewhat variable), the small fins, and the details of the hectocotylized arm. In the type (a male) the latter apparently had 9 pairs of suckers, succeeded by a series of about 26 thick, longitudinally grooved, transverse pads, bordered by a marginal fold or membrane best developed ventrally.

Sasaki (1914, p. 598) notes a number of discrepancies from Steenstrup's original description in the Japanese specimens examined by him. Some of them are not of great consequence, but others are of such a nature as to suggest the possibility that more than one recognizably distinct form has been included under *kochii* in the literature.

From Steenstrup's description I cannot make out just which of his specimens he regarded as the type, but since most of his figures are of a male from Deep Water Bay, Hong Kong, the presumption is strong if not conclusive that this is properly regarded as the type locality. If this be granted, the following specimens in the collection of the Museum of Comparative Zoology are clearly referable to the true *kochii*.

Material examined:

Specimens Examined.	Sex.	Locality.	Collector.	Date.	Where Deposited	Number in Author's Register
2	♀	Hong Kong, China.	Capt. W. H. A. Putnam.	Mar. 1861.	M. C. Z. 3446	268
3	1 ♂ 2 ♀	.. ..	.. ..	..	M. C. Z. 1537	269
9	3 ♂ 6 ♀	.. ..	.. ..	..	M. C. Z. 1571	270

In this series the males run considerably smaller than the females. The bodies of the females are more rounded than those of the males, and the fins are relatively larger, although these differences may depend in part at least on the varying manner of preservation. As the specimens have not been seen by me for some years, I am unable to add any further notes regarding them at this time.

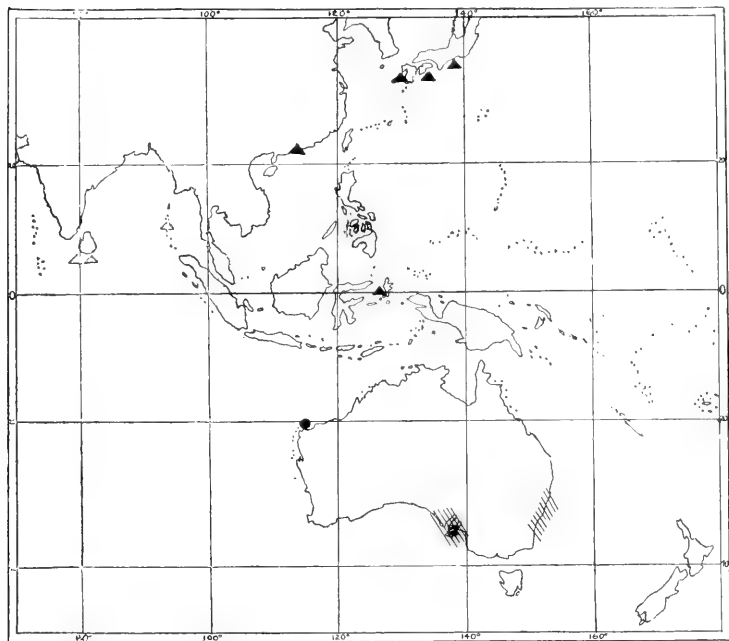


Chart 10. Indo-Pacific Faunal Region, showing distribution of the genera *Sepioloidea* and *Sepiadarium*.

▨ *Sepioloidea lineolata*.

● *Sepiadarium auritum*.

▲ *Sepiadarium kochii*.

■ *Sepiadarium austrinum*.

SEPIADARIUM AURITUM Robson, 1914.

1914. *Sepiadarium auritum* Robson, Proc. Zool. Soc., 1914, p. 677, text fig. A-E.

Chart No. 10.

Type Locality. Off Hermite Island, Monte Bello Group, Western Australia (Robson).

Recorded Distribution. Known only from the type locality.

Remarks. This species has been but briefly characterized, but the figures lead one to believe that it will prove to be distinct from either of the other forms here recognized. The long, narrow fins are especially characteristic. Robson (1914, p. 677) appears to consider his species after a manner an intermediate form between *Sepiadarium* and *Sepioloidea*, but the fin characters mentioned are hardly sufficient for one to recognize it as other than a thorough-going *Sepiadarium*.

SEPIADARIUM AUSTRINUM sp. nov.

Chart No. 10.

Diagnosis. Body small, sepioliform. Fins semicircular or semicordate, less than half the length of the body, attached well behind the middle. Head large, about as wide as the body. Arms nearly as long as body, the two dorsal pairs a little longer than the ventral two. Suckers small, biserial, but sometimes crowded into 4 rows near middle of arm, and almost always in 4 rows at tips where they become much reduced in size. Hectocotylized arm of male with 9½-10 pairs of normal suckers on basal portion, these replaced distally by a single series of stiff, somewhat pointed, tongue-shaped lamellae, more or less grooved at the apex in such a way as finally, at the very tip of the arm, to result in the lamellae being split into alternating rows of small papillae; true marginal webs absent; entire arm strongly recurved dorsally and the resulting concavity excavated. Tentacle clubs strongly keeled and with about 6 rows of small suckers on the widest part, largest ventrally. Total length of type specimen, 32.0 mm. Dorsal length of mantle, 12.3 mm. Width of body, 12.5 mm.

Type Locality. St. Vincent Gulf, South Australia (A. Zietz, September, 1885).

Recorded Distribution. Known only from the type locality.

Remarks. The most distinctive feature of this little squid, as compared with its two congeners, lies in the structure of the hectocotylized arm. In general plan the hectocotylus is similar in all three species of *Sepiadarium*, but in

austrinum the lamellae are conical rather than transversely ridge-shaped, they are not longitudinally folded or crenulate, there are fewer of them, and the marginal membranes so conspicuously developed in the other forms are here almost or quite lacking. The fins of both sexes are more like those of *kochii* than those of *auritum*. Close checking with the original descriptions and figures of both these forms will reveal numerous other differences of detail.

An interesting feature of the present species, which I have not dwelt upon in the diagnosis, is the incipient digitation of the mantle margin near its junction with the nuchal commissure, evidently a rudiment or vestige of the curious arrangement which is pushed to such an extreme in *Scpioloidca*. I am not aware that this has been observed in any other species of *Sepiadarium*, but the present material indicates that it is a condition easily obscured by inadequate preservation, so too much stress should not be laid upon its apparent absence in the others.

A full description of this species, with figures, will appear in a forthcoming monograph on the South Australian cephalopods.

FAMILY IDIOSEPIIDAE.

Sepio-Loliginei, sub-fam. **Idiosepii** Steenstrup, 1881, p. 233, 240 (23, 30).

Idiosepiidae Fischer, 1882, p. 350.

.. Appellöf, 1898, p. 623.

.. Naef, 1912, p. 243.

IDIOSEPIUS Steenstrup, 1881.

Idiosepius Steenstrup, 1881, p. 219, 233, 236, 240 (9, 23, 26, 30).

.. Verrill, 1881, p. 417 (suggests relationship to *Loligo*).

Idiosepion Fischer, 1882, p. 350.

Idiosepius Brock, 1884, p. 105-114.

.. Steenstrup, 1887, p. 67-72, 116, 119, 120, 121 (21-26, 70, 73, 74, 75).

Microteuthis Ortmann, 1888, p. 648.

Idiosepius Appellöf, 1898, p. 570, with figs.

Idiosepius, the only genus now recognized as belonging to the aberrant family *Idiosepiidae*, was originally described by Steenstrup along with *Sepiadarium* about 40 years ago (1881, p. 219), and like the latter genus was founded on a single species, *I. pygmaeus*, based on specimens from the East Indies and Zamboanga in the Philippines. Steenstrup clearly noted the unique features which mark the genus and which separate it from even the *Sepiadarioid* group, and so placed it in a new sub-family, *Idiosepii*, of his family *Sepio-Loliginei*.

The subsequent history of the group is much the same as that of *Sepiadarium*, and is the result of the efforts of much the same group of investigators. As in

the case of *Sepiadarium*, Verrill (1881) suggested an affinity with *Loligo* rather than with *Sepia*. The following year Fischer (1882) established the group in full family standing under the name *Idiosepiidae*, placing it between the *Sepiadaridae* and the *Loliginidae*. The generic name he amended to *Idiosepiion*, but not in a manner which is now held to be permissible.

Brock (1884, p. 105) referred this genus to the *Sepiolidae* along with *Sepiadarium* and *Sepioloidea*, but Steenstrup (1887) again showed cause for the rejection of this view.

Ortmann (1888, p. 648), in working on Japanese material, recognized the apparent similarity of his specimens to *Idiosepius*, but because he considered them referable to the *Sepiolidae*, described them as a new genus and species, *Microteuthis paradoxa*. There seems little doubt that subsequent authors have been correct in suppressing *Microteuthis* as a complete synonym of *Idiosepius*, but for reasons to be given on a subsequent page, it is probable that the species is perfectly valid, and will stand as the second of the genus.

Appellöf (1898) made important contributions to our knowledge of the group, working on extensive material from Ternate, where these little squids apparently occur in abundance. He came to the well-supported conclusion that Fischer's recognition of the family as distinct from the *Sepiolidae*, *Sepiidae*, or *Loliginidae* is justifiable, and practically all writers have since followed this view, especially since no further evidence germane to the question has been brought to light.

A third species was added to the genus by Joubin (1894), although he did not at once recognize its affinity with *Idiosepius* and described it as *Loligo picteti*. This form came from Amboina.

In summing up it may be said that the *Idiosepiidae* comprise a monogeneric group of three slightly differentiated species, strictly characteristic of the Indo-Pacific faunal region, which they are now known to inhabit from the region of Borneo and the Banda Sea on the south to southern Japan on the north. To these a fourth species is here added which carries the distribution of the group to the south of the Australian continent (see map, text fig. 2). Unfortunately, of the habits and ecology of any of the species, nothing whatever is known.

KEY TO THE SPECIES OF IDIOSEPIUS.

- a. Tentacles variable, with small clubs, one-third the length of the tentacle or less; ventral arms of male with only a single sucker at base of each 1

- aa. Tentacles as thick or thicker than the arms, bearing suckers for more than half their length; ventral arms of male with several or many normal suckers 2
1. Body minute (total length 12-15 mm.), sepioliform, more or less rounded behind; ventral arms of male distal to basal sucker smooth, suckerless, the right arm much thicker and heavier than its mate; tentacles very conspicuously more slender than the arms *pygmaeus*, p. 357
 - 1'. Body larger (mantle length 17 mm.), elongate, tapering posteriorly; right ventral arm of male very short and broad; heavily transversely plicate on the oral face distal to the basal sucker, the aboral surface with a deep longitudinal groove; left ventral arm of male more slender and longer than its mate, the portion distal to the very minute basal sucker smooth, and the tip made bilobate by the projection of a small, tongue-like process on the oral face *picteti*, p. 359
 2. Body small (mantle length 10 mm.); right ventral arm in male with 3-5 suckers at base, otherwise bare; left ventral arm in male with 4-7 suckers at base, otherwise bare except for a semi-circular membrane on the dorsal side near tip *paradoxus*, p. 358
 - 2'. Body larger (mantle length of male 15.8, of female 21.6 mm.); strongly sexually dimorphic; both ventral arms in male normally suckered for most of length, the right a trifle shorter than its mate, its extremity only bare; left similar but the tip furnished with two conspicuous fleshy flaps *notoides*, p. 361

IDIOSEPIUS PYGMAEUS Steenstrup, 1881.

1881. *Idiosepius pygmaeus* Steenstrup, K.D. Vid. Selsk. Skr. (6), i, p. 219, 236 (9, 26), pl. i, fig. 11-22.
1882. *Idiosepium pygmaeum* Fischer, Man. Conchyl., p. 351, text fig. 128 (after Steenstrup).

1886. *Idiosepius pygmaeus* Hoyle, Chall. Rep., p. 20, 213, 218.
 1895. " " Joubin, Rev. suisse Zool., iii, p. 460.
 1898. " " Appellöf, Ceph. Ternate, p. 562, 572-593, text fig. 1
 pl. xxxii, fig. 1-5, 7; pl. xxxiii, fig. 11-13, 22;
 pl. xxxiv, fig. 24, 26, 29-30.
 Chart No. 11 and fig. 64.

Type Locality. 4° 20' Lat. N., 107° 20' Long. E. (Steenstrup).

Recorded Distribution. 4° 20' Lat. N., 107° 20' Long. E., China Sea, off Gulf of Siam (Steenstrup); Zamboanga (Steenstrup); Banda Sea (Appellöf); Ternate (Appellöf).

Remarks. This small species, even more diminutive (with its gross measurements of but 12 to 15 mm.) than *I. paradoxus*, is to be distinguished, if we are to believe Steenstrup's figures, by the slender tentacles, short tentacle clubs, single suckers persistent on the ventral arms in the male, and the lack of flanges or appendages of any kind on the smooth terminal portions of these arms (text



Fig. 64. Schematic view of ventral arms of male, oral aspect (after Steenstrup).

fig. 3). Several of Steenstrup's figures, however, are not in as complete agreement with one another as they might be, while Appellöf brings into his account several new divergencies. Of course it is quite conceivable that the normal variability of individuals of this species is sufficient to account for all this and more, but the relative constancy described for Japanese specimens and likewise noted by me in Australian material of the genus, leads me to suspect otherwise, and that even in Steenstrup's original material there is a possibility that more than one species may be involved.

All the Japanese records of *kochii* are apparently referable to *paradoxus*.

IDIOSEPIUS PARADOXUS Ortmann, 1888.

1888. *Microteuthis paradoxa* Ortmann, Zool. Jahrb., Syst., iii, p. 649, 665, pl. xxii, fig. 4.
 1902. " " Joubin, Revis. Sepiolidae, p. 105, text fig. 15 (after Ortmann).
 1910. *Idiosepius pygmaeus* (pars) Wülker, Jap. Ceph., p. 22 (merely listed).
 1912. " *paradoxa* Berry, Proc. Acad. Nat. Sci. Phila., 1912, p. 405 (brief note).
 1913. " *pygmaeus* (pars) Sasaki, Zool. Mag. Tokyo, p. 401 (in Japanese), pl., fig. 3.
 1914. " " (") " Annot. Zool. Jap., viii, p. 599.

Chart No. 11 and fig. 65.

Type Locality. Kadsiyama, Bay of Tokyo, Japan (Ortmann).

Recorded Distribution. Japan: Kadsiyama (Ortmann); Misaki, Sagami (Sasaki); Inland Sea (Sasaki).

Remarks. On the ground only of Ortmann's scanty data I once expressed the opinion that this species might prove conspecific with *I. pygmaeus*, but the much more complete information since given by Sasaki convinces me that the Japanese *Idiosepius* is clearly a distinct species. A little larger than *I. pygmaeus*, it further differs in the short, thick tentacles, suckered for one-half or more of their length, the development of a semicircular flap near the tip of the left ventral arm in the male, and the persistence of 3 to 7 suckers on the basal portion of each modified arm in the male.



Fig. 65 Schematic view of ventral arms of male, oral aspect (after Sasaki).

The mantle length of the specimens examined by Ortmann and Sasaki is given as 8-10 mm.

IDIOSEPIUS PICTETI Joubin, 1894.

1894. *Loligo picteti* Joubin, Rev. suisse Zool., ii, p. 26, 60-64, pl. iii, iv.

1895. *Idiosepius picteti* Joubin, Rev. suisse Zool., iii, p. 460.

Chart No. 11 and fig. 66.

Type Locality. Amboina (Joubin).

Recorded Distribution. Known only from the type locality.

Remarks. This species comes from the very midst of a region reported to be inhabited by *I. pygmaeus*, but it seems to be a very distinct form. Here the right ventral arm in the male is very short and broad, its oral surface thrown into about twelve heavy transverse plications, while its aboral surface bears a deep longitudinal furrow. The left ventral arm is more slender and is longer than its mate. Each arm of this pair bears a single small sucker near the base. Other than the sucker and a flattened, tongue-like process on the inner face near the tip, the left arm is unornamented.



Fig. 66. Schematic view of ventral arms of male, oral aspect (after Joubin).

Other peculiarities are the small tentacle clubs, the curious fimbriated edging which surrounds the narrowly delimited sucker-bearing area on the clubs, and

the extremely sudden reduction in size undergone by the suckers of the sessile arms near their extremities.

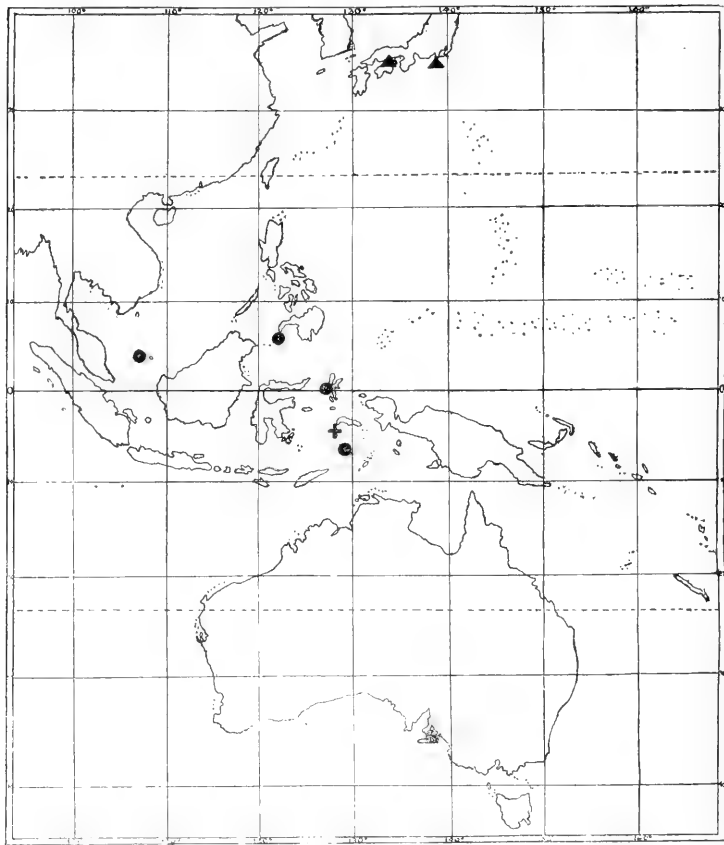


Chart 11. Portion of Indo-Pacific Faunal Region, showing distribution of the genus *Idiosepius*.

● *Idiosepius pygmaeus*.

△ *Idiosepius paradoxa*.

+ *Idiosepius picteti*.

■ *Idiosepius notoides*.

In size *I. picteti* is nearly similar to *I. notoides*. I have seen no specimens of it, but the characters of the hectocotylus as described are such as to lead me to believe the species unquestionably to be valid.

IDIOSEPIUS NOTOIDES sp. nov.

Chart No. 11 and fig. 67.

Diagnosis. Body small in both sexes, but the male especially so; cylindrical, obtusely pointed behind and with a distinct ventral flexion. *Fins* small, semi-circular, about one-third as long as the body, narrowly attached, strongly posterior but not terminal in position. *Head* moderately large, nearly as wide as body. *Arms* short, not very dissimilar in length, about one-third as long as body, the second pair usually a little longer than any of the others. *Suckers* small, rather crowded, biserial throughout. Both ventral arms in the male *hectocotylized*; normal for most of length and bearing 7-11 sucker pairs of the usual type; right ventral arm with the conical tip simple and free of suckers; left ventral arm appreciably longer than right and with a few more suckers, its tip vertically bifurcating into a pair of much compressed, recurved flaps. *Tentacles* short, stout, one and a half to one and three-quarters as long as the arms. *Clubs* large, including nearly the whole exposed length of the tentacles; keel wanting, but sucker-bearing area bordered by a delicate membrane; suckers in two rows at tip and base of club but crowded into three or four on middle. *Colour* of female after preservation, light brown, conspicuously mottled with patches of slaty chromatophores; the male uniformly slaty with a few minute light spots.



Fig. 67. Schematic view of ventral arms of male, oral aspect.

	Type, male.	Paratype, female.
Total length	26.0 mm.	35.0 mm.
Dorsal length of mantle	15.8 mm.	21.6 mm.
Width of body	7.0 mm.	8.8 mm.

Type Locality. Goolwa, South Australia (A. Zietz).

Recorded Distribution. Known only from the type locality.

Remarks. The characters chiefly relied on for the specific discrimination of this little squid are the suckering of the tentacles nearly to the base, the large number of suckers on the sessile arms (twice as many as are figured for *I. pygmaeus*), the extent to which the ventral arms of the male remain normal, and the curious double flap which terminates the left member of this pair. Only *I. picteti* seems to attain so large a size, although the males of the present species

are not nearly so large as the females. The striking sexual dimorphism exhibited is a remarkable feature, but will possibly prove to be a generic rather than a specific character.

The species will be more fully described and mentioned in the forthcoming report to which allusion has already been made.

CONCLUSION.

From the foregoing notes it appears that instead of being practically monospecific genera as some authors have seemed tempted to consider them, both *Sepiadarium* and *Idiosepius* contain a number of fairly well marked geographical races, which, until the existence of actual intergrades be proven, are best considered as distinct species. Both these genera are now seen to have an extended distribution in Indo-Pacific waters, and it is possible that both will prove fairly rich in species as collections are made over a more extended area of this region.

The scanty evidence available indicates that *Sepioloidea* is both a more compact and a more localized genus, the distribution of which through the whole of the region occupied by the other two genera is not to be expected.

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A LIST OF THE TABANIDAE (DIPTERA) IN THE SOUTH AUSTRALIAN MUSEUM, WITH DESCRIPTIONS OF NEW SPECIES.

By E. W. FERGUSON, M.B., CH.M.

THE material on which the following paper is based was kindly placed at my disposal by the Board of Governors of the Public Library, Museum and Art Gallery of South Australia, with a view to having the species identified and named.

A portion of the material was submitted to Miss Ricardo on a visit to London, and that author has published the results of her examination, together with other material submitted by me.⁽¹⁾

Subsequently more material having been received from the Museum, it has been decided to issue a list of all the species represented in the collection, together with descriptions of new species and notes on some of those already described.

The list of species dealt with comprises 75, which are distributed among the following genera:

Erephopsis	12	Ectenopsis	1
Diatomineura	8	Demoplatus	1
Pelecorrhynchus	4	Silvius	11
		Tabanus	38

In addition, the collection contains a number of species which have not been identified, either because they were represented by one or more specimens not in a suitable condition for identification, or else because they are too closely allied to described species to warrant their description as new on the material available.

Sub-Family PANGONINAE.

- EREPHOPSIS GUTTATA** Don. Q., Caloundra; N.S.W., Dorrigo.
 .. **SUBMEDIA** Walk. W.A., Capel R. (W. D. Dodd). Another female labelled "Sydney, G. Masters, *S. singularis*."
 .. **QUADRIMACULA** Walk. N.S.W., Dorrigo.

(1) Ricardo, Ann. Mag. Nat. Hist. (8), xix, p. 208, 1917.

EREPHOPSIS CONCOLOR Walk. An old specimen labelled q.l., probably for Queensland.

.. **MACULIPENNIS** Macq.? S.A., Yorketown, Pt. Lincoln, Yeelanna. Specimens were identified by Miss Ricardo as this species; they do not agree too well with Macquart's description, which is a very complete one, but does not fit any species known to me. I believe there will eventually prove to be a number of allied species of this type, judging from specimens seen in various collections.

EREPHOPSIS GEMINA Walker.

Erephopsis gemina Walk., List Dipt., i, p. 138, 1848; Ric., Ann. Mag. Nat. Hist. (7), v, pp. 112, 117, 1900; and (8), xvi, pp. 24, 25, 1915; *Pangonia testaceomaculata* Macq., Dipt. Exot. suppl. iv, p. 20, 1850; Ric., *loc. cit.*, p. 24; *Erephopsis doddi* Ric., *op. cit.* (8), xix, p. 211, 1917.

I think there can be little doubt that *E. doddi* Ric. is synonymous with *E. gemina* Walk. In London I compared the types without being able to detect any reason for separating them, while a study of the descriptions given by Miss Ricardo has failed to reveal any character of specific importance. In answer to my enquiry, Dr. Guy Marshall, of the Imperial Bureau of Entomology, writes: "*Erephopsis doddi* Ric. appears to me to be indistinguishable from *E. gemina* Walk., and Austen agrees." The type of *E. doddi* Ric. is in the South Australian Museum Collection.

Hab. W.A., Warren R.

EREPHOPSIS AUREOHIRTA Ric. Q., Bowen.

.. **XANTHOPILIS** Ferg. A single specimen labelled q.l.

.. **LASIOPHTHALMA** Boisd. N.S.W., Mt. Kosciusko. Specimens are in the Department of Public Health, N.S.W., from Bright, V.

EREPHOPSIS BINOTATA Latreille.

Pangonia binotata Latr., Encyclop. Method. viii, p. 703, 1811; *Pangonia macroporum* Macq. Dipt. Exot. I, i, p. 101, 1838; *Erephopsis id.* Ric., Ann. Mag. Nat. Hist. (7), v, p. 112, 117, 1900. Latreille's description leaves no doubt as to the species he had under examination, and the identity of *P. binotata* with *E. macroporum* Macq. is certain. Miss Ricardo evidently overlooked Latreille's species altogether in her revision. The species appears to be

confined to Kangaroo Island and the South Australian coast. Two females, one without locality label, not in very good preservation, appear to belong to this species.

- EREPHOPSIS DIVISA** Walk.? W.A., Bunbury. A single female, probably belongs to this species.
- .. **GIBBULA** Walk. W.A., Warren R.
- DIATOMINEURA AURIFLUA** Don. S.A., Adelaide, Mt. Compass, Bull L., Meadows, Longeal, Yallmin, Lucindale, Mt. Lofty; N.S.W., Dorrigo, Sydney; T., Strahan, Launceston, Waratah, Hobart, Mt. Wellington.
- .. **PATULA** Walk.? S.A. A single male doubtfully determined as this species by Miss Ricardo. The specimen is not in very good condition, and appears hardly distinct from *D. auriflua* Don.
- .. **BREVIROSTRIS** Macq. N.S.W., Clarence River.
- .. **MONTANA** Ric. N.S.W., Blue Mts.
- .. **FULGIDA** Ferg. and Henry. N.S.W., Dorrigo.
- .. **PULCHRA** Ric. Two specimens labelled S.A. Pulleine, two without locality label, and one labelled q.l. The species occurs in northern N.S.W., and Q.
- .. **VIOLACEA** Macq. N.S.W., Tweed R.

DIATOMINEURA RUFICORNIS Macquart.

Diatomineura ruficornis Macq., Dipt. Exot., suppl. i, p. 26, 1846; Walk., l.c. pt. v, suppl. i, p. 142, 1854; *D. constans* Walk., Dipt. Saund. pt. i, p. 15, 1850; White, Roy. Soc. Tasmania, Papers and Proc., 1915, p. 20; Ric., Ann. Mag. Nat. Hist. (7), v, p. 113, 1900; and (8) xix, p. 208, 1917.

The above synonymy has been recorded by White, and Miss Ricardo has given her opinion that it is probably correct. In examining the specimens from Mt. Wellington referred to *D. ruficornis* Macq., by Miss Ricardo, I was struck with the difference in the palpi between these specimens and others identified as *D. constans* Walk. In *D. constans* the palpi are broad at the base and end in a long-drawn-out pointed apex; in the specimens labelled *D. ruficornis* the second joint of the palpi consists practically of the expanded basal portion. No other difference is apparent between the two forms. Miss Ricardo has the following note on the palpi of *D. ruficornis*: "Palpi with the first joint short, the second long, flattened at base, broad ending in a fine point." On examining a series of 70 specimens of *D. constans* in the Museum collection from Cradle Mountain,

Strahan, and Waratah, I find that though in the great majority of specimens the second joint of the palpus is drawn out, the degree or length of this part varies considerably, though in only three out of seventy is the extension absent, and these three do not appear to be separable by any other character. In my opinion the two names must be regarded as referring to the one species. The clothing varies considerably in different individuals, both on the thorax and abdomen, and there is a good deal of difference in size, so that the name *constans* was not a happy choice. In most specimens the first posterior cell is widely open, but in some it is narrowed at the apex, and in five out of the 70 specimens examined this cell is closed in the margin.

- PELECORRHYNCHUS FUSCONIGER** Walk. T., Burnie.
 „ **ERISTALOIDES** Walk. T., Cradle Mt.
 „ **ALBOLINEATUS** Hardy. T., Cradle Mt.
 „ **MONTANUS** Hardy, var. A. T., Cradle Mt.

Mr. Hardy has kindly verified the above identifications.

ECTENOPSIS? VICTORIENSIS Ferg. S.A. These specimens have been commented upon in describing the species in the publications of the Royal Society of Victoria.

DEMOPLATUS TRICHOCERUS Bigot. Q., Cairns.

SILVIUS NOTATUS Ric. V., Rainbow.

„ **INSULARIS** Ric. Bathurst I., type, and another female.

SILVIUS INDISTINCTUS Ricardo.

Silvius indistinctus Ric., Ann. Mag. Nat. Hist., (8), xvi, p. 262, 1915; and (8), xix, p. 217, 1917; *S. hilli* Taylor, Proc. Linn. Soc. N.S. Wales, vol. xl, pt. 4, p. 806, 1915.

I am indebted to Mr. Hill for a specimen of *S. hilli* Taylor, and for the loan of a series for comparison. The species is a very variable one in the coloration of the abdomen and in the presence or absence of the median triangular spots, but specimens in Mr. Hill's series agree exactly with specimens of *S. indistinctus* determined by Miss Ricardo. Mr. Hill has kindly verified this by comparing a specimen determined by Miss Ricardo with Taylor's type. Miss Ricardo's name has precedence by about a month. *S. insularis* Ric. is a closely allied species, smaller and with somewhat different antennae and palpi.

Hab. N.T., Bathurst I., Melville I.

SILVIUS AUSTRALIS Ric. N.Q., Cairns.

„ **ALCOCKI?** Summers. N.T., Darwin.

SILVIUS MARGINATUS? Walk. N.T., Darwin. I am indebted for the two above provisional identifications to Mr. G. F. Hill, of the Australian Institute of Tropical Medicine, Townsville.

SILVIUS IMITATOR sp. nov.

A small black species resembling *T. necocirrus* and others of the hairy-eyed group of *Tabanus*.

♀ Black. Face yellowish, grey above; densely clothed with light grey tomentum and with scanty creamy pubescence; beard creamy; palpi brownish, second joint nearly as long as proboscis, strongly curved at base, rather thick throughout, ending in a blunt point, shallowly grooved on outer surface, densely clothed with grey tomentum; antennae black, the two basal joints with some black hairs, the third joint strongly dilatate, upper border strongly convex but hardly angulate, annuli rather shorter, together about equal to basal portion; subcallus clothed with grey tomentum, not markedly tumid nor shining. Forehead very broad, slightly though distinctly narrowed to vertex, hardly twice as long as broad anteriorly; clothed with grey tomentum, with scanty black pubescence; callus nitid, reddish brown, black in places, irregularly shaped, occupying the whole of breadth anteriorly and reaching nearly to middle with an obscure extension to near ocelli; ocelli distinct; eyes with rather sparse long white pubescence. Thorax black, reddish brown at sides, with a sub-median grey stripe on each side of median area, most distinct anteriorly, clothed with erect black hairs (partly abraded); shoulders with dark brown hairs; sides with long grey pubescent tufts; scutellum similar to dorsum, posterior border with fringe of scanty grey hairs. Abdomen black, segmentations narrowly greyish, somewhat wider near lateral margins, with a median row of triangular spots, clothing abraded, but traces of grey pubescence present on lateral borders and on median spots; venter brown with grey segmentations, clothed with erect brownish hairs and decumbent creamy pubescence most marked on segmentations. Legs with femora black, tibiae reddish brown; apex of anterior pair darker, tarsi dusky, pubescence grey on femora, black elsewhere; posterior tibiae distinctly spurred. Wings hyaline, the basal portions of the longitudinal veins and the cross veins narrowly shaded light brown; costal cell and extreme base light brown; stigma brown, conspicuous; no appendix present. Long: 10 mm.

Hab. W.A., Bunbury (W. R. Mack, Jan., 1898). Type in South Australian Museum.

Described from a single female, not in very good condition, but so distinct

from all other known species as to merit description. Superficially the species resembles members of the hairy-eyed group of *Tabanus*, and most closely *T. neocirrus* Ric. I know of no described species with similar broad forehead and callus reaching eyes.

SILVIUS TEPPERI sp. nov.

A moderately large dark brown species with broad abdomen, closely resembling superficially *Ectenopsis victoriensis*.

♀ Dark brown. Face deeply depressed, densely clothed with grey tomentum and rather sparse white pubescence; beard white; palpi yellow, first joint short, subcylindrical, with white hairs, second joint long, stout, moderately strongly curved, ending in a blunt point, clothed with grey tomentum and scattered short black hairs; antennae black, first and second joints yellowish brown, with black hairs, third joint with basal portion widely expanded, upper border strongly rounded hardly angulate, annuli rather short and stout; subcallus densely clothed with grey tomentum, not shining. Forehead of moderate width slightly narrowed to vertex, clothed with grey tomentum and scattered black pubescence; callus consisting of a basal depressed quadrate portion occupying about half the width of the front followed by a thick irregularly grooved extension nearly reaching ocelli, dark chestnut in colour; ocelli present. Eyes bare. Thorax black reddish brown at sides, mostly denuded, some grey hairs, pleurae reddish brown with grey tomentum and tufts of grey pubescence; scutellum black with scanty grey hairs on posterior border. Abdomen dark brown, segmentation narrowly bordered with grey, expanding slightly at sides and in centre to form series of indistinct spots on 2-5 segments; clothing much abraded, traces of dark brown pubescence present with white pubescence on segmentations; first segment with rather longer white hairs in middle; sides of segments with tufts of white hairs. Venter lighter brown with broader segmentations, pubescence brownish on basal portions, grey on segmentations. Legs reddish brown, femoral pubescence whitish, elsewhere dark, posterior tibial spurs short but distinct. Wings hyaline, veins yellowish brown, costal cell and extreme base similarly coloured; stigma inconspicuous; no appendix. Long.: 14 mm.

Hab. S.A., Adelaide (J. G. O. Tepper).

Described from a single specimen somewhat abraded, but not closely resembling any species known to me. It presents a rather remarkable superficial resemblance to *Ectenopsis victoriensis* Ferg., but the palpi and antennae are very different.

SILVIUS GRANDIS Ric. N.W.A. Type.

SILVIUS MONTANUS Ricardo.

Silvius montanus Ric., Ann. Mag. Nat. Hist. (8), xix, p. 216, 1917.

Type from Mt. Tambourine, Queensland. I have recently received two specimens from the Queensland Museum, taken at National Park, Brisbane, by Mr. H. Hacker. One of these agrees very well with the type, the other differs in having darker palpi, less marked wings, and in the abdominal pubescence being white on the segmentations. The eyes are not bare, as stated by Miss Ricardo, but rather thinly pubescent; this is also the case in the type.

SILVIUS FRONTALIS Ric. N.T., Darwin, Stapleton, Batchelor. I am indebted to Mr. Hill for this identification.

In addition to the above there are three species of *Silvius* in the collection represented by single specimens and not in sufficiently good condition for describing. One may prove to be a female of *S. psarophanes* Taylor, which was described from the male.

Sub-Family TABANINAE.

GROUP IV. Forehead with no callus. (Group numbers are those used by Miss Ricardo.)

TABANUS ANGSTICALLUS Ric. N.T., Melville I. Type.

TABANUS LEUCOPTERUS van de Wulp.

Tabanus leucopterus van de Wulp, Tijdschr. voor Entom. xi, p. 98, 1865.

This species, which clearly belongs to Miss Ricardo's Group IV, does not appear to have been hitherto recorded from Australia, the type locality being the Aru Islands. Miss Ricardo has, however, identified a specimen in the Museum collection from Stewart River, North Queensland, as this species, and another specimen is in my collection from Kimberley, North-West Australia. Probably it will be found to have a wide distribution in the north.

GROUP VII. Abdomen with one or more stripes, usually continuous.

TABANUS CINERASCENS W. S. Macl. N.T., Darwin.

.. **RUFINOTATUS** Bigot. N.T., Melville I.; Q., Cairns.

.. **PARVICALLOSUS** Ric. Q., Mt. Tambourine.

TABANUS STRANGMANNI Ricardo.

Tabanus strangmanni Ric., Ann. Mag. Nat. Hist. (8), xiv, p. 393, 1914; and (8), xix, p. 219, 1917; *T. mastersi* Taylor, Proc. Linn. Soc. N.S. Wales, xli, pt. 4, p. 754, 1916.

Specimens of this species were identified by comparison with Miss Ricardo's type in London; subsequently specimens were received from Mr. Taylor under the name *T. mastersi*, and proved identical with those determined as *T. strangmanni*. For confirmation a specimen was resubmitted to the British Museum and was returned as *T. strangmanni*.

Hab. N.T.; Q., Cairns.

TABANUS PSEUDOARDENS Taylor. Q., Cairns.

TABANUS HERONI sp. nov.

A large species resembling *T. victoriensis* in general appearance, but abdomen reddish with median black stripe and whitish spots.

♀ Face black, densely clothed with grey tomentum, separated from cheeks by deep grooves, the latter clothed with grey tomentum and with short black pubescence; beard white, a few black hairs intermingled; palpi nearly as long as proboscis, reddish brown, clothed with rather long intermingled pale and dark hairs, second joint stout, rather strongly curved; antennae black, first and second joints clothed with rather long black hair, third joint rather strongly angulate and toothed at base, annuli about as long as rest of joint; subcallus not prominent, densely clothed with yellowish grey tomentum. Forehead of moderate width, subparallel, if anything slightly wider at vertex than anteriorly, densely clothed with greyish tomentum, brownish above except at vertex, and with short black pubescence; callus dark reddish, elongate, not quite reaching eyes anteriorly and extending to middle. Eyes apparently bare, but under the microscope short thin widely separated hairs can be made out. Thorax black, lateral margins yellowish brown, clothed with brown tomentum with indistinct traces of grey submedian tomentose lines; pubescence suberect, black, a few greyish hairs at sides and posteriorly; shoulders with black hairs; pleurae reddish brown with tufts of long hair, black anteriorly, white posteriorly; scutellum black with brown tomentum and some straggling grey hairs. Abdomen wide, dark reddish brown with a medium black stripe, clothed with black decumbent pubescence, with median apical spots of white pubescence on segments, most evident on second, third, and fourth; lateral margins with similar white spots at postero-lateral angles of segments. Venter reddish with short black pubescence. Legs reddish brown, tarsi darker. Wings with all veins suffused with brown, narrowly in basal half, more distinctly in apical half; first posterior cell widely open, no appendix present. Long.: 20 mm.; width across head, 6 mm.; wing, 18 mm.

Hab. N.S.W., Dorrigo (W. Heron).

In general appearance this species is very close to *T. victoriensis* Ric., but differs in the colouration of the abdomen. It is probably also close to *T. limbatinervis* Macq., but that species is said to have the first posterior cell closed.

TABANUS EIDSVOLDENSIS Taylor. Q., Eidsvold.

GROUP VIII. Species with median or lateral spots, or both, on abdomen, not usually forming a continuous stripe.

TABANUS VICTORIENSIS Ric. N.S.W., Dorrigo; Q., Mt. Tambourine.

GROUP IX. Species with paler bands, and sometimes spots on abdomen.

TABANUS NOTATUS Ric. Q., Cairns, Coen R. A specimen from Mary R., N.T., was doubtfully identified as this species by Miss Ricardo.

.. **MACQUARTII** Ric. N.S.W., Dorrigo; Q., Bowen. A specimen from the Wentworth Falls differs somewhat from the typical specimens, but I do not care to describe it as specifically distinct.

.. **DODDI** Taylor. Q., Cairns. Specimens from Cairns were identified by Miss Ricardo as *T. macquartii* Ric., and there is no doubt that both species were included in her series when describing the species. At the same time I agree with Mr. Taylor in separating the northern form as a distinct species.

.. **QUADRATUS** Taylor. N.T., Darwin.

.. **NEOGERMANICUS** Ric. N.T., Melville I.

.. **CLAVICALLOSUS** Ric. N.S.W., Milson I. Miss Ricardo is in error in stating that the type was in the South Australian Museum. The species was one of a number sent to the British Museum by myself and the type is in that Institution. A paratype has, however, been placed in the South Australian Museum collection.

GROUP X. Species with abdomen unicolorous or almost so, sometimes darker at apex.

TABANUS CYANEUS Wied. N.S.W., Sydney.

.. **SANGUINARIUS** Bigot. Q., Mt. Tambourine, Caloundra.

.. **AVIDUS** Bigot. Q., Bowen.

.. **NIGRITARSIS** Taylor. N.T., Darwin, Stapleton; Q., Bowen.

.. **BREVIOR** Walk. N.T.

GROUP XI. Eyes hairy (*Theriopectes*).

TABANUS CIRCUMDATUS Walk. S.A., Murray R., Meadows, W. Coast. Yeelanna, Parachilna, Mt. Lofty; N.S.W., Captain's Flat,

Blue Mts.; T., Swansea. Most of the South Australian specimens are without locality label and are too badly damaged to make an absolutely certain identification.

- TABANUS EDENTULUS?** Macq. T.; S.A., Lyndoch, Blakiston, Mt. Lofty. The South Australian specimens are somewhat narrower but appear inseparable from specimens from Tasmania, determined by White as this species. A series from Kangaroo I. are too badly damaged to identify with certainty.
- „ **ANTECEDENS** Walk. T., Cradle Mt., Waratah, Mt. Wellington.
- „ **INDEFINITUS** Taylor. N.S.W., Sydney.
- „ **HOBARTIENSIS?** White. T., Cradle Mt. A single specimen agreeing with Hobart specimens doubtfully identified as this species.

TABANUS FLINDERSI sp. nov.

Allied to *T. circumdatus*, but readily distinguished by wings with cross-veins clouded, and with very conspicuous stigma.

♀ Face reddish black in centre, clothed with grey tomentum, and with rather straggly fine creamy pubescence; cheeks reddish with similar clothing; beard creamy. Palpi yellow, second joint long, little thickened at base, ending in a long slender point, clothed with creamy pubescence, thickest at base. Antennae black, second joint reddish at base, first two joints with rather short black hairs, third joint broadly dilatate and strongly angulate at base. Subcallus reddish black, nitid, partly abraded with traces of grey tomentum at sides. Forehead moderately wide, evidently though not greatly narrowed to vertex, abraded with traces of grey tomentum and black pubescence; callus little raised, resting on subcallus, as wide as front anteriorly and triangularly prolonged to middle. Eyes clothed with moderately long and dense creamy pubescence. Thorax black with traces of grey tomentose, submedian lines; densely clothed with long erect black pubescence; with small hoary tufts above wing roots; shoulders reddish with black hair tufts; sides with hair tufts mostly creamy but with some black hairs in centre. Scutellum black with a few creamy hairs at apex. Abdomen black, becoming dark reddish brown at sides of segments, with narrow yellowish brown segmentations; thickly clothed with depressed black pubescence, creamy along segmentations, denser at sides and in middle where the

creamy hairs form a series of median spots. Ventral surface dark reddish brown or blackish with rather broad yellowish segmentations, with long erect black pubescence intermingled with semi-erect silky whitish pubescence, these two varieties only visible when viewed from different angles. Legs dark, femora black, tibiae dark reddish, the tarsi more infuscate, almost black. Wings grey, veins in middle of wing faintly suffused with brown, this much more marked along cross veins at base of discal cell and to a slight extent at fork of second longitudinal; stigma dark brown, very conspicuous; appendix present. Long.: 12 mm.; width of head, 4 mm.; wing, 11 mm.

Hab. Flinders I. Type in South Australian Museum.

Described from five specimens, all more or less damaged; in some, where extensively abraded, the abdomen appears reddish with a median black stripe. The species comes near *T. tasmaniensis* White, but the costal cell and extreme base of the wing are darkly infuscate in that species, which also differs in a number of ways, *i.e.*, size, uniformly black colour, shape of forehead and callus, shape of third antennal joint, etc. It is possible that this is *T. gregarius* Er., but the description is hardly sufficient to enable one to place that species with any degree of certainty, and it seems better to risk creating a synonym than to pin Erichson's name to a species which may not be the one originally described.

TABANUS IMPERFECTUS Walk. T., Waratah. A single specimen probably this species but too damaged for certain identification.

„ **LATIFRONS** Ferg. T., Cradle Mt.

„ **GENTILIS** Er. T., Cradle Mt.

TABANUS NEOCIRRUS Ricardo.

Tabanus neocirrus Ric., Ann. Mag. Nat. Hist. (8), xix, p. 223, 1917.

In the South Australian Museum collection there is a specimen labelled Type by Miss Ricardo. In her description Miss Ricardo states the type to be in the South Australian Museum. A complication, however, arises from the fact that Miss Ricardo further states that the type is from Swansea, Tasmania, whereas the specimen labelled type is from South Australia, and is evidently the second specimen Miss Ricardo had before her in describing the species. The South Australian specimen, whether to be regarded as the type or not, represents a very distinct species and one I have not so far seen from Tasmania, and as there are allied forms in Tasmania it is possible that Miss Ricardo was dealing with two different species. At the same time till more information can be obtained, the South Australian species must bear the name *neocirrus*.

TABANUS ACUTIPALPIS? Macq. S.A., Kangaroo I.; T., Flinders I.

TABANUS (THERIOPECTES) MERIDIONALIS sp. nov.

A moderately large species allied to *T. postponens* but without frontal callus.

♀ Face yellowish brown, clothed with grey tomentum and rather sparse white pubescence with a few black hairs entangled; beard white; palpi yellow, second joint moderately slender, ending in a long point, with short whitish pubescence longer and denser at base; subcallus yellowish brown with grey tomentum, shining where denuded; antennae reddish yellow, basal joints somewhat lighter, first subcylindrical, second short cup-shaped with the anterior dorsal angle produced in a rather long process, anterior margin with a ring of black hairs; third joint broad, strongly angulate and toothed above, a few black hairs on tooth, lower edge also slightly angulate, annuli black. Forehead moderately wide, subparallel; reddish brown where denuded, more or less densely covered with grey tomentum and scanty black pubescence, longer on vertex; no callus present. Eyes with rather short hairs not readily seen. Thorax black, with four distinct grey tomentose stripes, a submedian and sublateral on each side, also a short stripe above wing roots; with erect black hairs and scanty decumbent golden pubescence most marked posteriorly; shoulders reddish brown with long black hairs; sides clothed with grey tomentum and with tufts of long hoary white pubescence with a few dark hairs in middle. Scutellum black with grey tomentum and a fringe of golden pubescence. Abdomen brown with grey segmentations and a row of median grey triangular spots, pubescence black, grey on segmentations and median spots; venter wholly reddish, yellow with grey tomentum, and fine decumbent whitish pubescence. Legs reddish yellow, anterior tarsi and tips of other tarsal joints infuscate; pubescence white on femora, elsewhere black. Wings hyaline, veins brown, black towards tip of wing, stigma brown, conspicuous; appendix present. Long.: 12.5 mm.; width of head, 5 mm.; wing, 11 mm.

Hab. S.A., Adelaide, Kangaroo I., Coorong, Yeelanna.

In the *Annals and Magazine of Natural History*, 1917, p. 224, Miss Ricardo records the presence of *T. postponens* in South Australia, basing her determination on specimens in the South Australian Museum. Examination of this material, which is before me, shews that two distinct species have been included, one probably *T. circumdatus*, the other the present species. I am separating it from *T. postponens* as it does not agree with specimens in my own collection

from New South Wales, which were named after comparison with the type, and which have a distinct callus. Except for the absence of the callus the species agrees fairly well with Miss Ricardo's description of Walker's type. In some specimens there is an indication of a feeble callus where the tomentum has been abraded, but very different in appearance from the callus in my specimens of *T. postponens*; the antennae also are much stouter. There are five specimens before me which I regard as conspecific; in three out of the five, however, the abdomen is more reddish in colour; this seems to be the result of abrasion. In the collection is a male from Murat Bay, which probably belongs to the same species, but as it differs somewhat in the antennae and legs I cannot be sure of its identity.

TABANUS (THERIOPLECTES) ALBOHIRTIPES sp. nov.

Allied to *T. circumdatus*, but with very densely hairy eyes and a fringe of white hairs on posterior tibiae.

♀ Face black, clothed with grey tomentum and with rather straggling grey pubescence; beard white. Palpi reddish brown, second joint not greatly thickened at base ending in a long point, clothed with grey tomentum and pubescence. Antennae black, the second joint and extreme base of third dark reddish brown, third joint broad, rather strongly humped at base. Subcallus black with reddish tinge at sides, clothed with grey tomentum, but partly abraded. Forehead moderately broad, about three times as long as broad anteriorly, very slightly narrowed at vertex, densely clothed with grey tomentum and with rather long black pubescence longest at vertex; callus black, nitid, reaching eyes with an extension to middle. Eyes densely clothed with moderately long white hairs. Thorax black clothed with grey tomentum with traces of indistinct narrow lighter grey tomentose stripes; with decumbent golden pubescence in places (evidently very liable to abrasion) and numerous long erect hairs, white anteriorly but dark elsewhere; with tufts of pale creamy hairs above wing roots; shoulders pale reddish grey with brown hair tufts; sides black, with grey tomentum and dense tufts of long, hoary white hairs; scutellum black with similar erect hairs to dorsum and with a fringe of pale golden pubescence. Abdomen black, segmentations reddish brown, the lateral margins and base of second segment similarly coloured; densely covered with brownish grey tomentum and with traces of depressed golden pubescence. Venter black with light reddish brown segmentations, clothed with grey tomentum and with long erect pale creamy pubescent hairs. Legs with femora dark, tibiae yellowish brown, infusate

towards apex and tarsi dark; femora with long pale pubescence, posterior tibiae with heavy fringe of white hairs along outer side; wings whitish, veins pale brown, appendix present. Long.: 13 mm.; width of head, 5 mm.; wing, 12 mm.

Hab. S.A., Pt. Lincoln, Denial Bay.

A distinct species from any known to me, and separable from most of the described species by the posterior tibiae being fringed with white hairs. *T. robustus* Taylor has similar white hairs on the posterior tibiae, but judging from the description has distinct thoracic ornamentation; the curious meal-like tomentum on the abdomen is also characteristic. There is another species before me doubtfully identified as *T. acutipalpis* Macq., which has a white fringe of hairs, but it differs widely in general appearance, thoracic markings and size. The wings, though quite transparent, have a distinctly white appearance. Two other specimens in the collection perhaps represent a variety of this species.

♀ Face, cheeks, and subcallus yellowish brown with pale creamy tomentum and pubescence; palpi light yellow; antennae with two first joints and base of third reddish brown. Forehead yellowish brown with light creamy tomentum and dark pubescence, callus pale yellowish brown without extension. Eyes very densely hairy. Thorax similar but more evidently clothed with decumbent golden pubescence. Abdomen with moderately dense decumbent black pubescence and pale creamy pubescence along the segmentations and forming a series of median spots on the second to sixth segments. Legs as in type but posterior tibial fringe with dark hairs intermingled with the white. Wings as in type. Long.: 15 mm.

Hab. S.A. (A. P. Burgess), Mt. Pleasant, in scrub (J. G. O. Tepper, 8.11.86).

The Mt. Pleasant specimen is more abraded than the other, and in general appearance approximates closer to the type, but the black hairs predominate in the tibial fringe. Larger series may shew that these specimens are entitled to specific rank.

A specimen from Perth, Western Australia, appears to belong to the same species as the var.?, it differs in being somewhat darker, particularly the sides of the second abdominal segment.

TABANUS DIXONI Ferg. S.A., Mt. Lofty, Modbury,

.. **BASSII** Ferg. S.A., Coorong, Robe.

.. **PSEUDOBASALIS** Taylor. S.A., Yeelanna, Kangaroo I.:
W.A., Kuminin. The Yeelanna specimens were somewhat

doubtfully identified by Miss Ricardo (2) as *T. nemopunctatus* Ric., but Miss Ricardo overlooked the hairy eyes. Specimens were compared with Taylor's type in the Australian Museum.

TABANUS VETUSTUS Walk. S.A., Pt. Elliot, Coorong, Adelaide, Robe, Eucla, Kangaroo I.; T. Specimens from Kingston, Robe, Coorong and Corney Pt. possibly represent a variety, but are not in good enough condition for certain naming.

(2) Ricardo, Ann Mag. Nat. Hist. (8), xix, p. 218, 1917.



ON AUSTRALIAN COLEOPTERA.

By ARTHUR M. LEA, F.E.S., ENTOMOLOGIST, S.A. MUSEUM.

PART III.

FAMILY CHRYSOMELIDAE.

DITROPIDUS.

IN point of numbers this genus is second only to *Paropsis* in the Australian Chrysomelidae. To enable the species here described to be more readily identified they have been divided into groups, according to their clothing and colours.

PROTHORAX and ELYTRA pubescent.

DITROPIDUS GIBBICOLLIS sp. nov.

♂ Coppery or coppery bronze, elytra usually slightly brighter than prothorax; labrum and basal half of antennae obscurely reddish. Moderately clothed with white pubescence, sparser on middle of pronotum than elsewhere.

Head shagreened, and with fairly dense, partially concealed punctures; with a rather feeble median line. Eyes moderately separated. *Prothorax* scarcely twice as wide as the median length, gibbous in front, vaguely depressed near base, shagreened; with dense and rather small elongated punctures in middle, becoming larger and more rounded on sides. *Elytra* subquadrate, with deep and well defined striae on the sides, shallower but with distinct punctures elsewhere, the interstices shagreened and finely punctate. *Legs* rather short; front tibiae rather thin. Length (♂ ♀), 2.2-2.5 mm.

♀ Differs in being rather more robust, club somewhat smaller, legs slightly shorter, and in the abdomen.

Hab. South Australia: Mount Lofty (S. H. Curnow and A. H. Elston). Type, I. 10956.

The under surface sometimes has a bluish or greenish gloss; on some females the elytra are almost of a brassy purple; on two (of the nine) specimens before me there is a vivid blue spot between the eyes. The distance between the eyes is about the length of the basal joint of the antennae in the male, slightly more in the female; from the sides the hind angles of the prothorax are seen to be slightly obtuse. It is a compact species, and almost the smallest pubescent member of

the genus; it is near *D. comans*, but slightly smaller, prothorax not quite so gibbous, and the discal striae are shallower, although the lateral ones are quite as deep; the legs are also darker; from *D. intonsus* it differs in being smaller, the prothorax more gibbous and with fine sculpture very different, and the legs entirely dark.

DITROPIDUS DISCICOLLIS sp. nov.

♂ Brassy, under surface with a slight greenish gloss, labrum and basal half of antennae reddish, parts of tibiae obscurely diluted with red. Moderately clothed with white pubescence, sparser on middle of pronotum than elsewhere.

Head with rather dense punctures, becoming coarse on clypeus, with a rather wide median line. Eyes separated slightly more than the length of basal joint of antennae. *Prothorax* scarcely twice as wide as the median length, somewhat gibbous in front, feebly depressed on each side near base; with fairly numerous minute punctures in middle, becoming larger on sides and apex. *Elytra* subquadrate, shagreened throughout; striae deep and well defined on sides, feeble but with fairly distinct punctures elsewhere; interstices with small asperate punctures. *Legs* not very long and (for the genus) rather thin. Length, 2.25 mm.

Hab. South Australia: Mount Lofty (S. H. Curnow). Type (unique), 1. 10957.

Structurally close to the preceding species, but the prothorax not shagreened, and the punctures on its middle smaller and quite round; the median line on the head is also deeper and wider.

PROTHORAX pubescent, ELYTRA glabrous.

DITROPIDUS CUPRICOLLIS sp. nov.

♂ Bronzy, prothorax coppery bronze, labrum palpi and parts of antennae and of legs flavous. Head, prothorax, under-surface, and legs with white pubescence.

Head with crowded and rather small punctures. Eyes separated the width of front of clypeus. *Prothorax* about twice as wide as the median length; punctures small and not very dense. *Elytra* slightly narrowed posteriorly; with rows of fairly large punctures, becoming larger and set in deep striae at the sides; interstices very feebly rugose. Front *legs* slightly longer than hind ones. Length, 3.4 mm.

Hab. South Australia: Morgan (A. M. Lea). Type (unique), 1. 10892.

In general appearance, except that it is somewhat more oblong, and that the elytral punctures are not quite so coarse, it is much like the female of *D. crassipes*; the size is slightly greater than that of *D. cribripennis*, but the prothoracic punctures are very much finer, and the elytral ones, although strong, are also very much finer than on that species; the outlines are much as on *D. gymnopterus*, but the elytra are not shagreened and are otherwise very different; the finer sculpture of the elytra of *D. pubicollis* is also very different. The joints of the club are wholly or partly blackish, the tarsi, base of tibiae and parts of femora (almost the entire hind ones) are also more or less blackish. There is a feeble median carina in a feeble depression on the head, but both are indistinct from most directions; from above the hind angles of the prothorax appear to be acute and the front ones rounded off, but from the sides the hind ones are seen to be rectangular and the front ones slightly acute.

DITROPIDUS MODICUS sp. nov.

♂ Bronzy; labrum, basal half of antennae (the club blackish), and legs (the tarsi blackish) flavous. Head, prothorax, under-surface, and legs with white pubescence.

Head with dense and small punctures, becoming larger on clypeus; with a feeble median line. Eyes separated about the width of base of clypeus. *Prothorax* about twice as wide as the median length, sides evenly rounded; with well-defined but not large punctures, denser on sides than in middle. *Elytra* about as long as the basal width; with rows of rather large punctures, on the sides set in well-defined striae; interstices with sparse and minute punctures. Front legs slightly longer than hind ones. Length, 2 mm.

Hab. Queensland: Bowen (Aug. Simson's $\frac{6}{5} \frac{1}{5} \frac{1}{5}$). Type (unique), I. 10978.

A minute species in general appearance like a very small specimen of *D. cribripennis*, but punctures much smaller, and general outlines less oblong; from the description of *D. albertsi*, it differs in having a coppery gloss, without a trace of blue, and in its entirely pale femora and tibiae, except for a very slight genicular infuscation.

DITROPIDUS GLOBULUS sp. nov.

♂ Bronzy; labrum, antennae (club infuscated), palpi and most of legs somewhat flavous. Head, prothorax, under-surface and legs, with fairly dense, white pubescence.

Head with dense and fairly strong punctures; with a feeble median line. *Eyes* rather close together. *Prothorax* rather more than twice as wide as the median length, sides strongly rounded; with numerous small subaciculate punctures, becoming dense on sides, where also the surface is shagreened. *Elytra* scarcely as long as the basal width, sides gently rounded; with rows of small punctures, becoming larger and set in distinct striae on the sides; interstices faintly wrinkled (almost shagreened). *Legs* rather stout, front ones slightly longer than the hind ones. Length (♂ ♀), 2.75-3 mm.

♂ Differs in being slightly more robust, club slightly thinner, front and hind legs of equal length, and in the abdomen.

Hab. Australia (old collection). Type, I.10961.

A globular species in size and outlines almost exactly as in *D. intonsus*, but the elytra glabrous; the eyes are also closer together, those of the female of the present species being the same distance apart as in the male of that species; the distance between them on the present species is about equal to the length of the basal joint in the male, to the two basal joints in the female. On the male (there is one of each sex in the Museum) the tarsi knees and almost the entire hind femora are infuscated, on the female the pale parts are darker and the dark parts are more extended, on the female also the prothorax has a slight purplish gloss. On the male the pubescence of the pronotum is confined to the sides and apex, on the female it is more extended, but each has probably been slightly abraded.

DITROPIDUS FLAVIPENNIS sp. nov.

♂ Bronzy; labrum, basal half of antennae, palpi, elytra (extreme base and suture slightly infuscated) and legs flavous. Head, prothorax, under-surface and legs, with white pubescence.

Head with fairly dense and strong punctures, becoming stronger on clypeus; the latter with its posterior suture well-defined. *Eyes* widely separated. *Prothorax* about twice as wide as the median length; punctures of moderate size, but not crowded. *Elytra* moderately long, slightly narrowed posteriorly; with rows of distinct but not very large punctures, set in striae on the sides; interstices with minute punctures. Length, 2.75 mm.

Hab. South Australia: Oodnadatta (Blackburn's collection). Type (unique), I. 4429.

A suboblong species with eyes separated fully the width of clypeus and flavous elytra. The scutellar lobe is scarcely visibly notched, but that would not appear sufficient to refer the species to *Bucharis*. The type is a male, as although it has a subapical impression on the abdomen, it is shallow and not

circular; the tip of the pygidium, however, is not brought forward, and the front legs are not longer than the hind ones; characters usually confined to females in the genus.

Since the above was written two females (from Alexandria in the Northern Territory) belonging to the British Museum have been examined, and these differ from the type in being somewhat larger, and with the apical fovea of the abdomen normally large and round.

DITROPIDUS STRIATUS sp. nov.

♀ Red, flavous and black. Head, prothorax, under-surface and legs, with white and not very dense pubescence.

Head large and almost vertical; with dense and sharply-defined punctures, becoming crowded in front. *Eyes* widely separated. *Prothorax* not twice as wide as the median length, front slightly produced and overhanging head, with a feeble depression near base; with dense and sharply defined punctures, becoming crowded on sides. *Scutellum* small. *Elytra* moderately long; with fairly large punctures, irregular on an elongated triangular space behind scutellum, and on the dilated sides near shoulders, elsewhere set in deep striae; interstices convex and with minute punctures. *Abdomen* with a large, round, deep, apical fovea; punctures of pygidium much as on pronotum. *Legs* short. Length, 4.25 mm.

Hab. Western Australia: Boulder (A. Bethune). Type (unique), I. 4394.

As the scutellar lobe is notched, the club five-jointed with the joints rather short and wide and the intercoxal process of prosternum wider than long, with its posterior end gently incurved, this species can only be referred to *Ditropidus*, although it looks out of place in that genus; at a glance it appears close to *Prasonotus latibasis*, but that species has the prosternal process longer than wide, and its end deeply incurved. The head and prothorax are of a rather deep red the elytra are flavous, with a very narrow black basal edging, the basal space is red with six black spots (including one on each shoulder), giving it a fasciated appearance, there is a conspicuous black and reddish zigzag fascia at the apical third; the metasternum, four basal segments of abdomen, and the femora are deeply infuscated or black, the club is slightly infuscated. There are ten strong striae on each elytron.

PROTHORAX and ELYTRA glabrous.

A. ELYTRA not entirely dark.

DITROPIDUS CRIBRICOLLIS sp. nov.

♂ Coppery, with a greenish gloss; elytra flavous, with a coppery-green gloss, becoming very pronounced towards base; labrum, legs and abdomen (except

basal segment) flavous. Under-surface and legs rather sparsely clothed, head still more sparsely.

Head with dense and sharply defined punctures, becoming longitudinally confluent about base. Eyes very widely separated. *Prothorax* about twice as wide as the median length, base not one-fourth wider than apex; with dense and fairly large punctures, becoming crowded on sides. *Elytra* (for the genus) moderately long; with rows of rather large punctures, becoming smaller posteriorly, but on the sides larger and set in distinct striae. *Legs* moderately long, front pair longer than hind ones. Length (♂ ♀), 2.5-2.8 mm.

♀ Differs in being more robust, less of elytra dark, and the gloss more purplish than green; abdomen entirely pale, with a large, round, deep, apical fovea; and the front legs no longer than the hind ones.

Hab. Australia (old collection). Type, I. 10962.

A rather narrow species, with decidedly coarser punctures than usual. The head of the female is badly broken, and the antennae of the male, except the basal joints (which are flavous), are missing.

DITROPIDUS VARIICOLLIS sp. nov.

♂ Head (muzzle excepted), prothorax (sides narrowly excepted), scutellum, and extreme base of elytra, dark coppery-green or bronze; elytra flavous, with a few obscurely infuscated spots; metasternum, part of prosternum, and most of abdomen, blackish; rest of under-surface reddish or flavous; legs flavous, the tarsi infuscated; antennae flavous, the club infuscated. Under-surface and legs sparsely clothed, the head almost glabrous.

Head finely shagreened, and with fairly dense small punctures; median line feeble. Eyes widely separated. *Prothorax* slightly more than twice as wide as the median length, finely shagreened; with small but fairly dense punctures in middle, the sides densely and finely strigose. *Elytra* not much longer than wide; with series of small, but sharply defined punctures, becoming larger and set in fairly deep striae on the sides; interstices with very minute punctures. Length (♂ ♀), 2.25-2.5 mm.

♀ Differs in being slightly more robust, prothorax dark only at extreme base and for a semi-circular space at apex, under-surface (except for some narrow sutural parts) entirely reddish, and in the abdomen.

Hab. South Australia: Port Lincoln (old collection), Mount Lofty (R. J. Burton), Adelaide (A. M. Lea). Type, I. 4431.

A beautiful species; the elytra are suggestive of those of *D. cornutus*, but the head of the male is utterly different, and the pronotum is distinctly strigose on

the sides; on *D. nigricollis* the pronotum is densely strigose throughout, and the eyes are larger and less widely separated. The seriate punctures on the elytra are infuscated, and so for small ones, are unusually distinct. On the male the clypeus and labrum are rather obscurely flavous, but on the females these parts are of a rather bright red, and the red extends as a triangle to half-way between the eyes; on the male the flavous parts of the pronotum are rather obscure and strictly lateral; on the female its pale portion is more reddish, and extends from side to side and to the front angles, leaving a semicircular dark apical space, differing in extent on the two specimens before me; on the elytra of the female the infuscations are better defined than on the male, and on each the most conspicuous one is an oblong spot in the centre of the disc, between the third and fourth rows of punctures.

DITROPIDUS NIGRIBASIS sp. nov.

♂ Reddish, basal half (more or less) of head and club infuscated; elytra flavous, a narrow basal edging (common to the prothorax and scutellum) black, tarsi infuscated. Under-surface and legs sparsely clothed, the head still more sparsely.

Head shagreened and with small dense punctures; median line feeble. Eyes widely separated. *Prothorax* more than twice as wide as the median length; with small dense punctures in middle, the sides densely strigose. *Elytra* with rows of rather small but distinct punctures, on the sides set in rather deep striae. Length (♂ ♀), 2·2-2·25 mm.

♀ Differs in being slightly more robust, antennae somewhat thinner, eyes more distant, prothorax slightly longer, elytra less narrowed posteriorly, legs somewhat shorter and in the abdomen.

Hab. Australia (Blackburn's collection); Western Australia: Swan River (A. M. Lea). Type, I, 10971.

A small pale species, which differs from the description of *D. fulvus* in having the head not glabrous, the prothorax redder than the elytra, and the tarsi infuscated. It is allied to *D. nigricollis*, but differs in having longer antennae, pronotum with distinct punctures about middle, instead of strigose throughout, and under-surface with no part black. From the preceding species, to which it is structurally very close, it differs in having the prothorax entirely red, except for the basal edging (on one male, however, there is a slight discal infuscation), with the strigae of the sides more extended, the elytra without infuscated spots, and the under-surface of the male no darker than that of the female. The muzzle is paler than the base of the head, but the shades of colour gradually change; the abdominal fovea of the female is unusually large. The antennae are somewhat

longer than is usual in the genus, but as the joints of the club are not very lax, and the prothorax is glabrous, it was not referred to *Elaphodes*.

DITROPIDUS NIGRIVENTRIS sp. nov.

Flavous, elytra slightly paler than prothorax, metasternum and abdomen black, base and suture (both very narrowly) of elytra, scutellum and club infuscated. Under-surface and legs sparsely pubescent.

Head with rather sharply defined punctures; median line feeble. Eyes large and close together. *Prothorax* more than twice as wide as the median length, somewhat gibbous in front, with a rather shallow depression on each side obliquely directed from scutellar lobe to front angle (but touching neither); with rather sparse and distinct, but small punctures in middle, becoming larger and more numerous on sides. *Elytra* moderately long; with rows of rather large, deep punctures, on the sides set in rather deep striae. Length, 2.2-2.25 mm.

Hab. South Australia: Leigh Creek (Blackburn's collection). Type, I. 10974.

I am satisfied that the two specimens before me belong to but one species, they both have the abdomen foveate at the apex, although the fovea seems too small and shallow for a female, the abdomen is not depressed in the middle, however, and in consequence the tip of the pygidium is not brought forward, this being typical of females; the front legs are not longer than the hind legs (on a few species the legs are not sexually variable in length): but the distance between the eyes of the type is slightly less than the length of the basal joint of the antennae, on the second specimen it is slightly more than the length of that joint, the difference is not great, but it is at once apparent on the specimens, gummed side by side on a card, and is accompanied by a difference in size of the eyes. The difference may be varietal; if sexual, the type must be a male, and the other specimen a female.

DITROPIDUS LONGUS sp. nov.

♂ Flavous, two spots on prothorax, scutellum, suture (very narrowly) base and a transverse post-median fascia (sometimes broken up into spots) on elytra black; second to fourth segments of abdomen and base of pygidium more or less deeply infuscated or blackish, club and tarsi feebly, if at all, infuscated. Under-surface and legs with sparse, white pubescence, head still more sparsely clothed.

Head with dense, sharply defined punctures of moderate size, becoming larger on clypeus; median line very feeble. Eyes very widely separated. *Pfo*-

thorax at base about once and one half as wide as the median length, at apex less than the median length, sides obliquely narrowed from base to apex; with dense and sharply defined punctures of moderate size, becoming denser and larger on sides. *Elytra* (for the genus) rather long, sides obliquely decreasing to apex; with rows of moderately large punctures, at the sides and apex set in rather deep striae; interstices with sparse and small punctures. Front *legs* slightly longer than the hind ones, basal joint of front tarsi somewhat produced on one side. Length (♂ ♀), 2.5-3 mm.

♀ Differs in being more robust, eyes slightly more distant, antennae thinner, *elytra* less narrowed posteriorly, abdomen more convex and with a large apical fovea, and front legs no longer than the hind ones, with the basal joint of tarsi smaller and not lop-sided.

Hab. Western Australia: Cue (H. W. Brown). Type, I. 4421.

An elongate species, with longer prothorax than usual, but the five-jointed club, incurved end of prosternal process, and minute scutellum indicate that it should be referred to *Ditropidus*; the scutellar lobe is notched, but the notch is very feeble. The *elytral* markings are somewhat suggestive of *D. tarsatus*, but the prothorax and tarsi do not agree with the description of that species. The flavous portion of the *elytra*, and the legs, are slightly paler than the pale parts of the prothorax and under-surface. On the males the spots on the prothorax are placed at the apical third, are rounded and each is scarcely bigger than an eye; on the females they are much larger and transverse, almost touching the sides, and on one are connected across part of the middle; the dark markings at the base of the *elytra* are irregular, but little more than a basal edging; the post-median fascia is not exactly alike on any two of the eight specimens under examination, on one it touches the sides, on another it consists of hardly more than a rather narrow transverse infuscation, crossing the suture for a short distance, with a spot between each end and the margin; on one specimen the median portion is connected with the left spot, but not with the right; but it usually has a zigzag appearance; the infuscations of the abdomen (including the pygidium) are more pronounced on the males than on the females. The front and hind angles of the prothorax, as viewed from the sides, are seen to be rectangular, but from above the front ones seem to be rounded off, and the hind ones acute, and even to slightly embrace the shoulders. Owing to "waterlogging" the seriate punctures on the *elytra*, when viewed from above, appear to be of great size, even wider than the interstices, but from oblique directions they are seen to be only about one-third, or one-fourth, the width of the interstices.

DITROPIDUS LONGIPES sp. nov.

♂ Flavous, claws and trochanters black, scutellum, extreme base of elytra, and parts of club infuscated. Under-surface and legs with sparse, white pubescence, head still more sparsely clothed.

Head with dense and rather coarse punctures; median line shallow and rather wide. Eyes very widely separated. *Prothorax* at base not quite twice as wide as the median length; punctures in middle as large as on head, but not so dense, becoming larger and denser on sides. *Elytra* obliquely narrowed posteriorly; with rows of fairly large punctures, becoming larger and set in strong striae on the sides, interstices with very minute punctures. Front *legs* much longer than hind ones. Length (♂ ♀), 2.5-3 mm.

♀ Differs in having the prothorax shorter, elytra less narrowed posteriorly, front legs no longer than the hind ones, and in the abdomen.

Hab. South Australia: Leigh Creek (Blackburn's collection). Type, I. 10976.

The general outlines are somewhat as on the preceding species, but the front legs of the male are decidedly longer than on that species, or on any other of the genus before me, their great length is due primarily to the tibiae, but the femora and tibiae are also longer than those of the other legs. The black trochanters and claws give the legs a rather curious appearance.

A female from Oodnadatta probably belongs to the species, it differs from the typical female in being somewhat larger, and in having the metasternal episterna infuscated.

DITROPIDUS BASICEPS sp. nov.

♂ Flavous; base of head, scutellum, extreme base and suture of elytra, metasternum and abdomen black, club infuscated. Under-surface and legs with sparse, white pubescence.

Head with fairly dense, sharply defined punctures; median line lightly impressed. Eyes rather widely separated. *Prothorax* at apex about as wide as the median length; with rather numerous and sharply-defined, but small punctures, somewhat denser but scarcely larger on sides than elsewhere. *Elytra* obliquely narrowed posteriorly: with rows of rather small punctures, becoming large and set in deep striae on the sides: interstices impunctate or almost so. Front *legs* slightly longer than hind ones. Length (♂ ♀), 2.25-2.5 mm.

♀ Differs in having the prothorax somewhat shorter, elytra less narrowed posteriorly, front legs no longer than the hind ones, and abdomen with a large apical fovea.

Hab. South Australia: Oodnadatta, Quorn (Blackburn's collection). Type, I. 4428.

On the male there is a small and slight infuscation, starting at the suture, at the apical third of the elytra; on the female the infuscation is extended so as to occupy the whole of the apical third; the female also has some feeble prothoracic infuscations. The distance between the eyes of the female is slightly less than the greatest width of the clypeus, and slightly more than in the male. In some respects the species is close to the description of *D. obtusus*, but the head is dark at the base, and the elytra are without distinct punctures on the interstices; their seriate punctures are rather small, but, owing to waterlogging, they appear to be as wide as the interstices on the male, and almost as wide on the female, their true sizes are apparent from oblique directions. It approaches some of the smaller and narrower forms of *D. davisi*, but the intercoxal process of the prosternum is much less conspicuously notched, being in fact almost truncated; from the smaller specimens of *D. serenus*, to some of which it is very close in appearance, it may be distinguished by the eyes; those of the male being scarcely as close together as those of the female of that species; the prothoracic punctures, although small, are also more distinct.

DITROPIDUS APICIPENNIS sp. nov.

♂ Reddish flavous; scutellum, extreme base, shoulders, suture and apical half (or less) of elytra, abdomen and part of metasternum black; club, tarsi, middle knees, and almost the entire hind legs, more or less deeply infuscated, or blackish. Under-surface and legs sparsely clothed.

Head with fairly dense, sharply defined, but asperate punctures; median line slightly impressed. Eyes widely separated. *Prothorax* more than twice as wide as the median length; with very small, dense punctures. *Elytra* at base slightly wider than long, sides obliquely narrowed to apex; with series of small punctures, becoming larger and set in distinct striae at the sides; interstices with very minute punctures, the outer one on each elytron dilated at the apex, and not continuing the general convexity. *Front tibiae* slightly longer and thinner than the hind ones. Length (♂ ♀), 3.25-4 mm.

Hab. Victoria: Sea Lake (J. C. Goudie); South Australia: Murray River (H. S. Cope and A. H. Elston), Moonta (Blackburn's collection). Type, I. 4432.

An unusually wide species, the specimens of which at one time I was inclined to regard as representing a large, wide, and distinct variety of *D. davisi*, but the elytral tips are essentially different, the marginal interstice of each being dilated

and not continuing the general convexity (as on that species) but directed obliquely outwards; the tips being alike on the nine specimens (including the varieties described below) under examination. I know of no other species having similar tips. The intercoxal process of the prosternum is less deeply notched than on *D. davisi* and in places is transversely strigose. On some females the prothoracic punctures are so small and close together that the surface appears almost shagreened; the seriate punctures on the elytra are really unusually small, but owing to waterlogging appear to be almost or quite as wide as the interstices. From above the front angles of the prothorax appear to be widely rounded off, but they are really rectangular. On several females the base of the abdomen is reddish. A female, from Kalgoorlie (F. H. du Boulay), has the elytra reddish, except for very narrow, black, basal, sutural and apical edgings, its metasternum, base of abdomen, and legs (except tarsi) are also reddish. A male, from Murray Bridge, has the elytra (except that the basal third is obscurely diluted with red) and metasternum black.

DITROPIDUS MARGINIPENNIS sp. nov.

♀ Bronzy; clypeus, labrum, basal half of antennae, palpi, sides and apex of elytra, under-surface (part of abdomen infuscated), and legs (tarsi infuscated) flavous. Under-surface and legs with sparse, white pubescence, head almost glabrous.

Head with dense and small punctures, many of which are obliquely confluent; median line rather wide but feeble. Eyes widely separated. *Prothorax* at base about twice as wide as the median length; with numerous small, but rather sharply defined punctures, becoming somewhat denser on sides. *Elytra* suboblong; with rows of fairly large punctures, on the sides set in deep striae. *Abdomen* with a large, round, deep, apical fovea. Length, 3.3-25 mm.

Hab. South Australia: Mount Lofty (J. G. O. Tepper). Type, I. 4445.

A second specimen differs from the type in having the pale portion of the head extended as a triangle almost to the base, the prothorax with a small spot on the scutellar lobe, and an oblique vitta on each side of the base reddish, and less of the abdomen infuscated. At first glance the species appears fairly close to *D. apiciflavus*, but the pale portion of the elytra extends to the base on each side, the sterna are also entirely pale, and there are slight differences in the head and prothorax; *D. xanthurus* is a less oblong species, with sides of prothorax densely strigose. The sides and apex of the prothorax, from above, appear to form a perfect semicircle.

B. ELYTRA entirely dark, PROTHORAX not dark (no representative herein described).

C. ELYTRA and PROTHORAX entirely dark.

DITROPIDUS MAJORINUS sp. nov.

♂ Bronzy; labrum, antennae (club infuscated), palpi, and legs (tarsi and knees infuscated) red. Head, under-surface, and legs with white pubescence.

Head rather coarsely shagreened, with a wide and shallow median line. Eyes separated about the length of three basal joints of antennae. *Prothorax* at base about twice as wide as the median length, sides strongly rounded, hind angles slightly embracing shoulders, scutellar lobe obliquely upturned and very feebly notched; with small and fairly dense punctures, becoming aciculate on sides, and to a slight extent about middle of apex. *Elytra* about as long as wide; with rows of rather large punctures, becoming larger and set in moderate striae on the sides; interstices with small dense, rugulose punctures (almost shagreened). *Legs* rather stout; hind tibiae rather narrow at base, moderately curved, with the apical two-fifths dilated, and parallel sided almost to apex. Length, 3.5-4 mm.

Hab. South Australia: Mount Lofty (S. H. Curnow). Type, I. 10989.

At first glance fairly close to *D. concolor*, but jaws of male much less powerful, legs stouter and red, etc.; from some directions the dilated part of the hind tibiae appears to commence suddenly. Of the specimens before me one has a dark green gloss on the whole of the upper-surface, and the other has a vague purplish gloss on the elytra.

DITROPIDUS GLOSSATUS sp. nov.

♂ Coppery-bronze, labrum, antennae (club infuscated), palpi, legs (tarsi and knees infuscated) reddish. Head, under-surface, and legs with white pubescence.

Head with dense and rather small, subasperate punctures; median line shallow. Eyes moderately distant. *Prothorax* at apex about as wide as the median length, sides strongly rounded; with fairly dense and sharply defined, but not very large, punctures in middle, becoming larger and more crowded on sides. *Elytra* very little longer than the basal width, sides rather strongly narrowed posteriorly; with rows of fairly large punctures, becoming larger and set in deep striae on the sides; interstices finely shagreened or with minute dense punctures. *Legs* rather stout. Length (♂ ♀), 3-3.25 mm.

♀ Differs in being more robust, elytra less narrowed posteriorly, legs somewhat shorter and thinner, abdomen larger, more convex, and with a large, round, deep, apical fovea.

Hab. South Australia: Port Lincoln (Blackburn's collection), Mount Lofty, Ardrossan (J. G. O. Tepper), Lucindale (B. A. Feuerheerdt and A. M. Lea); Victoria: Coromby, on *Acacia farina* in January (Tepper), Diamond Creek in March (Aug. Simson); Tasmania: Georgetown (Simson). Type, I. 10988.

At first glance like a small specimen of the preceding species, but prothorax and elytra wider at their junction; prothorax with denser and more sharply defined punctures, and not at all strigose; the colours are somewhat as in *D. ochropus*, but the eyes are closer together, the body is wider, and the punctures are much coarser. The labrum (as on many other species) appears as a bright red protruding tongue; the red of the legs is sometimes rather dingy; on some specimens the coppery gloss is more pronounced than on others, on an occasional female the upper-surface has a slight purplish gloss, one female (from Diamond Creek) has the prothorax, except for the front corners, and elytra, of an almost purplish-blue. The hind tibiae of the male are rather wide at the apex, but the increase in width is quite regular; on the male the distance between the eyes is about equal to the length of the basal joint of the antennae, on the female it is about one-fourth more.

Vars.? A male from Northern Queensland (Blackburn's collection) may represent a variety; it differs in having the eyes a trifle more distant (half-way between those of the sexes of the typical form), the elytra of a very deep violet-blue, and the legs entirely dark. Sexes from New South Wales (Barabba and Sydney, Dr. E. W. Ferguson, and Mount Victoria, A. M. Lea) are intermediate between the Queensland and typical specimens, their legs at first glance appear black, but are really obscurely diluted with red, and the eyes are almost as on the types.

DITROPIDUS MACROPS sp. nov.

♂ Coppery-bronze; labrum, antennae (club slightly infuscated) palpi and legs (knees and tarsi infuscated) of a rather dingy red, or reddish-flavous. Head, under-surface, and legs with white pubescence.

Head with rather small punctures; median line slightly impressed. Eyes close together. *Prothorax* at apex about as wide as the median length, sides strongly rounded; with rather small but sharply defined punctures in middle, becoming larger and more crowded on sides. *Elytra* suboblong; with rows of fairly large punctures, becoming larger and set in deep striae on the sides. *Abdo-*

men sloping to base and apex, with a shallow depression on the apical segment. *Legs* moderately stout, front ones slightly longer than hind ones. Length, 2.2-2.5 mm.

Hab. Australia (old collection); South Australia: Port Lincoln (Blackburn's collection). Type, I. 10851.

The abdomen of each specimen has a shallow rounded depression, but it is very different to the deep fovea of undoubted females of the genus; the abdomen otherwise, the eyes and front legs, are all typically masculine. In general appearance they are like small specimens of the preceding species, but the eyes are much closer together (less than half of the length of the basal joint of the antennae separating them, on the males of that species they are as far apart as the length of that joint), the elytra are also more oblong, and the abdomen is different. Two males from Brisbane appear to belong to the species, but have the upper-surface shining black, with hardly any metallic gloss, their hind femora are also deeply infuscated. The only female I have seen, that probably belongs to the species, differs from the males in having the eyes fully twice as widely separated, legs somewhat shorter and thinner, the front ones no longer than the hind ones, and the abdomen larger and more convex, with a large, round, deep, apical fovea.

DITROPIDUS PUNCTIPENNIS sp. nov.

♂ Greenish-bronze; labrum, antennae (club infuscated) palpi and legs (claws and hind femora lightly infuscated), of a rather dingy flavous. Head, under-surface, and legs with white pubescence.

Head shagreened, and with small dense punctures; median line narrow and distinct. Eyes close together. *Prothorax* at apex about as wide as the median length; a marginal row of distinct punctures on each side, elsewhere with sparse and very minute punctures. *Elytra* not much longer than wide; with rows of large punctures, at the sides scarcely larger but set in deep striae. *Tibiae* comparatively thin, the front ones slightly longer than the others. Length (♂ ♀), 2.2-2.5 mm.

♀ Differs in being more robust, with a decided coppery gloss, prothorax shorter, elytra less narrowed posteriorly, legs shorter, the front ones no longer than the hind ones, and abdomen larger, with a large, round, deep, apical fovea.

Hab. Western Australia: British Museum (F. du Boulay), Mullewa (W. D. Dodd and A. M. Lea). Type, I. 10922.

In general appearance fairly close to the preceding species, and with similar eyes, but at once distinguished by the prothorax, this at first appears to be without

punctures; but the seriate ones on the elytra are above the average size. The eyes of the male are separated less than the length of the basal joint of the antennae, on the female they are separated the length of the three basal joints.

DITROPIDUS CRIBRICEPS sp. nov.

♀ Coppery-bronze; parts of antennae, of palpi, and of legs reddish. Under-surface and legs moderately clothed with white pubescence, head almost glabrous.

Head moderately convex, median line absent; punctures dense, sharply defined, and not very small. Eyes widely separated. *Prothorax* at apex about as wide as the median length, sides strongly rounded; with numerous small punctures in middle, becoming larger and crowded on sides, the hind angles substrigose. *Elytra* short, sides slightly rounded; with rows of rather large punctures, becoming smaller posteriorly, and on the sides set in deep striae; interstices almost impunctate. *Abdomen* with a large, round, deep, apical fovea. Length, 2·8-3 mm.

Hab. Queensland: Bluff (A. M. Lea). Type, I. 10861.

A briefly oblong-elliptic species, somewhat like *D. ochropus*, but head without a median line, and punctures decidedly coarser; in build it is much like the preceding species, but is larger, head and prothorax with more sharply defined punctures, and eyes of female more distant; they are also much more distant than on the presumed female of *D. macrops*; it is larger than the description of *D. trabcutus* and is not sub-canaliculate between the eyes. The labrum is almost black; the basal half of the antennae on the type is pale, but on a second specimen the upper portion of the two basal joints is infuscated, the club is deep black on both; the knees, tarsi, and hind femora are more or less deeply infuscated. The basal angles of the prothorax slightly embrace the shoulders, and are almost spiniform.

DITROPIDUS VIRIDITINCTUS sp. nov.

♂ Black with a slight greenish gloss, labrum, basal half of antennae, palpi and legs (knees and tarsi infuscated), of a more or less dingy flavous. Head, under-surface, and legs with sparse, white pubescence.

Head with rather small and not very dense punctures, median line shallow. Eyes widely separated. *Prothorax* at apex about as wide as the median length, somewhat gibbous in front, sides strongly rounded; punctures very minute. *Elytra* oblong; with rows of rather large punctures, becoming smaller posteriorly, and set in deep striae on the sides. *Legs* moderately stout. Length, 2·5-2·75 mm.

Hab. South Australia: Mount Lofty (J. G. O. Tepper). Type, I. 10905.

In general appearance much like *D. macrops* and *D. punctipennis* on a large

scale, but eyes of male much more distant; from *D. ochropus* it differs in being slightly wider, less metallic, prothoracic punctures smaller, head not shagreened and with more distinct punctures, and the legs not so brightly coloured; from *D. striatopunctatus* in being less compact, and with eyes more distant; from *D. lentulus* in being more oblong, less metallic, prothoracic punctures smaller and antennae shorter. The elytra are not as black as the prothorax, and about the apex are obscurely diluted with brown; on a second specimen the punctures on the head are slightly larger and denser than on the type, and the median line is more distinct.

DITROPIDUS CLYPEALIS sp. nov.

♂ Black; clypeus, labrum, basal half of antennae, palpi and parts of legs more or less reddish. Head, under-surface, and legs with sparse, white pubescence.

Head with dense, fairly coarse, and sharply defined punctures; median line slightly impressed. Eyes separated about the length of the four apical joints of the club. *Prothorax* at apex scarcely as wide as the median length, sides strongly rounded; with dense and rather small, but sharply defined punctures, no larger on sides than in middle. *Elytra* not much longer than the basal width, sides obliquely narrowed; with rows of not very large punctures, on the sides set in deep striae; interstices with minute punctures. *Legs* not very thick, the front ones no longer than the hind ones. Length, 2.25 mm.

Hab. South Australia: Port Lincoln (F. R. Zietz and Blackburn's collection); New South Wales: Sydney (G. E. Bryant). Type, I. 10852.

A blacker species than the one I have identified as *D. oederwahi* and the prothoracic and cephalic punctures denser and more sharply defined, etc.; at first glance it somewhat resembles *D. macrops*, but is non-metallic, eyes of male much more distant, and punctures of head very different; these punctures are much as on *D. frontalis*, *D. sobrinus*, *D. seminulum*, and *D. melasomus*, but the body is shorter, and the median line of the head is more distinct. Of the specimens from South Australia, three have the red of the clypeus extended triangularly backwards for a short distance, their tibiae and front femora are reddish, another has the clypeus black and the knees and tibiae reddish; two, from Sydney, have the red of the clypeus not extended backwards, and the middle as well as the front femora reddish, the first joint of their club is slightly larger than the following ones, but no darker than the preceding ones.

Var. A. Three specimens from Brisbane (C. McGregor) and Lucindale (A. M. Lea) differ in being larger (2.75-3.25 mm.) and in having the legs entirely black, one is a male with the clypeus black, the others are females with

the clypeus red, they differ from the male, and from males of the typical form, in being more robust, eyes more widely separated, median line deeper, labrum shorter, legs shorter, the front ones slightly shorter than the hind ones and abdomen larger, more convex and with a large round, deep, apical fovea. A female from Birchip (J. C. Goudie's No. 382), has the base of the front femora red, and the elytral punctures smaller, but in other respects it agrees with females of the variety.

DITROPIDUS BASIVENTRIS sp. nov.

♂ Black with a slight bronzy gloss, becoming coppery-bronze on head and prosternum; sides of clypeus, basal half of antennae, palpi (tips excepted), and legs (knees, tarsi and hind femora infuscated), more or less flavous. Head, under-surface, and legs very sparsely clothed (almost glabrous).

Head shagreened and with small dense punctures. *Eyes* widely separated. *Prothorax* at base more than twice as wide as the median length, sides strongly rounded; with sparse and very small punctures. *Elytra* short; with rows of fairly large punctures, becoming smaller posteriorly and set in deep striae on the sides; interstices almost impunctate. *Legs* not very stout; front tibiae flat, somewhat curved and slightly longer than the hind ones. Length, 2 mm.

Hab. Queensland: Longreach (A. M. Lea). Type (unique), I. 10868.

At first glance quite an ordinary looking metallic species, but the distance between the eyes is equal to the length of the three apical joints of the club, the interocular space appears to be circularly flattened, but on close examination is seen to be slightly concave; the prothorax is unusually wide and almost impunctate, and its sides and apex from behind appear to form a perfect semicircle; the punctures on the basal segment of the abdomen are rather dense and coarse.

DITROPIDUS ARMATUS, sp. nov.

♂ Blue; basal half of antennae reddish, the club infuscated or black. Head, under-surface, and legs with white pubescence.

Head shagreened and with dense punctures; median line moderately impressed; clypeus with two small subtriangular elevations in middle. *Eyes* rather widely separated. *Prothorax* about twice as wide as the median length, sides strongly rounded; with dense and rather small punctures in middle, becoming larger and crowded on sides, where also a few are confluent. *Elytra* not much longer than basal width, sides rather strongly narrowed posteriorly; with rows of large punctures, on the sides set in deep striae; interstices with small dense punctures, and in places feebly wrinkled. *Legs* unusually thick, the front ones conspicu-

ously longer than hind ones, and with very wide tibiae and tarsi; femora armed. Length (σ ♀), 4.5 mm.

♀ Differs in having the head smaller, clypeus unarmed, eyes more widely separated, punctures of upper-surface smaller, legs much shorter and thinner, front ones no longer than the hind ones, femora unarmed and abdomen more convex, with a large, round, deep, apical fovea.

Hab. North Western Australia (Macleay Museum), King's Sound (Blackburn's collection from W. W. Froggatt). Type, I. 4435.

A large blue species readily distinguished from all other blue ones, and the blue variety of *concolor*, by the powerful armed legs of the male, and by the armed clypeus; *D. laminatus*, with somewhat similar clypeus and strong (but unarmed) legs in the male, is smaller, darker, and the male has a conspicuous opaque patch on the side of each elytron. The tooth on each of the front femora is not very acute, but it is quite distinct, on the middle ones it is less distinct, but it is almost absent from the hind ones. On many specimens the blue has a violet tinge, on the head, partly owing to the clothing and punctures, it appears duller than elsewhere.

DITROPIDUS FOVEIVENTRIS sp. nov.

♀ Black with a bronzy green gloss, elytra blackish blue, labrum and basal half of antennae somewhat flavous, upper-surface of basal joint infuscated. Head, under-surface, and legs with sparse, inconspicuous pubescence.

Head with moderately dense and sharply defined but rather small punctures; median line narrow at base, wide and shallow in middle. Eyes widely separated. *Prothorax* more than twice as wide as the median length, sides strongly rounded; with a row of distinct punctures at base, but interrupted by scutellar lobe, elsewhere with small, and not very dense punctures. *Elytra* suboblong; with rows of narrow and, for the genus, very small punctures, becoming more distinct on the sides, where they are set in shallow striae; interstices with sparse and small punctures. *Abdomen* with a very large, round, deep, apical fovea. *Legs* stout. Length 4.5 mm.

Hab. South Australia: Port Lincoln (A. M. Lea). Type (unique), I. 10986.

A large black oblong-elliptic species, with a bluish or greenish gloss in places; the seriate punctures on the elytra are much smaller than on any other large species, and even on the sides the striae (not including the lateral gutter which is distinct throughout) are lightly impressed, characters which readily distinguish the species from *D. concolor*, *D. carbonarius*, *D. coelestis*, *D. laminatus*, *D. imperialis*, and other large ones; the punctures on the interstices, although small, are

not much smaller than those in the rows, so that the discal rows from some directions appear to consist of double the usual number. At a glance it looks close to *D. labiatus*, but the prothorax is non-strigose throughout. The abdominal fovea is unusually large, and is not margined with hairs as on the females of many species.

DITROPIDUS STRIATIPENNIS sp. nov.

♀ Metallic purple, elytra dark and metallic green, legs coppery or coppery-purple, under-surface darker, labrum and basal half of antennae (the club infuscated) reddish. Head, under-surface, and legs with comparatively long, white pubescence.

Head with dense but partially concealed punctures; median line distinct. Eyes moderately distant. *Prothorax* at apex about as wide as the median length, sides strongly rounded; with dense and sharply defined but not very large punctures in middle, becoming crowded and larger, but not confluent on sides. *Elytra* with sides gently rounded and narrowed posteriorly; with rows of fairly large punctures, nearly all set in deep striae; interstices impunctate or almost so. *Abdomen* with a large, round, deep, apical fovea. *Legs* rather short. Length, 3.3-25 mm.

Hab. Queensland: Good and Thursday Islands (G. E. Bryant). Type, I. 10902.

In size and outlines somewhat like *D. insularis*, and with prothoracic punctures about the same size, but elytral sculpture very different, eyes larger and closer together than in the female of that species, and under-surface more densely clothed. I know of no really close ally. The prothoracic punctures frequently have a coppery glitter, as also have many on the elytra; the elytra from some directions appear entirely purplish; almost all their striae are deep, so that the interstices at the summit of the apical slope are all separately convex, the only series of punctures that are not in distinct striae are the two short ones on each side of the suture. The distance between the eyes is about equal to the length of the three apical joints of the club.

DITROPIDUS VENTRALIS sp. nov.

♂ Black, upper-surface coppery-bronze, six basal joints of antennae, except upper-surface of first, reddish. Under-surface, pygidium, and legs with sparse, whitish pubescence.

Head with fairly dense punctures at base. Eyes large and almost touching. *Prothorax* at base decidedly less than twice the median length, sides strongly rounded; with very minute (scarcely visible) punctures, except for a few large

ones in each of the hind angles, and for a row in each lateral gutter. *Elytra* scarcely longer than the basal width; with rows of large punctures, on the sides set in deep striae; interstices scarcely visibly punctate. Length, 2.5 mm.

Hab. Northern Territory: Darwin (G. F. Hill). Type, I, 10909.

At first glance quite an ordinary looking, briefly-ovate species, but readily distinguished by the eyes being very close together (less than half the length of the basal joint of antennae separating them), and the pygidium produced forwards so as almost to touch the basal segment of the abdomen (these characters no doubt are confined to the males); the clypeus is also peculiar, it is impunctate, narrow at the base and sloping downwards, with a rounded surface to the dilated apex; the only distinct punctures on the pronotum are those in the basal angles; the scutellar lobe is unusually acute; the intercoxal process of the prosternum is fully twice as wide as its median length, and the middle of its front edge is distinctly upturned (subdentate). The upper-surface from most directions has the coppery-bronze appearance of so many species of the genus, but from others the elytra, more notably on one specimen than on the other before me, appear decidedly purple. The eyes are somewhat as in *D. doriae*, but that is a larger and differently coloured species with very different abdomen; *D. palmerstoni*, from the same locality, is much the same in colour, but differs in the punctures, eyes, abdomen, etc.

DITROPIDUS INDISTINCTUS sp. nov.

♂ Bronzy, under-surface and legs black, basal half of antennae reddish, the club infuscated or blackish. Under-surface and legs with sparse pubescence.

Head with dense punctures only at base. Eyes large and close together. *Prothorax* more than twice as wide as the median length, sides strongly rounded; punctures very minute. *Elytra* briefly suboblong; with rows of not very large punctures, becoming larger and set in deep striae on the sides; interstices with numerous very minute punctures. Front legs slightly longer than hind ones. Length (♂ ♀), 2.25-2.75 mm.

♀ Differs in being larger and more robust, prothorax shorter (about thrice as wide as long), elytra longer, less narrowed posteriorly, and with smaller punctures, front legs no longer than hind ones and abdomen foveate.

Hab. South Australia: Leigh Creek (Blackburn's collection, No. 2638), Quorn (A. H. Elston) Type, I, 10849.

A very ordinary looking species. The prothorax, except on close examination, appears to be impunctate; the interstitial punctures of the elytra cause the surface to appear very feebly shagreened. The five females taken by Mr. Black-

burn are all distinctly larger and more coppery than the three males, one of them has a slight purplish gloss on the elytra; the median line of their heads is usually quite distinct, on the males it is absent or ill-defined. The eyes are large and rather close together in the male (although not so close as in the preceding species), the distance between them being about equal to the length of the basal joint of the antennae, on the female they are almost twice as distant; on both sexes the inter-ocular space is sparsely punctate. The outlines and general appearance are much as in *D. congenitus*, but the eyes of that species, sex for sex, are about twice as far apart, and the prothorax has more distinct punctures, *D. sobrinus*, also with very similar outlines, is non-metallic; *D. quadratipennis* is somewhat wider, with eyes more apart, prothoracic punctures much coarser and legs longer; from *D. cribiceps* it differs in having punctures of head very different, legs entirely dark and eyes of female much closer; at first glance it is like metallic specimens of *D. pygidialis*, but the eyes are very different and the prothorax is non-strigose, the latter character also distinguishes it from *D. strigicollis*.

DITROPIDUS QUADRATIPENNIS sp. nov.

♂ Bronzy; basal half of antennae reddish, the club more or less deeply infuscated, labrum obscurely diluted with red. Under-surface and legs with sparse pubescence, head still more sparsely clothed.

Head shagreened and with dense punctures, more sharply defined on clypeus than elsewhere. Eyes rather close together. *Prothorax* at base more than twice the median length, sides strongly diminishing to apex; with fairly dense and distinct punctures in middle, becoming coarse on sides. *Elytra* briefly sub-oblong; with rows of fairly large punctures, on the sides set in deep striae; interstices with very minute punctures. *Legs* moderately long, front ones slightly longer than hind ones. Length (♂ ♀), 2.6-3 mm.

♀ Differs in having more sharply defined punctures on head, eyes smaller and about one-third more apart, prothorax shorter, elytra slightly longer, and slightly less narrowed posteriorly, legs shorter and thinner, the front ones no longer than the hind ones, and abdomen foveate.

Hab. South Australia: Leigh Creek and Port Lincoln (Blackburn's collection, No. 2641), Adelaide (H. H. D. Griffith). Type, I. 10987.

A very compact species with eyes of the male almost as close together as on the preceding species, being but slightly more distant than the length of the basal joint of antennae, but the two species differ in many other respects. Some specimens have a dark greenish gloss, others are somewhat coppery. The hind angles of the prothorax are really slightly obtuse, but from above they seem

conspicuously acute; there is a rather vague oblique impression (generally, however, with distinct punctures) on each side, the two meeting or almost meeting, on the scutellar lobe; the punctures on the disc are subject to individual variation, they are dense and sharply defined on several specimens, sparser and smaller on others, but they appear to be always dense and rather coarse on the sides, although not confluent; except for a slight diminution of the sides the elytra, of the male, seem almost square. The outlines are much as in *D. aurichalceus*, but the punctures are coarser, sides of prothorax non-strigose, and legs not red, etc.; *D. melasomus* has somewhat similar outlines, but is non-metallic and the punctures and inter-ocular space are very different; it is somewhat like *D. glossatus*, but the legs are not red, and the elytra not shagreened.

DITROPIDUS OBSCURIPENNIS sp. nov.

♂ Coppery or coppery-bronze, under-surface and legs black with a slight metallic gloss, basal half of antennae reddish. Head, under-surface, and legs with inconspicuous pubescence.

Head vaguely shagreened, and with dense, sharply defined punctures, slightly larger on clypeus than elsewhere; median line rather feeble. Eyes moderately separated. *Prothorax* at base not twice as wide as the median length, sides strongly narrowed to apex, with a shallow bisinuate depression near base, its middle on the scutellar lobe; with fairly dense, sharply defined punctures, becoming larger and crowded on sides. *Elytra* oblong; with rows of rather large punctures, on the sides set in deep striae, surface conspicuously shagreened. *Legs* rather stout, front ones slightly longer than hind ones. Length (♂ ♀), 2.25-2.75 mm.

♀ Differs in having the median line of the head deeper, especially near the base, labrum slightly smaller, elytra not at all narrowed till close to apex, legs somewhat shorter, with the front and hind ones of equal lengths, and abdomen with a large apical fovea.

Hab. South Australia: Leigh Creek (Blackburn's collection, No. 2642). Parachilra (E. L. Savage). Type, I. 10845.

Some specimens have a slight purplish gloss; the sides of the labrum are sometimes obscurely diluted with red. The shagreening of the elytra causes the surface to appear less polished than the prothorax, their lateral interstices are more acutely costate than is usual in the genus. The distance between the eyes of the male is about equal to the length of the two basal joints of antennae, in the male it is about one-third more; on the only male from Leigh Creek the abdomen at first glance appears to be without an apical impression, but from some direc-

tions a vague circular one is visible, it could not, however, be regarded as a fovea; but on two males from Parachilna (which otherwise agree perfectly with the type) there is a small but distinct fovea, very different, however, to the large deep one of the females.

DITROPIDUS COGNATUS sp. nov.

♂ Bronzy, labrum conspicuously red, basal half of antennae reddish, the club infuscated or black. Head, under-surface, and legs with whitish pubescence.

Head shagreened and with fairly dense punctures, more sharply defined on clypeus than elsewhere; median line rather vague. Eyes moderately separated. *Prothorax* at base not twice as wide as the median length, sides on apical half strongly rounded; with rather dense and sharply defined, but not very large punctures in middle, becoming larger, denser, and frequently longitudinally confluent on sides. *Elytra* suboblong, sides evenly narrowed from base; with rows of not very large punctures, becoming larger and set in distinct striae on the sides, interstices with very small and dense punctures or slightly shagreened. *Legs* rather stout, front ones longer than hind ones. Length (♂ ♀), 3.3-3.5 mm.

♀ Differs in having the median line of the head more distinct, the prothorax shorter, with more evenly rounded sides, elytra less narrowed posteriorly, legs shorter, the front ones no longer than the hind ones and the abdomen with sparser clothing on the basal segment, and the apical one foveate.

Hab. South Australia; Peterborough (Blackburn's collection, No. 2639), Murray River (A. H. Elston and F. R. Zietz). Type, I. 10848.

The distance between the eyes of the male is about equal to the length of the three basal joints of antennae, in the female it is about one-third more; although there is not a distinct median line on the prothorax the punctures along its middle are sparser and smaller than on the adjacent surface. The shagreening of the elytra is less conspicuous than on the preceding species, the size is considerably larger, and the prothorax is without a bisinuate subbasal impression; the elytra are longer than in *D. quadratipennis* and their surface sculpture is different, the prothoracic punctures are longer and often confluent on the sides, although not strigose; *D. indistinctus* is smaller, narrower at the junction of the prothorax and elytra, and the former with scarcely visible instead of conspicuous punctures; *D. cognatus* is smaller, more distinctly coppery, labrum not conspicuously red, and punctures different.

Var. A female from Williamstown (J. G. O. Tepper) has a decided coppery gloss, approaching purple, on the upper-surface, and the punctures on the sides of its prothorax are smaller, although elongate.

DITROPIDUS PUNCTICOLLIS sp. nov.

♂ Black, upper-surface with a slight bronzy gloss, basal half of antennae (except upper-surface of first joint) obscurely diluted with red. Under-surface and legs sparsely pubescent.

Head shagreened and with small punctures; clypeus shining and almost impunctate. Eyes rather close together. *Prothorax* at the base not quite twice as wide as the median length, sides strongly narrowed to apex; with very small and inconspicuous punctures in middle, becoming coarse on sides. *Elytra* rather short, sides rather strongly narrowed posteriorly; with rows of rather strong punctures, on the sides set in deep striae, the interstices between which are costiform. Front legs slightly longer than hind ones. Length (♂ ♀), 2.5-3 mm.

♀ Differs in being more robust, eyes more apart, elytra less narrowed posteriorly, front legs no longer than hind ones, abdomen larger, more convex, more sparsely clothed on middle of basal segment, and with a large apical fovea.

Hab. New South Wales: Blue Mountains (Blackburn's collection); Sydney (Dr. E. W. Ferguson). Type, I. 10911.

The labrum is shining black, on almost all other dark species it is conspicuously red, or at least with reddish sides, the antennae at first glance appear to be entirely dark. The distance between the eyes of the male is about equal to the length of the basal joint of antennae, in the female of the two basal joints. At first glance the species appears decidedly close to *D. pygidialis*, but the prothorax is non-strigose on the front angles, its sides have coarse punctures, and the inter-ocular space is different; it is also close to *D. quadratipennis*, but the prothorax has only very minute punctures in the middle; in some respects it resembles *D. brachysomus* on an enlarged scale, but is less metallic with different punctures, and inter-ocular space different.

DITROPIDUS BREVIS sp. nov.

♂ Bronzy, under-surface of basal joint of antennae reddish. Under-surface and legs sparsely clothed, but pubescence longer and denser on middle of basal segment of abdomen than elsewhere.

Head shagreened and with small dense, asperate punctures; median line well-defined. Eyes about as wide apart as the length of the three basal joints of antennae. *Prothorax* about twice as wide as the median length, sides strongly rounded; with small, elongate punctures, frequently becoming confluent on sides. *Elytra* along suture less than the basal width; with rows of rather strong punctures, on the sides set in deep striae; interstices with very minute punctures. *Abdomen* with a small and shallow, but distinct, apical fovea. *Legs* rather stout, front ones distinctly longer than hind ones. Length, 3.3-25 mm.

Hab. Northern Territory: Darwin (G. F. Hill, No. 289). Type, I. 10860.

A short almost globular species; from above the head is completely hidden, the sides and apex of the prothorax appear to form one continuous outline, and the hind angles to be very acute, and to strongly embrace the shoulders; but from the sides they are seen to be much less acute, although decidedly less than right angles. Each of the types has a small fovea on the abdomen, but the clothing of the basal segment, the depression between that segment and the apex, and the long front legs are decidedly masculine features. The punctures on the prothorax are so close together, and so frequently confluent, that the sides at first glance seem almost strigose. The shape is much as in *D. palmerstoni*, and the colour is somewhat similar, but the prothoracic and elytral punctures are very different.

DITROPIDUS GLABER sp. nov.

♂ Black with a vague bluish or bronzy gloss, basal half of antennae and sides of labrum reddish. Under-surface and legs very sparsely pubescent.

Head with small and fairly dense punctures at base, irregular elsewhere. Eyes rather close together. *Prothorax* at base slightly more than twice the median length, sides strongly rounded; with rather small and numerous, sharply defined punctures, no larger on sides than in middle, but slightly denser. *Elytra* briefly suboblong; with rows of rather small punctures, becoming larger on the sides, and set in deep striae; interstices with sparse and minute punctures. Front legs scarcely longer than hind ones. Length (♂ ♀), 2.2-5 mm.

♀ Differs in being more robust, prothorax slightly shorter, elytra less narrowed posteriorly, legs slightly shorter and thinner, and abdomen foveate.

Hab. New South Wales: Sydney (W. du Boulay). Type, I. 10857.

Structurally close to *D. tibialis*, but hardly metallic, legs entirely dark, prothoracic punctures less conspicuous, and elytra almost impunctate; from *D. solitus* it differs in having the prothoracic punctures finer, no coarser on the sides than in the middle, seriate punctures on elytra much finer, eyes (sex for sex) slightly more distant, and clothing of under-surface sparser, it is even very sparse on the middle of the basal segment of the abdomen of the male. On the male the eyes are separated about the length of the basal joint of antennae, on the female of the three basal joints; the median line of the head is rather vague on both sexes, but occupies almost the whole of the inter-ocular space. On one of the females the prothorax and head have a slight coppery gloss.

DITROPIDUS SCUTELLARIS sp. nov.

♀ Coppery or coppery-bronze, labrum and basal half of antennae reddish. Under-surface and legs with sparse, white pubescence.

Head with rather dense punctures at base, sparse or irregular elsewhere; median line shallow but distinct. Eyes distant about the length of three basal joints of antennae. *Prothorax* scarcely twice as wide as the median length, sides strongly rounded; with dense and sharply defined but not very large punctures, becoming slightly smaller on sides. *Scutellum* thin and rather long. *Elytra* briefly suboblong; with rows of rather small punctures, becoming larger and set in rather deep striae on the sides; interstices with very small punctures. *Abdomen* with a large, round deep apical fovea. Length, 2.25-2.5 mm.

Hab. Australia (old collection); South Australia: Murray Bridge (J. G. O. Tepper), Kangaroo Island (A. M. Lea). Type, I. 10907.

A metallic species with unusually narrow scutellum, it is at least twice as long as wide, and as this is a most unusual feature I have named the species, although there are but females, 6, before me; the upper-surface is much the colour of *D. odewahni*, but the scutellum, legs, punctures, etc., are different; the outlines are almost as in *D. venustus*; in general appearance it is close to *D. aurichalceus*, but is slightly narrower, prothoracic punctures more sharply defined, sides non-strigose, scutellum narrower and legs dark; it is apparently close to *D. lactus*, but differs, from the description of that species, in being larger, and in the sculpture of the prothorax. On one specimen the clypeus, and on another the base of the front femora, are obscurely reddish.

DITROPIDUS CONGENITUS sp. nov.

♂ Coppery or coppery bronze, basal half of antennae obscurely reddish. Under-surface and legs with sparse pubescence.

Head with dense, sharply defined punctures, median line rather slightly impressed. Eyes moderately separated. *Prothorax* scarcely twice as wide as the median length, sides strongly rounded; with fairly dense and sharply defined but rather small punctures, no larger on sides than in middle. *Elytra* very little longer than the basal width; with rows of fairly large punctures, on the sides set in deep striae; interstices with very minute punctures. Front legs slightly longer than hind ones. Length (♂ ♀), 2.5-2.75 mm.

♀ Differs in being more robust, elytra less narrowed posteriorly, legs somewhat shorter, the front ones no longer than the hind ones and abdomen foveate.

Hab. South Australia: Adelaide (H. H. D. Griffith), Murray Bridge (A. M. Lea). Type, I. 10926.

In general appearance decidedly close to the preceding species, but scutellum much shorter (of normal size and shape) punctures of head denser and larger, eyes of female more widely separated and labrum almost black; it differs from *D. tropicus* in its decidedly coppery tone, somewhat longer form and smaller punc-

tures; at first glance it resembles *D. concolor*, on a small scale, but the jaws are very different. The distance between the eyes of the male is almost equal to the length of the three basal joints of antennae, in the female it is about one-third more; on most of the specimens the hind suture of the clypeus from some directions appears to be marked by a narrow shining line, but it is inconspicuous, or invisible, from most directions.

DITROPIDUS TRIANGULIFER sp. nov.

♂ Black; clypeus, labrum, a triangular space extending to between eyes, and basal half of antennae flavous. Head, under-surface, and legs with sparse pubescence.

Head with dense, but partially concealed punctures, more distinct on clypeus than elsewhere; median line feeble. Eyes widely separated. *Prothorax* about twice as wide as the median length; with small, sharply defined and rather dense punctures, no larger on sides than in middle. *Elytra* rather short, distinctly narrowed to apex; with rows of large punctures, on the sides set in deep striae; interstices with sparse and scarcely visible punctures. Front *legs* slightly longer than hind ones. Length, 2.75 mm.

Hab. Queensland: Charters Towers (Blackburn's collection). Type, (unique), I. 10998.

Structurally and in general appearance close to *D. viriditinctus*, but prothorax with more distinct punctures, colour of head different and legs darker, the legs are certainly not black, but they are too obscure to be regarded as more than slightly diluted with red, the dilated sublaterobasal portion of each elytron is of much the same colour.

DITROPIDUS PUNCTIVARIUS sp. nov.

♂ Black, upper-surface usually with a bluish or purplish gloss, labrum and part of antennae red. Under-surface and legs with very sparse pubescence.

Head rather more convex than usual; with sharply defined punctures, sparser between eyes than elsewhere; median line rather feeble. Eyes widely separated. *Prothorax* not twice as wide as the median length, sides strongly rounded; with fairly dense and rather small punctures, no larger towards sides than in middle. *Elytra*, for the genus, moderately long, sides slightly narrowed posteriorly; with rows of fairly large punctures, on the sides set in deep striae; interstices with very minute punctures. Front *legs* scarcely longer than hind ones. Length (♂ ♀), 3-4 mm.

♀ Differs in being more robust, head with median line much more distinct,

eyes more apart, antennae and legs somewhat thinner, elytra less narrowed posteriorly and abdomen foveate.

Hab. Tasmania: Hobart (Blackburn's collection and A. M. Lea), Launceston (Simson's collection, Nos. 2705 and 3500) Type, I. 10889.

Structurally close to *D. subaeneus*, but head more convex, prothoracic punctures smaller, and elytra somewhat longer and more parallel-sided; the outlines are as in *D. oblongipennis*, but the legs are entirely dark, and the prothoracic sculpture much finer; the punctures of the head vary in density, but (except on the varieties noted below) appear to be always sharply defined, the inter-ocular space is not at all shagreened, a character at once distinguishing it from the species known to me as *D. nitiduloides* and *D. ochropus*. The upper-surface is rarely entirely black, as the elytra at least have a bluish gloss, frequently the whole upper-surface is of a beautiful deep blue or purple, the purple specimens are usually females; the basal joint of the antennae varies from entirely pale to entirely dark, but usually only its upper-surface is dark, usually five, but sometimes only four of the following joints are pale; the hind suture of the clypeus is usually but not always conspicuous.

Vars. There are no mainland specimens under examination agreeing in all details with Tasmanian ones, but some from Victoria, Mount Buffalo (Blackburn's collection), are very close, differing only in having stronger punctures between the eyes and on the pronotum, and a slight greenish gloss on the elytra. One female, from Victoria, has the head more convex than usual, almost impunctate, and the median line very feeble, its prothoracic and elytral punctures are also smaller than usual. Three specimens from New South Wales, Sydney, and National Park (Lea), and Blue Mountains (G. E. Bryant), have the upper-surface shining black, without the least bluish or greenish gloss, the head impunctate, very convex, the median line feeble or absent, and the prothoracic and elytral punctures as on the preceding specimen.

DITROPIDUS GAGATES sp. nov.

♂ Black, usually with a faint bronzy gloss; labrum and five or six basal joints of antennae (the first usually with upper-surface infuscated) reddish. Head, under-surface and legs with sparse pubescence.

Head with dense and moderately large punctures; median line well-defined. Eyes rather close together. *Prothorax* not twice as wide as the median length, sides strongly rounded; punctures small and not very dense. *Elytra* briefly sub-oblong, slightly narrowed posteriorly; with rows of not very large punctures, becoming smaller posteriorly, and on the sides set in deep striae; interstices impunctate or almost so. *Front legs* scarcely longer than hind ones. Length, 3.5-4 mm.

♀ Differs in being slightly more robust, elytra less narrowed posteriorly, legs somewhat shorter and thinner, and abdomen foveate.

Hab. New South Wales: Blue Mountains (Dr. E. W. Ferguson), Jenolan (J. C. Wiburd), Mount Victoria (A. M. Lea); Victoria: Dividing Range (Blackburn's collection). Type, I. 10999.

The distance between the eyes of the male is about equal to the length of the basal joint of antennae, in the female it is about one-third more; the prothoracic punctures are decidedly small and could fairly be regarded as minute on most specimens; the interstices between the lateral striae of the elytra are wider than usual; it is slightly more oblong than *D. labiatus*, and without bluish or greenish gloss, inter-ocular space of female much narrower, and with denser and coarser punctures; *D. carbonarius* has coarser prothoracic punctures and eyes more apart; *D. frontalis* is very close in appearance, but is somewhat more rounded and eyes more distant; *D. mclasomus* also differs in the eyes; *D. nitiduloides* has the head shagreened; at first glance specimens look like large ones of *sobrinus*, but the eyes are close together, the punctures are somewhat different and the legs are entirely dark.

DITROPIDUS VIRIDIMICANS sp. nov.

Bright coppery-green, some parts with purple or violet reflections; under-surface black with a slight metallic gloss, labrum, basal half of antennae (club more or less deeply infuscated), and base of front and of middle femora more or less reddish. Length (♂ ♀), 3-4 mm.

Hab. New South Wales: Blue Mountains (Dr. E. W. Ferguson), Jenolan (J. C. Wiburd), Illawarra (H. W. Cox), Sydney (A. M. Lea); Victoria: Dividing Range (Blackburn's collection). Type, I. 10000.

The sculpture, sex for sex, is as described in the preceding species, but the male has even more parallel-sided elytra, and on the apical segment of its abdomen there is a shallow glabrous impression; the female in sculpture is practically identical. The clothing is also the same, but the general appearance is very different, owing to the brilliantly metallic upper-surface; on some specimens the head appears to be entirely purple, but from most directions the purple seems divided by a triangular green space; the prothorax and elytra, wholly or in parts—sometimes the punctures only, appear purple from some directions. It is near *D. subacneus*, of which I have only seen females, but is more brightly metallic, prothoracic punctures smaller, cephalic ones larger, median line of head less pronounced, eyes of female less apart, and under-surface less sparsely clothed; it is also somewhat like *D. lentulus*, on a large scale, but is more brightly metallic, under-surface with longer clothing and punctures not quite the same.

INDEX TO GENERA AND SPECIES

	Page		Page
abdominalis, Hippocampus	319	asper, Gymnodactylus	184
Ablepharus	220	Nephrurus	182
acanthurus, Varanus	202	Aspidiphorus	280
Acentronura	317	ater, Limnichus	279
acutipalpis, Tabanus	376	atrocostatum, Lygosoma	213
adelaidensis, Amphibolurus	196	atromaculatum, Lygosoma	208
Tiliqua	205	atronitens, Pedilophorus	287
Adelphodrassus	235	aurantiacus, Pseudolabrus	47
Aeluroscalabotes	184	aureohirta, Erephopsis	366
aequale, Lygosoma	217	auriflua, Diatomineura	367
aeratum, Lygosoma	211	auritum, Sepiadarium	354
aethiops, Ophiclinus	57	australe, Acentronura	317
affinis, Typhlops	22	Lygosoma	214
albiceris, Diaea	252	australicum, Chelonarium	87
albofasciolatum, Lygosoma	214	australiensis, Dysdera	233
alboguttatus, Diplodactylus	187	australis, Diporophora	198
albohirtipes, Tabanus	377	Limnichus	278
albolineatus, Pelecorrhynchus	368	Moneta	239
albostriatum, Theridion	241	Nannoperca	46
albovittatum, Hypoblenum	267	Silvius	368
alburna, Cytaea	267	Thecadactylus	189
albus, Calleroththalmus	232	Typhlops	25
alcocki, Silvius	368	austrinum, Sepiadarium	384
Amaurobius	231	avidus, Tabanus	373
ambigua, Lygosoma	208		
amphiboluroides, Diporophora	199	baileyi, Cryptodelma	192
Amphibolurus	195	Balaenoptera	158
analis, Neriene	244	bankrofti, Lygosoma	219
anguillaris, Peronedys	60	barbatus, Amphibolurus	197
angusticallus, Tabanus	371	basiceps, Ditropidus	390
annulatus, Diplodactylus	187	basimaculata, Eirone	170
annulipes, Amaurobius	231	basiventris, Ditropidus	398
antecedens, Tabanus	374	basii, Tabanus	378
antipodiana, Argyrodes	239	Bathyphantes	245
apicipennis, Ditropidus	391	batillus, Typhlops	30
Aprasia	193	Batocera	290
Araneus	248	Bebius	92
Archemorus	250	bennettii, Diporophora	198
argus, Stigmatopora	308	Bethelium	89
Argyrodes	239	bicarinatum, Lygosoma	212
Ariadna	233	bilineata, Diporophora	198
Ariamnes	239	binoei, Heteronota	184
armatus, Ditropidus	398	binotata, Erephopsis	366
asholodes, Clubiona	254	bipes, Lygosoma	219

	Page		Page
bitaeniatus, <i>Opisthonus</i>	268	chelys, <i>Ulesanis</i>	244
bituberculatus, <i>Typhlops</i>	27	cheverti, <i>Gymnodactylus</i>	183
blackmanni, <i>Lygosoma</i>	212	Chiracanthium	255
Boleophthalmus	79	Chlamydopsis	85
bougainvillii, <i>Histiophryne</i>	72	Chlamydosaurus	200
bougainvillii, <i>Lygosoma</i>	217	chrysoctemus, <i>Plotius</i>	267
boulengeri, <i>Ablepharus</i>	220	cicatosus, <i>Archemorus</i>	250
boutonii, <i>Ablepharus</i>	220	cincta, <i>Oedura</i>	189
boydii, <i>Gonyocephalus</i>	194	cinerascens, <i>Tabanus</i>	371
brachysoma, <i>Lygosoma</i>	209	circumdatus, <i>Tabanus</i>	373
branchiale, <i>Lygosoma</i>	214	clarovittata, <i>Cytaea</i>	267
brauni, <i>Macrogongylus</i>	205	clavicallosus, <i>Tabanus</i>	373
brevicaudus, <i>Varanus</i>	202	cleroides, <i>Bethelium</i>	90
breviceps, <i>Hippocampus</i>	321	Clubiona	254
brevior, <i>Tabanus</i>	373	Clynotis	266
brevirostris, <i>Diatomineura</i>	367	clypealis, <i>Ditropidus</i>	397
brevis, <i>Ditropidus</i>	405	cognata, <i>Pseudomaevia</i>	269
brookii, <i>Hemidactylus</i>	190	cognatus, <i>Ditropidus</i>	404
broomensis, <i>Ablepharus</i>	220	colletti, <i>Lygosoma</i>	206
broomii, <i>Typhlops</i>	25	colossea, <i>Storena</i>	237
brunnea, <i>Chelosania</i>	194	colubrinus, <i>Ariamnes</i>	239
brunneus, <i>Aeluroscalabotes</i>	184	complanata, <i>Ocrisiona</i>	266
bryophagus, <i>Pedilophorus</i>	282	compressicaudum, <i>Lygosoma</i>	209
bryophilus, <i>Microchaetes</i>	274	concinna, <i>Trite</i>	267
bucephalus, <i>Trianectes</i>	53	concolor, <i>Erephopsis</i>	366
bungana, <i>Egernia</i>	203	congenitus, <i>Ditropidus</i>	407
burnettii, <i>Ablepharus</i>	221	conspicillatus, <i>Diplodactylus</i>	187
burtonii, <i>Lialis</i>	193	Corestetha	104
byrnei, <i>Diplodactylus</i>	186	cornutus, <i>Gymnodactylus</i>	183
Byrrhinus	277	<i>Oxyurichthys</i>	80
caecus, <i>Tripetenopus</i>	84	costatus, <i>Diplocrepis</i>	66
caeruleomaculatus, <i>Boleophthalmus</i>	79	<i>Leptonotus</i>	301
calauropomus, <i>Callionymus</i>	48	crassicauda, <i>Lygosoma</i>	215
Callerophthalmus	232	crassis-pina, <i>Echinophryne</i>	67
Callionymus	48	Craterocephalus	43
candidus, <i>Amaurobius</i>	231	cribriceps, <i>Ditropidus</i>	396
carinata, <i>Demansia</i>	173	cribricollis, <i>Ditropidus</i>	385
carinataiceps, <i>Pedilophorus</i>	284	eristatus, <i>Amphibolurus</i>	195
Carphodactylus	184	<i>Ichthyocampus</i>	40, 304
castaneus, <i>Limnichus</i>	279	crucigerum, <i>Chiracanthium</i>	255
casuarinae, <i>Lygosoma</i>	214	Cryptodelma	191
caudalis, <i>Lissocampus</i>	306	cunninghami, <i>Egernia</i>	204
caudicinctus, <i>Amphibolurus</i>	196	cupricollis, <i>Ditropidus</i>	382
caudolineatus, <i>Varanus</i>	202	curtirostris, <i>Syngnathus</i>	39, 300
celebesiana, <i>Leucange</i>	246	cyaneus, <i>Tabanus</i>	373
Ceramodactylus	182	cyanogaster, <i>Lygosoma</i>	213
challengeri, <i>Lygosoma</i>	210	Cyclostenus	262
Chelonarium	86	cylindrica, <i>Tetragnatha</i>	246
Chelosania	194	cylindrica, <i>Bebius</i>	92

	Page		Page
Cyllognathus	243	eborascensis, Heteronota	184
Cyrtophora	246	Echinomyræ	66
Cytaea	267	ectatommae, Chlamydopsis	85
dahlîi, Egermia	203	Ectenopsis	368
damaeus, Ceramodactylus	182	edentulus, Tabanus	374
darwinensis, Chlamydopsis	85	Egermia	202
dearmatus, Palpelius	267	eids-voldensis, Tabanus	373
decora, Clubiona	255	Eirone	170
decresiense, Lygosoma	216	elderi, Diplodactylus	186
decresii, Amphibolurus	196	elegans, Ablepharus	222
decurrens, Helcogramma	52	ellipticus, Linnichus	280
delectabilis, Opisthonus	268	Emoa	213
delicata, Larinia	247	endoterus, Typhlops	32
Lygosoma	209	entrecasteauxii, Lygosoma	210
Delma	192	ephippiata, Mesolita	101
Demansia	175	epicosmus, Theridion	243
demissa, Tetragnatha	246	eques, Phyllopteryx	315
Demoplatus	368	eraduensis, Physignathus	199
Denisonia	156	eremius, Varanus	200
depressa, Egermia	203	Erephopsis	365
derbiana, Heteronota	184	crystalloides, Pelecorrhynchus	368
Dermatopsis	62	excavatum, Chiracanthium	256
devisi, Denisonia	178	excavatus, Drassodes	235
devisii, Lygosoma	212	extraneus, Lesticothynnus	169
Diaea	252	extriladum, Theridion	244
Diatomineura	367	eyresii, Craterocephalus	43
diemensis, Amphibolurus	197	fascicularis, Microchaetes	274
Dinopsis	229	fasciculatus, Pedilophorus	286
Diplocrepis	66	fasciolatum, Lygosoma	209
Diplodactylus	185	filamentosus, Rhycherus	70
Diporophora	198	filiformis, Bebius	96
discicollis, Ditropidus	382	fissifrons, Stephanopsis	253
Pedilophorus	285	flutularius, Leptoichthys	307
distinguendus, Ablepharus	221	flagellans, Nephila	246
Ditropidus	381	flavipennis, Ditropidus	384
diversipes, Theridion	242	flavipes, Ligonipes	263
diversus, Typhlops	31	flaviventer, Lygosoma	216
divisa, Erephopsis	367	flindersi, Tabanus	374
dixonî, Tabanus	378	foliatus, Phyllopteryx	313
doddi, Tabanus	373	foliorum, Lygosoma	213
Dolophones	250	formicicola, Chlamydopsis	85
domina, Lygosoma	208	formosa, Storena	237
dorsalis, Egermia	203	foveiventris, Ditropidus	399
Dorymetaecus	258	fracticolor, Oedura	189
Drassodes	234	fragile, Lygosoma	217
dunensis, Tropidechis	179	fraseri, Delma	192
Dysdera	233	frenatus, Hemidactylus	190
Ebenavia	185	frequens, Amaurobius	231

	Page		Page
frerei, Egernia	204	Gymnodactylus	182
frontalis, Silvius	371	hasseltii, Latrodectus	244
frosti, Lygosoma	217	Hemicloea	234
fulgida, Diatomeneura	367	Hemidactylus	189
fulvus, Prynus	234	Hemiergis	215
Furina	180	Hemisphaeriodon	206
fusconger, Peltecorrhynchus	368	heroni, Tabanus	372
fuscum, Lygosoma	211	Heteronota	184
gagates, Ditropidus	409	heteropus, Ablepharus	221
galwayi, Mugilogobius	50	hilli, Diplodactylus	187
Gamasomorpha	233	Hinulia	206
Gasteracantha	249	Hippocampus	318
gastrostigma, Lygosoma	215	Histiogamphelus	303
gemina, Erephopsis	366	Histiophryne	72
gemmata, Argyrodes	239	hobartiensis, Tabanus	374
gemmatus, Pedilophorus	282	Homoemota	94
gentilis, Tabanus	375	Hoplodactylus	191
gerrardi, Hemisphaeriodon	206	horni, Ebenavia	185
gerrardii, Lygosoma	218	horridus, Moloch	200
gibbicollis, Ditropidus	381	howensis, Aspidiphorus	281
gibbula, Erephopsis	367	humeralis, Aspidiphorus	280
giganteus, Varanus	201	humilis, Bathyphantes	245
gilberti, Physignathus	199	Hypoblennum	267
gilleni, Varanus	200	hystricosus, Microchaetes	276
gilvum, Chiracanthium	258		
glaber, Ditropidus	406	Ichthyocampus	40, 304
globosus, Aspidiphorus	280	Idiosepius	355
globulus, Ditropidus	383	imbricatus, Amphibolurus	195
gloriosa, Lycosa	261	imitator, Silvius	369
glossatus, Ditropidus	393	impar, Pseudodelma	193
Glyphisodon	46	imperfectus, Tabanus	375
godeffroyi, Gonyocephalus	194	inconstans, Histiophryne	75
Gonyocephalus	194	indefinitus, Tabanus	374
gouldii, Varanus	201	indicus, Varanus	201
gracile, Lygosoma	216	indistinctus, Ditropidus	401
gracilipes, Oreodeira	222	Silvius	368
gracilis, Argyrodes	239	inermis, Amphibolurus	196
Pletholax	193	infralabialis, Typhlops	35
graciloides, Lygosoma	216	infrapunctatum, Lygosoma	210
grandis, Silvius	370	ingrami, Varanus	201
gratiosus, Clynotis	266	initiale, Lygosoma	215
grossa, Tentana	244	inornata, Egernia	203
grypus, Typhlops	17	inornatus, Adelphodrasus	236
guentheri, Typhlops	23	insulanus, Jotus	265
guichenoti, Lygosoma	210	Saitis	264
guttata, Erephopsis	365	insularis, Corestetha	104
guttatus, Pseudechis	174	Dinopis	229

	Page		Page
insularis, Meta	246	lineopunctulatum, Lygosoma ..	218
Silvius	368	Linyphia	245
interrupta, Mesolita	99	Liolepisma	209
invenusta, Ocrisiona	266	Lissocampus	306
isolepis, Lygosoma	208	Lissotes	88
Jotus	265	litoralis, Pholcus	238
jugularis, Amphibolurus	197	longipes, Ditropidus	390
kenti, Typhlops	22	longirostris, Physignathus	199
kershawi, Lissotes	88	longula, Trite	267
kingii, Chlamydosaurus	200	longus, Ditropidus	388
Egernia	204	loricata, Gamasomorpha	233
kochii, Sepiadarium	351	lucasi, Diplodactylus	188
labialis, Typhlops	30	luctuosa, Egernia	202
labillardieri, Lygosoma	207	Lycosa	260
laeve, Lygosoma	211	Lygo-oma	206
laevis, Carphodactylus	184	maccoeyi, Lygosoma	212
Lariuia	246	maccoyi, Lygosoma	216
lasiophthalma, Erephopsis	366	macilenta, Tetragnatha	246
lateralis, Rhinogobius	48	macquartii, Tabanus	373
latifrons, Tabanus	375	Macrogonylus	205
latrodectus	244	macropisthopus, Lygosoma	218
lauta, Egernia	202	macrops, Ditropidus	394
laui, Oonops	232	maculata, Denisonia	177
Lepidoblennius	62	maculatipes, Pedilophorus	284
Lepidodactylus	191	maculatus, Amphibolurus	195
lepidopodus, Pygopus	191	maculipennis, Erephopsis	366
Leptoichthys	307	major, Egernia	203
Leptonotus	301	Eirone	171
Lestrichothymus	169	majorinus, Ditropidus	393
lesueurii, Oedura	188	marginatus, Silvius	369
Physignathus	199	marginipennis, Ditropidus	392
Leucange	246	marmorata, Oedura	188
leucopterus, Tabanus	374	marmoratus, Lepidoblennius	62
leucosema, Storena	237	Phyllodactylus	185
levis, Nephurus	182	mastoidea, Gasteracantha	249
Lialis	193	mayeri, Oedura	189
lichenigerum, Lygosoma	210	mediofasciata, Tillomorpha	95
lietor, Periapodes	97	Menneus	230
ligatus, Typhlops	21	meridionalis, Tabanus	376
Ligonipes	263	Mesolita	99
Limnichus	278	mestoni, Perochirus	191
lineata, Delma	192	Meta	246
Typanocryptis	198	metallicum, Bethelium	91
lineatus, Ablepharus	222	Lygosoma	210
lineolata, Sepioloidea	350	michaelseni, Diplodactylus	186
lineo-ocellatus, Ablepharus	220	Microchaetes	274
		microtis, Lygosoma	217
		miliusii, Gymnodactylus	183

	Page		Page
minor, Microchaetes	274	nigropunctatus, Araneus	248
miopus, Lygosoma	218	nigrum, Lygosoma	213
mirogastra, Tillomorpha	96	nitens, Tetragnatha	246
mitchelli, Trichophryne	68	noctivagus, Byrrhinus	277
mixtus, Pedilophorus	282	nodipennis, Pedilophorus	283
mjobergi, Lygosoma	215	notatus, Silivus	368
modicus, Ditropidus	383	Tabanus	373
moestula, Tillomorpha	97	notoides, Idiosepius	361
Moloch	200	novae-guineae, Lygosoma	213
moluccensis, Cyrtophora	246	novae-hollandiae, Hippocampus	320
Moneta	239	obscuripennis, Ditropidus	403
monilis, Oedura	189	occipitalis, Tiliqua	205
monotropis, Lygosoma	209	oceanicus, Peropus	190
montana, Ariadna	233	ocellatum, Lygosoma	211
Diatomineura	367	ocellatus, Phyllodactylus	185
montanus, Pelecorrhynchus	368	ocelliferum, Lygosoma	206
Silivus	371	Ochyra	93
muelleri, Ablepharus	222	Ocrisiona	266
Mugilogobius	50	Oedura	188
multifasciata, Furina	180	Oedurella	188
multiradiatus, Dermatopsis	63	olivii, Gymnodactylus	183
mundivense, Lygosoma	212	Omolepida	214
mundulum, Theridion	241	Oonops	232
mundum, Lygosoma	212	Ophichinus	54
muricatus, Amphibolurus	197	Ophidiocephalus	193
murrayi, Lygosoma	208	ophioscincus, Lygosoma	220
musculus, Balaeoptera	158	Ophioseps	194
mustelinum, Lygosoma	209	Opisthonus	268
myrmecophila, Mesolita	102	Oreodeira	222
		orientalis, Ablepharus	221
Nannonymphaeus	259	Cryptodelma	192
Nannoperca	41	ornata, Rhychoedura	182
nasutus, Ophioseps	194	ornatum, Bethelium	91
neocirrus, Tabanus	375	ornatus, Ablepharus	221
neogermanicus, Tabanus	373	Amphibolurus	195
Neosebastes	64	Oxyurichthys	80
Nephila	246	pachyurus, Diplodactylus	187
Nephurus	182	pacificus, Hoplodactylus	191
Nerene	244	pagenstecheri, Lygosoma	213
nigra, Stigmatopora	311	pallida, Chlamydopsis	86
nigribasis, Ditropidus	387	pallidum, Chiracanthium	257
nigriceps, Cryptodelma	192	Lygosoma	208
Saitis	261	Palpelus	267
nigriclavus, Aspidiphorus	280	panopea, Tetragnatha	246
nigricollis, Physignathus	199	pantica, Neosebastes	64
nigritarsis, Tabanus	373	paradoxus, Idiosepius	358
nigriventris, Ditropidus	388	pardalis, Lygosoma	208
nigrodecoratum, Theridion	241	Ophichinus	58
nigrolutea, Tiliqua	205		

	Page		Page
parvicollisus, Tabanus	371	pseudotropis, Lygosoma	210
pascoei, Mesolita	103	pubiventris, Byrrhinus	277
patula, Diatomineura	367	pulchella, Aprasia	193
pectoralis, Lygosoma	212	pulcher, Diplodactylus	187
Pedilophorus	282	pulchra, Diatomineura	367
pelagicus, Gymnodactylus	182	Egernia	204
Pelecorynchus	368	pumilus, Lygosoma	215
peltata, Dolophones	250	punctatovittatum, Lygosoma	218
penicillatus, Poltys	249	punctatus, Varanus	201
Periaptodes	97	puncticollis, Ditropidus	405
Perochirus	191	punctipennis, Byrrhinus	277
Peronedys	59	Ditropidus	395
peronii, Lygosoma	215	punctivarius, Ditropidus	408
Peropus	190	punctulatum, Lygosoma	215
phaeochorda, Linyphia	345	pusillus, Nannonymphaeus	260
phillipi, Syngnathus	297	Lepidodactylus	191
Pholcus	238	pygmaeus, Idiosepius	357
phthisica, Larinia	246	Pygopus	191
Phylloactylus	185	quadratipennis, Ditropidus	402
Phyllopteryx	313	quadratus, Tabanus	373
Physignathus	199	quadrilineatum, Lygosoma	216
picteti, Idiosepius	359	quadrinacula, Erephopsis	365
pictipenne, Bethelium	90	queenslandiae, Tropidophorus	222
picturatum, Lygosoma	218	quoyii, Lygosoma	207
pictus, Amphibolurus	196	rapax, Triaconyx	229
pinguis, Typhlops	24	raucus, Pedilophorus	282
planiventralis, Lygosoma	218	repens, Ophioseps	194
platurus, Gymnodactylus	183	reticulata, Delma	192
plebeia, Delma	192	reticulatum, Lygosoma	219
Pletholax	193	reticulatus, Amphibolurus	196
Plotius	267	Rhinogobius	48
plumea, Hemicleoa	234	Rhodona	217
poecilolaemus, Syngnathus	295	rhodonoides, Ablepharus	222
Poltys	249	rhombifera, Oedura	189
polychromus, Pedilophorus	287	rhomboidale, Lygosoma	211
polygrammicus, Typhlops	19	Rhycherus	70
polyopthalmus, Diplodactylus	186	Rhynchoedura	182
praepeditum, Lygosoma	219	richardsonii, Lygosoma	208
pretiosum, Lygosoma	211	Riopa	214
properum, Theridion	241	robusta, Oedura	188
Protennemus	98	robustus, Solegnathus	312
proximus, Typhlops	18	rostrale, Lygosoma	211
Prynos	234	rostratus, Histiogamphelus	303
Pseudechis	174	rotunda, Ulesanis	243
pseudoardens, Tabanus	372	rubropunctata, Diaea	252
pseudobasalis, Tabanus	378	rufescens, Amphibolurus	195
Pseudodelma	193	Lygosoma	214
Pseudolabrus	47		
Pseudomaevia	260		

	Page		Page
ruficolle, Bethelium	91	strenua, Lycosa	260
ruficornis, Diatomineura	367	striatipennis, Ditropidus	400
rufinotatus, Tabanus	371	striatus, Ditropidus	385
rufum, Lygosoma	209	striolata, Egernia	204
rugosa, Egernia	203	submedia, Erephopsis	365
rugosus, Trachysaurus	205	subopacum, Bethelium	92
ruidum, Bethelium	91	subtilis, Cyllognathus	243
Saitis	264	sulcatus, Ophielinus	55
salvator, Varanus	200	sundevalli, Hemicloea	234
sanguinarius, Tabanus	373	~uta, Denisonia	176
scharffi, Lygosoma	217	Symptericthys	75
schraderi, Pygopus	191	Syngnathus	39, 294
scincoides, Tiliqua	205	Tabanus	371
scortea, Histiophryne	74	tabida, Larinia	247
scutellaris, Ditropidus	106	taeniata, Oedurella	188
scutellata, Mesolita	99	! Saitis	264
scutirostrum, Lygosoma	216	taeniatus, Ophidiocephalus	193
scutulatus, Amphibolurus	195	taenicauda, Diplodactylus	186
Sepiadarium	351	taeniolum, Lygosoma	206
Sepioloidea	350	Taeniomembras	41
ser-rato-fasciatus, Opisthonus	268	taeniopleurus, Ablepharus	221
setosus, Microchaetes	275	tamarensis, Taeniomembras	41
Siaphos	216	tambourinense, Lygosoma	207
sibbaldii, Balaenoptera	158	temporalis, Physignathus	199
signatus, Drassodes	234	Tentana	244
signiferum, Bethelium	90	tenua, Lygosoma	207
Silvius	368	tenuidens, Simaetha	269
Simaetha	269	tenuis, Ablepharus	221
simplex, Lygosoma	217	tepidariorum, Theridion	242
Solegnathus	312	tepperi, Silvius	370
speciosa, Tharpyna	251	tessellatus, Diplodactylus	187
spectabile, Lygosoma	210	tetradactylum, Lygosoma	212
spenceri, Lygosoma	213	Tetragnatha	246
Varanus	201	Tharpyna	251
sphaericus, Microchaetes	274	Thecadactylus	189
sphyrurus, Gymnodactylus	183	Theridion	241
spinigerus, Diplodactylus	185	tigrina, Lygosoma	209
spinipes, Gonyocephalus	194	Tiliqua	205
spinnipes, Dorymetaecus	259	tillides, Bethelium	91
spissus, Aspidiphorus	281	Tillomorpha	95
steindachneri, Diplodactylus	186	timidus, Ablepharus	222
stenodactylus, Diplodactylus	187	timorensis, Varanus	202
stenurus, Diplodactylus	186	tincta, Delma	192
Stephanopsis	253	torresianus, Typhlops	27
Stigmatopora	308	Trachysaurus	205
stokesii, Egernia	204	Triaconyx	229
Storena	237	Trianectes	53
strangmanni, Tabanus	371	triangulifer, Ditropidus	408
		trichocerus, Demoplatus	368

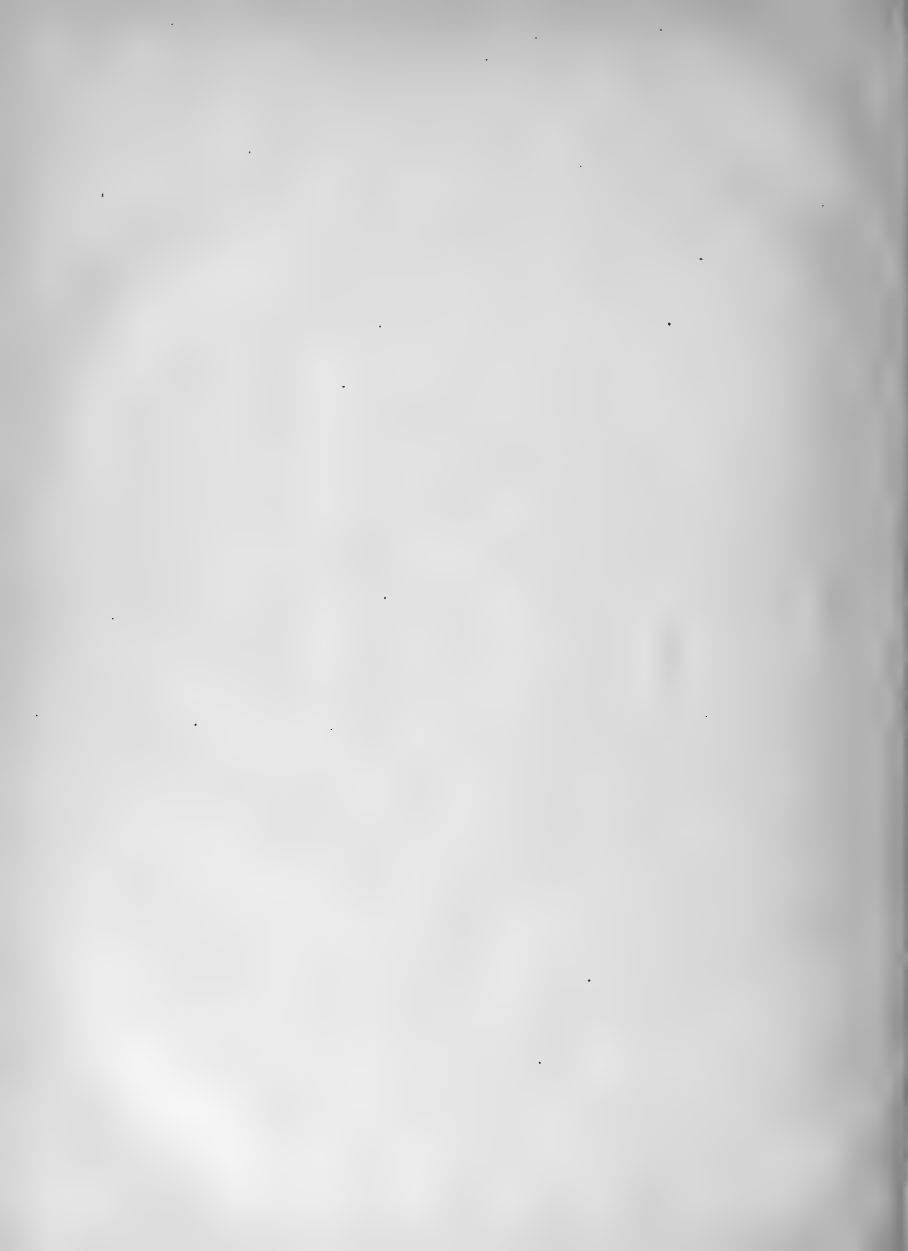
	Page		Page
Trichophryne	68	verreauxii, Lygosoma	219
tricolor, Homoemota	94	verrillii, Oedura	189
trilineatum, Lygosoma	210	verrucosus, Araneus	248
trimaculatus, Protepnemus	98	Sympterichthys	76
trinodosus, Menneus	230	vetustus, Tabanus	379
Tripectenopus	83	victoriae, Glyphisodon	46
Trite	267	victorialis, Nephila	246
Tropidechis	179	victoriensis, Ectenopsis	368
Tropidophorus	222	Tabanus	373
truncatum, Lygosoma	219	violacea, Diatomineura	367
tryoni, Lygosoma	207	virgatus, Ablepharus	220
Oedura	188	viridimicans, Ditropidus	410
tuberculatus, Hoplodactylus	191	viridimitens, Pedilophorus	286
Microchaetes	275	viridipes, Araneus	248
Tympanocryptis	198	viridinctus, Ditropidus	396
tympanum, Lygosoma	207	vittatus, Cyclostenus	262
Typhlops	17	Diplodactylus	186
Ulesanis	243	waiti, Lygosoma	211
unguirostris, Typhlops	20	waitii, Typhlops	29
Varanus	200	walkeri, Lygosoma	218
variabilis, Moneta	240	wallacei, Batocera	290
Ochyra	93	websteri, Amphibolurus	195
variegatus, Peropus	190	westringi, Gasteracantha	249
variicollis, Ditropidus	386	whitii, Egernia	203
varius, Ophielinus	57	wiedii, Typhlops	26
Varanus	201	winnecke, Diporophora	198
venatoria, Clubiona	254	woodwardi, Diplodactylus	188
ventralis, Ditropidus	400	Lygosoma	215
vercoi, Syngnathus	298	xanthopilis, Erephopsis	366

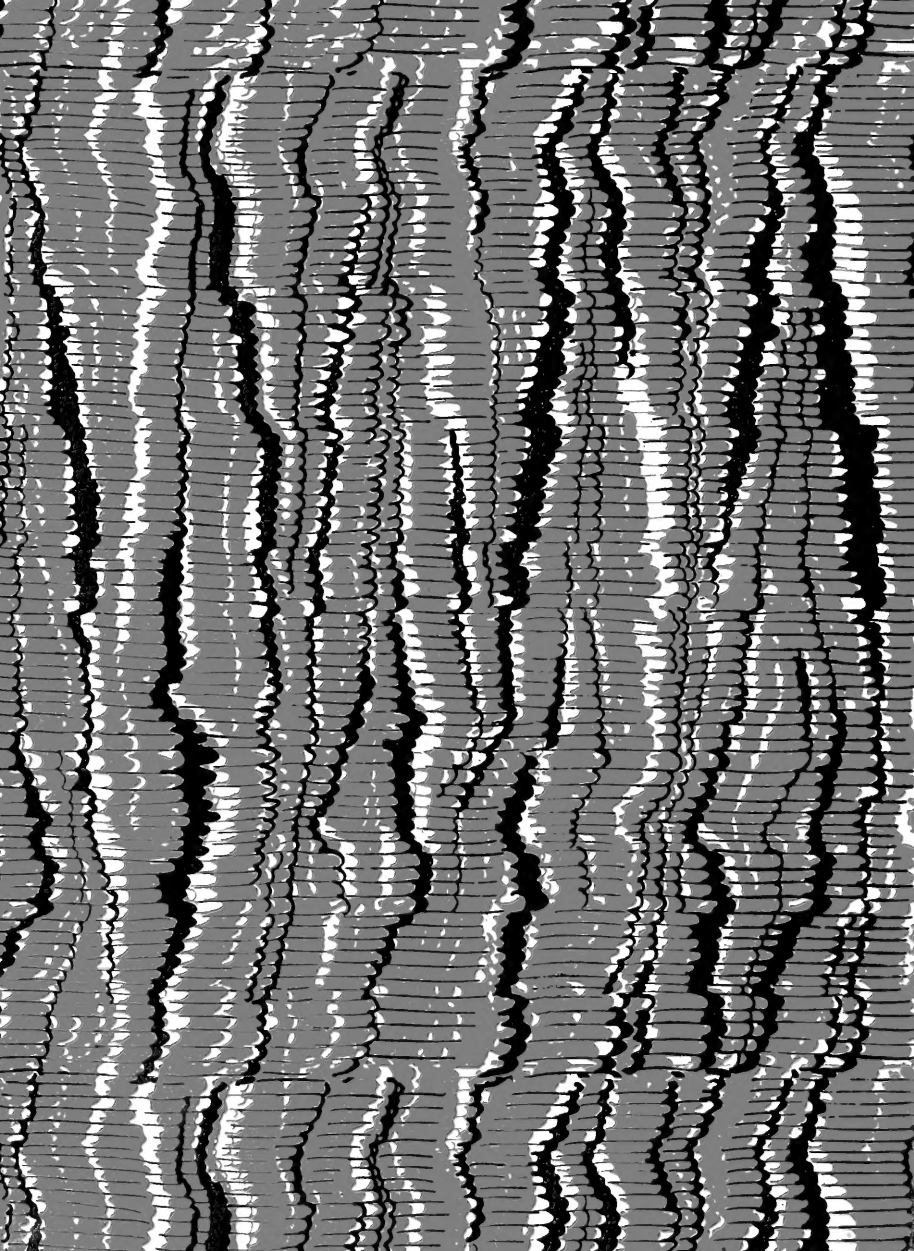
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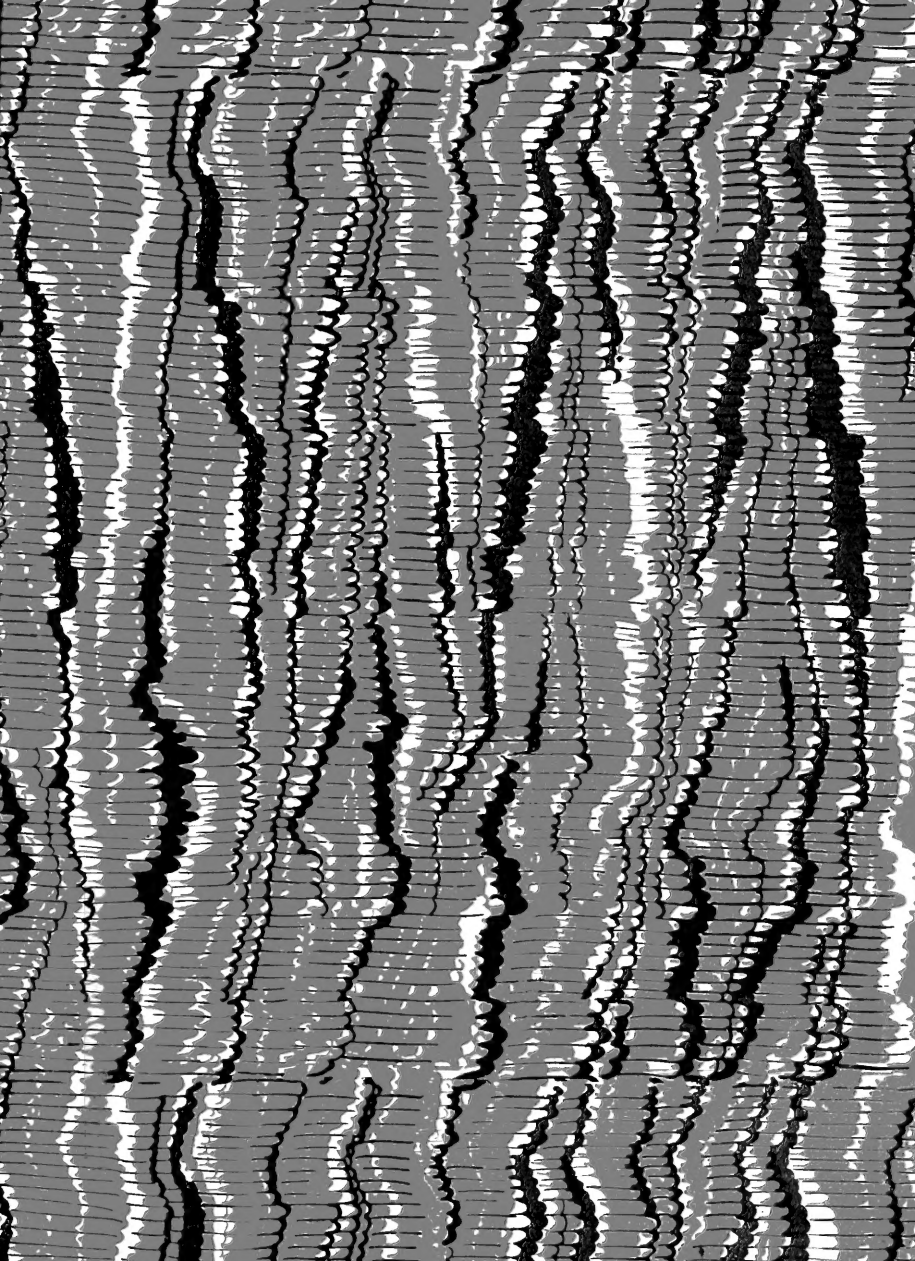
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