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PART II.—ZOOLOGY.

REPORT ON THE WORK
OF THE
HORN SCIENTIFIC EXPEDITION

TO
CENTRAL AUSTRALIA.

PART II.—ZOOLOGY.

EDITED BY
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PART II.—ZOOLOGY.

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CORRIGENDA.

Page 27. Add to footnote—"vol. vii. (new series), p. 222."

In article Aves (pp. 53-111) for "Lawrie's Creek" read "Laurie's Creek," and for "Hermannsburg" read "Hermannsburg."

Page 139, line 20. For "Lawrie's Creek" read "Laurie's Creek."

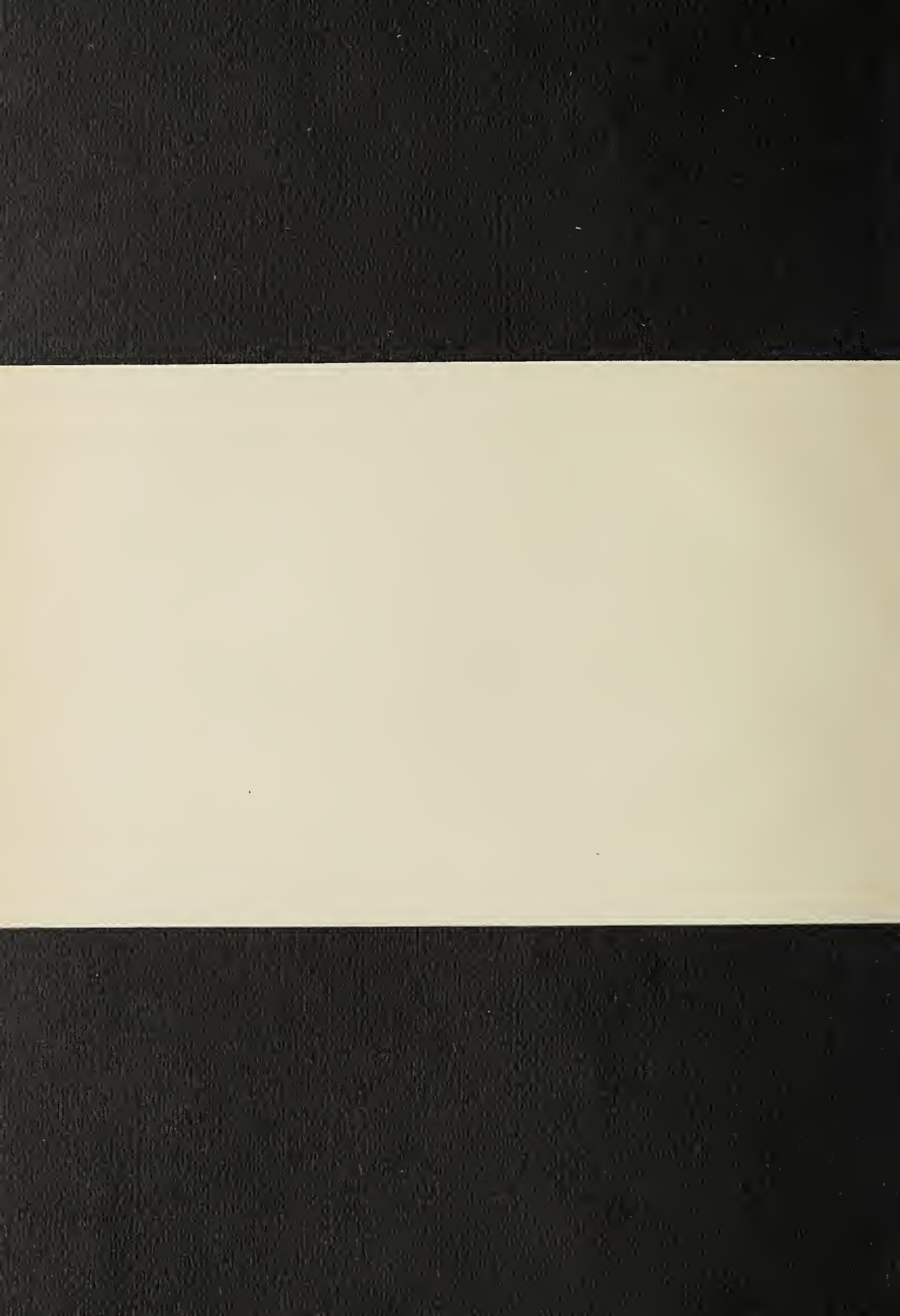
Page 140, line 2. For (4) read (3).

Page 219. At the end of line 2, for "ornamented" read "magnified."

On line 4, for "frount" read "front."

Page 232. On the last line, for "Central Australian" read "Queensland."

Page 264. For "Hermannsburg" read "Hermannsburg."



MAMMALIA.

By BALDWIN SPENCER, M.A., C.M.Z.S., Professor of Biology
in the Melbourne University.

(PLATES 1, 2, 3, 4).

Whilst many workers, such as Gould, Waterhouse, Gray, Ogilby and others, have dealt with and described mammals occurring in Central Australia, there has been as yet scarcely any attempt to draw up a detailed list of the mammalian fauna of this part of the continent. The number of mammals brought back by the early explorers—owing to the insuperable difficulties in the way of making collections whilst traversing with horses the arid interior—was naturally but small.

In recent years the Elder Expedition brought back a small collection of some twenty specimens, which were described by Messrs. Stirling and Zietz* and referred to the following eight species:—*Myrmecobius fasciatus*, *Trichosurus vulpecula*, *Lagorchestes hirsutus*, *Onychogale lunata*, *Petrogale lateralis*, *Macropus robustus*, *Hapalotis mitchelli*, *Mus albocinereus* (?).

The most extensive list is that given by E. B. Sanger,† who states that, after two years' sojourn in the central districts, the following were all the mammals that he met with:—Chiroptera—*Scotophilus mori*. Rodentia—*Hapalotis conditor*, *H. cervina*, *H. mitchelli*, *Mus vellerosus*, *Hydromys fulvolovatus*. Carnivora—*Canis dingo*. Marsupialia—*Osphranter rufus*, *Onychogale lunata*, *Bettongia grayi*, *Perameles fasciatus*, *Petrogale lagotis*, *Chæropus castanotis*, *Phalangista sp.*

As Mr. Sanger says:—"The physical conditions of the interior of Australia are not such as to support a varied fauna." More especially is this true in the case of the mammalia. A frog or a mollusc may tide over months of drought, a mammal cannot usually do so, and hence the mammalian fauna of such an arid region must consist of two elements—(1) a small number of forms able to travel long distances with comparative ease, such as the kangaroo or dingo, and (2) a

* Trans. R.S. South Aust., vol. xvi., p. 154.

† American Naturalist, vol. xviii., 1884, p. 9. I am much indebted to Mr. J. J. Fletcher for his kindness in drawing my attention to this article and providing me with a copy of it, as it was unprocurable in Melbourne.

larger number of smaller and usually burrowing animals capable of living for long with very little water to drink, and able to feed upon insects such as ants or the parched-up vegetation growing on the rocks and sand-hills.

The fauna must also vary very much according to the succession of seasons. A year or two of drought will thin out the animal population to a wonderful extent, and this thinning out can only be made good again by increased fertility and by immigration following upon one or two good seasons.

Anyone who has seen the central desert will realise at once how effectual a barrier to migration it affords to very many forms of life, the result being that a line of division can be drawn separating, as Professor Tate has pointed out, the Eremian region of the centre from the Autochthonian in the south-west and the Euronotian in the east and south-east. Around the true Eremian region runs a broad belt in the north, east, and south-east, over which the rainfall is less than twenty-five inches per annum. To the south-west lies a similar, only much narrower, band. To this matter reference will be made again when dealing with the marsupial fauna.

The mammalia of the central or Eremian region are representative of the five orders found elsewhere in Australia.

(1) *Carnivora*.—The dingo (*Canis dingo*) is fairly numerous. Most of the specimens seen were of the yellow-brown colour, but occasionally they were black. We met with them everywhere, and they seem to wander far out into the sand-hill country, as one followed us at dusk across Lake Amadeus. Near to the latter the dead bodies of five were found polluting the water of a native well at the bottom of a hole some twelve feet deep, into which they had evidently ventured in search of water, and out of which they had been too weak to climb. They probably feed upon marsupials, such as the rat-kangaroo (*Bettongia lesueuri*), which is not rare upon the sand-hills.

(2) *Rodentia*.—At certain times the country appears to be over-run by migratory rats, who travel in vast hordes, appearing and disappearing with strange suddenness. At ordinary times perhaps the most common mammals are the small jerboa-rats (*Hapalotis mitchelli*) and the mouse (*Mus novæ-hollandiæ*?). They are met with everywhere in the plain country. Though we did not meet with it, another species of *Hapalotis* (*H. conditor*) has often been recorded from the central parts. This owes its specific name to the fact that one or two families construct a nest built out of sticks firmly put together in a somewhat beehive shape at the base of a shrub.

(3) *Chiroptera*.—The most striking form amongst the bats is the large *Megaderma gigas*, Dobson. It is very local in its distribution, and, like many other forms in Central Australia, the numbers in which it occurs vary from season to season. Usually it is to be easily secured hiding during the day time in a cave amongst the McDonnell Ranges near to Alice Springs, but at the time of our visit this cave had been partially filled up and the bats had taken refuge somewhere else, so that only a single specimen was obtained. The size and general grey-white colour of the animal, together with the pink tinge on the ears and nose leaf, render it a striking object when seen alive.

The commonest form of bat which is met with everywhere flying about at evening is *Nictophilus timoriensis*.

(4) *Marsupialia*.—Of the six families found in Australia five are represented in the central area. One (Notoryctidæ) is represented by a single genus and species and is confined to it; another, Phalangeridæ, is represented by a single species, while the family Phascologyidæ is not represented.

The exact northern limit of *Phascologymys latifrons* is not defined, but apparently its distribution does not extend into the more northern parts of South Australia. The most northerly recorded locality is apparently Port Augusta.

The absence of the Phalangeridæ—except in regard to the ubiquitous *Trichosurus vulpecula*, the common so-called opossum—is easily understood, as the family is distinctly an arboreal one, inhabiting, as a general rule, well wooded districts where the rainfall is more regular than in Central Australia. The common *Trichosurus vulpecula* is probably the most widely-dispersed of all the Australian marsupials, and the most able—judging from the way in which it does so—to adapt itself to varying conditions of environment, though as yet it has not been recorded from the York Peninsula.

Except as forming a fringe for the river* beds in Central Australia there is no real woodland district, and hence it is not surprising that the family Phalangeridæ, which is especially a woodland one, is scarcely represented in the interior.

With the single exception of *Notoryctes typhlops* mentioned above, there cannot be said to be any important marsupial type which is confined to the Eremian region.

* It may be as well to say that the rivers which figure in maps of Central Australia only "run" at considerable intervals of time, between which—except for rare water-holes—they are perfectly dry.

The marsupial fauna is characterised, as might have been expected, by (1) the absence of almost all forms characteristic of the coastal and well-watered parts of the continent—that is, the Euronotian district ; (2) by the presence of a few forms confined to the district ; (3) by the predominance of other forms which are found in the inland parts of Queensland, New South Wales, Victoria, South and West Australia—that is, forms inhabiting the broad band of country previously referred to as surrounding the Eremian region on almost all sides. So far as the marsupials are concerned, this is a well-marked region. (4) By the presence of a few forms such as *Trichosurus vulpecula*, *Sminthopsis crassicaudata*, and *S. murina*, which appear to be universally, or nearly so, distributed over the continent.

A glance at the distribution of the species now recorded will show that there is only one of them which is as yet known only from the eastern side of the Eremian region and not also from the south and west. This is the rare *Antechinomys laniger*, which has been found in the inland parts of Queensland and New South Wales. There can, however, be little doubt but that the range of this extends into West Australia. It will be seen on the other hand that there is a strong predominance of South and West Australian species, together with a smaller number of forms, inhabiting these districts as well as the inland parts of Queensland and New South Wales and, to a lesser extent, the northern parts of Victoria.

So far as is at present known thirteen genera are represented, six of which belong to the Diprotodontia and seven to the Polyprotodontia. The thirteen genera are represented by eighteen species, of which seven belong to the Diprotodontia and eleven to the Polyprotodontia. To compare these numbers with the total number for Australia, including Tasmania, we find that of the Diprotodontia some twenty-four per cent. of the genera and seven of the species are represented, and of the Polyprotodontia some sixty-three per cent. of the total number of genera and twenty-five per cent. of the species. This proportionate representation in both cases is more closely similar to that of Tasmania than to that of any other division of the Australian region, and yet no two parts form a greater contrast to one another at the present day than do Central Australia and Tasmania. Whilst the latter owes its comparative poverty of diprotodont marsupials to the fact of its separation from the mainland before the period of their full development, the case is quite different with regard to Central Australia. In the latter the finding of abundant remains of extinct diprotodonts, some of huge size, has shown that at a former period it was the home of a fauna dependent upon a plentiful and constant vegetation such as does not now exist.

The changes resulting in the loss of humidity and the comparatively rapid drying-up and conversion of the country into a more or less arid region went hand-in-hand with the extinction of the old fauna. It is scarcely possible to imagine that many of the mammals would be able to accommodate themselves to such a complete reversal of climatic conditions as evidently took place in Central Australia, and more especially in the southern, central, and western parts, which now form what Professor Tate has called the Eremian region.*

It was at this time, when the physiographic conditions of the continent became changed, that the distribution of the marsupial fauna, as we now find it, must have been determined, at all events in its broad outlines.

The remains of extinct diprotodonts, evidently existing in large numbers, show that there must have been a very considerable land area in the central parts suitable for habitation, and in all probability affording a means of communication between the eastern and western parts of the continent. This diprotodont fauna probably spread across from the east to the west, and thus Western Australia received the ancestors of its present diprotodonts. Climatic changes in Tertiary times led to the drying-up of the central and western parts of the continent, until finally these parts became to a large extent waterless; surrounding them was formed a broad belt of comparatively dry country, whilst the humid and more fertile parts were confined to the littoral regions rising inland into mountain ranges and running along the north, east and south-east coasts. To this Professor Tate has given the name of Euronotian region. In the south-west lies a similar district—the Autochthonian.

So far as the marsupial fauna is concerned we can divide Australia into two main regions, the first of which corresponds to the Euronotian region, while the second includes the remainder of the continent. The Autochthonian region, which is so strongly marked in the case of plants, cannot, so far as marsupials are concerned, be regarded as distinct. It has certainly a few distinctive forms, but these are principally to be found amongst the more specialised diprotodonts. Its marsupial fauna in no way stands in the same relationship to that of the rest of the continent as does its flora. So far as it is known it is closely allied to that of the great mass of country which stretches right across to the inland boundary of the Euronotian region.

There is again no distinctive Eremian marsupial fauna, but there is, on the other hand, a very distinct one which is characteristic of the broad belt of country in which the rainfall is between ten and twenty-five inches yearly.

* Aust. Ass. Adv. Sci., Sydney, 1888, vol. i. Presidential Address to the Biological Section, p. 312, pl. xviii.

This belt of country includes the greater part of Queensland and New South Wales and a portion of Victoria, the southern part of South Australia and the inland part of West Australia which borders the central desert from Eucla in the east, on the Great Australian Bight, to Shark Bay on the western coast line.

It is separated from the Euronotian by both positive and negative characters. Certain genera, such as *Myrmecobius*, *Chœropus*, *Peragale*, and *Antechinomys*, together with numerous species of other genera, are found in it, but not in the Euronotian region, in which, on the other hand, are still more numerous genera and species not met with in the inland country. To pass from the coastal district over the ranges into the inland parts anywhere along the southern and eastern part of the continent is not only to leave behind a rich variety of forms, but to be brought into contact with a quite different series, often of genera and, to a very large degree, of species of marsupials, birds, reptiles, and fishes.

There is really in Australia a primary division of marsupials into two groups:—

(1.) Those which require an environment dependent upon and resulting from a constant rainfall of twenty-five inches and upwards yearly, and which inhabit the Euronotian region.

(2.) Those which have become modified so as to be fitted to an environment dependent upon and resulting from a rainfall of less than twenty-five inches yearly. These practically inhabit the remainder of the continent.

As a sub-division of these, a certain number of forms may be grouped together which can exist under the more rigorous conditions of a climate in which the rainfall is under ten inches yearly, and it is these which form the marsupial fauna of Central Australia. This central marsupial fauna is essentially an immigrant one, of comparatively recent date, and the immigration appears to have taken place in the main from the southern and western borders.

To summarise briefly. In times probably just preceding the Pleistocene there was a large and well-watered land area in Central Australia inhabited by a well-developed marsupial fauna. Across this central area migration took place in the main, and certainly so far as the diprotodonts are concerned, from east to west. In this way West Australia acquired its diprotodont fauna. Subsequently the central area became transformed into a dry, arid region, in which condition it has remained until the present day.

There must, judging by the presence of such species as *Macropus eugenii* in Kangaroo Island, have been for some time an extension of land to the south of the continent stretching across what is now the Great Australian Bight.

There then followed, in some cases, a differentiation of forms separated by the central area, resulting for example in the existing *M. eugenii* on the west and its close ally, *M. parma*, on the east. In the case of *M. robustus* we have an example of a form which either was able to maintain its existence despite the change in climate or else migrated subsequently from the north-east.

Following upon the extinction in the central area of the greater part of its marsupial fauna, there ensued a migration of such forms as could live in an arid region, and the differentiation of a certain number such as *Dasyuroides byrnei*, *Phas. macdonnellensis*, *Sminthopsis psammophilus*, *S. larapinta*, and others not yet discovered. The one form which is at once the most modified and pre-eminently distinctive of this region is *Notoryctes typhlops*.

The following table indicates the distribution of the marsupials known from Central Australia † :—

	W.A.	S.A.	Int. N.S.W.	Coast N.S.W.	Int. Q.	Coast Q.	North. Territ.	Int. Vict.	Coast Vict.
<i>Macropus rufus</i> - - -	X ?	X	X						
<i>Macropus robustus</i> - - -		X	X				X		
<i>Petrogale lateralis</i> - - -	X								
<i>Onychogale lunata</i> - - -	X	X							
<i>Lagorchestes conspicillatus</i> (var. <i>leichardtii</i>) - - -	X								
<i>Bettongia lesueuri</i> - - -	X	X							
<i>Trichosurus vulpecula</i> - - -	X	X	X	X	X	X	X	X	X
<i>Peragale lagotis</i> - - -	X	X							
<i>Chæropus castanotis</i> - - -	X	X	X				X	X	
<i>Phascologale cristicauda</i> - - -		X							
<i>Phascologale calura</i> - - -	X	X							
* <i>Phascologale macdonnellensis</i> - - -									
<i>Sminthopsis murina</i> - - -	X	X	X	X	X	X		X	X
<i>Sminthopsis crassicaudata</i> - - -	X	X	X	X	X	X		X	X
* <i>Sminthopsis psammophilus</i> - - -									
* <i>Sminthopsis larapinta</i> - - -									
* <i>Dasyuroides byrnei</i> - - -									
<i>Antechinomys laniger</i> - - -			X		X				
* <i>Notoryctes typhlops</i> - - -									

* Those marked with an asterisk are peculiar to Central Australia so far as at present known.

‡ In addition to those named in this list, there certainly exist in Central Australia a species of *Dasyurus* and at least one of *Perameles*. Mr. Gillen informs me that at Alice Springs the blacks have a special corroboree associated with the "Chilperta," or native cat. *Perameles fasciatus* is included in Sanger's list, and Mr. Byrne, of Charlotte Waters, who is well acquainted with the marsupial fauna of that district, tells me that he knows of the existence of one species of *Perameles*, and believes that a species of *Peragale* occurs of considerably smaller size than, and distinct from, *P. lagotis*.

(5) *Monotremata*.—As might have been expected, the family Ornithorhynchidæ is not represented in the Eremian region at the present time. The only permanent waters are rocky holes amongst the ranges, and these are unfit for habitation by Ornithorhynchus. The family Echidnidæ, on the other hand, has a wide distribution amongst the rocky hills, being certainly found at Barrow Creek in the north and Charlotte Waters in the south. Those from the former district are stated to be remarkably small; but those from the latter, though very much smaller than the largest specimens known from Queensland, are still of medium size.

The following is a list of the mammals secured, the various species of which are dealt with separately:—

Sub-class EUTHERIA.

Order Carnivora.

Family CANIDÆ.

- (1) *Canis dingo*.

Order Rodentia.*

Family MURIDÆ.

- (1) *Hapalotis mitchelli*.
 (2) *Hapalotis apicalis*.
 (3) *Hapalotis cervinus*.

Order Chiroptera.

Family NYCTERIDÆ.

- (1) *Megaderma gigas*.

Family VESPERTILIONIDÆ.

- (1) *Nyctophilus timoriensis*.

Sub-class METATHERIA.

Order Marsupialia.

Sub-order DIPROTODONTIA.

Family MACROPODIDÆ.

* The collection also includes species of the genus *Mus*, as yet undetermined.

Sub-family Macropodinae.

- (1) *Macropus rufus*.
- (2) *Macropus robustus*.
- (3) *Petrogale lateralis*.
- (3) *Lagorchestes conspicillatus*, var. *leichardti*.
- (5) *Onychogale lunata*.

Sub-family Potoroinae.

- (1) *Bettongia lesueuri*.

Family PHALANGERIDÆ.

Sub-family Phalangerinae.

- (1) *Trichosurus vulpecula*, var. *typica*.

Sub-order POLYPROTODONTIA.

Family PERAMELIDÆ.

- (1) *Peragale lagotis*.
- (2) *Chæropus castanotis*.

Family DASYURIDÆ.

Sub-family Dasyurinae.

- (1) *Phascologale cristicauda*.
- (2) *Phascologale macdonnellensis*.
- (3) *Phascologale calura*.
- (4) *Sminthopsis crassicaudata*.
- (5) *Sminthopsis murina*.
- (6) *Sminthopsis larapinta*.
- (7) *Sminthopsis psammophilus*.
- (8) *Dasyuroides byrnei*.
- (9) *Antechinomys laniger*.

Family NOTORYCTIDÆ.

- (1) *Notoryctes typhlops*.

Sub-class PROTOTHERIA.

Order Monotremata.

Family ECHIDNIDÆ.

- (1) *Echidna aculeata*, var. *typica*.

Order **Carnivora.**

Family CANIDÆ.

(1) *Canis dingo.*

This appears to be universally distributed, occurring in the ranges, on the stony plains, and amongst the sand-hills.

Order **Rodentia.**(1) *Hapalotis mitchelli*, Ogilby. Mitchell's jerboa-rat.

This is the commonest form of jerboa-rat in the central districts, where it forms burrows in the sandy, plain country amongst the scrubs formed by mulga (*Acacia aneura*), desert oak (*Casuarina decaisneana*), and such smaller shrubs as various species of *Eremophila* and *Cassia*. The small entrance to the burrow is not indicated by any mound, but is simply a hole in the earth, sometimes on the open ground, at others close to the root of a shrub and just large enough to admit the body of the animal. The burrow may go down for a depth of three or four feet. In each burrow lives apparently a pair of animals, and when young ones are present a rough nest is formed of cut pieces of grass-stalks. In one burrow we found an adult female with four very young and five larger young ones, evidently two successive broods, and in another an adult female with four large young ones. These numbers indicate the number of young produced at one birth. They are nocturnal in their habits, burrowing in search of food at the bases of shrubs, and can only be obtained by digging during the daytime.

Ogilby,* in speaking of *Hapalotis albipes*, quotes certain remarks of Sir George Grey with regard to the manner in which that species carries its young. The latter writer says :—"The mother has no pouch, but the young attach themselves with the same or even greater tenacity than is observable in the young of Marsupiatæ." Ogilby states that he has failed to elicit any further information, either confirmatory or rebutting, from zoologists on this subject. At all events, in *H. mitchelli* there is no such attachment of the young to the teats, and though the very small young ones were being suckled, the mother, when disturbed, attempted to escape, leaving the young ones behind.

The native name at Charlotte Waters is Ulabaiya.†

Habitat.—South, West, and Central Australia.

* Catalogue of Australian Mammals, Sydney Museum, 1892, p. 115.

† I insert the native names, as these are very useful when collecting amongst the blacks. To secure many animals, especially the burrowing nocturnal forms, the assistance of the blacks is indispensable.

(2) *Hapalotis apicalis*, Gould. The white-tipped jerboa-rat.

This is evidently a comparatively rare form, and is considerably larger in size than *H. mitchelli*.

I am indebted to Mr. Gillen for an adult male and to Mr. Field for an immature male specimen. Both of them came from Alice Springs.

(3) *Hapalotis cervinus*, Gould. Fawn-coloured jerboa-rat.

We did not secure any specimen of this during the Expedition, nor were any to be found some months later during February, 1895, when I again visited Charlotte Waters; but Mr. Byrne kindly sent me down three specimens secured in June and July, 1895, when they had for some reason become plentiful, following upon a good rain season. Mr. Byrne, writing from Charlotte Waters in July, referring to this species, says:—"The jerboa-like rodents are coming from the eastwards, and they almost amount to a plague here," and, writing again in September, says that they have again become so scarce that the blacks have difficulty in securing a specimen.

This migration of rodents in Central Australia appears to be dependent entirely upon the occurrence of good seasons, and with the advent of these is not an uncommon occurrence.

Order Chiroptera.

Family NYCTERIDÆ.

(1) *Megaderma gigas*, Dobson.

Only a single specimen of this was obtained at Alice Springs from a cave in the McDonnell Ranges; subsequently, through the kindness of Mr. F. J. Gillen, I obtained two more. At times they are met with in abundance in this locality, and are evidently confined to the central part of the continent.

Habitat.—Central Queensland and Alice Springs.

(2) *Nyctophilus timoriensis*, Geoffroy.

This is the commonest species of bat, being met with everywhere in the central district.

Habitat.—The Australian region.

Order Marsupialia.

Sub-order DIPROTODONTIA.

Family MACROPODIDÆ.

Sub-family Macropodinae.

(1) *Macropus rufus*, Desmarest. The red kangaroo.

The numbers in which this, as other forms of marsupials, are met with doubtless varies with the seasons and the consequent amount and quality of food available. Mr. Sanger says—"This animal is but rarely seen, and only after a heavy rain, when there is plenty of vegetation for it to feed upon. Towards the confines of the desert it is more numerous." We saw it frequently in small numbers throughout all the plain districts, just as the Euro (*M. robustus*) is met with amongst the ranges. We never saw more than ten or twelve feeding together; amongst these would be two or three large rufous-coloured males, while the rest would be smaller blue-grey females and young ones.

It was seen everywhere in the plains from Mt. Olga, lying south of Lake Amadeus, to the Burt Plains, lying north of the McDonnell Ranges, and in all the intervening country. In a note with regard to the specimens in the British Museum collection, to which the locality of West Australia is attached, Mr. Thomas says that probably this is incorrect, as no other record exists of the occurrence of *M. rufus* there, and Gould states that it is not found west of South Australia. At Mt. Olga we were not very far away from West Australia, and the same class of country, stretches right across into the latter. As *Macropus rufus* is the characteristic kangaroo of this country, there can be no doubt whatever that its range does extend into the inland parts of West Australia.

The following notes refer to two skulls brought back:—The first is that of an "aged" animal from the Horn valley amongst the McDonnell Ranges. The upper incisors have very little enamel-covered portion left. m^1 is worn down to a mere shell. No transverse anterior ridge is left in m^1 or m^2 . In m^3 the anterior transverse ridge is worn down until it shows a union in the middle with the large ridge behind.

In the lower jaw m^1 is very small and nearly worn away. The left anterior palatal foramen is 15.5 mm. long, the right foramen is only 11 mm., showing thus a difference of 4.5 mm. in length between the two.

Nasals.—Greatest length, 72 mm.; least combined width (in middle), 18 mm.; greatest combined width (at the posterior end), 28 mm.

The second specimen is that of an "adult" animal from Ayers Rock. The fourth molar in each jaw is not yet completely cut through. In the upper jaw the space between the roots of i^1 on each side is 5 mm. The enamel-covered part of i^2 is 9 mm. high and 5 mm. broad. The antero-posterior dimension of i^3 is 9.5 mm. There is a fairly well-marked single groove. There are no central connecting ridges to the anterior transverse ridges of the molars.

The anterior palatal foramina measure 13 mm. in length, reaching well back to the suture between the maxillæ and premaxillæ. The greatest length of the nasals is 70 mm.; least combined width (in middle), 15 mm.; greatest combined width (at the posterior end), 34.25 mm.

The colour markings of the animal agree with those of *M. rufus*, to which the animal may be undoubtedly referred. The molar teeth, as seen in the "adult" specimen are those characteristic of the species, with which they also agree in the length of the anterior palatal foramina. i^3 is longer than the same tooth in the typical *M. rufus*, and more resembles that of *M. giganteus*, though in the presence of only one notch it still more closely resembles that described in *M. antilopinus*.

The most important difference which they show when compared with the typical skull dimensions, as given by Mr. Thomas, is in regard to the nasals.

In *M. rufus* these are described as "very long, narrow, parallel-sided, their middle width going from 4 to $4\frac{1}{2}$ times into their length." In *M. giganteus* the nasals are described as "broadening behind." The dimensions given above show that the relation between the least width and the length of the nasals is that given by Mr. Thomas, but that there is a most marked broadening behind, and, further, that there is a great difference in this respect between the two specimens. In the second the posterior is more than twice the median width.

Evidently there are, as shown in the case of i^3 , the anterior palatal foramina and the nasals considerable variations to be found within the limits of the species, and it may not be at all unlikely that such forms as *M. antilopinus*, *M. isabellinus*, and *M. magnus* will turn out to be simply varieties of the form *M. rufus*, which is widely distributed through the central parts of the continent.

Habitat.—The inland parts of New South Wales and South Australia, and the whole central area from the south of Lake Amadeus to the Burt Plains north of the McDonnell Ranges. As stated above, there can be no doubt but that its range extends across the desert into West Australia.

(2) *Macropus robustus*, Gould. The Euro.

This is the "Wallaroo" of Queensland and the inland parts of New South Wales and the "Euro" of South Australia, specimens from which were formerly described as belonging to a distinct species (*M. erubescens*). In the British Museum Catalogue Mr. Thomas says:—"I cannot distinguish specifically the kangaroo described as *M. erubescens*, which seems to be merely a more rufous form of the present species. As to colour, every intermediate gradation appears to occur, and the skulls of the two forms are quite identical. In a general way South Australian specimens belonging to "*erubescens*," and New South Wales ones to "*robustus*," but specimens agreeing with both are often found in one and the same place."

So far as colouration is concerned the Euros of Central Australia are strongly suffused with rufous, and the blacker forms characteristic of the animal known locally in Queensland and New South Wales as the "Wallaroo" do not occur. The intermingling of the two colour varieties referred to by Mr. Thomas must take place somewhere to the east of the central district, the mountain ranges of which are separated by considerable tracts of plain and desert country from the ranges of the eastern parts in which the wallaroo is found.

This species is exclusively confined to the rocky hills, and is apparently never met with in the plain country inhabited by *Macropus rufus*.

The native name is Cünŭla.

Habitat.—Its range is very wide, extending right across the continent from the head of Spencer Gulf to the "far north." On the eastern side of the central area it is found in the inland parts of New South Wales and Queensland. Its western limit is not known, but it certainly extends as far as the western end of the McDonnell Ranges, and probably will be found in all the hill ranges of Central and also inland West Australia.

There is thus in the Eremian region one species of *Macropus* characteristic of the plain country and another of the hills. Both of them are also characteristic forms of the border-land between the former and the Euronotian region into which they do not extend.

(3) *Petrogale lateralis*, Gould. The West Australian rock-wallaby.

This is the common rock-wallaby of the central districts, living among the rocks along with the Euro (*Macropus robustus*).

Of five specimens secured at Paisley Bluff, in the McDonnell Ranges, four were females, and each had a single, fairly-developed young one in the pouch. The teats are four in number. All the specimens seen were of the typical colouration.

In each of six skulls secured at Alice Springs (two "aged," two "adult," and two immature) there is only one premolar present on each side of each jaw. In the "aged" and "adult" specimens it belongs to the permanent and in the immature ones to the milk dentition.

In a young female specimen taken from the pouch, and in which i^3 is just appearing, there is also no trace of any third premolar.

The animal is plentiful in and confined to the rocky ranges, not coming down on to the plains. It is very shy and remarkably agile in its movements amongst the rocks.

Habitat.—It is not, as its popular name implies, by any means confined to West Australia, and is to be met with probably everywhere in the hill country of the central part of Australia. It is certainly to be found amongst the ranges of the central part drained by the Finke and Todd rivers and their tributaries, and was also secured by the Elder Expedition in the Barrow Ranges.

(4) *Lagorchestes conspicillatus*, var. *leichardti*, Gould. The spectacled hare-wallaby.

Though far from uncommon, only one specimen of the continental variety of the spectacled hare-wallaby, known as Leichardt's hare-wallaby, was caught. It was secured in a spring-trap at night amongst sandy country, close to a camp at the base of Mt. Sonder in the McDonnell Ranges. It is apparently (Kreffft) a solitary-living and nocturnal animal, and we never saw it about during the day-time. The fact that during the greater part of our time the thermometer fell at night to a very low temperature, often below freezing-point, will probably account for the fact that nocturnal animals were only rarely to be secured. Unfortunately the skull of the specimen was stolen one night from camp by a dingo, and for purposes of recognising the species only the skin remained. The following are the measurements of the skin, the bones having been left in the legs :—

Length of body and head	...	...	470 mm.
Tail	...	...	400 „
Hind foot	...	...	153 „
Ear	...	...	42 „

The colouration agrees with that of the variety *leichardti*, but it will be seen on comparison with the measurements given by Mr. Thomas* that both the hind-foot and the ear are proportionately considerably longer than in the typical form. At the same time the ear, as in *L. conspicillatus*, is less than one-third the length of the hind-foot.

Habitat.—The range of the variety is usually stated as North Australia, but it certainly occurs in the central districts, and, as Mr. Thomas says, “is probably spread over the whole of Central and North-western tropical Australia.” The southern limit of its range is not known, but it certainly occurs south of the tropics.

Messrs. Stirling and Zietz record *L. hirsutus*, the Western Australian species, amongst the mammals of the Elder Expedition, and Mr. Streich informed them that it appeared to be numerous in the northern parts of the Victoria Desert.

(5) *Onychogale lunata*, Gould. The crescent wallaby.

Two specimens, for which I am indebted to Mr. F. J. Gillen, were caught at Alice Springs. It has been recorded from Central Australia by Sanger,† and was captured in the Everard Ranges during the Elder Expedition.

Sub-family Potoroinæ.

(1) *Bettongia lesueuri*, Quoy and Gaimard.

This is the common sand-hill rat-kangaroo of Central Australia, and is perhaps, judging by the number and size of the excavations which it makes, the most common form of marsupial amongst the sandy plains and sand-hills, where we often saw it during the daytime, dodging with wonderful speed and agility in and out amongst the bushes and tussocks of porcupine grass.

This species seems to be especially a dry-country one.

The native name is Mäl-lä.

Habitat.—We found it during the whole course of the expedition, and there can be no doubt but that it is distributed right across South, Central and West Australia.

Family PHALANGERIDÆ.

Sub-family Phalangerinæ.

(1) *Trichosurus vulpecula*, var. *typicus*, Kerr. The common phalanger.

This common phalanger is very widely distributed, occurring everywhere amongst the eucalypts which border the river-beds.

* British Museum Cat., p. 82.

† Am. Nat., vol. xviii., 1884.

In the skull of a male, in which in the lower jaw the permanent p^4 has carried up the milk p^4 , which still remains as a thin shell forming a cap on the permanent tooth, there is present between i^2 and p^4 on the left side a small tooth. Mr. Thomas* says that there is sometimes present in the lower jaw a minute tooth between i^2 and p^4 which probably represents p^3 . In this specimen the tooth in question is separated by a diastema of 1 mm. from i^2 , and by one of 2 mm. from p^4 , so that presumably it indicates a tooth anterior to p^3 . In the upper jaw the single tooth present between the canine and p^4 is separated from the former by a diastema of 1 mm., and from the latter by one of 3.5 mm.

In a second skull—that of a mature female—in the upper jaw there is on each side a diastema of 3.5 mm. between i^3 and the canine, of 3 mm. between the latter and the small tooth (p^1 ?), and of slightly less than 3 mm. between the latter and p^4 .

The native name is Wi-ōta.

Sub-order POLYPROTODONTIA.

Family PERAMELIDÆ.†

(1) *Peragale lagotis*, Reid. The rabbit-bandicoot.

This is not uncommon, judging by the number of tails used by the natives as ornaments. They tie the white terminal tufts together in bundles of from twelve to twenty.

It is to be found wherever the ground is suitable for its burrows.

The native name (Charlotte Waters) of the animal is Urgătă and of the tail Alpeeta.

Range.—Central, South and West Australia.

(2) *Charopus castanotis*, Gray. The pig-footed bandicoot.

At the present time this is one of the most difficult of the smaller marsupials to secure. It is known to the natives by the name of "Dubaija," but during the expedition we were unable to secure a single specimen. On a subsequent visit to Charlotte Waters I was fortunate enough to obtain one secured by the blacks.

The dorsal surface, as in Western Australian specimens, is of a light, almost orange-brown, colour; the ventral surface is light fawn colour.

* Brit. Mus. Cat., p. 186.

† Since this was printed I have received from Mr. Byrne a species of *Perameles* and specimens indicating the existence of another species of *Peragale*, of smaller size than *P. lagotis* and of a darker colour.

The tail is considerably more than half as long as the body, with a terminal crest which, on the dorsal side, commences at about 70 mm. from the tip. At first the hairs of the crest are of a dark brown colour, but at the tip, where they measure 22 mm. in length, they are white. On the ventral surface there is also a smaller crest of white hairs, commencing at about 30 mm. from the tip and reaching a length of 12 mm.

The mammae as described are eight in number.

DIMENSIONS OF FEMALE (in al.).

Head and body	...	...	...	230 mm.
Tail	...	...	...	139 „
Muzzle to eye	...	...	...	34 „
Hind foot	...	...	...	69 „
Ear	...	...	...	54 „

Habitat.—The inland parts of Victoria and New South Wales, South and West Australia, and Central Australia. In the British Museum Catalogue the locality of Northern Territory is queried. There is no doubt but that the range of the animal extends widely over the central area. In the Adelaide Museum is a specimen from Barrow Creek, which lies well within the tropics, and throughout the whole of our expedition all the natives were well acquainted with it. My specimen was dug out of a hole in a sandy plain by a native black woman. Mr. Lydekker* has given an account of its habits derived from notes by Mitchell and Krefft. It appears to have been at one time fairly common in such parts as the Murray district, but is now very difficult to find, and is evidently rapidly becoming extinct, except perhaps in the more central districts.

Chœropus is, again, one of the border-land forms of marsupials and not found in the Euronotian region.

Note.—In August I received from Mr. Byrne a female with two well-developed young in the pouch. These, judging from their size, must have been born not less than a month, probably the breeding-time was near to the end of June, though the date most likely varies to a certain extent with the nature of the seasons. This specimen was captured at Charlotte Waters, and is of considerably darker colour than the one described above.

* Marsupials and Monotremes, p. 147.

Family DASYURIDÆ.

Sub-family Dasyurinae.

(1) *Phascologale cristicauda*, Krefft. The crest-tailed Phascologale.

(Plate I., Figs. 1a, 1b. Plate IV., Figs. 5, 6, 7, 8).

The exact determination of this species is a matter of considerable difficulty. Through the kindness of Mr. Byrne I received some six adult and four immature specimens of what was apparently a species of *Phascologale* from Charlotte Waters, though at the same time it showed in the structure of the foot more the character of a *Sminthopsis*, rendering it a matter of some difficulty to which genus, as at present defined, it should be referred. All the specimens were females, half of them with young ones attached to the teats. On a subsequent visit to the same district I obtained, also through the kindness of Mr. Byrne, additional specimens, two of them being males. The latter are much less numerous than the females, and much more difficult to find. The blacks state that the male is never found in the same burrow with the female when the latter has young, but that they return later on. This may or may not be so, but blacks' statements on matters of natural and other history must be accepted with reserve, as they are not devoid of imagination or at all incapable of inventing an ingenious excuse to account for failures of capture.

All the specimens secured agreed fairly closely in size (that is, the adults) with the measurements given by Mr. Krefft for his single specimen of *Chaetocercus cristicauda*. The dentition showed the peculiarity of the latter in that the lower p^4 was always absent, its position being indicated by a slight diastema. In addition, the upper p^4 is also absent in the great majority of specimens. In the young ones it is never or very rarely present; in the adult form it is at most tubercular in shape, and generally wanting or present on one side only. Apparently there is no milk premolar. Mr. Krefft says:—"The third and last premolar of the upper jaw is very diminutive and tubercular."*

In relative dimensions the hind feet may be regarded as intermediate between those of a typical *Phascologale* and *Sminthopsis*. The footpads of the hind feet differ from those characteristic of the former in that the five typical striated pads are wanting. At the base of the toes are three granulated elevations, much as, for example, in *Sminthopsis murina*, each bearing an unstriated pad formed by the coalescence of certain of the granulations, but of regular form.

* "Mammals of Australia."

Unfortunately the foot-pads were not recorded by Mr. Krefft.

The black crest typical of the tail of *Ph. cristicauda* was present, but differed from that described by Krefft in being developed on the ventral as well as on the dorsal surface.

The peculiarity of the dentition, the crested tail, and the general measurements of the body led me to refer the animal to Krefft's species.

Mr. J. J. Fletcher very kindly, in response to my request, inspected and sent me a description of the type specimen, and subsequently, through the courtesy of Mr. R. Etheridge, jun., the curator of the Sydney Museum, to whose kindness I am much indebted, I had the opportunity of examining the specimen itself.

Unfortunately, as Krefft stated, the original, which came from "South Australia, probably the neighbourhood of Lake Alexandrina,"* was in a bad state of preservation when received. Very little could be made of it as a mounted specimen, and the taxidermist of that time (as Mr. Etheridge is also of opinion) evidently endeavoured to make amends for the lack of fur by inserting patches borrowed from some other beast of as nearly as possible the same colour and texture, but the result is not a success. There is, however, enough of the original fur and animal remaining to show that the figure† given by Krefft is exceedingly unsatisfactory.

The mounted specimen is nothing like so rufous in colour as the drawing represents, and has, moreover, a distinctly lighter under-surface. To replace the lost fur the taxidermist chose a more mouse-coloured one. In the plate (presumably drawn from the specimen or from notes provided by Mr. Krefft) the head is shown as flattened after the manner of a *Phascogale*; in the stuffed specimen it is distinctly rounded. The ear in the figure is too small. The tail of the mounted specimen is much more swollen out at the base than is represented in the figure, and has the appearance of being incrassate during life.‡ The most curious feature in regard to the tail, however, is the presence of black hairs forming a crest (they are matted together, but can be clearly seen) on the under-surface of the tip. These are neither mentioned in the description nor drawn in the figure, where the tail is most inaccurately represented, both in regard to the crest and general shape.

* Krefft: "Mammals of Australia." The pagination of this volume is irregular, and so cannot be referred to.

† P.Z.S., 1866, pl. 36.

‡ The original description and the figure given in the P.Z.S., 1866, differ somewhat from the description given by Krefft in his "Mammals of Australia." In the latter he says—"Tail thick, with compressed sides, ornamented by a crest of hair on the apical half, similar to the tail of the pig-footed bandicoot." It can only be said, in reference to this, that neither in the figure nor in the actual specimen itself is the tail like that of *Chaeropus castanotis*.

So far as I can judge, the tail of the specimen when received by Mr. Krefft must have been very similar to that of certain of the least well-preserved specimens received by myself from the central district, where the heat is so great that, if the animal (as frequently happens of necessity) cannot be placed in spirits directly after capture, the skin rots and the fur comes out. How bad the skin of Mr. Krefft's specimen must have been is shown by the fact that one hind-foot now measures 18 and the other 24 mm. The nature of the pads cannot unfortunately be determined.

Under the circumstances detailed above—an originally badly-preserved type specimen, a drawing which could not in certain respects (as to the tail and colouration) have fairly represented the animal, and a description which is not only far from complete but is incorrect—there is considerable difficulty in assigning with certainty any newly-found specimens to the species in question.

We have, however, the dimensions given by Mr. Krefft, the corrections in the description of the animal as to colour and form of the tail and its crest, which can be made after inspection of the type specimen, and the peculiarity noted in the dentition by Mr. Krefft.

A re-description, taking all these points into consideration, would apply so closely to the specimens recently obtained from Central Australia, that I have thought it better to amend the description as given by Mr. Krefft, and to place my specimens in the same species rather than to create a new one for their reception.

The amended description will read as follows:—

Phascologale cristicauda, Krefft.

Size large. Form strong. Fur close and soft, mainly composed of the under fur.

The general body colour is mouse-grey tinged with rufous on the back. The under surface is white or cream-coloured, and so are the inner and anterior faces of the limbs and the upper surfaces of the hands and feet. The under-fur on the back is slate-grey at the base and rufous terminally; on the ventral surface it is cream-white terminally.

The tail is thickly covered in its proximal half on the upper and lateral surfaces with coarse, chestnut-coloured hairs; on the ventral aspect the hairs are dark brown in colour. About the middle of its length it is covered with coarse black hairs, which increase in length distally on the upper and under surface until,

especially on the upper surface, they form a distinct black crest, a smaller crest being present on the under-surface.* The tail is considerably swollen out proximally and somewhat incrassated, though the incrassation is hidden by the body hairs, which pass on to the root of the tail.

Ear when laid forward reaching to the posterior border of the eye. They are covered internally and externally with short, stiff hairs.

The eye is surrounded by a light ring of hairs.

Hairs on the fold of the pouch and in the pouch-area, where they are scanty, are white.

Hands and feet white or light grey above. Palms with six granulated elevations, each with a small unstriated pad.

There is a small tuft of white, whisker-like hairs on the posterior side of the fore-arm just above the wrist.

Soles of feet with three granulated elevations at the base of the toes, each with a small unstriated pad. The soles are hairy in the heel region and have a series of thick-set, strong hairs running along the outer and inner margins and bending over on to the under-surface, only the median part of which, so far back as the heel, is really naked. The median part is strongly granulated.

Pouch opening vertically downwards, with moderately-developed lateral folds.

Mammæ eight (may be reduced to six or rarely four).

DIMENSIONS.

	Mr. Krefft's Specimen.	Adult ♂ in al.	Adult ♀ in al.
Head and Body	121	148	130
Tail	83	89	85
Ear	—	15.5	15.5
Hind-foot, length	28	26	28

Dentition *i.* $\frac{1.2.3.4}{1.2.3}$ *c.* $\frac{1}{1}$ *p.m.* $\frac{1.0.3.4}{1.0.3.0}$ *m.* $\frac{1.2.3.4}{1.2.3.4}$

* This description of the tail, though considerably different from that given by Krefft, will still apply to his specimen, as he seems to have quite overlooked the small crest present on the under-surface.

In the upper jaw the first incisor is larger than the other three, and is separated from them by a diastema. The canine is large and strong and measures 3 mm. or even slightly more in length. P^3 is larger than p^1 , and p^4 , if present at all, is minute and tubercular and usually absent.

In the lower jaw the three incisors of each side are sub-equal, close together and to the canine, which is strong and measures 2.5 m.m. in height. P^1 is quite wanting, and p^3 often lies close against m^1 or is separated from it by a slight diastema.

The following are the dimensions of the skull of an adult female :—

Basal length	...	...	...	...	34.5
Greatest breadth	...	...	...	...	23.5
Nasals, length	...	...	..	...	12
,, greatest breadth	...	...	...	...	5
,, least breadth	...	...	...	...	2.5
Intertemporal breadth	...	...	...	...	7
Palate, length	...	...	...	...	18
,, breadth between outer corners of m^3	...	...	...	...	11
Palatal foramen	...	...	...	...	5
Basi-cranial axis	...	...	...	...	14
Basi-facial axis	...	...	...	...	20
Facial index	...	...	...	...	142.8
Teeth, horizontal length of p^4	...	...	...	...	1
,, length ms^{1-3}	...	...	...	...	7.5
,, breadth m^4	...	...	...	...	2

Habitat.—South and Central Australia. Mr. Krefft's specimen probably came from Lake Alexandrina, though the exact locality is doubtful, mine from Charlotte Waters, Central Australia, with the exception of two immature males kindly sent to me by Mr. E. C. Cowle, who procured them at Illamurta, in the James Range. To Messrs. Byrne and Cowle I am much indebted for their valuable assistance in securing specimens of this rare and interesting species.

The native name is Amperta.

The animal lives in burrows, which it lines with grass, in sandy and stony table-lands, thus forming another exception to the usual statement that the members of the genus Phascologale are exclusively arboreal.*

* *cf.* The description of *Ph. macdonnellensis*, an undoubted Phascologale.

The above will serve to define the species. It will be seen that in one important point, viz., the absence of the five striated pads upon the sole of the hind-foot, *Ph. cristicauda* differs from the other species referred to the genus; and if this character be insisted upon as essential, then it must be removed from the genus. On the other hand, the dentition, general form of the body, and the characters of the skull (especially in respect to the nasal bones and the swollen bullæ) are distinctly those of a Phascologale rather than a *Sminthopsis*. *Ph. cristicauda* may be best regarded perhaps as a form intermediate between the genera Phascologale and *Sminthopsis*, and as showing in its dentition, together with such other forms as *Ph. apicalis* and *Dasyuroides byrnei*, an approach towards the genus *Dasyurus*.

The following are the dimensions of twenty of the specimens in my collection, which will serve to give some idea of the individual variations in this respect:—

———		Head and Body.	Tail.	Ear.	Hind-foot.
Specimen <i>a</i> , mature	♀	125	93	14	26
Specimen <i>b</i> , mature	♀	130	85	15·5	28
Specimen <i>c</i> , mature	♀	130	85	14	26
Specimen <i>d</i> , mature	♀	130	86	15	26
Specimen <i>e</i> , mature	♀	135	84	17	27
Specimen <i>f</i> , mature	♀	—	88	—	27
Specimen <i>g</i> , mature	♀	135	88	18 ?	26
Specimen <i>h</i> , small immature	♂	91	67	15	22·5
Specimen <i>i</i> , mature	♀	135	86	15	26
Specimen <i>k</i> , immature	♀	86	51	12	20·5
Specimen <i>l</i> , mature	♂	144	93	15	28
Specimen <i>m</i> , mature	♂	136	83	14	27
Specimen <i>n</i> , not quite mature	♀	128	89	14·5	27
Specimen <i>o</i> , not quite mature	♀	132	85	14·7	25
Specimen <i>p</i> , mature	♀	—	—	—	26·5
Specimen <i>q</i> , mature	♀	138	86	13·5	25
Specimen <i>r</i> , mature	♂	148	89	15·5	26
Specimen <i>s</i> , mature	♀	170	98	16	30·5
Specimen <i>t</i> , mature	♂	220	126	18	35
Specimen <i>u</i> , mature	♀	168	110	17	30·5

The width of the foot in specimen *d* is 7·2 mm., in specimen *t* is 10 mm., and in specimen *u* is 8 mm.

Two points will be noticed : first, that the males (which are much rarer than the females) are larger than the latter, and, secondly, that there are somewhat remarkable variations in the size of individual specimens.

The smallest mature male measures 136 mm. (head and body) in length, the largest 220 mm.

The smallest mature female measures 125 mm., the largest 170 mm. That the smaller one is mature is proved by the fact that it is actually carrying young attached to the teats.

Apart from size, and a curious point with regard to the number of mammae, the larger agree precisely with the smaller ones, and it may be noticed that the three large ones were secured in June, after six months of very good season, whilst the rest were all secured at earlier dates. Dependent as these Central Australian animals are to a large extent upon the nature of the season for their food, it is possible that they attain full size at very varying periods of life, and that an animal reared during a successive series of bad seasons, and consequent dearth of food, may never attain the full size characteristic of the species, though at the same time it may bear young ones.

A still more remarkable feature is to be noticed with regard to the number of mammae.

In ten specimens the number is six, in three eight are present, and in one only four.

In no case are there more than four to which, judging by their size, young ones have been attached ; in specimen *g*, with only four, these are all of large size, and have evidently recently had young attached.

In specimen *f* there are indications of two very small anterior mammae in addition to the usual six ; whilst in specimens *s* and *u* eight are present, all small in size, as the animals were captured some months after the breeding season.

Evidently the number of young produced at a birth is undergoing diminution, though whether this be a temporary or permanent reduction it is impossible to say. It is, however, worth noting that in both the large females caught after some months of exceptionally good season all eight mammae are equally developed. In two or three of those with only six, it is evidently the most anterior pair which have undergone retrogression. Possibly, as said above, two or three successive bad seasons, such as had actually occurred prior to the capture of the majority of the specimens, may have a very important direct influence upon the development of the body.

It is difficult, unless actually seen, to realise the different conditions of environment consequent in Central Australia upon good or bad seasons. In the latter all is dead, dry, and sterile, scarcely an insect, save ants, to be seen; in the former, everything is green and flourishing—flowers, insects, and animals of all kinds become abundant.

We know that in the case of crustacea, such as *Estheria* and *Apus*, and amongst the frogs, very rapid growth takes place, so that the animals are enabled to take advantage of a good season directly it comes. Possibly the same is true of the smaller mammals. They cannot aestivate like the frogs do, but in all likelihood they have the power of very rapid growth if conditions be favourable, when, and only when, they will reach their full state of development.

In addition to those of which the dimensions are given, I have, amongst others, four young ones, three females and one male. These were captured, together with females with young attached to the mammae, in November and December, which is evidently a breeding time. The four larger young ones belong to the previous breeding season, and cannot be many months old.

In no specimen, mature or immature, is there any trace of a lower p^4 . In the lower jaw there is a slight and in the upper (when p^4 is wanting) a larger diastema between p^3 and m^1 .

The only specimens in which the upper p^4 can be seen are (1) specimen *c*, in which it is present, very small and tubercular in shape, on the left side only; (2) specimen *h*, in which it can be just seen on each side; (3) specimen *k*, in which it is present on each side as a small tubercle; (4) specimen *l*, in which it is present in the same condition; (5) specimen *m*, in which it is very minute and pushed out to the side of the jaw.

In this species the lower p^4 has evidently been completely lost; there is no milk upper p^4 to be seen, and the permanent tooth is evidently gradually disappearing, the result being a close approximation, so far as numbers are concerned, to the dentition which is characteristic of the genus *Dasyurus*.

There is also considerable variation in the size of the hallux, which in specimen *p* is very small.

Note.—Since the above was written I have received additional specimens through the kindness of Messrs. Gillen and Byrne. *In each of four large females eight mammae are present, and young have evidently been attached to all of them.* In another somewhat smaller specimen seven mammae are present, four on the left

and three on the right side, and three embryos are attached on each side, the remaining mammæ being small and evidently not recently used. In four smaller one six mammæ are present, three on each side, and two embryos have been attached on each side. It is the anterior mammæ which have disappeared.

(2) *Phascologale macdonnellensis*, Spencer.* The fat-tailed Phascologale.

(Plate II., Figs. 1, 1a, 1b, 1c. Plate IV., Figs. 9, 10, 11, 12).

Size medium, the fur moderately coarse. The general colour of the back is dull greyish-brown, with a well-marked chestnut patch behind each ear. The ventral surface is grey. There is a light line above and below the eye. A light line runs along the upper jaw, and is continuous at the angle of the jaw with the white ventral surface of the head and lower jaw.

Ears rounded; clothed inside and out with short, light-coloured hairs; reaching, when laid forward, to the middle or close to the anterior end of the eye. Hands and feet grey above.

Palms with six striated pads; the proximal half of the pollical pad curved, with the concavity facing inwards; the proximal outer pad V-shaped, with the apex pointing towards the fingers, the inner leg of the V being very slightly longer than the outer.

There is a small tuft of white, whisker-like hairs placed on the posterior side of the fore-arm, just above the wrist.

Soles naked except under the heel, where they are hairy; granulated; the hallucal pad divided into two; hallux reaching slightly further forward than the proximal end of the anterior pad of its side. Pads six in all and distinctly striated.

Tail shorter than head and body; notably stout for its proximal half; tapering rapidly at about the middle of its length, and from this gradually to the tip; markedly incrassate; covered with fairly-long stiff hairs, but with no crest. In colour somewhat lighter than the body, the ventral being somewhat lighter than the dorsal surface.

Pouch only slightly developed, opening vertically downwards. Two lateral folds of skin; within the pouch area the hairs are comparatively scanty and light-coloured throughout; external to the pouch area the hairs are dark-coloured for their basal two-thirds, the pouch area being thus clearly marked out, and the folds being doubtless more developed when young are present.

* Proceedings Royal Society Victoria.

Mammæ six ; three on each side.

Fur composed of larger coarse hairs ; the lower half slate-grey, the upper half dark brown and projecting beyond the under-fur.

Under-fur composed of finer hairs, slate-grey in their lower half, merging into lighter grey and then light brown at the extremity.

On the tail all the hairs are stiff, the majority being light brown ; a smaller number scattered about are dark brown at the base, succeeded by a lighter band and then by a dark tip.

Under the jaw the hairs are white, with a dark brown basal portion ; the hairs not being very close together, the dark bases show clearly. On and behind the pectoral region ventrally the hairs (under-fur) are close together ; all are slate-grey in the proximal and white in the distal half, giving a general grey appearance, which merges into brown at the sides of the body.

DIMENSIONS.

	(a) Adult ♀ in al.	(b) Adult ♂ in al.	(c) Adult ♂ in al.	(d) Adult ♂ in al.	(e) Adult ♀ in al.
Head and Body - - -	92	102	120	104	96
Tail - - - -	77	70	74	72	71
Hind-foot, length - -	14	14	15	15	14
„ „ greatest width -	4	4.2	5	4	5.2
Ear - - - -	13	13	12.5	12	11.2

Dentition *i.* $\frac{1.2.3.4}{1.2.3}$ *c.* $\frac{1}{1}$ *p.m.* $\frac{1.0.3.4}{1.0.3.4}$ *m.* $\frac{1.2.3.4}{1.2.3.4}$

In the upper jaw p^4 is either absent or very minute in each of thirteen specimens examined ; in the lower jaw it is apparently almost always absent. In only one specimen (*d*) is it present, and here it is very minute, and only visible on the right side. It is evidently almost entirely lost, but its presence in this one instance will serve to show the danger of regarding its total absence as determined in a given species until a fair number of specimens have been examined. It is of course possible that it may be yet found in *Phascologale cristicauda* and

Dasyuroides byrnei, but no trace has been found in the numerous specimens yet examined.

Skull somewhat delicately built. Flattened and broadened anteriorly, with the muzzle rather short and conical, as in *Ph. minutissima*. Nasals comparatively little expanded posteriorly. Occipital ridges well developed. A central depression in the region of the posterior ends of the nasals and anterior ends of the frontals. Anterior palatine foramen just reaching to the level of the canines. A pair of large vacuities opposite to the first three molars. Bullæ large and swollen; their mastoid portions much enlarged.

SKULL DIMENSIONS (♀).

Basal length	25
Nasals, length	10
„ greatest width	3
„ least width	2
Intertemporal breadth	5·2
Palate, length	14
„ breadth between outer corners of m^3	9·5
Palatal foramen	2
Basi cranial axis	9
„ facial „	16
Facial index	177·7
Teeth, horizontal length of p^4	minute
„ „ „ „ $m^1—m^3$	6
„ breadth m^4	1·7

Habitat.—Central Australia, Alice Springs. The animal is terrestrial, living in holes amongst rocks and under stones.

The first specimen was secured by Mounted-trooper South, of Alice Springs, and by him presented to Dr. Stirling, for whom it had been intended. Dr. Stirling kindly handed it over to me for description, as officer in charge of the zoological department of the expedition.

Subsequently, whilst staying at the Alice Springs, I was able, through the kindness of Mr. F. J. Gillen, to secure two more specimens, both of them females.

The animal is evidently in the main terrestrial, being captured by the blacks (two specimens also were caught by cats) in holes amongst stones.

Since the first description was written, and in consequence of an exceptionally good season in Central Australia, ten more have been captured, for which I am indebted to Mr. F. J. Gillen and to Mr. J. Field.

Though I have received a large collection of marsupials from Charlotte Waters, yet this species is not included, the reason apparently being that it lives, as Mr. Field informs me, under the large rocks on hill-sides, and is therefore confined to the hill range country further to the north, where, again, species such as *Phascologale cristicauda*, which is frequently found burrowing in the stony plains around Charlotte Waters, does not seem to occur.

The native name is Enoonta Latwinna.

(3) *Phascologale calura*, Gould. The lesser brush-tailed pouched mouse.

This is evidently not a common form in the central district. I am much indebted to Mr. F. J. Gillen for an adult male specimen captured at Alice Springs.

DIMENSIONS, ADULT ♂ (in al.)

Head and body	...	...	...	135 mm.
Tail	...	...	...	147 „
Hind-foot, length	...	...	...	24 „
„ greatest width	...	...	...	7 „
Ear	...	...	...	23 „

Habitat.—South, West, and Central Australia.

(4) *Sminthopsis crassicaudata*, Gould. The fat-tailed pouched mouse.

This is evidently the commonest species of *Sminthopsis* in the central district.

It is a burrowing (?), nocturnal animal, and hence, like most of the smaller marsupials, not easy to catch. In all the specimens in my collection the fur is soft and fine and the general body colour dark grey. On the palm are four granulated elevations at the base of the fingers, on which one of the granulations is larger than the others. On the pollical side is a V-shaped pad, in which, at the hinder end of the inner and longer arm of the V, the granulations may not have completely fused; at the level of the apex of the V, and on the opposite side of the palm, is a small round pad.

The sole has three pads at the base of the toes, without distinctly-striated pads.

The ears, when laid forward, reach (in spirit specimens) at least half way between the anterior end of the eye and the tip of the snout.

The tail varies in length, but is relatively longer than the specimen of which measurements are given in the British Museum Catalogue and than that of mature specimens from the coastal district. It is incrassated and light grey in colour all over, the ventral being little, if any, lighter in colour than the dorsal surface.

The following are the dimensions of eight of the specimens :—

	Specimen <i>a</i> ♀ in al.	Specimen <i>b</i> ♀ in al.	Specimen <i>c</i> ♀ in al.	Specimen <i>d</i> ♀ in al.	Specimen <i>e</i> Immature ♀ in al.	Specimen <i>f</i> ♀ in al.	Specimen <i>g</i> ♂ in al.	Specimen <i>h</i> ♀ in al.
Head and Body -	84	80	85	89	68	91	82	96
Tail - -	71·5	73	69	56*	56	73	75	52
Hind-foot - -	15·5	15·5	16	15·5	15	15	15·5	15
Ear - -	14·5	17	16	15·5	14	19	17	15

* Tip broken off.

In specimen *a* ten mammæ are present, to four of which young ones are attached.

In specimen *b* ten mammæ are present, to five of which embryos are attached.

In specimen *c* ten mammæ are present.

In specimen *d* only six mammæ can be seen, though the animal is mature; these correspond to the anterior three of each side present in the other specimens. Except in regard to this point the specimen is closely similar to the others, and evidently belongs to the same species. It was captured at Charlotte Waters on the same sandy plains in which specimens *a*, *b*, and *c* were caught.

In specimen *f* ten mammæ are present, two on one side and four on the other, having embryos attached. Specimens with embryos attached to the teats were captured in November and December, which are evidently breeding months. Specimen *h** did not come from Central Australia, and its measurements are inserted for comparison with those from the latter district. It will be seen that the tail is proportionately shorter. With the exception of this example, all the

* From the southern part of South Australia. I am indebted for this to Mr. A. Zietz.

above (and also other specimens from Central Australia of which measurements have been made), whilst they agree generally in length of the body with the measurements given in the British Museum Catalogue, vary from these in the uniformly greater length of tail, and the slightly greater length of the hind-foot. In the greatest width of the latter (across the region of the pads at the base of the toes) they are all closely similar, varying only between 2·7 and slightly more than 3 mm. The head is proportionately narrower and longer in all of them than in specimen *h*. There can however be little doubt but that they are all referable to the species *crassicaudata*, and that the greater length of tail, which, however, never exceeds that of the body, and the greater length of the head indicate merely a local variation.

In all specimens there are present a few long whisker-like hairs just above the wrist which point outwards and backwards, and the longest of which measures 12 mm.

Note.—A specimen received in August has ten young ones attached to the teats. These had evidently been produced in July after the occurrence of an exceptionally good season. Under favourable circumstances there are evidently therefore at least two breeding seasons in Central Australia. Females with young attached were secured in November and December, and again after the lapse of six months (during which period, though many were captured, none had young) in July. It may also be noticed that the full number of young were only observed at the close of an exceptionally good season.

(5) *Sminthopsis murina*, Waterhouse. Common pouched mouse.

This species does not appear to be common in the central district, for, although a large number of the closely-allied *S. crassicaudata* have been secured, only two specimens of it were obtained, one at Alice Springs and one at Oodnadatta. Mr. Byrne, who, as will be seen from this report, has collected a very large number of marsupials, and is thoroughly well acquainted with those existing in the Charlotte Waters district, has not as yet met with this species.

The foot is proportionately broader than in *S. crassicaudata*, and the tail is longer than the head and body, and is not incrassated.

The face, as described in *S. murina*, has a darker mark in front of and around the eyes, but the same is also present in all the specimens of *S. crassicaudata*, the colouration of the two species, so far as the Central Australian specimens are concerned, agreeing very closely.

The upper p^4 is notably larger than either p^3 or p^1 .

Sminthopsis murina, var. *constricta*.

At Oodnadatta a specimen was secured—unfortunately only a single one—which in certain respects may be considered as intermediate between *S. murina* and *S. crassicaudata*. The head is shorter and broader than in the specimens of the latter and the tail longer. On the other hand, it is distinctly incrassated, though not so markedly so or so stout as in *S. crassicaudata*.

The foot is proportionately broader than in the latter, measuring 4 mm. across the region of the sole pads, which are fairly well developed, but not striated.

The general colouration is closely similar to that of *S. murina*.

The ears, when laid forward, reach to the anterior canthus of the eye.

There is a small tuft of white, whisker-like hairs on the posterior face of the fore-arm just above the wrist.

It may perhaps, on the whole, be best regarded as a variety of *S. murina*.

DIMENSIONS OF ♀ (in al.)

Head and body	...	...	...	...	71
Tail	...	...	...	...	80
Hind-foot	...	...	...	...	15·5
Greatest width of hind-foot			...	...	4
Ear	...	...	...	...	12·5

(6) *Sminthopsis larapinta*, Spencer.*

(Plate II., Figs. 2, 2a, 2b).

Size small, form light and delicate. Fur very soft and fine, moderately long, composed almost entirely of under-fur with few longer dark hairs.

General colour a mouse-grey, suffused on the dorsal surface with rufous. The sides, under surface of the body and head, and upper surfaces of the hands and feet are white.

Ears large; when laid forward they reach considerably beyond the eye.

Palms naked, granulated. The posterior external pad is V-shaped, with the apex pointing forwards, and is striated.

A small tuft of white, whisker-like hairs is present on the posterior side of the fore-limb, just above the wrist.

* Proc. R.S. Vict., vol. viii. (New Series), p. 8.

Soles granulated anteriorly and in the median part. Four pads present, a small one at the base of the hallux and three larger ones at the base of the toes. The latter are faintly striated.

Tail much longer than body. Very stout in its proximal part and strongly inerassated; very much stouter and more strongly inerassated than in *S. crassicaudata*. Tapering to a long thin end. Strongly scaled, with at the proximal end short hairs, which do not hide the scales. Distally the hairs are more numerous and somewhat longer towards the tip.

$$\text{Dentition } i. \frac{1.2.3.4}{1.2.3}. \quad c. \frac{1}{1}. \quad p.m. \frac{1.0.3.4}{1.0.3.4}. \quad m. \frac{1.2.3.4}{1.2.3.4}.$$

Teeth as usual in the genus. Canines small, and the upper premolars increasing in size backwards.

DIMENSIONS.

	Specimen <i>a</i> .	Specimen <i>b</i> .	Specimen <i>c</i> .
	Adult ♂ in al.	Adult ♂ in al.	Adult ♂ in al.
Head and Body	88	85	95
Tail	105	95	111
Hind-foot	18.2	17.5	18
Ear	14	15	16
Width of Hind-foot	4	3.5	4

Habitat.—Central Australia, Charlotte Waters. Terrestrial; burrowing. Mr. Byrne informs me that this species seems to prefer the stony table-lands, whilst *S. crassicaudata* prefers the softer ground near the creeks and amongst the sand-hills.

The characteristic features of this form are (1) the remarkably long, stout and strongly-inerassated tail, and (2) the relative length and width of the hind-foot.

There is no difficulty in distinguishing the animal from *S. crassicaudata*, which is frequently found in the same district. I have some thirty mature specimens of the latter, which all agree closely with one another in the relative dimensions of the body, and in none of which the tail is as long as the head and body, nor is there any approach to the great widening-out of the proximal portion which forms

such a prominent feature in *S. larapinta*. The greater proportionate length of the foot seems to distinguish it also from both *S. murina* and *S. crassicaudata*.

The general dimensions of the body are more similar to those of *S. leucopus*, but the sole pads are not so markedly striated, and the great swollen tail serves at once to distinguish it from this species.

The specific name is adapted from the native name of the Finke River—the Larapinta—in which district it is found, and for the specimens upon which the species is founded I am indebted to the kindness of Mr. P. M. Byrne.

(7) *Sminthopsis psammophilus*, Spencer.* The sand-hill pouched mouse.

(Plate I., Figs. 2, 2a, 2b.)

Size medium. Fur close, long and fine. Dorsal surface dark grey. Ventral surface of head and body white. A brownish tinge on the thighs. The hairs on the back are of a grey colour basally and darker at their tips. Amongst the long, fine hairs are interspersed on the back long, stiff, darker hairs. On the under surface of the body the hairs are grey in their basal halves and white in their outer halves. On the thigh the white may be replaced by a brown tinge.

The ears are covered back and front with short, stiff, grey hairs.

There is a line of white hairs round the eye.

A small tuft of long, white, bristle-like hairs is placed on the fore-arm just above the wrist.

The hairs of the hands and feet are cream-coloured.

The hairs on the soles reach to the pads, except over a narrow median granulated space stretching backwards from the base of the toes to the hallux.

The tail is covered with short, stiff, whitish hairs dorsally and laterally, and with a well-marked line of black hairs ventrally. The hairs increase slightly in length on the upper and lower surface at the tip, so as to form a slight crest.

The palms are granulated, with six ill-defined elevations, but no striated pads.

The soles are hairy; three pads are present at the base of the toes placed on granulated elevations, but are not striated. The hallux is small, and lies about half-way between the heel and the base of the claws.

The ears are large, reaching half-way between the eye and the tip of the snout.

* Proc. R.S. Vict., vol. vii. (New Series), 1895, p. 222.

The tail is long and thin.

Mammæ and pouch ? (Only a single male specimen was secured).

DIMENSIONS OF MALE (in al.).

Head and body	...	...	..	105
Tail ...	...	...	...	116
(Very tip broken off).				
Ear ...	...	...	...	24.5
Hind-foot	...	...	...	25
Dentition	$i. \frac{1.2.3.4}{1.2.3.}$	$c. \frac{1}{1}$	$p.m. \frac{1.0.3.4}{1.0.3.4}$	$m. \frac{1.2.3.4}{1.2.3.4}$

Habitat.—Central Australia, near Lake Amadeus. Terrestrial, living amongst sand-hills covered with tussocks of porcupine grass (*Triodia irritans*).

Our attention was drawn to the first specimen seen by Mr. E. C. Cowle as we were riding over porcupine sand-hills. It was running about in the daytime from tussock to tussock of grass. A second specimen was seen in the same district, but not captured, and Mr. Cowle has since informed me that he has seen the same animal in the James Range.

Though we only secured the single specimen, there can be no doubt of its specific distinction from other species of the genus.

(8) *Dasyuroides byrnei*, Spencer.* Byrne's pouched mouse.

(Plate III. Plate IV., Figs. 1, 2, 3, 4).

The following is a more complete description of this species, of which the preliminary notice has already appeared.

Size similar to that of the larger species of Phascologale. Form stout and strong. Fur close and soft, mainly composed of the under-fur. General colour a grizzled grey with a faint rufous tinge, especially on the head and back.

Chin, ventral surface, inner sides of limbs and upper surfaces of hands and feet white.

Tail rufous-coloured on rather less than its proximal half, where it is thickly covered with fairly-long hair. The distal half is thickly covered all round with long black hairs, which form a very well-marked dorsal and ventral crest.

* Proc. Royal Soc., vol. viii. (New Series), p. 6.

A small tuft of five or six long white and backwardly-directed, bristle-like hairs is placed on the fore-arm, just above and behind the wrist. One or two of them are longer than the rest (the longest measures 42 mm.), and resemble the face whiskers.

Ears naked above. Laid forward, they reach nearly to the anterior canthus of the eye.

Palms with five well-marked and faintly-striated pads placed on granular elevations.

Hallux absent.

Soles comparatively narrow, with three well-marked pads placed on elevations at the base of the toes; the pads with fairly well-marked striations. The median part of the sole is naked and granulated. Each side has a strongly-marked, close-set series of hairs bending over towards the mid line.

Tail fairly thick, but not incrassated.

Mammæ six. Pouch very slightly developed, with two low lateral folds.

Skull somewhat strongly built. Muzzle short and broad. Greatest breadth of nasals slightly less than once and a half their least breadth.

Inter-orbital space fairly broad, its edges slightly converging backwards, and not forming rudimentary post-orbital processes.

A median depression is present in the region of the posterior part of the nasals and the anterior part of the frontals. Occipital ridges well developed.

Anterior palatine foramen reaching just beyond the level of the front edge of the canines. A pair of large vacuities reaching from the middle of m^1 to the level of m^4 ; a smaller pair of vacuities behind these.

Bullæ very large and rounded; their mastoid portion much inflated.

The following are the skull dimensions:—

Basal length	...	...	...	37·2
Greatest breadth	...	...	..	24·2
Nasals, length...	...	..	...	13·5
„ greatest breadth	...	...	...	4·2
„ least	„	...	...	3
Inter-temporal breadth	...	...	...	8

Palate, length ...	...	...	...	21
„ breadth between outer corners of m^3 ...				12
Basi-erianial axis ...	...	...	...	9.15
Basi-faeial axis ...	...	...	...	23
Facial index ...	...	...	...	153.3
Teeth, horizontal length p^4		...	...	1.2
„ length of ms^{1-3}	...	...	...	9
„ breadth of m^4	...	...	...	3

$$\text{Dentition } i. \frac{1.2.3.4}{1.2.3} \quad c. \frac{1}{1} \quad p.m. \frac{1.0.3.4}{1.0.3.0} \quad m. \frac{1.2.3.4}{1.2.3.4}$$

The dentition is somewhat similar to that of such a Phaseologale as *Ph. apicalis*.

There is a considerable interval in the upper jaw between i^1 and i^2 . The canines are large and strong, that in the upper jaw measuring from 3 to 4 mm. in length, and that in the lower jaw upwards of 3 mm. In the immature form the upper p^4 is absent; in somewhat older specimens it is present and about the same size as p^1 , both of them being smaller than p^3 . The lower p^4 is never present (in seven specimens examined). Presumably there is no milk upper p^4 .

DIMENSIONS.

	a Mature ♂ in al.	b Mature ♀ in al.	c Mature ♂ in al.	d Immature ♂ in al.	e Mature ♂ in al.	f Mature ♂ in al.	g Mature ♂ in al.
Head and Body	182	175	165	125	175	170	166
Tail	130	132	140	100	138	134	131
Ear	18	20	20	16.5	21	23	21
Hind-foot	38	37	39	33	37	37	38

The greatest width of the hind-foot varies between 7.5 and 9 mm.

In general appearance, except in regard to the tail, *Dasyuroides byrnei* presents a strong resemblance to large specimens of *Ph. cristicauda*, but can at once be distinguished by the absence of a hallux. In addition, it is of somewhat larger size and stouter build. Both species have the strongly black-crested tail, rufous-

coloured in its proximal half; but it is not so stout in *D. byrnei* as in *Ph. cristicauda*, nor is it incrassated.

Habitat.—Central Australia. Terrestrial; burrowing; insectivorous. Living in burrows on sandy and stony table-lands. Nocturnal.

My specimens were secured at Charlotte Waters, and I am indebted for them to the kindness of my friend Mr. P. M. Byrne, whose name I have much pleasure in associating with the species. Whilst collecting at Charlotte Waters in February, 1895, I had the opportunity of seeing both *Dasyuroides byrnei* and *Phascologale cristicauda* alive. The superficial resemblance of the two is remarkable, and so striking that even the blackfellows insisted upon the male of the former being that of the latter species, which is rarely found. It was a curious fact that the females of the first and the males of the second were very rare.

As at present defined, this species cannot be placed in either of the genera *Sminthopsis* or *Phascologale*. In certain respects it presents characters at present regarded as distinctive of one or the other, while it differs markedly from both of them in the absence of a hallux. To have associated it with these forms would have meant the merging of the two genera into one another, and the additional widening of the characters so as to include a non-hallucated form. The only other alternative was the creation of a new genus, and I therefore adopted this plan, though it may be pointed out that the genera *Phascologale* and *Sminthopsis* stand in need of revision.

Dasyuroides may be regarded as a genus closely allied to both *Phascologale* and *Sminthopsis*, and serving at the same time as an approach to *Dasyurus*. These relationships are indicated in the following points:—

The general form of the body closely resembles that of the larger *Phascologales* or of a very small *Dasyurus*, and is very different from, that is, much less slender than that of even the largest *Sminthopsis* (*S. virginie*).

The shape of the hind feet is neither that of a *Phascologale* nor of a *Sminthopsis*. Judging merely by the length, the only dimension given in description, it might naturally be supposed that the foot was more or less similar in its proportions to such a form as *Ph. wallacei*, for example. This, however, is far from being the case, as, though the two animals agree in length of body and foot, yet the latter in *D. byrnei* is very much narrower than that of *Ph. wallacei*, and when placed side by side* they are seen to belong to two entirely different types of

* That is, comparing the foot of *D. byrnei* with that of *Ph. wallacei* represented in pl. xxiii. of the Brit. Mus. Cat. of Marsupials and Monotremes, 1888.

feet. On the other hand, while the foot is more similar to that of a *Sminthopsis*, it differs from this in being more stoutly built; whilst, in the absence of hallux, it is markedly distinguished from that of either genus.

The claws are strong, and curved as in *Phascologale*.

The sole of the foot is hairy—more so, indeed, than in many species of *Sminthopsis*.

The pouch is very slightly developed as in *Phascologale*, and the mammae are six in number, and not eight or ten as is usual in *Sminthopsis*.

The skull is flattened in the frontal region as in *Phascologale*; but, on the other hand, it differs from the latter and agrees with *Sminthopsis* in the important character of the nasal bones, which are only very slightly expanded posteriorly.

The dentition, on the contrary, is closely similar to that of a *Phascologale* such as *Ph. apicalis*, in which p^4 in each jaw is disappearing; while in *D. byrnei* it appears to have been lost altogether in the lower jaw. In this respect the latter shows an approach to *Dasyurus*, though not to the same extent as is done by *Ph. cristicauda*.

On the whole, perhaps, in spite of the marked difference in the shape and proportions of the foot, the affinity of *Dasyuroides* is closer with the genus *Phascologale* than with *Sminthopsis*.

(9) *Antechinomys laniger*, Gould. The jerboa pouched mouse.

Of this rare species we only secured two specimens, captured along with several examples of the very common jerboa-rat (*Hapalotis mitchelli*) on the Missionary Plains in the Finke Valley, between the James Range to the south and the McDonnell Ranges to the north. As other writers have before noticed, the figures given by Gould (under the name of *Phascologale lanigera*), are very misleading, both as to form, colour and habitat.

The most striking features of the animal are its slender graceful form and its disproportionately long and thin hind legs. It is purely terrestrial, living in burrows in the sandy plain districts along with countless numbers of *Hapalotis* and a small species of *Mus*.

In general appearance it bears a striking resemblance, both in colour and the form of its body, to *Hapalotis mitchelli*, but is more slender in build.

The two specimens (both males) collected by us are somewhat darker in colour than the one figured by Mr. Alston.*

In addition to the characters usually given it may be noted that along the anterior edge of the ears runs a strongly-marked fringe of long white hairs, 5 mm. in length.

In his work on "Marsupials and Monotremes,"† Mr. Lydekker says, referring to a remark made by Mr. Thomas dealing with the method of progression of *Antechinomys*, "this saltatory mode of progression having been doubtless developed in accordance with the exigencies of the arid sandy country inhabited alike by *Antechinomys* and *Hapalotis*."

Watching the animals in their natural surroundings, it is really somewhat difficult to see what is exactly the advantage gained by such small forms of animals in this saltatory mode of progression. The country in which they usually live is covered with big tussocks of grass and shrubs of various sizes. With a larger animal, such as a kangaroo, it is doubtless an advantage to be able to go straight ahead instead of having to "dodge round" tussocks of grass; but neither the *Hapalotis* nor the *Antechinomys* gain any such advantage, as both are far too small to spring over the grass tussocks, and perhaps the most noticeable point in connection with this matter is that the true mouse, which lives in great numbers in the same part and has not taken on this saltatory method, thrives just as well.

What the small animals, whose chief enemies are birds of prey, appear to need is the power of rapidly gaining the shelter of a shrub or tussock of grass, and there lie so close to one another, that a running animal such as a true mouse can do this as rapidly as a jumping animal such as a *Hapalotis* can, possibly even a little more rapidly, as the run into shelter is a continuous one, whereas, when the *Hapalotis* or *Antechinomys* has taken a jump bringing it close to shelter, there must be a slight pause prior to the final run. A very slight difference in time when a hawk is in pursuit will save or lose the animal its life. Possibly the real advantage in the saltatory method of progression amongst these small forms lies in the greater difficulty of pouncing down upon an animal travelling by leaps and bounds rather than in any advantage gained in the way of speed. So far as travelling over the ground is concerned, a mouse can and does do it just as well as a *Hapalotis*.

It is somewhat curious to notice that two animals so differently organised as *Hapalotis* and *Antechinomys* have taken on the same habit and live side by side, one in large numbers and the other very scarce.

* P.Z.S., 1880.

† Allen's Naturalist's Library, "Marsupials and Monotremes," p. 181.

Since the return of the expedition I have been able, through the kindness of Mr. Byrne, to secure three more specimens, two of them fortunately being females.

The measurements of the five specimens in my possession are as follows :—

	Specimen <i>a</i> .	Specimen <i>b</i> .	Specimen <i>c</i> .	Specimen <i>d</i> .	Specimen <i>e</i> .
	Adult ♂ in al.	Adult ♂ in al.	Adult ♂ in al.	Adult ♀ in al.	Adult ♀ in al.
Head and Body - - -	87	82	95	100	95
Tail - - - -	129	116	138	136	136
Ear - - - -	23	22	19	21	20
Hind-foot - - -	28.5	29	33.	32	31
Muzzle to Eye - - -	15	14	17	16	15
Forearm and Hand - -	33.5	34	36	35.5	34
Heel to front of large sole pad	24	25	28.2	28	26
Lower Leg - - - -	34	34	38	37-	37

Messrs. Thomas,* Lydekker,† and Ogilby‡ state that the number of teats is unknown. Krefft§ says :—“The female has no pouch, and is provided with eight mammae.” In both of specimens *d* and *e*, of which the dimensions are given above, there are six mammae arranged in a circle. There is no trace of a pouch, no folds of any kind being distinguishable, and the whole of the mammary area is thickly covered with hairs. Judging from the dimensions the animals are mature, so that probably the teats are only largely developed during the breeding season.

It does not, however, follow that because the number of teats in the two females above described is six, that therefore Mr. Krefft was wrong in stating that eight are present, as, judging from the variability previously described in the cases of *Phas. cristicauda* and *S. crassicaudata*, the number of teats is evidently subject to variation within the limits of a species.

* British Museum Catalogue p. 310.

‡ “Marsupials and Monotremes,” p. 181.

† Catalogue of Australian Mammals, p. 9.

§ “Mammals of Australia.”

Family NOTORYCTIDÆ.

(1) *Notoryctes typhlops*, Stirling.

This animal is still very rare and difficult to procure, owing to its habits. The blacks say that they can only find it after rain, when the sand is firm enough to allow of its tracks being followed.

Its distribution, so far as is at present known, extends as far south as Charlotte Waters; in all probability it will be found in the sand-hill country over the whole central district and in the similar country in West Australia.

It is probably the single representative of the only family of marsupials confined exclusively to the Eremian region.

A living specimen (which unfortunately died soon after), was, through the kindness of Mr. Ross, secured at Crown Point, on the Finke River. I was not with the party when the animal was brought in, but Dr. Stirling has kindly furnished me with the following notes:—

“The animal was let loose in the sand in the garden. It travelled over the surface pretty quickly, and with a lateral undulatory movement of the body, which was at the same time appressed to the ground. It tried repeatedly to burrow, but was soon stopped by the hard earth which lay beneath the two or three inches of loose surface sand. Eventually it began to make its way into the hard substratum. In burrowing it seems to use its snout to assist in boring its way, and the claws of the fore-paws were used as much for cutting as for scooping; the edge of the large triangular nail of the fifth digit being an efficient instrument for this purpose. The fore-paws work under the body and do not throw the sand outwards. The hind-paws come into play as soon as it gets its body well under the surface, and are used to push back the sand.

“The track when moving on the surface is peculiar and unmistakeable, the tail, being closely appressed to the ground and seeming to form a sort of fulcrum or *point d'appui*, leaves a zig-zag, continuous trail, and on each side of that is a more or less interrupted and confused track made of the paws, which are never lifted but dragged along. The belly also remains in contact with the surface.

“When taken in the hollow of the hand it made no attempt to bite, but worked away with its snout and paws in its unavailing attempts to burrow through the fingers.

“There had been no rain when this animal was caught. It was put into a box of sand, which was wrapped up and kept in a warm place by the fire (weather cold, but not excessively so).

“Next morning the ‘mole’ was evidently *in extremis*, and it died during the forenoon.

“The fur had a singularly soft silky feel and was distinctly iridescent.”

Mr. Byrne, writing to me in September, 1895, says:—“A few days ago I had a *Notoryctes* alive for about twenty-four hours, but he was very weak when brought in and seemed unable to burrow to any depth in the tub of sand into which I put him. He eat one “witchetty,” and once or twice, when everything was quiet, he elevated his head and tail quietly and made a slight chirping noise, which he repeated two or three times, running forward a few steps between each cry. I fancy that fear has a good deal to do with their dying so quickly in captivity, as they are very nervous little animals, and the slightest sound disturbs them and starts them burrowing. When held in the hand they scratch incessantly.”

I have now had more than forty specimens* in my possession, and add here a few notes with regard to certain points. Since Dr. Stirling’s original account was published, further notes have been issued by the latter, and Dr. Gadow has dealt with certain points, such as the teeth, and Professor Wilson has published the first instalment of his detailed account of the musculature. Dr. Stirling and myself are now engaged upon an investigation of certain parts, such as the teeth, fur, and reproductive organs.

Dimensions of the body.—There is comparatively little variation in this respect, and one sex is not decidedly larger than the other, though the longest specimen yet actually measured is a male. The following table relates to twenty of those now in my possession:—

	1	2	3	4	5	6	7	8	9	10
	♀	♀	♀	♂	♂	♂	♂	♂	♀	♂
Length from snout to tip of tail - -	155	155	160	152	151	148	148	158	157	155
Length from anus to tip of tail - -	23·5	21·5	23	24	24	21	22	24	23	24

* To Mr. Byrne I am much indebted for a large number of specimens. The present season appears to have been an exceptionally favourable one for securing this still rare form of marsupial.

	11	12	13	14	15	16	17	18	19	20
	♀	♂	♂	♂	♀	♂	♀	♀	♀	♂
Length from snout to tip of tail - -	145	145	143	155	155	180	152	152	148	170
Length from anus to tip of tail - -	22	24	22	24	22	21	25	23	23.5	26

As Dr. Stirling stated, there is no trace of an external scrotum. Mr. Benham, in notes furnished to Dr. Stirling, said that "the testes of a male are like those of a cat," but in none of the numerous male specimens which we have now examined can any external trace of the testes be detected. The only possible explanation of Mr. Benham's note is that they may be more distinguishable externally just at the breeding season.

Colour.—The colour varies considerably from a light almost silvery tint to a rich chestnut-brown, and an iridescent effect is often noticeable, especially in the live animal.

Fur.—This is long, soft and silky, and consists of (1) very fine hairs equivalent to the under-fur of other marsupials, and (2) much fewer, larger and somewhat flattened hairs.

The fine hairs may be perfectly smooth and thread-like, or, not infrequently, they may have serrated edges. The large hairs are of no greater length than the fine ones, and their presence is not noticed, except the fur be examined with a lens, when they can be distinguished by their usually somewhat darker colour and coarser appearance. Each has a long shaft which swells out into a flattened more expanded portion, and then this suddenly contracts to form a very short pointed free end. The broad flattened out part occupies perhaps half the length of the hair.

The most interesting point, however, is concerned with their arrangement. Sections through the skin at once show that a bunch of fine hairs perhaps, as many as twenty in number, issues from a common follicular opening on the surface, and that to each group of fine hairs corresponds a single large flattened one which passes out through the same opening, and is always placed behind the small hairs.

It is especially interesting to notice this in connection with the descriptions given by Leydig, Poulton and others of the arrangement of the hairs in

Ornithorhynchus, where, from a common follicular opening, issue four bundles of small hairs behind the single large one.

In the first specimen which came into my hands some years ago I was struck with the appearance of a patch of hairs just above the sacral region. They were somewhat darker than the rest and more closely matted together, and conveyed the impression that they might be associated with the presence of a glandular area. Every specimen since examined has shown exactly the same appearance, and sections through this region show that a curious modification of the hairs is present. The groups of follicles run down to a much greater depth than elsewhere, so that in either transverse or longitudinal section the appearance is presented of a pad-like structure about 10 mm. in diameter, which gradually thins off at each side. This pad is made up of the long and very closely-set groups of hair follicles, each group consisting of a large number of fine and a single large flattened hair.

Examination of the hairs shows that the larger ones are somewhat shorter in this part than the fine ones, and that their ends are always broken up into from two to six very slightly divergent stiff, pointed branches. These, as it were, entangle the fine hairs, and so produce the matted appearance.

This modified area is more prominent in dried than spirit specimens, looking in the former like a rather dirty patch where the fur has been pressed down. It is difficult to attach any meaning to its presence, but its constant development would seem to indicate that it must serve some special purpose.

Teeth.—In his paper “On the Systematic Position of *Notoryctes typhlops*”* Dr. Gadow, from the examination of nine specimens, said:—“The full number of teeth seems to be ‘*i.* $\frac{3}{3}$. *c.* $\frac{1}{1}$. *p.m.* $\frac{2}{2}$. *m.* $\frac{4}{4}$,’” The full number of teeth in each jaw according to this being ten.

There is, as Dr. Stirling and Dr. Gadow have pointed out, considerable variation in the number of teeth in front of the molars, which appear to be always four in number in both the upper and lower jaws.

As this question will be more fully dealt with by Dr. Stirling and myself, I will only say here that the full number of teeth in each jaw is eleven, but that in none of the thirty specimens which I have so far examined has there ever been the full number present in both jaws.

* Proc. Zool. Soc. London, May 3, 1892, p. 361.

It was only after examining twenty-nine specimens that one was found in which the full number of incisors was present in the upper jaw, whilst in only a comparatively few specimens an additional premolar was present in the lower jaw, always small and pushed out to the side of the jaw, in front of the first molar. The full dentition so far as at present known is $i. \frac{4}{3}$ $c. \frac{1}{1}$ $p.m. \frac{2}{3}$ $m. \frac{4}{4}$.

In the specimens in which it is present the upper p^4 is implanted immediately in front of the premaxillary suture, and the presence of this tooth serves to eliminate one of the features in which, as recorded by Dr. Gadow (and so far as the material available up to that time existed), *Notoryctes* might be regarded as differing from recent marsupials.

Dr. Gadow remarks that "the most remarkable feature is, however, that the reduction either in numbers above or in size, or in both, is undoubtedly greater in the left mandible than in the right. This fact seems well established, considering that out of the nine specimens examined the left-sided reduction is greater in not less than eight specimens; reduction in size alone in three, in numbers in five specimens. The total number of teeth in the nine right mandibles is eighty-six, in the corresponding left mandibles only seventy-nine. The number of reduced and of absent teeth on the right side is eleven, on the left side nineteen. Such a decided asymmetry is practically unique. I have failed to perceive any corresponding asymmetry in the size of the two mandibles."

I have carefully examined the teeth of a large number of specimens, and give the rough results, so far as numbers are concerned, which are derived from twenty-five of them :—

LEFT UPPER JAW.

Three specimens with 8 teeth each	...	...	24
Six specimens with 9 teeth each	...	...	54
Fifteen specimens with 10 teeth each	...	...	150
One specimen with 11 teeth	...	...	11
Total	...	...	<hr/>239

RIGHT UPPER JAW.

One specimen with 7 teeth	...	...	7
One specimen with 8 teeth	...	...	8
Eight specimens with 9 teeth each	...	...	72
Fifteen specimens with 10 teeth each	...	...	150
Total	...	...	<hr/>237

LEFT LOWER JAW.

One specimen with 7 teeth	...	...	...	7
Five specimens with 8 teeth each	...	...	...	40
Nine specimens with 9 teeth each	...	...	...	81
Nine specimens with 10 teeth each	...	...	...	90
One specimen with 11 teeth	...	...	...	11
				<hr/>
Total	...	...	...	229

RIGHT LOWER JAW.

One specimen with 5 teeth	...	...	...	5
Six specimens with 8 teeth	...	...	...	48
Eight specimens with 9 teeth	...	...	...	72
Nine specimens with 10 teeth	...	...	...	90
One specimen with 11 teeth	...	...	...	11
				<hr/>
Total	...	...	...	226

If we take into account the fact that one specimen included in the above is very old, and that on one side of the lower jaw all the teeth have dropped out in front of the large premolar, whilst two remain on the other side, it will be seen that there is scarcely any discrepancy between the numbers of teeth developed so far as the total is concerned. There is, however, a very considerable amount of variation present in different individuals, both with regard to the number and also the form of the teeth in front of the large premolar.

The pouch.—This varies very much according to the time of year at which the animal is caught; and judging from the examination of a considerable number of female specimens caught at various times, I think that the breeding season will be found to be in or about November.

The largest pouch present (in a specimen captured in January) measured from its very posterior to its anterior end 17·5 mm., though the portion enclosed by the ventral wall measured 9 mm. The opening is thus an elongate, backwardly-sloping one. The greatest width of the pouch was 12 mm. and the depth 8 mm. It is divided into two halves by a ridge on the abdominal wall, in such a way that at the anterior end two lateral bays are completely separated off from each other for a short distance. Two mammary elevations, placed one at the commencement of each lateral bay, are present of considerable size, and (after the animal had

been preserved in alcohol) they are hard, smooth and white, with a very distinct little brown nipple at the apex of each. They are in appearance very unlike the mammæ of other marsupials; so much so, that until we examined them closely, Mr. Byrne and myself both thought that they were the smooth naked bodies of small pouch embryos attached to the teat, and that the little brown nipple was the minute tail.

The most curious point, however, in regard to the pouch is that, in examining thirty specimens, eight of them showed what I took at first to be the commencement of the development of the pouch, which varies considerably in size in the female. Though the indentation of the skin was slight, it was at once recognisable when the thick hairs covering the abdomen were pushed to the sides so as to leave the middle line relatively bare. It lies about 8 mm. in front of the anus—just the right position for a minute pouch—and has, moreover, a few very dark brown hairs arising from the indentation, exactly such as are present in the well-developed pouch of the female.

Dissection of two of the animals proved at once that they were males, so that in *Notoryctes* *there may be developed the rudiment of a pouch in the male.*

Marsupial bones.—In the original description of *Notoryctes*, drawn up from specimens which were not in a good state of preservation, these were described as small nodules in the tendon of the external oblique muscles of the abdomen. In three of my specimens in a good state of preservation, which have been examined, the marsupial bones are well developed, each is 4·5 mm. in length, and they diverge as usual from the anterior border of the pubic symphysis.

Reproductive organs.—From the examination of female specimens, in which the pouch is well developed and shows two mammæ (as already described by Dr. Stirling), we have been able to determine the structure of the reproductive organs. The only satisfactory way of doing this is by means of serial sections, which show that they are formed in a typical marsupial manner, with two lateral vaginae. The median canal is closed, and the structure of the organs is closely similar to that of *Hypsiprymodon*.

So far as the reproductive organs are concerned, they show, as every other organ of the body does, that *Notoryctes* is merely a marsupial modified so as to adopt the burrowing habit. It is in no manner whatever an intermediate form between Monotremes and Marsupials.

Notoryctes, though essentially a burrowing animal like the European mole, differs from the latter in not forming a permanent burrow; that is, it has no

“run” such as the European mole constructs, though, at the same time, it is quite probable and, in fact, almost certain that it burrows deep down into the more solid ground, and there, during the breeding time, the female probably remains. When in search of food, it must make its way through the surface sand, which is much too loose to allow of a permanent burrow being formed.

There is some doubt as to the nature of its food. It has been stated that ants attack *Notoryctes* rather than *vice versa*. In one of the earlier specimens which came into my possession there were certainly a number of ants, or rather the remains of these, clinging to the fur. The stomach of the same specimen contained the remains of ants and also the hard “shells” of ant eggs. It is really very difficult to see how any ant could annoy *Notoryctes*. The fur is so thick, close and fine that no ordinary ant could do more than get entangled amongst it, whilst, where the hair is absent, the surface is encased in a leathery integument.

Mr. Bishop, of Idracowra, to whom Dr. Stirling has previously expressed his indebtedness, found that *Notoryctes* would feed upon the larval form of a beetle commonly known as “witchetty.”

I think there can be no doubt but that *Notoryctes* will feed upon anything available in the way of insects or insect larvæ with which it comes in contact; but, on the other hand, I do not think it likely that its normal food is the “witchetty.”

The latter lives, when found amongst the sand-hills, in the roots of certain plants, such as Acacias and Cassias, and the teeth of *Notoryctes* are not such as to fit it for gnawing. On the other hand, when it is travelling, and presumably in search of food, *Notoryctes* moves along in the sand near to the surface, where in Central Australia it is quite certain to come in contact with ant-nests.

There are amongst the marsupials of Central Australia two which are especially fitted to prey upon ants. One, *Myrmecobius*, has become modified, with its long tongue, to feed upon them above-ground, and the other, *Notoryctes*, has become modified to feed upon them and their eggs and larvæ under-ground.

The great degeneration of the eye in *Notoryctes* is associated also with its habits. It is difficult to understand how any animal which lives under the conditions in which *Notoryctes* does could have preserved eyes exposed on the surface of the head.

The fine grains of the sand through which it burrows would have been a fruitful source of irritation, resulting constantly in the production of inflammation, and more than counterbalancing the advantage to be gained from the possession of eyes when it did come to the surface, for it must be remembered that *Notoryctes* is in reality more a surface animal than the European mole.

The only way in which the blacks capture it is by accidentally finding it on the surface after tracking it up on the damp sand, which shows that it normally spends a part of its time above-ground.

As yet, unfortunately, we know nothing of the development, no embryos having been found in the pouch, so that even the conditions of the newly-born young with regard to the eyes is unknown.

Order Monotremata.

Family ECHIDNIDÆ.

(1) *Echidna aculeata*, var. *typica*, Shaw.

Despite the arid nature of the country, the rocky and scrubby hills of Central Australia, abounding with ant-nests, are not unsuited to the Echidna, and it has apparently a wide distribution. The northern specimens, from the neighbourhood of Barrow Creek, are said to be very small in size; but the southern ones, caught on the desert sandstone hills near Charlotte Waters, are only perhaps a little smaller than the average mainland form.* The only difference between them and the typical form lies in the fact that they are considerably lighter in colour. The hair, instead of being deep brown or black, is yellowish brown—lighter than in the Tasmanian variety; while the spine tips are a not very dark brown instead of black.

DESCRIPTION OF PLATES.

PLATE I.

- Fig. 1.—*Phascologale cristicauda*. Female. Life size. 1a hand × 1. 1b foot × 1.
 ,, 2.—*Sminthopsis psammophilus*. Male. Life size. 2a hand × 2. 2b foot × 2.

* It is usually stated (*vide* British Museum Catalogue, p. 381) that the Tasmanian variety is of a size "averaging larger than in the typical variety." This is by no means true, as Queensland specimens are considerably larger than the Tasmanian form, whilst Victorian ones are quite as large.

PLATE II.

- Fig. 1.—*Phascologale macdonnellensis*. Female. Life size. 1*a* head, side view.
Life size. 1*b* hand × 2. 1*c* foot × 2.
- „ 2.—*Sminthopsis larapinta*. Male. Life size. 2*a* hand × 2. 2*b* foot × 2.

PLATE III.

- Fig. 1.—*Dasyuroides byrnei*. Male. Life size. 1*a* hand × 1. Foot × 1.

PLATE IV.

- Fig. 1.—Dorsal view of skull of *Dasyuroides byrnei*. × 2.
- „ 2.—Ventral view of skull of *Dasyuroides byrnei*. × 2.
- „ 3.—Lower jaw of *Dasyuroides byrnei*. × 2.
- „ 4.—Teeth of upper jaw of *Dasyuroides byrnei*. × 2.
- „ 5.—Skull of *Phascologale cristicauda*.
- „ 6.—Lower jaw of *Phascologale cristicauda*.
- „ 7-8.—Teeth of upper jaw of two specimens of *Phascologale cristicauda*. × 2.
Fig. 7 is drawn from an especially large specimen and shows the very large canine and also the presence of the small *p*⁴.
- „ 9.—Skull of *Phascologale macdonnellensis*. × 2.
- „ 10.—Lower jaw of *Phascologale macdonnellensis*. × 2.
- „ 11.—Teeth of upper jaw of *Phascologale macdonnellensis*.
- „ 12.—Teeth of lower jaw of *Phascologale macdonnellensis* to show the minute *p*⁴ which is very rarely present.
-



Fig. 1



Fig. 1^a
x1



Fig. 1^b
x1.



Fig. 2



Fig. 2^a
x1



Fig. 2^b
x1



Fig. 1^b
x 2



Fig. 1^a



Fig. 2^b
x 2



Fig. 1



Fig. 2



Fig. 2^a
x 2

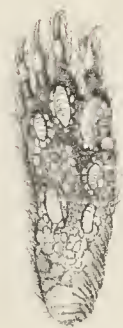


Fig. 1^c
x 2



Fig 1

Fig 1a
x1

Fig 1b
x1

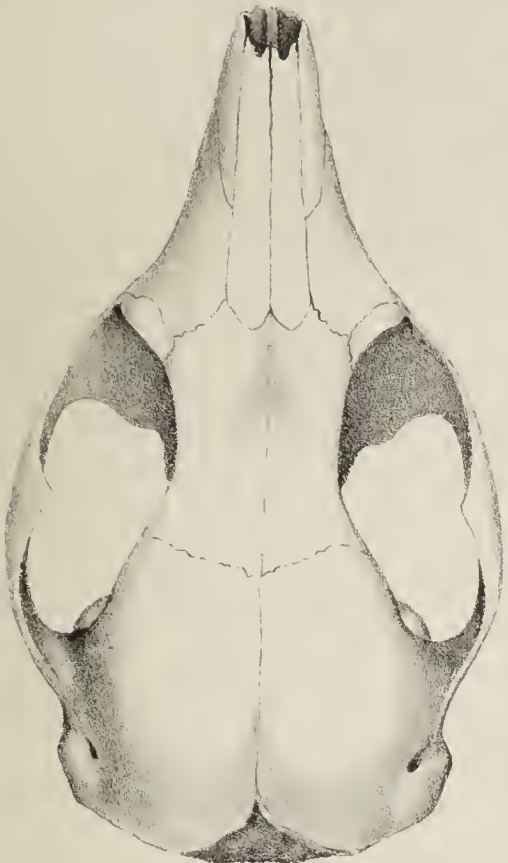


Fig 1
x2

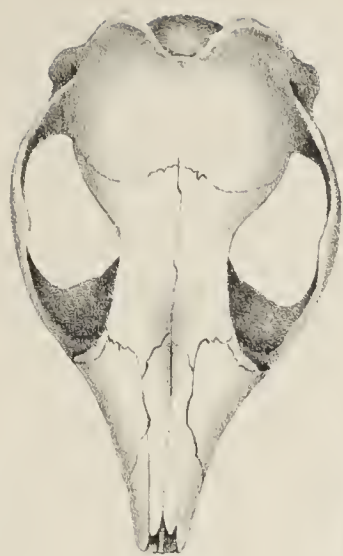


Fig 9
x2

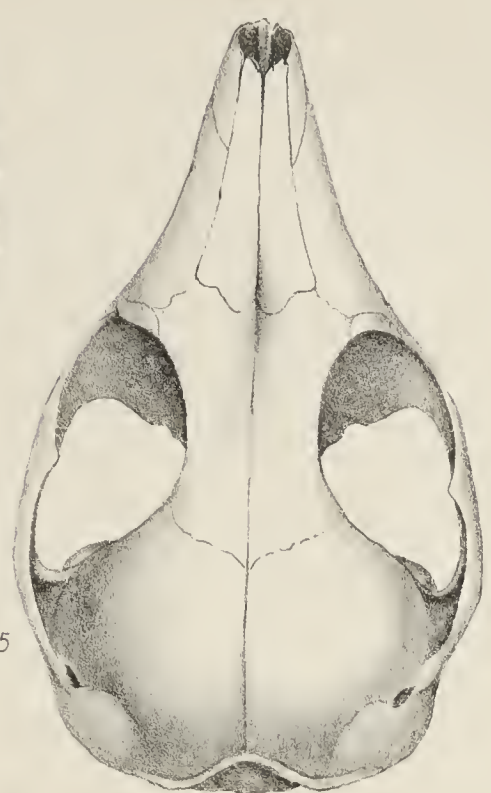


Fig 5
x2

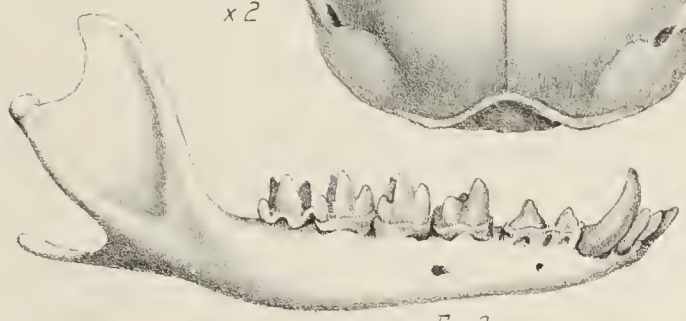


Fig 3
x2

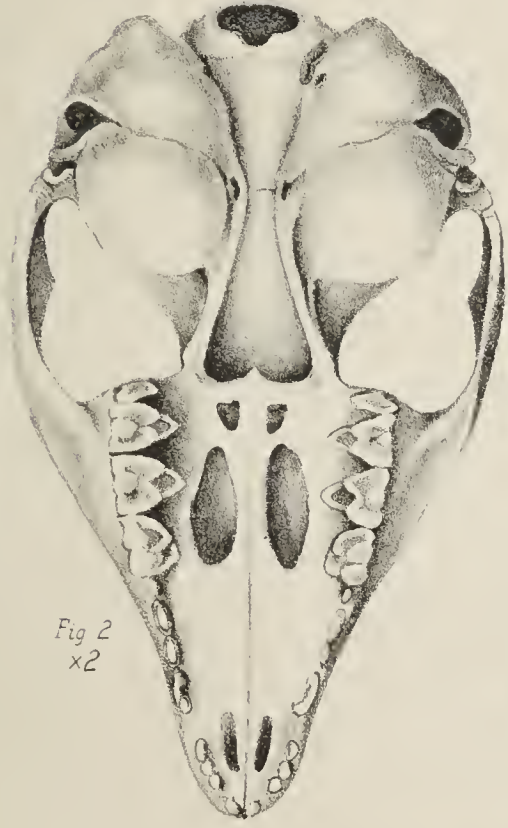


Fig 2
x2



Fig 6
x2



Fig 10
x2



Fig 8
x2



Fig 12
x2

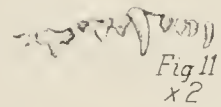


Fig 11
x2

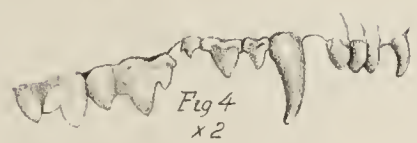


Fig 4
x2



Fig 7
x2

AVES.

By *ALFRED J. NORTH, F.L.S., Ornithologist to the Australian Museum, Sydney, with Field Notes by G. A. Kearland.*

(PLATES 5, 6 AND 7).

Professor W. Baldwin Spencer, of the University of Melbourne, has kindly sent me for examination a collection of Central Australian bird-skins, beautifully prepared by Mr. G. A. Kearland, one of the members of the Horn Expedition. The collection is an extremely important one as regards the geographical distribution of species, and contains examples of seventy-eight species, of which five are new to science. The majority of the birds collected range over the southern half of the Australian continent from east to west, but there is a slight preponderance of western forms. Several north-western species are now recorded for the first time from Central Australia; but it is worthy of note that no strictly northern species is represented in the collection.

Although new species of Central Australian birds have been obtained at various times, the present collection is the most important one formed since Captain Sturt's, in 1839. From an ornithological point of view, the results of the Expedition are highly gratifying and satisfactory, especially when it is taken into consideration that the journey was made during a somewhat dry season, and rapid travelling left but little time for thorough investigation. It is very evident, however, that much has still to be done before our knowledge of the avifauna of Central Australia is anything like complete; and that vast area, comparatively untrodden by the ornithological collector, will for many years offer the richest and most tempting field for future research in Australia.

That the interior possesses a great attraction to an enthusiastic worker and observer is verified by the fact that since the above lines were written Professor Baldwin Spencer has again undertaken a journey of more than two thousand miles during the mid-summer vacation "to secure certain forms of animals only obtainable after a heavy rainfall in the central desert region, and to observe the change in the nature of the country at such a season."* On the occasion of this visit the

* Baldwin Spencer, *Vict. Nat.*, vol. xi., p. 153 (1895).

aspect of the country was entirely changed, and where, during the middle of the previous year, the vegetation was dry and parched, it was now green and luxuriant, and all the clay-pans and water-holes were filled and alive with animal life.

In the accompanying paper Mr. Keartland's notes on his observations and the habits of the different species are placed between square brackets. Preliminary descriptions of the new species have already appeared in the July number of "The Ibis" for 1895.

No. 1. *ASTUR APPROXIMANS*, *Vigors and Horsfield*. Australian Goshawk.

Astur approximans, Vig. and Horsf., Trans. Linn. Soc., Vol. XV., p. 181 (1826); Gould, Bds. Austr., fol., Vol. I., pl. 17 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 15 (1849); Sharpe, Brit. Mus. Cat. Bds., Vol. I., p. 126 (1874); Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1085 (1886); North, Nests and Eggs Austr. Bds., p. 3 (1889).

One immature female, Darwent Creek.

[At several of the water-holes these birds were seen. Their chief food appears to be lizards and frogs, but they are very fond of young Ducks and other aquatic birds, which they seize with great dexterity from the surface of the water. Their nests, which are large in proportion to the size of the birds, are composed of sticks placed in high trees, generally near water.]

No. 2. *ACCIPITER CIRRHOCEPHALUS*, *Vieillot*. Collared Sparrow-Hawk.

Sparvius cirrhocephalus, Vieill, Nouv. Dict. d'Hist. Tom. X., p. 328 (1817).

Accipiter torquatus, Gould, Bds. Austr., fol., Vol. I., pl. 19 (1848).

Accipiter cirrhocephalus, Gray, Gen. Bds., Vol. I., p. 29 (1849); Sharpe, Brit. Mus. Cat. Bds., Vol. I., p. 141 (1874); Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., 2nd series, p. 166 (1887); North, Nests and Eggs Austr. Bds., p. 5, pl. II., fig. 6 (1889).

A. ♀ ad. sk., Deep Well.

A single specimen, similar in plumage and size to examples from southern and eastern Australia.

[Whilst camped for lunch near Deep Well our attention was attracted to a pair of these birds as they dashed about overhead and occasionally pounced upon one of the numerous small birds near the water. As they turned in the air the

bright sun shining on their backs gave them a very handsome appearance, and it was not until one had been shot that we were satisfied as to its identity.]

No. 3. *MILVUS AFFINIS*, *Gould*. Allied Kite.

Milvus affinis, Gould, Proc. Zool. Soc., 1837, p. 140; *id.* Bds. Austr., fol., Vol. I., pl. 21 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 15 (1849); Sharpe, Brit. Mus. Cat. Bds., Vol. I., p. 323 (1874); Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1096 (1886); North, Nests and Eggs Austr. Bds., App. p. 380, pl. iv., figs. 5 and 6 (1889).

One adult female, Henbury.

[At every stockyard or station passed Kites were seen. They are very local in their habits, and are seldom interfered with, as we were assured they do not molest the fowls, but are always on the look-out for any fragments of meat, whether cooked or raw. At Henbury one female bird was bold enough to come right into camp and pick up the flesh thrown to it from the birds I was skinning. This bird was in full plumage, and no doubt would have soon been busy with family cares. They build their nests of sticks in any suitable tree, and are not particular as to height.]

No. 4. *FALCO LUNULATUS*, *Latham*. White-fronted Falcon.

Falco lunulatus, Lath., Ind. Orn. Supp., p. xiii. (1801); Sharpe, Brit. Mus. Cat. Bds., Vol. I., p. 398 (1874); Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., 2nd series, p. 165 (1887); North, Nests and Eggs Austr. Bds., p. 19 (1889).

Falco frontatus, Gould, Bds. Austr., fol., Vol. I., pl. 10 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 14 (1849).

- A. ♂ ad. sk., Levi Range.
- B. ♂ ad. sk., Ross's Waterhole.
- C. ♀ ad. sk., Ross's Waterhole.

A common species found all over Australia.

[This Hawk is generally found near the rocky ranges. They fly with astonishing rapidity. They are very courageous, and will often attack and carry off birds heavier than themselves. At Ooraminna Rock Pool a pair of these birds were seen to dash into a flock of Chestnut-eared Finches and seize a bird each. In less than five minutes they returned and repeated the operation. The specimens secured were shot at Ross's Waterhole, where they were preying on Crested Bronze-

wing Pigeons (*Ocyphaps lophotes*). These birds had built their nest, but no eggs were found.]

No. 5. *HIERACIDEA BERIGORA*, *Vigors and Horsfield*. Western Brown Hawk.

Falco berigora, Vig, and Horsf., Trans. Linn. Soc., Vol. XV., p. 184 (1826).

Hieracidea occidentalis, Gould, Proc. Zool. Soc. (1844), p. 105; *id.* Bds. Austr., fol., Vol. I., pl. 12 (1848); Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., 2nd series, p. 166 (1877).

Hieracidea berigora, Sharpe, Brit. Mus. Cat. Bds., Vol. I., p. 421 (1874); North, Nests and Eggs Austr. Bds., p. 21 (1889); Stirling and Zietz, Trans. Roy. Soc. South Austr., Vol. XVI., p. 156.

A. ♀ (not quite adult), Petermann Creek.

One specimen only, slightly larger than examples from New South Wales and north-western Australia. Centre of the breast and the abdomen pale creamy-white; the remainder of the under-surface sandy rufous, each feather being distinctly marked with a narrow brownish shaft-stripe.

[This Hawk is very widely dispersed throughout Central Australia, being often met with where no other birds were seen. They are very fond of lizards, which appear to form their chief food. When the porcupine grass was ignited numbers of Hawks soon assembled, and, hovering above the smoke, quickly discovered the lizards and small animals disturbed by the fire, and pounced upon them with unerring precision. Although wary, several were shot, when their rich hazel eyes at once attracted attention. Their nests were frequently seen in the large trees along the watercourses.]

No. 6. *TINNUNCULUS CENCHROIDES*, *Vigors and Horsfield*. Nankeen Kestrel.

Falco cenchroides, Vig. and Horsf., Trans. Linn. Soc., Vol. XV., p. 183 (1826).

Tinnunculus cenchroides, Gould, Bds. Austr., fol., Vol. I., pl. 13 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 14 (1849); Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1096 (1887); North, Nests and Eggs Austr. Bds., p. 22, pl. iii., fig. 5 (1889).

Cerchneis cenchroides, Sharpe, Brit. Mus. Cat. Bds., Vol. I., p. 431 (1874).

One adult male, Hermannsburg; one immature male, Heavitree Gap. The latter has the head and two central tail feathers strongly washed with rufous.

[This species is dispersed throughout the continent, and its habits appear to be similar in all places. Its food consists chiefly of insects, lizards and mice; but small birds are also greedily devoured. Some of those seen near Alice Springs were lighter in colour than those found further south.]

No. 7. NINOX BOOBOOK, *Latham*. Boobook Owl.

Strix boobook, Lath., Ind. Orn., Suppl., p. xv. (1801).

Athene boobook, Gould, Bds. Austr., fol., Vol. I., pl. 32 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 17 (1849).

Ninox boobook, Sharpe, Ibis, 1875, p. 258; *id.*, Brit. Mus. Cat. Bds., Vol. II., p. 168 (1875); North, Nests and Eggs Austr. Bds., p. 25 (1889).

One adult male, Finke River; one adult female, Alice Well. The latter specimen has a greater extent of white on the face than is usually seen in this species, but is similar to examples obtained in the western district of New South Wales.

[These birds were found wherever the timber was large enough to furnish a hollow spout in which they could retire during the day, whilst at night their mournful note was often heard in several directions at the same time. They are very destructive amongst the small birds, which form their chief food.]

No. 8. CACATUA LEADBEATERI, *Vigors*. Leadbeater's Cockatoo.

Plectolophus leadbeateri, Vig., Proc. Zool. Soc., 1831, p. 61.

Cacatua leadbeateri, Gould, Bds. Austr., fol., Vol. V., pl. 2 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 35 (1849); Sclat., Proc. Zool. Soc., 1864, p. 188; Clark, Trans. Roy. Soc. South Austr. (Field Nat. Sect.), p. 29 (1889); North, Nests and Eggs Austr. Bds., p. 251 (1889); Ramsay, Cat. Austr. Bds., PSITTACI, p. 3 (1891); Salvad., Brit. Mus. Cat., Vol. XX., p. 123 (1891).

Plectolophus leadbeateri, Finsch, Die Papag., Vol. I., p. 304 (1867).

Two adult specimens, male and female, Alice Well.

[These birds were first seen near Finke Gorge, but were too shy to approach within shot. At Alice Well a pair were secured, and I was there informed that

when a particular grass-seed is ripe they are seen in flocks of several hundreds feeding on the ground, and the natives kill them with their boomerangs. Several holes in the spouts of red-gum trees were pointed out as their breeding-places.]

No. 9. CALYPTORHYNCHUS STELLATUS, *Wagler*. Western Black Cockatoo.

Calyptorhynchus stellatus, *Wagl.* Mon. Psitt., p. 685, t. xxvii. (1832); Ramsay, Cat. Austr. Bds., PSITTACI, p. 20. (1891); Salvad., Brit. Mus. Cat. Bds., Vol. XX., p. 111 (1891).

Calyptorhynchus naso, *Gould*, Bds. Austr., fol., Vol. V., pl. 9 (1848); North, Nests and Eggs Austr. Bds., p. 252 (1889).

Calyptorrhynchus stellatus, *Finsch*, Die Papag., Vol. I., p. 351 (1867).

		Total length.	Wing.	Tail.	Tarsus.	Bill in height.	
C.	♂ ad. sk.	- 20in.	- 15	- 10·5	- 0·8	- 2·5	Goyder's Well.
D.	♂ ad. sk.	- 20in.	- 14·7	- 10·5	- 0·9	- 2·5	Petermann Ck.
E.	♂ ad. sk.	- 20·2in.	- 15·2	- 10·5	- 0·9	- 2·7	Darwent Ck.
F.	♀ ad. sk.	- 21in.	- 14·5	- 10·5	- 0·85	- 2·6	Darwent Ck.
G.	♀ ad. sk.	- 20·5in.	- 15·3	- 10·7	- 0·87	- 2·5	Darwent Ck.

The males are similar in size and plumage to examples obtained at King George's Sound; in one specimen, the crimson band across the median portion of the tail-feathers extends in a narrow line along the shaft of the outer web of the outermost feather on either side. The cross-bars on the under surface and under tail-coverts of the females are less numerous and much duller in colour than in specimens procured in West Australia.

C. macrorhynchus, from northern Australia, is larger in all its admeasurements, and has a much longer crest. An adult female in the Macleay Museum, obtained at Port Darwin, measures as follows:—Total length, 22·4 inches; wing, 15·8 inches; tail, 12 inches.

[Our first specimen was shot by Mr. Horn at the Goyder Well on 15th May, and I was informed that that is the most southern point at which they are found. The breeding season for these birds was evidently just over, as at Trickett's Creek we found them so numerous that four were killed at one shot. On several occasions large flocks were seen, and, judging from the large proportion of young ones shot and the poor plumage of many adults, flocking had only recently taken place. Unlike most other members of this genus they are frequently seen on the ground. When practicable, they perch on the tops of the trees and devour the seed from the

branches, but when the supply is exhausted from that source they may be seen hopping awkwardly over the ground picking up the fallen seeds. At Hell's Gate a flock of over fifty were on the ground at one time, whilst a few sentinels uttered their note of warning from the trees close by. They breed in the spouts of the eucalypts along the Finke, Todd, Hale and Palmer Rivers, and the young birds are often eaten by the blackfellows.]

Two eggs of this species taken from the hollow spout of a tree on the 12th March, 1895, are pure white, oval in form, the surface of the shell, although smooth, being minutely pitted and lustreless. Length (A) 1·93 x 1·48 inch; (B) 2·04 x 1·47 inch.

No. 10. CALOPSITTACUS NOVÆ-HOLLANDIÆ, *Gmelin*. Cockatoo-Parrot, Crested Parrakeet.

Psittacus novæ-hollandiæ, Gmel., Syst. Nat., I., p. 328 (1788).

Nymphicus novæ-hollandiæ, Gould, Bds. Austr., Vol. V., pl. 45 (1848); Sturt, Exped. Centr. Austr. Vol. II., App. p. 40 (1849).

Calopsitta novæ-hollandiæ, Sclat., Proc. Zool. Soc., 1860, p. 242; North, Nests and Eggs Austr. Bds., p. 254, pl. xiv., fig. 9 (egg), 1889; Clark, Trans. Roy. Soc. South Austr. (Field Nat. Sect.), p. 41 (1889).

Callipsittacus novæ-hollandiæ, Finch, Die Papag., Vol. I., p. 261 (1867).

Calopsittacus novæ-hollandiæ, Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1094 (1886); Salvad., Brit. Mus. Cat. Bds., Vol. XX., p. 135 (1891).

Two adult males, two adult females, Finke River. The under surface of one of the females is strongly washed with pale earthy-brown.

[These birds were found scattered over a wide range of country. They were plentiful along the Finke River and at several watering-places. At Heavitree Gap they were in flocks of over a hundred. On 15th July I saw a large number of young birds. One pair of old ones were supplying the wants of a brood of six as they clustered on a dry branch.]

The genus *Polytelis*, in which the next species has hitherto been included, was established by Wagler (who separated it from the genus *Palæornis* of Vigors) in 1832 in his "Monographia Psittacorum," p. 489, for the reception of *P. barrabandi*, the type of the genus. In the Proceedings of the Zoological Society for 1863, p. 232, Gould described the following species as *Polyteles alexandræ*; but

the acquisition of a large and interesting series of these birds has enabled me to show that it is necessary to found a new genus for the reception of this species.

Genus SPATHOPTERUS, *North*.

North, *Ibis*, 1895, p. 339.

Polyteles, Gould, Proc. Zool. Soc., 1863, p. 232 (part).

GENERIC CHARACTERS.

Adult male.—Similar to those of the genus *Polytelis*, except in having the end of the third primary of each wing singularly elongated and terminating in a spatule.

Adult female.—Destitute of spatules.

Young male.—Similar to the female.

Type.—*S. alexandræ* (In the Australian Museum, Sydney).

Range.—Central Australia.

The peculiar form of the third primary in each wing of this extraordinary new genus of Parrakeets will at once serve to distinguish it from *Polytelis*, or from any other genus found in Australia.

No. 11. SPATHOPTERUS ALEXANDRÆ, *Gould*. The Princess of Wales' Parrakeet.

Polyteles alexandræ, Gould, Proc. Zool. Soc., 1863, p. 232.

Polytelis alexandræ, Gould, Suppl. Bds. Austr., pl. 62 (1869); Clark, Trans. Roy. Soc. Austr. (Field Nat. Sect.), p. 33 (1889); *id.* "South Austr. Register," Aug. (1890); Ramsay, Cat. Austr. Bds., PSITTACI, p. 43 (1891); Salvad., Brit. Mus. Cat. Bds., Vol. XX., p. 479 (1891); North, Rec. Austr. Mus., Vol. II., p. 19, pl. ii., fig. 5 (1892).

Platycercus alexandræ, Finsch, Die Papag., Vol. II., p. 261 (1868).

		Total length.	Wing.	Central Tail Feathers.	Outer Tail Feathers.	Tarsus.
♂	imm. sk.	- 15in.	- 6·9	- 9·7	- 4·2	- 0·7
♀	ad. sk.	- 16in.	- 7·25	- 10	- 4	- 0·7
♂	ad. sk.	- 16·1in.	- 7·55	- 11	- 4·1	- 0·7
♂	ad. sk.	- 17in.	- 7·8	- 11·5	- 4	- 0·7

The measurements of the latter specimen are taken from a fine old male; length of spatulate tip, 0·75 inch; beyond the end of the second primary, 0·5 inch.

Many specimens of this delicately-coloured Parrakeet were collected at Glen Edith. They are all in splendid plumage and condition, and form the finest series of cabinet skins of this species yet obtained. In very old males the upper portion of the cheeks is strongly suffused with rosy pink; the pale bluish wash on the forehead and crown of the head extends on to the nape; the lower back and rump are of a much deeper blue, and the tibial plumes and lower sides of the body are conspicuously stained with rosy-red and lilac.

In the accompanying plate the singular form and chaste colouring of this beautiful Parakeet—the one best fitted of all our Australian birds to bear the name of the illustrious lady to whom it has been dedicated—has been most faithfully portrayed by Mr. Neville Cayley.

The food of this species consists almost exclusively of small grass-seeds, Mr. Fred. Turner, F.L.S., to whom I have submitted the contents of a crop of one of these birds for examination, has referred the seeds to the following species:—*Triodia mitchelli*, BENTH, one of the “porcupine” grasses; *Danthonia bipartita*, F. v. M., one of the “mulga” grasses, and *Portulaca oleracea*, LINN., or “Purslane.” The seeds of the latter plant, Mr. Turner informs me, were at one time used as an article of food by the aborigines of the interior of Australia.

[Although these handsome Parrakeets were first discovered over thirty years ago by Mr. F. G. Waterhouse during Stuart’s Expedition into Central Australia at Howell’s Ponds, their habit of avoiding the neighbourhood of settlement has rendered the collection of specimens or information regarding them somewhat difficult. During the time which has elapsed since they were first met with several expeditions have traversed the wilds of Central Australia; but I believe they have only been shot on three or four occasions, and only one pair of live birds has been brought to civilisation. They were secured by Mr. Alex. Magarey at Crown Point, and afterwards brought to Adelaide. The fact of so few being seen may be due to the singular habit the bird has of lying along the stout limbs of the tree like a lizard, instead of adopting the style of most other Parrots and perching on a twig or thin branch. Although all members of our party were keeping a keen watch for them all along the route, they were only met with once, on 16th June, in a desert oak forest between Glen Edith and Deering Creek. The advance party had halted for lunch, and on my arrival Professor Tate said he had seen a strange-looking Parrot in the oaks near at hand. I started off in the

direction indicated, and after going about two hundred yards saw what at first appeared to be a Cockatoo-parrot flying towards me. Having carefully noted the branch on which it perched, I hurried forward, but, notwithstanding the sparse foliage of the tree, I had to look carefully for some minutes before I found it. Immediately the shot was fired a number of these beautiful birds flew out of the trees in all directions, in twos, threes and fours. Five birds flew into one tree, but I had to walk round three times before I could see them. At last four heads were visible just raised from the thick limb, the bodies and tails lying horizontally along the timber.

I have since heard that one of their breeding-places has been discovered on the Hale River. Mr. Charles Pritchard, who accompanied the party as prospector for gold, and assisted me in obtaining my birds, has forwarded to me three eggs out of a clutch of five, which is the usual number. They closely resemble those of *Platycercus eximius* in shape and size, but have a smooth, glossy surface, more like a pigeon's egg. I have since compared them with one laid by Mr. Magarey's bird in captivity, and find they exactly correspond.

Writing under date 15th November, 1894, Mr. Pritchard says:—"Re their appearance here. This is the first time on record that they have made this their breeding-ground, but I do not think they have come to stay, and perhaps in a year or so they may be as rare as ever. These birds travel in lots from one pair up to nearly any number, are very tame, feeding about in the grass near the camp, and seem in no way afraid of people, cattle or horses. They breed in hollow trees, laying five eggs in a clutch, and several pairs of birds occupy holes in the same tree. They are nesting now in the eucalypts on the banks of the Hale River and other large watercourses. They do not always lie along the limbs as you found them at Glen Edith, but perch as other Parrots. I have a number in captivity, amongst them being an old male bird with a tail seventeen inches long."

Mr. E. C. Cowle also writes, under same date, that the Princess of Wales Parrakeets occasionally fly around his camp at Illamurta, and are breeding on the Hugh River.]

Under date of 28th April, 1895, Mr. Kearthland writes me from Melbourne as follows:—"Mr. Winnecke, one of the members of our late Expedition, has sent me a pair of live *Polytelis alexandrae*. I never saw Parrots so tame and gentle. They will fly off the top perch in the aviary on to my arm and eat seed out of my hand, and allow me to stroke them. Mr. Winnecke was informed that when the young

nestlings were in boxes at the camp of the men who took them, the old birds came and fed them for days, and were as tame as domestic pigeons."

No. 12. *PLATYCERCUS ZONARIUS*, *Shaw*. Banded Parrakeet, Port Lincoln Parrakeet.

Psittacus zonarius, Shaw, Nat. Misc., pl. 657 (1789-1813).

Platycercus baueri, Gould, Bds. Austr., fol., Vol. V., pl. 20 (1848).

Platycercus zonarius, Finsch, Die Papag., Vol. II., p. 212 (1868); Ramsay, Cat. Austr. Bds., PSITTACI, p. 48 (1891).

Barnardius zonarius, Salvad., Brit. Mus. Cat., Vol. XX., p. 560 (1891).

- A. ♂ imm. sk., Macumba Creek.
- B. ♂ imm. sk., Stevenson Creek.
- C. ♀ ad. sk., Henbury.
- D. ♂ ad. sk., Finke River.
- E. ♀ ad. sk., Francis Well.
- F. ♀ ad. sk., Francis Well

Two specimens marked females are much brighter in colour than others obtained in the southern portion of the colony.

[Some surprise was felt at the wide extent of country over which this beautiful Parrakeet was found, the first pair being seen at Macumba Creek. They were afterwards found throughout the trip wherever water existed. At Stevenson's Creek two black boys were preparing their supper, which consisted of nestlings of this species, which they had taken from the spouts of the eucalypts along its margin. On 12th May, whilst resting at Adminga Creek, a young bird with its yellow bill denoting its age, and apparently enjoying its first fly, fluttered on to a branch close to our party. I then saw, and afterwards confirmed, that many of the young ones are quite as brilliant in plumage as the mature birds. Although generally in pairs, flocks of six or seven are not uncommon, probably being the parent birds and young brood. Their chief food is grass-seed, but they also display great activity in climbing amongst the foliage in search of blossom.]

No. 13. *PSEPHIOTUS MULTICOLOR*, *Temminck*. Varied Parrakeet.

Psittacus multicolor, Temm., Trans. Linn. Soc., Vol. XIII., p. 119 (1821.)

Platycercus multicolor, Mitchell, Exped. Inter. Austr., Vol. I., p. 18 (1858); Finsch, Die Papag., Vol. II., p. 222 (1868).

Psephotus multicolor, Gould, Bds. Austr., fol., Vol. V., pl. 35 (1848); Scat., Proc. Zool. Soc., 1869, p. 627; North, Nests and Eggs Austr. Bds., p. 261 (1889); Clark, Trans. Roy. Soc. South Austr. (Field Nat. Sect.), 1889, p. 38; Ramsay, Cat. Austr. Bds., PSITTACI, p. 73 (1891).

One adult male and female, Reedy Hole; one adult male, Finke River.

[These birds were found near all water-holes passed. Although a number were shot, not one of the males was as brilliant in the scarlet markings on the thighs and abdomen as those found at Murtoa and in the Mallee Scrub near the Murray. They were always in pairs, and were never seen in flocks like the Red-rumped Parrakeet (*P. haematonotus*). The females were all of the same modest hue as those found further south.]

No. 14. MELOPSITTACUS UNDULATUS, Shaw. Warbling Grass Parrakeet.

Psittacus undulatus, Shaw, Nat. Misc., pl. 673 (1789-1813).

Melopsittacus undulatus, Gould, Bds. Austr., fol., Vol. V., pl. 44 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 40 (1849); Scat., Proc. Zool. Soc., 1862, p. 140; Finsch, Die Papag., Vol. II., p. 137; (1868); Clark, Trans. Roy. Soc. South Austr. (Field Nat. Sect.), p. 40 (1889); North, Nests and Eggs Austr. Bds., p. 264 (1889); Ramsay, Cat. Austr. Bds., PSITTACI, p. 87 (1891); (1891); Salvad., Brit. Mus. Cat. Bds., Vol. XX., p. 594 (1891).

One adult male, Lawrie's Creek.

[These lovely little birds were found widely dispersed throughout our trip, and were all breeding, as large numbers of very young birds were seen. At Deering Creek immense flocks were observed soon after sunrise flying round like a flock of domestic pigeons, and as they alternately turned their backs or breasts to the sun the effect was very striking, as the whole flock turned simultaneously with astonishing regularity. A number of nests were examined, but they contained either young birds or were just deserted.]

No. 15. CACOMANTIS PALLIDUS, Latham. Pallid Cuckoo.

Columba pallida, Lath., Gen. Syn. Suppl. II., p. 270 (1802).

Cuculus inornatus, Gould, Bds. Austr., fol., Vol. IV., pl. 85 (1848).

Cacomantis pallidus, North, Nests and Eggs Austr. Bds., p. 243 (1889).

Cuculus pallidus, Shelley, Brit. Mus. Cat. Bds., Vol. XIX., p. 261 (1891).

One immature female, Hermannsburg. The upper surface is mottled with rufous and the feathers of the lower back and rump tipped with buffy-white; under surface pale grey, crossed by numerous indistinct dusky barrings. Total length, 12·6 inches; wing, 7·4 inches; tail, 6·7 inches; tarsus, 0·78 inches.

[First seen near Oodnadatta and afterwards on the Finke River. They were not by any means plentiful, only two of each sex being met with throughout the trip. There is little doubt that Keartland's Honey-eater is here burdened with the trouble of rearing the young cuckoos, as a female shot was seen carefully inspecting a nest almost ready for eggs.]

No. 16. MISOCALIUS PALLIOLATUS, *Latham*. Black-eared Cuckoo.

Cuculus palliolatus, Lath., Ind. Orn. Suppl., p. xxx. (1801).

Chalcites osculans, Gould, Bds. Austr., fol., Vol. IV., pl. 88 (1848).

Mesocalius palliolatus, Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1094 (1886).

Misocalius palliolatus, Shelley, Brit. Mus. Cat. Bds., Vol. XIX., p. 279 (1891).

One adult male, Petermann Creek, similar to examples obtained in New South Wales. Specimens from north-western Australia are very much duller in colour.

An egg of a Cuckoo since received by Mr. Keartland from Mr. E. C. Cowle, of Central Australia, is probably referable to this species. It was brought in by a blackfellow, together with the eggs of an *Acanthiza*, in whose nest it was found, and from a locality where the Black-eared Cuckoos are plentiful. In fact, the egg of *M. palliolatus* is the only one belonging to any of the Cuckoos found in Central Australia that we are unacquainted with, and the specimen forwarded differs in colour and size from any Cuckoo's egg I had previously seen. It is a compressed ellipse in shape, and of a uniform chocolate-brown in colour. Length, 0·83 inch x 0·58 inch.

No. 17. LAMPROCOCYX BASALIS, *Horsfield*. Rufous-tailed Bronze Cuckoo.

Cuculus basalis, Horsf., Trans. Linn. Soc., Vol. XIII., p. 179 (1821).

Chrysococcyx lucidus, Gould, Bds. Austr., fol., Vol. IV., pl. 89, part upp. fig., ad. lower fig., juv. (1848).

Chalcites basalis, Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1099 (1886).

Lamprococcyx basalis, North, Nests and Eggs Austr. Bds., p. 247, pl. xiii., fig. 13 (1889).

Chalcococcyx basalis, Shelley, Brit. Mus. Cat. Bds., Vol. XIX., p. 294 (1891.)

One immature male and one adult female, Reedy Hole.

[As soon as *Geobasileus chrysorrhæa* was noticed, a sharp look-out resulted in Mr. Bell shooting a pair of Bronze Cuckoos. Where either of these birds are found the other is generally near, and there is no doubt that in Central Australia the usual relationship exists between them, the Cuckoo leaving the trouble of rearing its brood to the *Geobasileus*.]

No. 18. HALCYON PYRRHOPYGIUS, *Gould*. Red-rumped Kingfisher.

Halcyon pyrrhopygia, Gould, Proc. Zool. Soc., 1840, p. 113; *id.*, Bds. Austr., fol., Vol. II., pl. 22 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 20 (1849); Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1086 (1886).

Halcyon pyrrhopygius, North, Nests and Eggs Austr. Bds., p. 38 (1889); Sharpe, Brit. Mus. Cat. Bds., Vol. XVII., p. 258 (1892).

- A. ♂ not quite ad., Petermann Creek.
- B. ♀ not quite ad., Finke River.
- C. ♂ ad. sk., Henbury.
- D. ♂ ad. sk., Henbury.
- E. ♀ not quite ad., Gill Range.

Immature specimens have the feathers of the breast, sides of the neck and collar fringed with black, and the back of the collar more or less washed with pale rufous.

[In size and appearance at a distance this species bears a striking resemblance to *H. sanctus*, but its striated head and red back at once establish its identity. It is a solitary bird, and is frequently found at a great distance from water. Its food consists of lizards and grasshoppers. It is a very silent bird, and its harsh note is seldom heard except at breeding time.]

No. 19. *ÆGOTHELES NOVÆ-HOLLANDIÆ*, *Latham*. Owlet Nightjar.

Caprimulgus novæ-hollandiæ, *Lath.*, *Ind. Orn.*, Vol. II., p. 588 (1790).

Ægotheles novæ-hollandiæ, *Gould*, *Bds. Austr.*, fol., Vol. II., pl. 1 (1848); *Sturt*, *Exped. Centr. Austr.*, Vol. II., App. p. 17 (1849); *North*, *Nests and Eggs Austr. Bds.*, p. 26, pl. xiv., fig. 11 (1889); *Hartert*, *Brit. Mus. Cat.*, Vol. XVI., p. 651 (1892).

A. ♂ ad. sk., Reedy Hole.

B. ♀ ad. sk., Red Mulga Creek.

Two specimens similar to those from eastern and southern Australia. The male is more strongly washed with rufous upon the head and breast than the female, but considerable variation exists in the tints of plumage in this species. Apparently this rufous wash increases with age, for I have never observed it in young birds.

[Whilst cutting down a dead tree at Red Mulga Creek for fuel, a female bird flew out of a hollow branch, which proved to be her nest and dwelling-place at the same time. Several others were subsequently seen, and one was shot at mid-day near the George Gill Range. As they are nocturnal in their habits, this bird was no doubt disturbed from its retreat by the noise made by our party in passing. Their food consists chiefly of nocturnal lepidoptera.]

No. 20. *CHERAMŒCA LEUCOSTERNUM*, *Gould*. White-breasted Swallow.

Hirundo leucosternus, *Gould*, *Proc. Zool. Soc.*, 1840, p. 172.

Atticora leucosternon, *Gould*, *Bds. Austr.*, fol., Vol. II., pl. 12 (1848).

Cheramœca leucosternum, *Sharpe*, *Brit. Mus. Cat. Bds.*, Vol. X., p. 171 (1885); *Sharpe and Wyatt*, *Monogr. Hirund.*, Part XI. (1889); *North*, *Nests and Eggs Austr. Bds.*, p. 33, App. p. 383 (1889); *Sharpe and Wyatt*, *Monogr. Hirund.*, Part XVII. (1893).

Cheramœca leucosterna, *Stirling and Zietz*, *Trans. Roy. Soc. South Austr.*, p. 157 (1893).

Two adult males, Crown Point; one adult female, Hermannsburg.

[These birds were found throughout Central Australia, but were most plentiful near the Finke River, where they might be seen soaring near the water in pursuit of the winged insects on which they feed. At Hermannsburg I had the

opportunity of watching many of them tunnelling in a bank of the river, preparatory to nesting. Some of these tunnels were twenty-four inches long, but were all unfinished. The work incidental to nest construction with such slender tools as their bill and feet must be very great. At Henbury they were seen flying in company with the Welcome Swallow (*Hirundo neoxena*.)]

No. 21. *ARTAMUS MELANOPS*, *Gould*. Black-faced Wood Swallow.

Artamus melanops, *Gould*, Proc. Zool. Soc., 1865, p. 198; *id.*, Suppl. Bds. Austr., fol. Vol., pl. 7 (1869); North, Nests and Eggs Austr. Bds., p. 46, pl. viii., fig. 13 (1889); Sharpe, Brit. Mus. Cat. Bds., Vol. XIII., p. 17 (1890).

One adult male, Darwent Creek. Extent of wing, five inches. There is a great variation in the size of this species, even in birds obtained in the same locality. In a number of adult specimens from the western district of New South Wales the length of the wing varies from 4·7 to 5 inches. The females of this species may be easily distinguished from the males by having their under tail-coverts largely tipped with white.

No. 22. *PARDALOTUS ORNATUS*, *Temminck*. Striated Pardalote.

Pardalotus ornatus, *Temm.*, Pl. Col., pl. 394, fig. 1 (1826); Sharpe, Brit. Mus. Cat. Bds., Vol. X., p. 55 (1885); North, Nests and Eggs Austr. Bds., p. 50 (1889).

Pardalotus striatus, *Gould*, Bds. Austr., fol., Vol. II., pl. 38. (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 21 (1849).

A. ♂ juv. sk., Stevenson's Creek.

B. ♂ ad. sk., Alice Well.

The crimson alar speculum in the adult specimen is smaller and duller in colour than in southern and eastern Australian birds.

The young of this species do not assume the adult colouring from the nest, as stated by *Gould*. Young birds that have just left the nest are very much paler and have all the under surface more uniformly washed with pale yellow; the forehead and crown of the head are dull brown, the former strongly washed with yellow, and the yellow spot above the lores, which are greyish-white, is not so well defined, and there is only a faint indication of the white superciliary stripe. When slightly older the forehead is faintly washed with yellow, and some of the feathers on the crown of the head are black streaked down the centre with white;

the lores and upper portion of the ear-coverts are dusky-black, the latter minutely spotted with white, and the white eye-brow may be distinctly seen.

[These birds were shot in mallee scrub near Stevenson's Creek.]

No. 23. *PARDALOTUS RUBRICATUS*, *Gould*. Red-lored Pardalote.

Pardalotus rubricatus, Gould, Proc. Zool. Soc., 1837, p. 139; *id.*, Bds. Austr., fol., Vol. II., pl. 36. (1840); Sharpe, Brit. Mus. Cat. Bds., Vol. X., p. 60 (1885); Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1087 (1886); North, Nests and Eggs Austr. Bds., p. 54 (1889).

One adult male and female, one immature male and female, Petermann Creek. The latter have dusky centres and fringes to the feathers of the interscapular region, and conspicuous dark shaft-lines on the lower back.

[In the eucalypts along Petermann Creek these handsome little birds were numerous. Their soft notes are easily recognised and distinguish them from other species. Whilst *P. ornatus* and *P. affinis* give forth a treble note which has secured for them the name of "Pick-it-up" from our country boys, *P. rubricatus* simply gives a double note, the second exactly resembling the first. They are occasionally found in mallee and mulga scrub, but the eucalypts are their favourite haunts. They confine themselves to the tops of the trees, and were never seen on the ground. As several birds were exploring holes in the hollow branches, it is highly probable they prefer nesting in such places to tunnelling in the ground like *P. punctatus*. The sexes are alike in plumage, but the immature birds are not so bright as the old ones.]

No. 24. *GYMNORHINA TIBICEN*, *Latham*. Black-backed Crow-Shrike.

Coracias tibicen, Lath., Ind. Orn. Suppl., p. xxvii. (1801).

Gymnorhina tibicen, Gould, Bds. Austr., fol., Vol. II., pl. 46 (1848); Gadow, Brit. Mus. Cat. Bds., Vol. VIII., p. 91 (1883); North, Nests and Eggs Austr. Bds., p. 58, pl. vii., figs. 4, 5 and 6 (1889).

One adult male and female, Heavitree Gap. The former is similar in plumage to examples from the western district of New South Wales, and which are slightly smaller than specimens obtained in heavily-timbered mountain ranges or near the coast; but the black dorsal band in the female, and also in an adult male from Owen Springs, is very much narrower than in any other birds I have examined of this species. Both are fully adult, but many of the black feathers on the back of the male are tipped with white, and those of the female with greyish-

white. It is possible that these specimens are hybrids between the White-backed and the Black-backed Crow-Shrikes, *G. leuconota* and *G. tibicen*, for the range of both species extends over the greater portion of South Australia. I have seen black feathers occasionally on the backs of immature and adult birds of *G. leuconota*, but never forming so broad and distinct a band as in the specimens referred to.*

[Although birds of this genus are amongst the most common nearly everywhere else throughout Australia, in Central Australia they are very rare. After leaving Hergott, the first pair of these birds was seen at Crown Point, and although a sharp look-out was kept for them, they were not again seen until reaching Owen Springs and Heavitree Gap. The specimens secured were of the following dimensions:—Male, weight, $9\frac{1}{2}$ ounces; length, $15\frac{1}{2}$ inches; across wings, $29\frac{3}{4}$ inches. Female, 9 ounces; length, $15\frac{1}{2}$ inches; across wings, $24\frac{1}{2}$ inches.

No. 25. *CRACTICUS NIGRIGULARIS*, *Gould*. Black-throated Crow-Shrike.

Vanga nigrogularis, *Gould*, Proc. Zool. Soc., 1836, p. 143.

Cracticus nigrogularis, *Gould*, Bd. Austr., fol., Vol. II., pl. 49 (1848); *Ramsay*, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1087 (1886).

Cracticus nigrigularis, *Gadow*, Brit. Mus. Cat. Bds., Vol. VIII., p. 95 (1883).

Cracticus robustus, *North*, Nests and Eggs Austr. Bds., p. 62, pl. ix., fig. 8 (1889).

A. ♀ ad. sk., Finke River.

B. ♂ ad. sk., Goyder's Well.

C. ♂ imm. sk., Stevenson's Creek.

[These birds were frequently met with, and their merry song at early morn was listened to with pleasure. Perched on a dead branch, the black-throated Crow-

* Since the above was in type Mr. G. E. Shepherd has recorded in Volume XII. of "The Victorian Naturalist," p. 68, similar specimens obtained and observed by him in different parts of Victoria, and he also suggests the probability of these birds with the narrow black dorsal bands being hybrids between the White-backed and the Black-backed Crow-Shrikes; or another species altogether. The great variation, however, in the width of this band, which in some specimens is reduced to a narrow line of scattered black feathers, and also, as Mr. Shepherd points out, "varies considerably from a complete saddle to little more than a ring," precludes the possibility of it being a distinct species, but tends strongly to confirm the opinion that these birds are hybrids. Mr. Shepherd states that *G. tibicen* is never found in the neighbourhood where he obtained his specimens to which he refers, and never, apparently, get so far south; it therefore may be due to atavism if we admit that *G. leuconata* was derived from the black-backed species, but I feel confident that it is the result of hybridization, for I have never yet observed these distinct black bands or narrow lines of scattered black feathers on the backs of examples from Tasmania, where only the White-backed species of Crow-Shrike is found.

Shrike often kept up a continuous carol for over an hour. They are very bold in pursuit of their prey, and one was seen tearing a small bird to pieces close to our track. The sexes are alike in plumage, the mature birds being black and white, whilst the young birds of both sexes are brown on throat and chest. Gould has described the immature bird as the female. They are generally described as “jackeroos” by the residents of the north.]

No. 26. GRALLINA PICATA, *Latham*. Pied Grallina.

Gracula picata, Lath., Ind. Orn. Suppl., p. xxix. (1801).

Grallina australis, Gould, Bds. Austr., fol., Vol. II., pl. 54. (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 22 (1849).

Grallina picata, Sharpe, Brit. Mus. Cat. Bds., Vol. III., p. 272 (1877); North, Nests and Eggs Austr. Bds., p. 79, pl. viii., fig. 12 (1889).

One adult male, Hermannsburg. The range of this species extends all over the Australian continent.

[This well-known bird was found near all permanent waters. They are exactly similar to those found throughout the continent. Near Francis's Well, at sunset, we had a visit from a flock of several hundreds of these birds, which appeared to be migrating. They were evidently going to camp in the trees for the night. As a rule, except in Autumn, they are found in flocks of six or less, as the usual brood is four.]

No. 27. GRAUCALUS MELANOPS, *Latham*. Black-faced Graucalus.

Corvus melanops, Lath. Ind. Orn., Suppl., p. xxiv. (1801).

Graucalus melanops, Gould, Bds. Austr., fol., Vol. II., pl. 55 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 22 (1849); Sharpe, Brit. Mus. Cat. Bds., Vol. IV., pp. 30, 469 (1879); Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1087 (1886); North, Nests and Eggs Austr. Bds., p. 74, pl. ix., fig. 4 (1889).

A. ♂ ad. sk., Levi Range.

B. ♀ ad. sk., Levi Range.

Two adult specimens. Common all over the Australian Continent.

[This well-known bird was frequently met with in our travels along the Finke River, but in the rocky heights of Mereenie Bluff and Stokes' Pass they were seen in large numbers, performing all manner of aerial antics and hopping about the rocks in a peculiar manner, which at first suggested the possibility of a new species. A closer examination, however, dispelled the illusion.]

No. 28. PTEROPODOCYS PHASIANELLA, *Gould*. Ground Graucalus.

Graucalus phasianellus, Gould, Proc. Zool. Soc., 1839, p. 142.

Pteropodocys phasianella, Gould, Bds. Austr., fol., Vol. II., pl. 59 (1848); Sharpe, Brit. Mus. Cat. Bds., Vol. IV., p. 22 (1879); North, Nests and Eggs Austr. Bds., p. 76, pl. ix., fig 2 (1889).

Four specimens—one young male, Henbury; one adult male and two immature females, Alice Well.

The young male has the tips of the primaries, secondaries, and greater wing-coverts broadly edged with pale buff, the innermost secondaries and wing-coverts having narrow, subterminal black bars; the two central tail-feathers tipped with white and subterminally edged with black. The feathers of the forehead, nape, scapulars, and interseapular region are crossed with narrow black bars, and the barrings on the lower back, rump, and upper tail-coverts, are not as numerous as in the adult. The immature female has the innermost secondaries and scapulars tipped with buffy-white, narrowly crossed with bars of black; median and greater wing-coverts broadly tipped with dull brownish buff.

[At Crown Point these birds were first seen, but they were afterwards found at many places along the course of the Finke. They were very shy, and specimens were with difficulty procured. They are easily distinguished from *G. melanops* by their peculiar flight, which is generally in a straight line, accompanied by a short, rapid flutter of their wings and also by their shrill note.]

No. 29. PACHYCEPHALA RUFIVENTRIS, *Latham*. Rufous-breasted Thickhead.

Sylvia rufiventris, Lath., Ind. Orn., Suppl., p. liv. (1801).

Pachycephala pectoralis, Gould, Bds. Austr., fol., Vol. II., pl. 67 (1848).

Pachycephala rufiventris, Gadow, Brit. Mus. Cat. Bds., Vol. VIII., p. 208 (1883); North, Nests and Eggs Austr. Bds., p. 67, pl. xii., fig. 11 (1889).

One immature male, Deering Creek; one immature female, Illamurta.

[Near Illamurta one of these birds was killed, which proved to be a young male; but subsequently more were seen and several shot at different places. They were all similar in plumage, and in no case presented the sexual difference so noticeable in the genus generally. They are capital songsters, and must be heard at early morn to be appreciated. They were always found near water and in the scrub along the Finke River. The rocky gorges in the ranges were also frequented by them.]

No. 30. COLLYRIOCINCLA RUFIVENTRIS, *Gould*. Buff-bellied Thrush.

Colluricincla rufiventris, Gould, Proc. Zool. Soc., 1840, p. 164; *id.*, Bds. Austr., fol., Vol. II., pl. 75 (1848).

Collyriocincla rufiventris, Sharpe, Brit. Mus. Cat. Bds., Vol. III., p. 292 (1877); North, Nests and Eggs Austr. Bds., p. 82 (1889).

One male and female, Reedy Hole; two females, Levi Range. The female of this species has a distinct rufous eye-brow; the external webs of the innermost primaries, secondaries, and wing-coverts washed with pale rufous, and all the under surface strongly tinged with buff. Bill, brown; base of the lower mandible, horn colour.

[These birds are very similar in habit and choice of country to *C. harmonica*. They were first found at Reedy Hole, where they were hopping along the branches of the eucalypts, examining the crevices for spiders, &c., or on the ground. Their beautiful note as they called to each other proved very entertaining. Mr. Cowle has kindly forwarded me two of their eggs, taken from a nest near his camp. They closely resemble those of *C. harmonica* in size, color, and markings.]

No. 31. OREOICA CRISTATA, *Lewin*. Crested Bell-bird.

Turdus cristatus, Lewin, Bds. New Holl., pl. 9 (fem.)

Oreoica gutturalis, Gould, Bds. Austr., fol., Vol. II., pl. 81 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 23 (1849).

Oreoica cristata, Gadow, Brit. Mus. Cat. Bds., Vol. VIII., p. 174 (1883); North, Nests and Eggs Austr. Bds., p. 70, pl. viii., fig. 6 (1889); Stirling and Zietz, Trans. Roy. Soc. South Austr., Vol. XVI., p. 157 (1893).

- A. ♀ ad. sk., Swallow Creek.
- B. ♂ imm. sk., Finke River.
- C. ♂ ad. sk., Hermannsburg.
- D. ♂ imm. sk., Heavitree Gap.
- E. ♂ ad. sk., Sullivan's Creek.
- F. ♀ ad. sk., Finke River.

Similar to examples from eastern and western Australia. The immature males have an admixture of brownish-grey feathers in the gorget-shaped marking on the lower throat and breast, and which is not so dark or well-defined as in the adult male.

[This is one of our most widely-dispersed birds, and was found in all parts visited. It is also plentiful throughout Victoria and New South Wales. It is very active, and runs rapidly over the ground or fallen logs. The male is easily distinguished from his mate by the black band which crosses his white breast, whilst the female is plain brown above and lighter on the breast. In the north they are frequently called "Bell-birds,"* but bear no resemblance to *Manorhina melanophrys* in plumage, shape, or note. The *Oreoica* is such an accomplished ventriloquist that it is difficult to find. Perched on a low bush close at hand, its note often seems to come from several directions in the course of a minute.]

No. 32. SPHENOSTOMA CRISTATA, *Gould*. Crested Wedge-bill.

Sphenostoma cristatum, Gould, Proc. Zool. Soc., 1837, p. 150; *id.*, Bds. Austr., fol., Vol. III., pl. 17 (1848); Gadow, Brit. Mus. Cat. Bds., Vol. VIII., p. 74 (1883).

Sphenostoma cristata, Sturt, Exped. Centr. Austr., Vol. II., App. p. 25 (1849); North, Nests and Eggs Austr. Bds., p. 71, pl. viii., fig 5 (1889).

- A. ♂ ad. sk., Idracowra.
- B. ♀ ad. sk., Hermannsburg.
- C. ♂ ad. sk., Charlotte Waters.
- D. ♀ ad. sk., Charlotte Waters.
- E. ♂ ad. sk., Charlotte Waters.
- F. ♀ ad. sk., Charlotte Waters.

[Like *Oreoica cristata*, this bird is also endowed with ventriloquial powers, and his beautiful bell-like note often appears to come from a totally different direction from that occupied by the bird. They are also often heard singing at all hours of the night. They are generally very wary, and although many were seen and heard, it was some time before a pair was secured. The Wedge-bill builds an open cup-shaped nest of fine twigs or coarse grass very similar to that of *Psophodes crepitans*, and the eggs of these birds also bear a striking resemblance to each other in colour and markings. Although the Wedge-bill usually lays two eggs for a clutch, there was only one hard set in the nest found by Mr. Pritchard whilst clearing scrub for Mr. Winnecke to take a survey. Whilst near Charlotte Waters great numbers of these birds were found in companies of three (two old

* From some of its notes resembling the ringing of a bell. All over the interior and western districts of New South Wales the *Oreoica* is known by the vernacular name of Bell-bird.—A. J. N.

birds and one young one). Whether this is the general brood, or a provision of nature owing to the scarcity of food in the district named, I cannot say; but in no case was more than one young one seen. Adults of both sexes are alike in plumage. When asked to describe its note one of our party suggested, "Whistle the words 'Take it, Bob,' with a drop on the last note;" and I think it was a very good description of it.]

No. 33. RHIPIDURA ALBICAUDA, *North*. White-tailed Fly Catcher.

Rhipidura albicauda, *North*, *Ibis*, 1895, p. 340.

Adult male.—General colour above ashy-brown, becoming slightly darker on the crown of the head and browner on the rump and upper tail-coverts; primaries and secondaries dusky-brown, the innermost secondaries margined with white on their outer webs; primary-coverts brown; greater and median wing-coverts dark brown, the former largely and the latter slightly tipped with white on their outer webs; lesser wing-coverts ashy-brown, some of the feathers having whitish tips; two centre tail-feathers blackish-brown, the outermost feather on either side white; the remainder white, narrowly edged with blackish-brown on the basal half of the outer web, and increasing in extent towards the two centre feathers; shafts of the two centre tail-feathers blackish-brown, the remainder white; lores and ear-coverts blackish-brown; a line over the eye and a shorter one above the ear-coverts white; cheeks and throat white; lower throat dull black; remainder of the under surface ochraceous-buff; sides of the breast pale ashy-brown; thighs ashy-brown; under tail-coverts white; under wing-coverts whitish, with ashy-brown bases; bill, legs and feet brownish-black; "iris black." Total length 5·8 inches, wing 2·8, tail 3·5, bill from gape 0·45, tarsus 0·62.

The sexes are alike in plumage.

Habitat.—Stokes' Pass, Central Australia.

Type.—In the Australian Museum, Sydney.

Observations.—The above specimen has probably barely attained its adult livery, for in a female procured on the Levi Range the *two* outermost tail-feathers on either side are pure white, and the remainder on either side of the two centre feathers white very narrowly edged with blackish-brown on the basal half of their outer webs.

Judging from the above specimens, it may be presumed that very old birds have all but the two centre tail-feathers pure white.

This species, although quite distinct, differs only from *R. albiscapa* in having one or two of the outermost tail-feathers on either side pure white, and the remainder, with the exception of the two centre tail-feathers, white, narrowly edged with blackish-brown on the basal half of their outer webs.

[In the mulga scrub on Levi Range one of these pretty birds attracted attention. In note and habit of fluttering from branch to branch it closely resembled *Rhipidura albiscapa*, but its beautiful, fan-like tail, with four snow-white feathers on each side of a dark centre, rendered a closer examination necessary. Others were also shot at Petermann and Adminga Creeks.]

No. 34. *PETROICA GOODENOVII*, *Vigors and Horsfield*. Red-capped Robin.

Muscicapa goodenovii, Vig. and Hors., Trans. Linn. Soc., Vol. XV., p. 245 (1826).

Petroica goodenovii, Jard. and Selby, Ill. Orn., Add. to Vol. II., p. 8; Gould, Bds. Austr., fol., Vol. III., pl. 5 (1848); Sturt, Exped. Centr. Austr., Vol. II., App., p. 24 (1849).

Petroica goodenovii, Sharpe, Brit. Mus. Cat. Bds., Vol. IV., p. 171 (1879); North, Nests and Eggs Austr. Bds., p. 103 (1889).

- A. ♂ ad. sk., Horseshoe Bend.
- B. ♂ ad. sk., Finke River.
- C. ♂ ad. sk., Trickett's Creek.

[These birds were met with wherever scrub of any description afforded them shelter from the numerous Hawks which, no doubt, find the gay plumage of the male bird a conspicuous mark for their keen eyes. They were either single birds or in pairs, and are very silent in habit.]

No. 35. *MELANODRYAS BICOLOR*, *Vigors and Horsfield*. Hooded Robin.

Grallina bicolor, Vig. and Horsf., Trans. Linn. Soc., Vol. XV., p. 223 (1826).

Petroica bicolor, Gould, Bds. Austr., fol., Vol. III., pl. 7. (1848).

Petroica bicolor, Sharpe, Brit. Mus. Cat. Bds., Vol. IV., p. 173 (1879).

Melanodryas bicolor, North, Nests and Eggs Austr. Bds., p. 105 (1889).

One adult male, Finke River.

[Generally found near scrub or watercourses. They were very tame and easily approached. As they are precisely similar in all respects to those found elsewhere, an extended notice is unnecessary.]

No. 36. *MALURUS MELANOTUS*, *Gould*. Black-backed Superb Warbler.

Malurus melanotus, Gould, Proc. Zool. Soc., 1840, p. 163; *id.* Bds. Austr., fol., Vol. III., pl. 20 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 25 (1849); Sharpe, Brit. Mus. Cat. Bds., Vol. IV., p. 288 (1879); North, Nests and Eggs, Austr. Bds., p. 114, pl. xiii., fig. 19 (1889).

Two adult males, one immature male. Dr. Sharpe's description of this species in the British Museum Catalogue of Birds has been taken from an immature male, and agrees precisely with the latter specimen. The fully adult male has the throat deep cobalt-blue, a band across the upper portion of the breast velvety-black; the remainder of the under surface, flank-feathers and *under tail-coverts*, cobalt-blue. Mr. Keartland has since received from Mr. E. C. Cowle the nest and eggs of this species, together with a skin of the male bird captured while sitting. The eggs resemble those of *M. cyaneus*, but are smaller, and have conspicuous zones towards the larger end. Length (A) 0·6 x 0·5 inches; (B) 0·63 x 48inches; (C) 0·64 x 0·49 inches. An egg of *Lamprococcyx basalis* was also deposited in this nest.

[This is probably the most beautiful of the numerous species of *Malurus*. Our first specimen was killed by our black boy Harry. The specimen was unfortunately shattered to pieces, but sufficed to show the presence of the species at Deering Creek. Others were afterwards obtained at Hermannsburg, along the Finke River, and at Deep Well. Like all the genus, they are found in dense saltbush or undergrowth, and were once in company with *M. leucopterus*.]

No. 37. *MALURUS LAMBERTI*, *Vigors and Horsfield*. Lambert's Superb Warbler.

Malurus lamberti, Vig. and Horsf., Trans. Linn. Soc., Vol. XV., p. 221 (1826); Gould, Bds. Austr., fol., Vol. III., pl. 24 (1848); Sharpe, Brit. Mus. Cat. Bds., Vol. IV., p. 292 (1879); Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., 2nd series, p. 168 (1887); North, Nests and Eggs Austr. Bds., p. 113 (1889).

A ♂ ad. sk., Hermannsburg.

B. ♂ ad. sk., Henbury.

- C. ♂ ad. sk., Finke River.
- D. ♂ ad. sk., Bagot's Creek.
- E. ♂ juv. sk., Bagot's Creek.

Four males in nearly full plumage, one young male. Most of the feathers on the crown of the head and occiput are brown, tipped with deep cobalt, and in one specimen there is only a slight indication of the conspicuous turquoise-blue ear-coverts and cheek plumes. The plumage of the young male is similar to the female, with the exception of having a few chestnut feathers on the shoulder.

[The sociability of the *Maluri* is well known, and one pair of birds is seldom seen alone except at breeding time ; but at Hermannsburg I was surprised to find a flock of about a dozen birds of this genus, composed of equal proportions of *M. lamberti* and *M. leucopterus*, all hopping about a small bush, apparently on the best of terms. In fact, I killed a bird of each species at the one shot. Gould mentions this bird as having a very wide range in New South Wales, but adds :— “ It does not inhabit Tasmania, nor did I observe it in South Australia or hear of its ever having been seen there.” Our first specimen was obtained at Bagot's Creek, and along the Finke River they were plentiful ; but as they were all in bad feather, through moulting, they were not again shot until July, when their plumage had improved. They are partial to saltbush and any dense undergrowth, which not only affords shelter from Hawks, &c., but also harbours a number of spiders and other insects on which they feed.]

No. 38. MALURUS LEUCOPTERUS, Quoy et Gaimard. White-winged Superb Warbler.

Malurus leucopterus, Quoy et Gaim., Voy. de l'Uranie, Zool., p. 108, pl. 23, fig 2 ; Gould, Bds. Austr., fol., Vol. III., pl. 25 (1848) ; Sturt, Exped. Centr. Austr., Vol. II., App. p. 25 (1849) ; Sharpe, Brit. Mus. Cat. Bds., Vol. IV., p. 290 (1879) ; North, Nests and Eggs Austr. Bds., p. 116 (1889).

- A. ♂ ad. sk., Dalhousie.
- B. ♂ ad. sk., Finke River.
- C. ♂ ad. sk., Darwent Creek.
- D. ♂ imm. sk., Hermannsburg.
- E. ♂ juv. sk., Hermannsburg.

The immature male is brown above, and brownish-white below, all the feathers being more or less tipped or washed with deep cobalt-blue, especially on

the crown of the head. The young male resembles the female, with the exception of having a few cobalt-blue feathers on the crown of the head.

[This lovely Warbler was first seen at Dalhousie Springs on 9th May, and afterwards was found wherever saltbush prevailed throughout the trip, until the last was seen within twelve miles of Oodnadatta. Like *M. lamberti*, they were all moulting during May and June, and specimens were only shot in the endeavour to find *M. leuconotus*, which is declared by Gould to inhabit the interior; but I regret that the last-named was not seen. Although females and immature males of *M. leucopterus* were very numerous and easily approached, the adult males were very wary, and it was very difficult to get within gun-shot. An old nest found in a low bush was composed of grass, spiders' web, etc.]

No. 39. *AMYTIS STRIATA*, *Gould*. Striated Wren.

Dasyornis striatus, Gould, Proc. Zool. Soc., 1839, p. 143.

Amytis striatus, Gould, Bds. Austr., fol., Vol. III., pl. 29 (1848); North, Nests and Eggs Austr. Bds., p. 123, pl. ix., fig 10 (1889).

Amytis striata, Sharpe, Brit. Mus. Cat. Bds., Vol. VII., p. 107 (1883).

One adult male, Alice Well. Total length 6·2 inches, wing 2·45, tail 3·45, tarsus 0·95. I expected to find this species replaced in Central Australia by *A. goyderi*.

[This active little bird was first seen at Idracowra; but its habit of frequenting the dense poreupine grass, between the tussocks of which it runs with surprising rapidity, rendered it almost impossible to secure specimens. At Hermannsburg they were numerous, and although several were wounded, they succeeded in eluding capture amongst the grass. I am indebted to Mr. Belt for the only bird shot. This was obtained near Alice Well, and proved to be an adult male. They are only seen as they run with tail erect from tussock to tussock, and appear to scorn the use of their wings altogether. They are found almost throughout Central Australia wherever the porcupine grass abounds, so much so, that they are generally known as the "Poreupine bird."]

No. 40. *AMYTIS TEXTILIS*, *Quoy et Gaimard*. Textile Wren.

Malurus textilis, Quoy et Gaim., Voy. de l'Uran., p. 107, pl. 23, fig. 1 (1824).

Amytis textilis, Lesson, *Traité d'Orn.*, p. 454, pl. 67, fig 2 (1831); Sharpe, *Brit. Mus. Cat. Bds.*, Vol. VII., p. 107 (1883).

? *Amytis macrourus*, Gould, *Proc. Zool. Soc.*, 1847, p. 2; *id.*, *Bds. Austr.*, fol., Vol. III., pl. 30 (1848).

“Ghin-gie-willie,” Aborigines of Central Australia.

	Total length.	Wing.	Tail.	Tarsus.	
A. ♂ ad. sk.	6·2in.	2·5	3·2	0·9	Petermann Creek.
B. ♂ ad. sk.	6·2in.	2·5	3·35	0·95	Petermann Creek.
C. ♀ ad. sk.	6in.	2·42	3·4	0·95	Lawrie's Creek.
D. ♀ imm. sk.	6in.	2·4	3·3	0·93	Lawrie's Creek.
E. ♂ ad. sk.	6in.	2·4	3·3	0·93	Hermannsburg.

Of the five specimens collected three are adult males, all of which are darker than the females; two of them have rusty-red flanks, the other, although apparently adult, is destitute of this colouring, as are also the females. The immature female has the throat whitish, remainder of the under surface of the body pale isabelline, becoming darker on the sides of the neck and breast, which are indistinctly streaked with white; flanks and thighs pale isabelline brown. Gould's description of this species, in his folio edition of the *Birds of Australia*, agrees very well with the adult female, but his figures are probably taken from young birds and are very misleading, for when fully adult the under surface is but slightly paler than the upper, and the feathers of the throat, chest, and sides of the neck in the adult male are distinctly streaked with white. The same author is in error in stating that the bird he described as *A. macrourus*, is the only species of the genus that has been discovered in Western Australia. In the text of the *Voyage de l'Uranie*, p. 107, Quoy and Gaimard state that they obtained the type specimen of *A. textilis* at **la baie des Chiens-Marins*,” a fact evidently overlooked by Gould, as he gives a reference to this work both in his folio edition and *Handbook to the Birds of Australia*. The measurements given of the wing and tail of *A. macrurus* in the *Handbook* are clearly typographical errors; but with the exception of the bill, all of them are so totally at variance with those of the original description, that they tend to increase the doubt of *A. macrurus* being really distinct and separable from *A. textilis*. The only measurements given by Quoy and Gaimard in the original description of the latter species are—total

* Shark Bay, West Australia.

length $6\frac{1}{2}$ inches, tail 3 inches 2 lines. Gould's dimensions of *A. macrurus*, in the Proceedings of the Zoological Society and his Handbook are as follows:—

	Total length.	Bill.	Wing.	Tail.	Tarsus.
P.Z.S., 1847, p. 2. - - - -	7in.	$\frac{1}{2}$ in.	$2\frac{5}{8}$ in.	$4\frac{1}{4}$ in.	1in.
Handbk. Bds. Aus., Vol. I., p. 338 -	$5\frac{1}{2}$ in.	$\frac{1}{2}$ in.	$2\frac{7}{8}$ in.	$2\frac{1}{8}$ in.	$\frac{7}{8}$ in.

Mr. Kearland has since received the eggs of *A. textilis* from Central Australia, which he has forwarded to me, together with the following note:—

“This species builds at the foot of cane-grass on banks of creeks or close to tussocks of grass. The nest is circular, with an entrance in the side, and is rather loosely constructed of dried grasses. Eggs two or three in number for a sitting. This nest was taken by Mr. Cowle during February, 1895.”

One egg is nearly white in ground colour, with spots and dots, especially towards the thicker end, of rich reddish-brown. In the other specimen the ground-colour is reddish-white, and is almost obscured by rich reddish-brown markings, which predominate as usual on the thicker end. Length (A), 0·77 inches x 0·6 inches; (B), 0·77 inches x 0·6 inches. Both of these eggs closely resemble different types of the eggs of *Cincloramphus rufescens*.

With the eggs, Mr. Kearland sent the skin of the female shot at the nest; in this specimen the sides of the breast are rusty-red. As pointed out by Quoy and Gaimard in their original description of *A. textilis*, individual variation exists in the form of the bill and in the depth of colour of this species.

[Just as *A. striatus* is confined to the porcupine grass, so *A. textilis* is limited to the rocky gorges and sides of the ranges, where they appear in companies of six or seven, hopping or running like mice with tail erect, and suddenly dropping in some crevice or behind a stone. They are particularly plentiful at Stokes' Pass, but were also found at Petermann Creek, Lawrie's Creek, Hermannsburg, &c.]

No. 41. XEROPHILA LEUCOPSIS, *Gould*. White-faced Xerophila.

Xerophila leucopsis, Gould, Proc. Zool. Soc., 1840, p. 175; *id.*, Bds. Austr., fol., Vol. III., pl. 67 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 30, (1849); Gadow, Brit. Mus. Cat. Bds., Vol. VIII., p. 73 (1883); North, Nests and Eggs Austr. Bds., p. 150, pl. ix., fig. 14 (1889).

One adult female, obtained near Charlotte Waters.

[These widely-distributed birds were met with in nearly every place where mulga scrub exists. Equally indifferent whether water was near or miles away, the lively note of the little White-faced *Xerophila* might be heard. Sometimes they appeared wary, whilst at other times they would perch close by whilst I listened to their merry song.]

No. 42. *XEROPHILA NIGRICINCTA*, *North*. Black-banded *Xerophila*.

Xerophila nigricincta, *North*, *Ibis*, 1895, p. 340.

Adult female.—General colour above pale cinnamon, becoming richer and darker on the back and rump, and slightly lighter on the crown of the head, where the feathers are centred with dull blackish brown; primaries, secondaries, and wing-coverts brown; the innermost secondaries broadly margined with pale cinnamon, the remainder slightly edged with the same colour on their outer webs and tipped with buffy-white; outer webs of the primaries and the tips of the greater wing-coverts narrowly edged with buffy-white; two centre tail-feathers dull blackish-brown faintly washed and tipped with pale cinnamon; the remainder blackish-brown, with a spot of white at the tip of the inner web, increasing in extent towards the outermost feather, which is broadly tipped and narrowly edged on the outer web with white; forehead, lores and fore part of the cheeks buffy-white, narrowly margined above with an indistinct blackish line; ear-coverts, sides of the neck and upper tail-coverts pale cinnamon, the former having blackish bases; chin, throat and all the under surface dull white, slightly tinged with buff and crossed on the breast by a narrow black band; feathers on the lower sides of the body subterminally barred with rich chestnut; under tail-coverts white, slightly tinged with buff; under wing-coverts and inner margins of quills warm buff; bill black; legs and feet purplish-black. Total length 3·9 inches, wing 2·2, tail 1·7, bill from gape 0·45, tarsus, 0·68.

The sexes are alike in plumage.

Habitat.—Missionary Plain, Central Australia.

Type.—In the Australian Museum, Sydney.

Two males and one female were obtained. This new species of *Xerophila* is allied to *X. pectoralis* from Port Augusta, but from which it may be distinguished by having the breast crossed by a narrow black band, instead of a well defined band of cinnamon-brown across the chest, as in that species.

Mr. Keartland has since received from Mr. E. C. Cowle, of Central Australia,

the eggs of this species. They were taken from a large domed nest in low scrub, and are true ovals in shape and of a dull white ground colour, one specimen being thickly and uniformly freckled all over with reddish-brown markings, the other blotched with the same colour and forming confluent patches towards the larger end. Length (A) 0·72 inch x 0·53 inch; (B) 0·7 inch x 0·53 inch.

[Similar in habits to *X. leucopsis*, these birds were found at several places on the Missionary Plains. They were not by any means numerous, but were in small companies amongst the saltbush. Their note is very sweet, the solitude and comparative scarcity of bird-life no doubt adding to its charm.]

No. 43. *ACANTHIZA APICALIS*, *Gould*. Western Acanthiza.

Acanthiza apicalis, Gould, Proc. Zool. Soc., 1847, p. 31; *id.*, Bds. Austr., fol., Vol. III., pl. 57 (1848); Sharpe, Brit. Mus. Cat. Bds., Vol. VII., p. 296 (1883).

One adult male, Missionary Plain.

[This bird was only once met with, on the Missionary Plains. A flock of about eight or nine were found in a small patch of scrub, but nothing in the shape of information obtained beyond a specimen.]

No. 44. *GEOBASILEUS CHRYSORRHOA*, *Quoy et Gaimard*. Yellow-rumped Geobasileus.

Saxicola chrysorrhoa, Quoy et Gaim., Voy. de l'Astro., Zool., Tom. I., p. 198, pl. 10, fig 2 (1830).

Acanthiza chrysorrhoa, Gould, Bds. Austr., fol., Vol. III., pl. 63 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 30 (1849).

Acanthiza chrysorrhoa, Sharpe, Brit. Mus. Cat. Bds., Vol. VII., p. 298 (1883.)

Geobasileus chrysorrhoa, North, Nests and Eggs Austr. Bds., p. 141 (1889).

One adult male, Levi Range.

[This well-known bird was first seen at Levi Range, and afterwards at Heavitree Gap, &c. Its habits are too well-known to require repetition. A nest built in the usual way, and containing three fresh eggs, was found near Owen Springs on 11th July.]

No. 45. PYRRHOLEMUS BRUNNEA, *Gould*. Red-throat.

Pyrrholemus brunneus, Gould, Proc. Zool. Soc., 1840, p. 173; *id.*, Bds. Austr., fol., Vol. III., pl. 68 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 26 (1849); North, Nests and Eggs Austr. Bds., p. 145, pl. ix., fig. 15 (1889).

Sericornis brunnea, Sharpe, Brit. Mus. Cat. Bds., Vol. VII., p. 302 (1883).

One adult male, Heavitree Gap; one adult male, Deep Well; one adult female, Alice Well. The female may be distinguished from the male by having the throat whitish instead of bright rufous.

[This little songster was first found amongst the scrub at Hermannsburg, and the specimens secured were shot at Heavitree Gap, Deep Well and Alice Well. It is very partial to low scrub and saltbush, amongst which it finds insects, etc., suitable to its taste. It has a beautiful song, and it was much against my will that I had to sacrifice song to science in shooting my first specimen. Mr. Belt afterwards secured a pair on the route at the places named. The female is not quite so bright in plumage as her mate.]

No. 46. SMICRORNIS FLAVESCENS, *Gould*. Yellow-tinted Smicrornis.

Smicrornis flavescens, Gould, Proc. Zool. Soc., 1842, p. 134; *id.*, Bds. Austr., fol., Vol. II., pl. 104 (1848); Masters, Proc. Linn. Soc., N.S.W., Vol. II., p. 272 (1877); Sharpe, Brit. Mus. Cat. Bds., Vol. IV., p. 210 (1879); Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., p. 1089 (1886).

Two adult males, one female, Illamurta. Recorded for the first time from Central Australia.

An egg of this species, since received by Mr. Keartland from Mr. E. C. Cowle of Central Australia, is of a uniform cream ground colour, with a perfect zone of confluent indistinct creamy-brown markings on the larger end. Length, 0.6 inch x 0.47 inch. The nest was built in a eucalyptus sapling.

[This was the smallest bird found throughout the trip, and is no doubt one of the smallest in Australia. When they were first heard near Running Waters the sound was much like the loud twitter of the Welcome Swallow, but, on listening, it proved to have a very pretty song. They are generally found in eucalypts along the creeks, but also frequent the scrub on the hillsides. They are very restless in

their habits, and seem to be constantly on the move in quest of small insects which form their chief food. They are generally found either singly or in pairs.]

No. 47. *CALAMANTHUS ISABELLINUS*, sub-sp. nov. Desert Lark.

Pratincola campestris, Gould, Proc. Zool. Soc. (1840), p. 171 (part.)

Calamanthus campestris, Gould, Bds. Austr., fol., Vol. III., pl. 71 (1848) (part.)

One adult male and female, Missionary Plain. Specimens from the hot plains of Central Australia are easily distinguished from examples obtained at Port Lincoln and the southern portions of the Australian continent by the uniform isabelline hue of their upper surface, and by their being but faintly and narrowly streaked above and below; the rufous colouring of the forehead too is much paler and extends on to the nape. I should have regarded the desert-inhabiting race as specifically distinct had I not examined a large series of specimens from different localities, and which exhibit a perfect gradation in colour and markings, from the dark and broadly-streaked form frequenting marshy situations in the extreme southern portions of the continent, to the paler and far less conspicuously marked race found in Central Australia. I propose, however, to distinguish the latter form, in which the streaks on the upper surface are almost entirely lost, under the sub-specific name of *Calamanthus isabellinus*. Total length 4·5 inches, wing 2·15, tail 2, bill 0·5, tarsus 0·9.

The sexes are alike in plumage.

Habitat.—Missionary Plain, Central Australia.

Type.—In the Australian Museum, Sydney.

Mr. Keartland's note shows that the habits of the two races are entirely different from each other.

[Far away from scrub or shelter of any kind two of these little birds were seen running over the stones or gibbers as actively and quickly as Dottrel on the sea beach. How so small a bird, with its limited power of flight, manages to subsist on the scant supply of insects in such a place, and elude the vigilance of the numerous Hawks, is a mystery. Mr. Belt secured both birds, which proved to be male and female, between Adminga and Blood's Creeks.]

No. 48. *EPHTHIANURA AURIFRONS*, Gould. Orange-fronted Ephthianura.

Ephthianura aurifrons, Gould, Proc. Zool. Soc., 1837, p. 148; *id.*, Bds. Austr., fol., Vol. III., pl. 65 (1848); Sturt, Exped. Centr. Austr., Vol. II.,

App. p. 26 (1849); Sharpe, Brit. Mus. Cat. Bds., Vol. VII., p. 668 (1883); North, Nests and Eggs Austr. Bds., p. 144 (1889); Stirling and Zietz, Trans. Roy. Soc. South Austr., Vol. XVI., p. 158 (1893).

Two adult males and one female, Crown Point.

[On our return journey, near Crown Point, a number of these gay little birds were seen among the mulga scrub and saltbush. Unlike *E. tricolor*, bright-plumaged birds were the rule and not the exception. Two old nests were found in the saltbush. They were open, cup-shaped, and built of fine grass and spider's web.]

No. 49. *EPHTHIANURA TRICOLOR*, *Gould*. Scarlet-fronted Ephthianura.

Ephthianura tricolor, Gould, Proc. Zool. Soc., 1840, p. 159; *id.*, Bds. Austr., fol., Vol. III., pl. 66 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 26 (1849); Sharpe, Brit. Mus. Cat. Bds., Vol. VII., p. 667 (1883); North, Nests and Eggs Austr. Bds., p. 143, pl. xiii., fig. 12 (1889); Stirling and Zietz, Trans. Roy. Soc. South Austr., Vol. XVI., p. 158 (1893).

One young male, one semi-adult male, one nearly-adult male, Hermannsburg.

[Whether, as some authorities assert, these birds change their plumage twice a year or not, it is certain that adult males in full dress are very scarce. At Hermannsburg several flocks were seen in the scrub, but only one really bright bird was present; and, although several scores were seen on the Hugh River, only two mature specimens could be obtained, all the others being either females or immature birds. Being strictly insectivorous they are somewhat indifferent to the presence of water, and only seem to approach it because food is more plentiful in its vicinity.]

No. 50. *CINCLORAMPHUS CRURALIS*, *Vigors and Horsfield*. Australian Skylark.

Megalurus cruralis, Vig. and Horsf., Trans. Linn. Soc., Vol. XV., p. 228 (1826).

Cincloramphus cruralis, Gould, Proc. Zool. Soc., 1837, p. 150; *id.*, Bds. Austr., fol., Vol. III., pl. 74 (1848); Sharpe, Brit. Mus. Cat. Bds., Vol. VII., p. 498 (1883); Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1098 (1886); North, Nests and Eggs Austr. Bds., p. 152 (1889).

Cincloramphus cantillans, Gould, Bds. Austr., fol., Vol. III., pl. 75 (1848); Sturt, Exped. Centr. Austr., p. 31 (1849).

One adult male, Heavitree Gap.

[This bird was frequently found along the course of the Finke River and at other places, where its merry and loud song was heard as it flew from tree to tree, or perched on the dead branch of a tall eucalypt. The specimen secured was shot at Heavitree Gap, in a mulga scrub, amongst which it ran like a Ground Thrush, for which it was at first mistaken from a distance.]

No. 51. CINCLORAMPHUS RUFESCENS, *Vigors and Horsfield*. Rufous-rumped Skylark.

Anthus rufescens, Vig. and Horsf., Trans. Linn. Soc., Vol. XV., p. 230 (1826).

Cincloramphus rufescens, Gould, Bds. Austr., fol., Vol. III., pl. 76 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 31 (1849); Sharpe, Brit. Mus. Cat. Bds., Vol. VII., p. 500 (1883); North, Nests and Eggs Austr. Bds., p. 153 (1889).

Ptenædus rufescens, Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1090 (1886).

Two adult males, Bagot's Creek; two adult males, Levi Range.

[At Petermann Creek these birds were found in companies of three or four, and, to my surprise, kept flying from bush to bush, and worked amongst the blossom in a manner that at first led me to think they were Honeyeaters. By a little care several specimens were secured and their identity was established. Although frequently afterwards met with, it was some time before I heard their well-known note.]

No. 52. TENIOPYGIA CASTANOTIS, *Gould*. Chestnut-eared Finch.

Amadina castanotis, Gould, Proc. Zool. Soc., 1835, p. 105; *id.*, Bds. Austr., fol., Vol. III., pl. 87 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 27 (1849).

Estrelida castanotis, Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1091 (1886).

Teniopygia castanotis, North, Nests and Eggs Austr. Bds., p. 165 (1889); Sharpe, Brit. Mus. Cat. Bds., Vol. XIII., p. 311 (1890).

One adult male, Levi Range ; one young male, Swallow Creek. The latter differs from the adult in being destitute of the black patch in the centre of the chest, and in having only a slight indication of the chestnut cheeks and ear-coverts and the narrow transverse black lines on the throat and sides of the chest. Bill, orange.

[These finches were met with in enormous flocks at the rock pools in the ranges, and in smaller numbers all along the route wherever water was near. At Ooraminna Waterhole they were so plentiful that their droppings were several inches deep under the bushes. They appear to breed nearly all the year round, and to build their grass nests in all sorts of places, sometimes singly, but frequently in company. At Davenport Creek nine nests (three of which contained eggs) were found on one small bush. At Red Mulga Creek nests were found concealed amongst the *debris* left by floods, whilst at Heavitree Gap fresh eggs were taken from an old nest in which birds had been reared. Other nests were found in grass tussocks and the prickly "nigger-head," and at Alice Springs one was built on a shelf inside the blacksmith's shop. Unlike most finches these eggs have a decided blue tinge, five generally forming the clutch.]

No. 53. EMBLEMA PICTA, *Gould*. Painted Finch.

Emblema picta, Gould, Proc. Zool. Soc., 1842, p. 17 ; *id.*, Bds. Austr., fol., Vol. III., pl. 97 (1848) ; Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1092 (1886) ; Sharpe, Brit. Mus. Cat. Bds., Vol. XIII., p. 295 (1890).

One adult male, one female, and one young male, police camp, McMinn's Range ; one adult male and two females, Bagot's Spring ; one adult female, Mereenie Bluff. Two specimens marked females, probably very old birds, are similar in plumage to the fully adult male.

A set of eggs of this species, since received by Mr. Keartland, and taken by Mr. E. C. Cowle at Illamurta, Central Australia, on the 6th January, 1895, from a dome-shaped nest composed of dried grasses and lined with feathers, are pure white and measure as follows :—Length (A) 0·66 inch x 0·45 inch ; (B) 0·66 inch x 0·42 inch ; (C) 0·6 inch x 0·45 inch ; (D) 0·63 inch x 0·42 inch ; (E) 0·59 inch x 0·43 inch.

[These beautiful finches were first found in the rocky gorges of McMinn's Range and subsequently at Stokes' Pass, Glen of Palms, and Bagot's Spring. They are very timid and somewhat difficult to approach. Although there is no sexual difference in plumage, they vary with age. The scarlet patch, so conspicuous on

the breasts of adults, is almost or entirely absent on the young ones, and the rich black on the under parts of the mature birds is also replaced by a smoky black on the young. Several of these nests were seen which closely resembled those of *Amadina castanotis*, but were a trifle larger in size. They were placed on low bushes, built of grass and oval-shaped. Unfortunately they all contained young birds. The eyes of the adults being white give the live birds a remarkable appearance.]

No. 54. *CINCLOSOMA CINNAMOMEUM*, *Gould*. Cinnamon-coloured Ground Thrush.

Cinclosoma cinnamomeus, Gould, Proc. Zool. Soc., 1846, p. 68; *id.*, Bds. Austr., fol., Vol. IV., pl. 6 (1848); Sturt, Exped. Centr. Austr., Vol. II., App., pl. opp. p. 28 (1849).

Cinclosoma cinnamomeus, Sturt, Exped. Centr. Austr., Vol. II., App. p. 28 (1849).

Cinclosoma cinnamomeum, Sharpe, Brit. Mus. Cat. Bds., Vol. VII., p. 334 (1883).

- A. ♂ ad. sk., Hughes's Waterhole.
- B. ♂ ad. sk., Blood's Creek.
- C. ♀ ad. sk., Crown Point.

Three adult specimens of the smallest of our Australian Ground Thrushes.

[Running over the brown sand or stony ground near Blood's Creek these birds were not easily seen until closely approached. They run quickly over the ground and around the small clumps of saltbush in quest of insects. They were afterwards found at Crown Point in similar country. They appeared to live entirely on the ground, and were never seen in the trees or bushes.]

No. 55. *CINCLOSOMA CASTANOTUM*, *Gould*. Chestnut-backed Ground Thrush.

Cinclosoma castanotus, Gould, Proc. Zool. Soc., 1840, p. 113; *id.*, Bds. Austr., fol., Vol. IV., pl. 5 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 27 (1849).

Cinclosoma castanotum, Gray, Gen. Bds., Vol. I., p. 224 (1846); Sharpe, Brit. Mus. Cat. Bds., Vol. VII., p. 333 (1883).

Cinclosoma castaneonotum, Stirling and Zietz, Trans. Roy. Soc. South Austr., Vol. XVI., p. 158 (1893).

One example marked a female, Deering Creek. This specimen differs from any female I had previously seen of this species, and is similar to a semi-adult male in the reference collection of the Australian Museum in having the chestnut colouring of the upper surface extending all over the back and rump. On the under surface it resembles the female in having the throat and chest grey, instead of blue-black, and in being destitute of the line of black streaks on the feathers separating the white breast and abdomen from the brown flanks. Another semi-adult male in the Australian Museum collection, from the western district of New South Wales, shows a further advance towards maturity by having the grey feathers of the throat and chest intermingled with others of a glossy blue-black. If the specimen obtained by Mr. Keartland is really a female it is probably a very old bird and cannot be distinguished from the immature male. I believe it to be a young male.

[I was only successful in securing one female of this species, and with the exception of one afterwards seen at Hermannsburg, this was all we saw. The specimen obtained was peculiar from the fact that instead of confining itself to the ground like most members of the genus, it flew from bush to bush and was eventually shot on a branch fifteen feet from the ground.]

No. 56. *CHLAMYDODERA GUTTATA*, *Gould*. Guttated Bower-bird.

Chlamydochroa guttata, Gould, Proc. Zool. Soc., 1862, p. 161; *id.*, Suppl. Bds. Austr., pl. 35 (1869); Elliot, Monogr. Parad., Intro. p. xxii. (1873); Sharpe, Brit. Mus. Cat. Bds., Vol. VI., p. 390 (1881); Stirling and Zietz, Trans. Roy. Soc. South Austr., Vol. XVI., p. 157 (1893).

Two examples of this distinct and well-marked species obtained at Glen Edith. Both are males and are apparently not quite adult, or in the moult, for one has only a faint indication of the beautiful lilac nuchal plumes, and they are but slightly more developed in the other specimen. This species is readily distinguished from its near ally *C. maculata*, of eastern and southern Australia, by the feathers of the upper surface being blackish-brown instead of dark brown—rendering the spots, which are paler, more conspicuous—and by the absence of the earthy-brown band between the nuchal plumes and mantle. The head and neck, too, are much darker, and the tips of the wing-coverts and secondaries are pale yellowish-buff instead of tawny-buff.

[Wherever the “native fig” trees existed these birds were found. They were generally very shy, and only two specimens were obtained. Several bowers seen

bore a close resemblance to those of *C. maculata*. At Owen Springs we were informed that in dry weather these birds come to the water-buckets under the verandah to drink, and become quite fearless of the presence of persons sitting close by.]

No. 57. *CORVUS CORONOIDES*, *Vigors and Horsfield*. Australian Crow.

Corvus coronoides, Vig. and Horsf., Trans. Linn. Soc., Vol. XV., p. 261 (1826); Sharpe, Brit. Mus. Cat. Bds., Vol. III., p. 20 (1877); North, Nests and Eggs Austr. Bds., p. 186, pl. vii., fig. 8 (1889).

One adult male and one immature female, Hermannsburg; one adult male, Heavitree Gap. Similar to examples obtained in New South Wales.

[A camp-fire seems to possess an irresistible attraction for these birds. No matter where the wanderer in Central Australia may decide to boil his "billy," he is sure to have a visit from one or more of these Crows before the water boils. They are very bold, and at times come into the camp in search of food. Once at Heavitree Gap a Crow seized a piece of meat from the table whilst the cook was at work. At Hermannsburg over thirty Crows were within gunshot at one time, waiting for the refuse from the birds I was skinning. Both at Hermannsburg and Heavitree Gap scores of these birds were noted which all had hazel eyes, but at Stevenson Creek they were found in company with those possessing white eyes. A pair of dark-eyed birds shot at Hermannsburg measured as follows:—Male, weighed 20¾oz.; 3 feet 4 inches from tip to tip of wings; length, 20 inches; from tip joint to end of third primary, 13 inches. Female, 18¼oz.; spread of wings, 3 feet 3 inches; length, 20 inches; from joint to end of third primary, 13 inches. Others shot at Heavitree Gap were of similar proportions.]

No. 58. *POMATOSTOMUS RUBECULUS*, *Gould*. Red-breasted Pomatostomus.

Pomatorhinus rubeculus, Gould, Proc. Zool. Soc., 1839, p. 144; *id.*, Bds. Austr., fol., Vol. IV., pl. 21 (1848); Sharpe, Brit. Mus. Cat. Bds., Vol. VII., p. 421 (1883).

Pomatostomus rubeculus, Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1088 (1886); North, Nests and Eggs Austr. Bds., p. 155 (1889).

One adult female, Crown Point. Similar to examples from Port Darwin and Derby. It is interesting to extend the range of this northern and north-western Australian species to Central Australia.

[These birds invariably attract attention wherever met with. They are extremely sociable, and not only are two or three nests found on one tree, but there is strong evidence that two pairs of birds sometimes share the same nest. At Henbury three birds were seen carrying wool from an old sheepskin to a nest, whilst a fourth bird was inside arranging the material brought. It is very amusing to watch their peculiarly-laboured flight and curious antics as they jump from branch to branch. Their habit of mewling like a cat has gained for them the local eognomen of "eat-birds."]

No. 59. POMATOSTOMUS SUPERCILIOSUS, *Vigors and Horsfield*. White-eyebrowed Pomatostomus.

Pomatorhinus superciliosus, Vig. and Horsf., Trans. Linn. Soc., Vol. XV., p. 330 (1826); Gould, Bds. Austr., fol., Vol. IV., pl. 22 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 32 (1849); Sharpe, Brit. Mus. Cat. Bds., Vol. VII., p. 419 (1883).

Pomatostomus superciliosus, North, Nests and Eggs Austr. Bds., p. 156 (1889).

One adult female, Goyder's Well.

[This species is much smaller in size than the foregoing, but is precisely similar in structure and habits. Sometimes the two species are found in company. Their nests are large in proportion to the size of the birds, and are built of sticks and lined with wool or feathers. One measured 20 inches x 18 inches.]

No. 60. GLYCIPHILA ALBIFRONS, *Gould*. White-fronted Honey-eater.

Glyciphila albifrons, Gould, Proc. Zool. Soc., 1840, p. 160; *id.*, Bds. Austr., fol., Vol. IV., pl. 29 (1848); Gadow, Brit. Mus. Cat. Bds., Vol. IX., p. 211 (1884); North, Nests and Eggs Austr. Bds., p. 197 (1889).

One immature male, Levi Range.

[At Levi Range a solitary male specimen was shot as it was feeding on a cluster of Loranthus. Although carefully sought for, birds of this species were not again met with.]

No. 61. GLYCIPHILA OCULARIS, *Gould*. Brown Honey-eater.

Glyciphila? ocularis, Gould, Proc. Zool. Soc., 1837, p. 154.

Glyciphila ocularis, Gould, Bds. Austr., fol., Vol. IV., pl. 31 (1848); Gadow, Brit. Mus. Cat. Bds., Vol. IX., p. 213 (1884).

Stigmatops ocularis, North, Nest and Eggs Austr. Bds., p. 198 (1889).

One adult male, Davenport Creek; one adult female, Hermannsburg. Slightly smaller than examples from New South Wales. Total length 4·9 inches, wing 2·7, tail 2·2, tarsus 0·65, bill 0·7. Specimens of *G. subocularis*, from Derby and Port Darwin, are much smaller; average length of wing 2·3 inches.

[In proportion to its size this bird has a louder note than any other Honey-eater. Although no larger than a small finch it could be heard 200 yards away. They are very plentiful in the stunted mallee and acacias at Davenport Creek. A nest found near our camp was constructed of dry grass and green moss, but was not quite finished. These birds were afterwards found at several places on the homeward track along the Stevenson Creek.]

No. 62. *PTILOTIS KEARTLANDI*, North. Keartland's Honey-eater.

Ptilotis keartlandi, North, Ibis, 1895, p. 340.

Adult male.—General colour above pale greyish-brown, slightly tinged with olive-yellow and gradually passing into grey on the crown of the head and buff on the rump; upper tail coverts more distinctly tinged with olive-yellow; primaries, secondaries, and their coverts brown, strongly washed with bright olive-yellow on their outer webs; the median series of the greater wing-coverts slightly tinged with buff; lesser wing-coverts brown, washed with grey; tips of secondaries and the outer webs of the three longest primaries towards the tips narrowly edged with dull ashy-white; tail-feathers brown, externally washed with bright olive-yellow, and all but the two centre tail-feathers having dull whitish tips; a line in front, and the feathers above and below the eye, blackish; ear-coverts silky-grey, slightly tipped with blackish-brown; extending behind and partially concealed by the posterior and lower corner of the ear-coverts a conspicuous patch of bright yellow feathers; cheeks, chin, throat, and all the under surface pale lemon-yellow, slightly darker on the centre of the throat and fore-neck; each feather of the latter and those on the sides of the breast having a narrow indistinct line of brown down the centre; thighs brown; under tail-coverts, pale lemon-yellow; under wing-coverts and inner margins of primaries, pale fulvous; bill, blackish-brown; legs and feet, dark fleshy-brown; iris, dark brown. Total length 5·6 inches, wing 3·13, tail 2·2, bill from gape 0·7, tarsus 0·8.

The sexes are alike in plumage.

Habitat.—McMinn's Range, Central Australia.

Type.—In the Australian Museum, Sydney.

A female was also obtained at Davenport Creek; it is scarcely adult, having the skin around the gape yellow and the patch of yellow feathers at the lower corner of the ear-coverts not so bright or well-defined, otherwise it resembles the adult male; length of wing, 3·03 inches.

This very distinct species of *Ptilotis* I have named after Mr. George Arthur Kearland, whose assiduity and perseverance as ornithological collector contributed so much to the success of this branch of the work of the Expedition. *P. kearlandi* comes nearest to that section of the genus *Ptilotis* which includes *P. cratitia* and *P. plumulus*.

[The first example of this species was obtained in a gorge near the police camp at Illamurta, as it came in company with *Emblema picta* to drink at a small spring. They were frequently found afterwards in mallee, mulga, or acacia scrub, either in pairs or single birds. They seemed to be at constant feud with *Ptilotis penicillata*. Whenever the two species met, one invariably chased the other away. A nest of this species closely resembled that of *Ptilotis chrysops*.]

Mr. Kearland has since sent me two eggs of this species taken from a nest built in a low bush near Crown Point, on the Finke River. One specimen is of a pale fleshy-buff ground colour, very sparingly and minutely freckled with light chestnut red except on the thicker end, where intermingled with fine underlying streaks of faint purple the marks become confluent and a cap is there formed; length, 0·7 inch x 0·58 inch. The other is of a warm buff ground colour, minutely dotted and irregularly spotted with different shades of chestnut-red, the markings predominating as usual on the thicker end; length, 0·75 inch x 0·6 inch.

No. 63. ACANTHOGENYS RUFIGULARIS, *Gould*. Spiny-cheeked Honey-eater.

Acanthogenys ruficularis, Gould, Proc. Zool. Soc., 1837, p. 153; *id.*, Bds. Austr., fol., Vol. IV., pl. 53 (1848); North, Nests and Eggs Austr. Bds., p. 213, pl. xii., fig. 10 (1889).

Acanthochæra ruficularis, Gadow, Brit. Mus. Cat. Bds., p. 265 (1884).

One adult male, Idracowra; one adult female, Hermannsburg.

[These birds were scattered all through Central Australia, and, unlike most Honey-eaters, were frequently found on the ground. As this seemed peculiar, I carefully noted the spot from which the bird rose, and found the source of attraction had been some honey-bearing flowers. The variation in the colour of the iris was remarkable. Whilst some were light or dark brown, others were bright blue. In markings and note they do not differ from our well-known birds.]

No. 64. MYZANTHA FLAVIGULA, *Gould*. Yellow-throated Miner.

Myzantha flavigula, Gould, Proc. Zool. Soc., 1839, p. 143; *id.*, Bds. Austr., fol., Vol. IV., pl. 79 (1848); North, Nests and Eggs Austr. Bds., p. 230, pl. xii., fig. 4 (1889).

Manorhina flavigula, Gadow, Brit. Mus. Cat. Bds., Vol. IX., p. 261 (1884).

An adult male and female, Bagot's Creek. Slightly smaller than specimens obtained in New South Wales.

[Very plentiful at Hermannsburg, along the Finke and Palmer Rivers, and at all the waterholes and creeks. Generally in flocks of from three to a dozen they might be seen flying from tree to tree, or on the ground seeking for insects or honey in blossom or flowers. Their note is exactly like that of *M. garrula*, and in the distance they are easily mistaken for that bird.]

No. 65. DICAËUM HIRUNDINACEUM, *Latham*. Swallow Dicaëmi.

Sylvia hirundinacea, Lath., Ind. Orn., Suppl., p. lv. (1801).

Dicaëum hirundinaceum, Gould, Bds. Austr., fol., Vol. II., pl. 34 (1848); Sharpe, Brit. Mus. Cat. Bds., Vol. X., p. 19 (1885); Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1093 (1886); North, Nests and Eggs Austr. Bds., p. 236 (1889).

One adult male, Levi Range; one adult male, Finke River. This species is generally distributed over the Australian continent.

[Wherever the *Loranthus* was found on the mulga, eucalypt, or casuarina, these little birds were numerous, especially at Red Mulga Creek. They all appeared to be unusually bright in plumage, and this remark applies to all representatives of the species found throughout the trip. Their loud sharp note and

active habits renders them conspicuous amongst the small birds, and their pretty purse-like nests are marvels of neatness.]

No. 66. CLIMACTERIS SUPERCILIOSA, *North*. White-eyebrowed Tree-creeper.

Climacteris superciliosa, *North*, *Ibis*, 1895, p. 341.

Adult male. General colour above dull earth-brown, changing gradually into dark greyish-brown on the crown of the head and blackish-brown on the forehead; sides of the neck and upper tail-coverts grey, slightly washed with brown; primaries and secondaries brown with blackish-brown bases, all but the three outermost primaries and the three innermost secondaries crossed in the centre with a broad band of rich buff succeeded by another subterminal band of blackish-brown; tail brown, all but the two centre feathers and the outer webs of the outermost feather on either side crossed by a subterminal band of blackish-brown, increasing in width towards the outermost feather; lores blackish; feathers below the eye and a broad superciliary stripe white; ear-coverts greyish-black streaked with white down the centre of each feather; chin white; throat and fore-neck light greyish-brown; remainder of the under surface dark greyish-brown, the apical half of each feather with a broad longitudinal stripe of white down the centre, bordered on either side with a narrower line of black; lower sides of the body and centre of the abdomen buffy-brown, and less conspicuously streaked; under tail-coverts buffy-white, with irregular blackish-brown cross-bars; axillaries and greater under wing-coverts delicate buff, lesser under coverts dull white, mottled with blackish-brown; bill, legs, and feet, black; iris, dark brown. Total length 5.7 inches, wing 3.55, tail 2.55, bill from forehead 0.6, from gape 0.73, tarsus 0.73.

Adult female.—Like the male in colour, but having the white superciliary stripe margined above by a narrower line of rusty-red; the feathers on the centre and lower part of the fore-neck dull white, edged with pale rusty-red; the upper tail-coverts and the two centre tail-feathers grey, and the remainder of the tail-feathers slightly washed with grey.

Habitat.—Moolah, interior of New South Wales; Illara Creek and Bagot's Creek, Central Australia; Queensland.

Type.—In the Australian Museum, Sydney.

Obs.—This species of *Climacteris* is allied to *C. erythrops*, but differs principally in having a smaller bill; the crown of the head greyish-brown, instead

of blackish-brown ; the band through the wing rich buff, instead of pale greyish-buff ; the ear-coverts in the male dark greyish-black streaked with white, instead of uniform greyish-brown, and the orbital region and superciliary stripe pure white, instead of rusty-red. The female also has the white superciliary stripe, but bordered above by a narrower one of rusty-red, and in both sexes the under surface is more broadly and distinctly streaked with pure white, instead of dull white.

Upon examining the reference collection in the Australian Museum, I find there is a male and female of this species obtained in July, 1883, by the late Mr. Kenric Harold Bennett on Moolah Station, in the central province of New South Wales. The specimens procured by Mr. Keartland at Illara Creek and Bagot's Creek are alike in plumage, and are marked respectively male and female ; but the examples obtained by Mr. Bennett at Moolah, and shot together while nesting, vary as described above. There is also another specimen in the reference collection from Queensland marked a female, which is precisely similar to the one from Moolah. The latter specimens are marked male and female, "iris brown, legs and feet black."

An egg of *C. superciliosa*, received by Mr. Keartland from Central Australia and taken by Mr. Cowle from the hollow spout of a tree, is a rounded oval in form and closely resembles a small egg of *C. scandens* ; it is of a pale reddish-white ground colour, thickly spotted and dotted all over with rich reddish-brown markings, which are larger and become confluent on the thicker end ; length 0.73 inch x 0.67 inch.

[Like all members of this genus, we found this Tree-reeper busily at work on the trunks of all kinds of trees. They always flew to the base of the trunk, and working upwards in a spiral manner, soon reached the top, when they would immediately fly to the base of the next tree. The Sittella seems to prefer working head downwards, but the Tree-reeper is seldom if ever seen in that position.]

No. 67. SITTELLA PILEATA, *Gould*. Black-capped Sittella.

Sittella pileata, Gould, Proc. Zool. Soc. (1837), p. 151 (male) ; *id.*, Bds. Austr., fol., Vol. IV., pl. 104 (1848) ; Gadow, Brit. Mus. Cat. Bds., Vol. VIII., p. 362 (1883) ; North, Nests and Eggs Austr. Bds., p. 242 (1889).

Two nearly adult males, Swallow Creek ; two adult females, Bagot's Creek ; one adult female, Deering Creek.

[The Orange-winged *Sittella* loves to work head downwards, or hopping along under the limbs of trees inspecting the crevices in the bark in search of spiders or small insects. So in Central Australia we found the little black-headed species behaving in exactly the same manner. In mulga scrub or on the large eucalypts they might be seen either singly, in pairs, or flocks of a dozen or more busily at work. The sexes are easily distinguished, as all the upper part of the head in the female is black, whilst the male has simply a black cap with white at the base of the bill and over the eyes.]

No. 68. PHAPS CHALCOPTEA, *Latham*. Common Bronze-wing.

Columba chalconotus, Lath., Ind. Orn., Vol. II., p. 604 (1790).

Peristera chalconotus, Gould, Bds. Austr., fol., Vol. V., pl. 64 (1848).

Phaps chalconotus, Sturt, Exped. Centr. Austr., Vol. II., App. p. 41 (1849); Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., 2nd series, p. 171 (1887); North, Nests and Eggs Austr. Bds., p. 273 (1889); Salvad., Brit. Mus. Cat. Bds., Vol. XXI., p. 526 (1893).

- A. ♂ imm. sk., Lawrie's Creek.
- B. ♀ nearly ad. sk., Reedy Hole.
- C. ♂ imm. sk., Glen Ellen.
- D. ♂ imm. sk., Davenport Creek.
- E. ♀ imm. sk., Lawrie's Creek.

[At all permanent water these birds came at sunset, and continued arriving until quite dark, in order to drink. The first comers were generally young birds, the old ones coming later. They arrived singly, and could be heard to drop on the ground about fifty yards from the water with a heavy thud, and would then wait preening their feathers until joined by several others, when they marched in single file to the water, quenched their thirst, rose singly and quickly disappeared. At Reedy Hole several young birds were killed. When at one dry creek, a hole was made deep in the sand to get a soakage; the task was not completed until long after dark, but at the first streak of light the following morning pigeons commenced to arrive, and before it was light enough to shoot our black boy killed one with a stone. It would thus appear that these birds are either semi-nocturnal in their habits or able to scent the water, as it must have been some time since surface water existed there, for the hole required to be sunk over five feet.]

No. 69. OCYPHAPS LOPHOTES, *Temminck*. Crested Bronze-wing.

Columba lophotes, Temm., Pl. Col., 142 (1823).

Ocyphaps lophotes, Gould, Bds. Austr., fol., Vol. V., pl. 70 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 44 (1849); Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., 2nd series, p. 171 (1887); North, Nests and Eggs Austr. Bds., p. 277, pl. iv., fig. 10 (1889); Salvad., Brit. Mus. Cat. Bds., Vol. XXI., p. 535 (1893).

- A. ♂ ad. sk., Goyder's Well.
- B. ♂ ad. sk., Crown Point.
- C. ♀ ad. sk., Goyder's Well.
- D. ♂ ad. sk., Goyder's Well.
- E. ♀ ad. sk., Ross's Waterhole.

[All along the route these beautiful birds were found at the waterholes morning and evening, but during the day they scattered through the forests and scrub. At Goyder's Well they came in numbers soon after sunrise, and alighting about one hundred yards from the water, congregated on a small hillock for a few minutes to plume their feathers, and then marched in procession down to drink. In the flocks very young birds were often present, and also females containing eggs in the oviduct, thus showing their sociable habits during breeding time. At Lawrie's Creek I saw *Phaps chalcoptera*, *Ocyphaps lophotes*, and *Lophophaps leucogaster* all on the ground together within fifty yards of where I stood.]

No. 70. LOPHOPHAPS LEUCOGASTER, *Gould*. White-bellied Bronze-wing.

Geophaps plumifera, Sturt, Exped. Centr. Austr., App., Vol. II., p. 43 (1849).

Lophophaps plumifera, Gould, Handbk. Bds. Austr., Vol. II., p. 136 (1865).

Lophophaps leucogaster, Gould, Bds. Austr., Suppl., pl. 69 (1869); Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1095 (1886); North, Nests and Eggs Austr. Bds., p. 276 (1889); Salvadori, Brit. Mus. Cat. Bds., Vol. XXI., p. 535 (1893).

	Total length.	Wing.	Tail.	Tarsus.	Bill.	
B. ♂ ad. sk.	- 8	- 4.75	- 3.2	- 0.9	- 0.72	Crown Point.
C. ♀ ad. sk.	- 7.7	- 4.6	- 3	- 0.9	- 0.73	Crown Point.
D. ♂ ad. sk.	- 8	- 4.6	- 3.1	- 0.88	- 0.7	Crown Point.
E. ♀ ad. sk.	- 8	- 4.6	- 3.2	- 0.9	- 0.72	Crown Point.
F. ♂ imm. sk.	- 8	- 4.4	- 3.2	- 0.84	- 0.7	Levi Range.
G. ♀ ad. sk.	- 8.3	- 4.7	- 3.2	- 0.88	- 0.75	Levi Range.
H. ♂ ad. sk.	- 8.3	- 4.7	- 3.3	- 0.88	- 0.75	Levi Range.

Measurements of *L. plumifera* from Derby, north-western Australia :—

	Total length.	Wing.	Tail.	Tarsus.	Bill.
♀ ad. sk.	- 7.5	- 4.05	- 2.7	- 0.8	- 0.6

Seven examples of this distinct species were obtained. It is very much larger than *L. plumifera*, of the north-western coast, and from which it may be readily distinguished by the centre of the lower breast being white, and by having the feathers on the chest broadly tipped with white, and forming a distinct band immediately above the grey and black ones. The range of this species extends throughout the whole of Central Australia, the Gulf District, and the interior of northern and north-western Australia. In the recently issued Catalogue of the COLUMBÆ in the British Museum, Count Salvadori has taken his description of *L. plumifera* from specimens of the Plumed Bronze-wing obtained by the late T. H. Bowyer-Bower at Derby, north-western Australia, and although varying in the description, judging by the measurements I have no doubt they are similar to the birds from which Gould originally took his description of this species; but it must be remembered that in the Proceedings of the Zoological Society Gould described *L. plumifera* as having two semi-lunar marks of *white* on the chest, which, meeting, form a point in the centre, and also figured it with this *white* band on the chest in his folio edition of the Birds of Australia. The Derby specimens have no white marks on the chest, but, as Count Salvadori points out, a crescentic band of grey, margined below with a narrower one of black. In the Proceedings of the Linnean Society of New South Wales, Dr. Ramsay referred the birds obtained by the late T. H. Bowyer-Bower at Derby to *L. ferruginea*, relying upon Gould's statement in the Supplement to the Birds of Australia that *L. ferruginea* differs from *L. plumifera* and *L. leucogaster*, "in the absence of the *broad white pectoral band* so conspicuous in those birds." In conclusion, I would remark that I have examined a large series of the Plumed Bronze-wings from different parts of Australia, but I have never met with any

bird answering to Gould's original description and figure of *L. plumifera*. Of the existence of two distinct species of *Lophophaps* in Australia there is not the slightest doubt, and if the specific character of the birds from the Gascoyne River and Champion Bay are constant, then a third species must be added to the number.

[At Crown Point, on 18th May, Mr. Belt secured the first pair of these birds. They proved to be adults, and the female contained a well-developed egg in the oviduct. Subsequently I obtained them in numbers at Lawrie's Creek, Petermann Creek, Hermannsburg, and in fact wherever rocks and water existed, until we reached Crown Point on the return journey on 26th July. On several occasions they made a welcome addition to our table, where their beautiful white flesh was much appreciated. Their love of rocky country has gained for them their appellation of "Rock Pigeons." They are strictly ground birds and never perch on trees, but assembled in small companies on the rocky sides of the gorges through which we passed, where they seemed to enjoy basking in the hot sun. Owing to their colour they are not easily seen on the red sand or rocks. They are easily approached, and when disturbed rise with a "whirr" like a quail; but as soon as they are well on the wing they gently glide away, giving a tempting shot. At Stokes' Pass, Hugh Edgar, one of our camel drivers, found a nest, if such it might be called, containing two young ones nearly able to fly. They were entirely brown, but others probably a week older were found, which had developed the white and black on the throat and head, which were invisible on the nestlings, as the feathers had not formed on those parts. The birds lay their eggs on the ground, generally near a tussock of porcupine grass, and place a few loose straws around, but in such a careless manner that it scarcely deserves the name of nest. Subsequently, at Haast's Bluff, Dr. Stirling found several nests containing eggs or young ones. There were never more than two eggs, which are about one-third smaller than those of *Ocyphaps lophotes*, and are of a dull, creamy-white colour, with rather rough surface and lacking the usual glossy surface of pigeon eggs. I was informed that these birds have never been found further south than Crown Point, on the Finke River.]

No. 71. *GEOPELIA CUNEATA*, *Latham*. Little Turtle-Dove.

Columba cuneata, Lath., Ind. Orn. Suppl., p. lxi. (1801).

Geopelia cuneata, Gould, Bds. Austr., fol., Vol. V., pl. 74 (1848); Sturt, Exped. Centr. Austr., Vol. II., App. p. 44 (1849); Salvad., Brit. Mus. Cat. Bds., Vol. XXI., p. 462 (1893).

Stictopelia cuneata, Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1095 (1886) ; North, Nests and Eggs Austr. Bds., p. 279 (1889).

A. ♂ ad. sk., Finke River.

B. ♀ imm. sk., Heavitree Gap.

Two examples. The female, which is immature, has many of the feathers on the crown of the head and nape crossed with dusky black and tipped with pale brown, and the innermost secondaries, scapulars, and wing-coverts narrowly edged with light grey.

[These lovely little Doves were found all along the Finke River, and were particularly plentiful at Deering Creek, Darwent Creek, Reedy Hole and Heavitree Gap. During warm days they were found sheltering themselves beneath any shady bush, but in cool weather and in the morning and evening were seen in large numbers feeding on the ground or drinking at the waterholes. Many nests containing young were found and appreciated by our blacks as good food. The sites selected for breeding were generally the *debris* in the low shrubs near water, where the birds either hollowed the surface slightly or added a few pieces of grass to keep the eggs from rolling off.]

No. 72. TURNIX LEUCOGASTER, *North*. White-bellied Turnix.

Turnix leucogaster, North, Ibis, 1895, p. 342.

Adult female.—General colour above chestnut-brown, each feather being more or less broadly margined with buffy white; bases of the feathers on the top of the head black, their inner webs whitish, forming a conspicuous stripe down the centre of the head; nape and hind-neck pale chestnut brown, each feather being submarginally edged on either side with a narrow line of black; scapulars, back, rump, upper tail-coverts and tail more distinctly lined with black and having three or more irregularly shaped cross-bars on each feather, the scapulars being broadly margined with buffy-white and having a spot of ochraceous-brown near the tips; primaries, secondaries and primary-coverts blackish-grey; outer web of the first primary and edge of the wing white, the remainder narrowly edged with buff, also the tips of outer webs of secondaries and inner webs and tips of primary-coverts; tertiaries like the scapulars, but having three irregular-shaped white spots on the outer webs of the two longest feathers; remainder of the wing-coverts light red, broadly edged with pale buff and marbled with black near their tips, the lesser coverts slightly duller and more broadly tipped with black; lores and superciliary stripes white tipped with pale chestnut; feathers below the eye, sides of the face

and neck, white with blackish tips; chin and throat white; fore-neck pale buff; sides of the chest dull chestnut-red, tipped with pale buff, and gradually becoming darker on the sides of the breast, where the feathers are submarginally edged with black near their tips; remainder of the under surface and under tail-coverts dull white; bill bluish horn colour; legs and feet yellowish-white. Total length 5·2, wing 2·9, tail 1·3, bill 0·47, tarsus 0·7.

Habitat.—Davenport Creek, Central Australia.

Type.—In the Australian Museum, Sydney.

This new species of *Turnix* is allied to *T. velox* and *T. pyrrhothorax*, but the almost uniform white under surface will serve to distinguish it from either, and from any member of the genus yet discovered in Australia.

Three newly-hatched young in the down, obtained at "Hell's Gate," are probably referable to this species.

[Great numbers of these birds were found throughout the grass country north of Charlotte Waters. At Illamurta, on 30th May, a clutch of hard-set eggs were found, and afterwards young birds were frequently picked up. At Petermann Creek half-grown young ones ran about our camp. Wherever grass was plentiful, particularly near Heavitree Gap and on Missionary Plain, they were also numerous. Whilst crossing the latter country, my attention was called to a dingo hunting in the grass like a setter dog. Presently he made a decided set, and then suddenly springing forward, flushed a brace of these birds, one of which he caught in his mouth and soon swallowed. He soon started after the second one, and as he was approaching his bird, hunting keenly, he permitted me to get near enough to stop his quail-hunting. He was a fine male dingo, but black in colour.]

A set of the eggs of this species since received from Mr. Keartland, and taken at Illamurta, Central Australia, on the 18th June, 1895, are of a buffy-white ground colour, minutely freckled and sparingly spotted with different shades of chestnut-brown, purplish-brown, and violet-grey. Length (A) 0·93 inch x 0·7 inch; (B) 0·88 inch x 0·73 inch; (C) 0·9 inch x 0·7 inch; (D) 0·9 inch x 0·73 inches.

No. 73. *DROMAIUS NOVÆ-HOLLANDIÆ*, *Latham*. Emu.

Casuarius novæ-hollandiæ, *Lath.*, *Ind. Orn.*, Vol. II., p. 665 (1790).

Dromaius novæ-hollandiæ, *Gould*, *Bds. Austr.*, fol., Vol. VI., pl. 1 (1848);

Sturt, Exped. Centr. Austr., Vol. II., App. p. 47 (1889); North, Nests and Eggs Austr. Bds., p. 292, pl. xv. (1889); Schalow, J. F. Orn., XLIII. (1894).

A. juv. sk., Bagot's Creek.

B. juv. sk., Bagot's Creek.

C. juv. sk., Bagot's Creek.

D. juv. sk., Bagot's Creek.

[Occasionally seen on the sandhills. At Bagot's Creek, on 9th June, a brood of six young birds was captured, and later on other young ones and a pair of eggs were taken at Davenport Creek. In addition to the wild dogs, the natives wage a perpetual war against the Emu, which is regarded by them as an especial luxury. Owing to the weight of the birds, they leave tracks in the sand easily followed, and to this may be attributed their scarcity. They are very fond of the fruit of the quandong tree and other berry-bearing bushes. No trace was found of the Spotted Emu (*D. irroratus*) of West Australia.]

No. 74. *ÆGIALITIS NIGRIFRONS*, *Temminck*. Black-fronted Dotterel.

Charadrius nigrifrons, Temm., Pl. Col. No. 47, fig 1 (1823); Seebohm, Geogr. Dist. Charad., p. 138.

Hiaticula nigrifrons, Gould, Bds. Austr., fol., Vol. VI., pl. 20 (1848); Sturt. Exped. Centr. Austr., Vol. II., App. p. 49 (1849).

Ægialitis nigrifrons, Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., 2nd series, p. 171 (1887); North, Nests and Eggs Austr. Bds, p. 304, pl. xvi., fig. 4 (1889).

A. ♂ ad. sk., Macumba Creek.

B. ♂ ad. sk., Darwent Creek.

C. ♀ ad. sk., Darwent Creek.

D. ♀ ad. sk., Finke River.

This species is freely dispersed over the inland portions of the Australian Continent.

[At all waterholes these handsome little waders were seen in pairs running swiftly along the water's edge in search of aquatic insects.]

No. 75. *HIMANTOPUS LEUCOCEPHALUS*, *Gould*. White-headed Stilt.

Himantopus leucocephalus, Gould, Proc. Zool. Soc., 1837, p. 26; *id.*, Bds. Austr., fol., Vol. VI., pl. 24 (1848); Sturt, Exped. Centr. Austr., Vol. II.,

App. p. 50 (1849); Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., 2nd series, p. 1099 (1886); Seebold, Geogr. Distr. Charad., p. 283; North, Nests and Eggs Austr., p. 310, pl. xvii., fig. 3 (1889).

- A. ♂ juv. sk., Finke River.
- B. ♂ juv. sk., Stevenson Creek.
- C. ♀ juv. sk., Stevenson Creek.

[Four of these birds were seen at Blood's Creek. One was secured on the Finke River and a pair on the Stevenson Creek. They were all immature birds, and were wading in the shallow water in quest of small molluscs and aquatic insects, which seem to be their favourite food.]

No. 76. *ARDEA NOVÆ-HOLLANDIÆ*, *Latham*. White-fronted Heron.

Ardea novæ-hollandiæ, Lath., Ind. Orn., Vol. II., p. 701 (1790); Gould, Bds. Austr., pl. 53 (1848); Ramsay, Proc. Linn. Soc., Vol. I., 2nd series, p. 1096 (1886); North, Nests and Eggs Austr. Bds., p. 318 (1889).

One adult male, Hermannsburg. Common all over Australia.

[At Davenport Creek the first of these birds was met with. He proved to be rather wary, and several attempts were made to secure him as he made his loud croaking cry from the high trees near our camp before he was captured. He presented no marked difference to those afterwards seen along the Finke River at Hermannsburg. The nests of these birds were seen on the eucalypt trees near the water, and were built of sticks in the usual manner.]

No. 77. *NYCTICORAX CALEDONICUS*, *Gmelin*. Nankeen Night Heron.

Ardea caledonica, Gmel., Syst. Nat., p. 626 (1788).

Nycticorax caledonicus, Gould, Bds. Austr., fol., Vol. VI., pl. 63 (1848); Sturt, Exped. Centr. Austr., App., Vol. II., p. 52 (1849); North, Nests and Eggs Austr. Bds., p. 320, pl. xviii., fig. 1 (1889).

One specimen.

[Near Idracowra an immature female was obtained. Although a nocturnal bird, it appears to be equally sharp-sighted in the bright sunlight, and flew off when I was fully forty yards away. Several afterwards seen could not be approached within shot. They take shelter during the day in the dense foliage of the trees on the margins of the river, and at night seek their food, which consists of insects, frogs, fish, etc.]

No. 78. *ANAS GIBBERIFRONS*, Müller. Wood Teal.

Anas gibberifrons, Müller, Land en Volkenk., p. 159 (1841); North, Nests and Eggs Austr. Bds., p. 342 (1889).

Two young in down.

[These birds were numerous along the rivers and waterholes, and the same remarks apply to them as to *A. superciliosa*. We found newly-hatched birds on a small swamp near Horseshoe Bend, on the Finke River, on 21st May, and saw a number of "flappers" a few weeks later. The Chestnut-breasted Teal (*A. castanea*) was not met with.]

The following notes by Mr. G. A. Keartland refer to birds observed during the Expedition, but of which specimens were not brought down:—

No. 1. *AQUILA AUDAX*. Wedge-tailed Eagle.

All along the route these eagles were seen, sometimes soaring high overhead or perched on tall trees and crags of the various ranges. Occasionally they disputed with the dingo the right to a carcase well treated with strychnine, and as a natural consequence shared the same fate. At Heavitree Gap five eagles and six dogs were found lying near a dead cow, all victims to poison. At Finke Gorge a pair of eagles were seen in pursuit of a wallaby. The birds took turns in attacking their prey, which kept close to the rocks, around which it dodged to escape its pursuers; but in endeavouring to cross a small open space it was pounced upon and carried off. Some of these eagles are very dark in colour, whilst others are of a light brown. This variation in plumage may possibly be due to age. Several of their old nests were seen in the eucalypts along the course of the Finke and Palmer Rivers.

No. 2. *HALIASTUR SPHENURUS*. Whistling Eagle.

At each waterhole a pair of these birds was generally found. They appear to feed on any dead animal, but when hungry lizards are not despised by them. Those shot had a decided odor of dead bullock. At several camps they accompanied the crows, which came to clear up any bits of meat or fat thrown away. Perched on a neighbouring tree they waited until a crow had secured a choice morsel, when the eagles swooped down on him and soon deprived him of his prize. Many of their nests were seen, but no eggs were found.

No. 3. GYPOICTINIA MELANOSTERNON. Black-breasted Kite.

Near Darwent Creek several Kites were seen, but no specimens secured. Soaring overhead, the white base of the primaries contrasted with the black breasts. One seen devouring the remains of a wallaby disputed the feast with a dingo, but although busily engaged avoided all my attempts at approaching it, nor was our black boy any more successful.

No. 4. ELANUS SCRIPTUS. Letter-winged Kite.

These graceful Kites were seen near McMinn's Range, always in pairs. As they soared overhead the V-shaped marks on the under surface of the wings were very conspicuous. At times they were very numerous. Flying over the coarse grass and saltbush they prey on the small animals, lizards and grasshoppers, which are plentiful in the sand hills. Their nests, which are placed in the eucalypts along the course of the rivers or in the gorges, are built of sticks. Eggs in my collection are dull white, heavily blotched with chocolate. The Letter-winged Kite has a very wide range, and is found in nearly all parts of the continent of Australia.

No. 5. ELANUS AXILLARIS. Black-shouldered Kite.

This Kite, when reposing on the lofty branch of a dry tree, bears a striking resemblance to the last described species, but lacks the characteristic V-shaped markings beneath the wings. Its habits are similar to those of *E. scriptus*.

No. 6. FALCO HYPOLEUCUS. Grey Falcon.

Several fine birds of this species were seen at Levi Range, but all too wary to approach. They appeared to be hunting for lizards. Their nests closely resemble those of *Astur approximans*, built of small sticks. Two eggs in my collection bear a striking resemblance to light specimens of *Hieracidea berigora*. Surface light brown, almost obscured by darker markings. They were taken by Mr. E. C. Cowle near Illamurta, Central Australia.

No. 7. GEOPSITTACUS OCCIDENTALIS. Western Ground Parrakeet.

Owing to the nocturnal habits of these birds I was unable to obtain specimens, but the remains of those recently killed by dingoes were frequently found. During the summer of 1892 many were brought in by cats at Alice Springs telegraph station; and whilst there I was shown by Mr. Field portions of skins,

wings, and tails of the victims. Whilst the adult birds had borne a strong resemblance in colour and markings to *Pezoporus formosus*, it was evident, from some which had been killed during moulting, that the young are not so bright in colour, because the bright green of the adults was replaced by brown in the young. This inference is drawn from the fact that both types of plumage were found on portions of skin examined. As they frequent the dense porcupine grass, in which they hide during the day, a good dog is necessary to find them. They are locally known as the "Porcupine Parrot."

No. 8. *EUROSTOPODUS GUTTATUS*. Spotted Nightjar.

As I found feathers of this pretty nightjar on several occasions, I had hopes of securing specimens, but was disappointed. However, Mr. E. C. Cowle has forwarded me one of their eggs, found near Tempe Downs Station. It is dusky green, slightly spotted with black, elongated oval, and both ends nearly alike in shape.

No. 9. *LAGENOPLASTIS ARIEL*. Fairy Martin.

At Charlotte Waters a number of these martins were seen skimming over the water and flying across our camp, but were not found at any other place.

No. 10. *HIRUNDO NEOXENA*. Welcome Swallow.

This bird was only once seen throughout the trip. At Henbury three were flying overhead in company with the White-backed swallow (*Cheramæca leucosternum*).

No. 11. *ARTAMUS MINOR*. Little Wood Swallow.

A number of these little birds were seen flying about and soaring along the Levi Range, but although repeated attempts were made no specimens could be secured. They were either out of gunshot or flying over places where even our black boys could not recover those shot. This is to be regretted, as it was the only occasion on which they were seen, although they are credited by Mr. Gould with being found in New South Wales, Queensland and Victoria, and in Mr. North's "Nests and Eggs of Australian Birds" their habitat is stated to be much more extensive.*

* Specimens of *Artamus minor* from the localities indicated in "Nests and Eggs of Australian Birds" are in the Australian Museum, and the Dobroyde Collection.—A. J. N.

No. 12. SAULOPROCTA MOTACILLOIDES. Black and White Fantail.

Wherever it seemed possible for small birds to exist, and especially near water, the Black Fantail was seen. As it is so well known and sociable in its habits it secured immunity from martyrdom by perching on the camel in front of one I was riding, running along its back and catching flies. Another followed my camel for over a mile near Hermannsburg, frequently snapping his bill close to my head as he caught his dinner off my back.

No. 13. ANTHUS AUSTRALIS. Australian Pipit.

On the open grass plains several of these birds were seen, but they were by no means plentiful; the dryness of the ground rendering their food scarce and the presence of so many natural enemies no doubt contributing to make the country unfavourable to them.

No. 14. PTILOTTIS PENICILLATA. White-plumed Honeyeater.

This Honeyeater was found at various places *en route*, but was most numerous at Davenport Creek, where a nest containing two fresh eggs was secured. If I had not had a good opportunity of observing the bird sitting within four feet of where I stood, I am afraid the eggs would not have been identified, as the ground colour is white, with faint brown spots sparingly scattered over the surface.

No. 15. SYNOICUS AUSTRALIS. Brown Quail.

These birds were found at Darwent Creek on 22nd June. Whilst walking through a quantity of kangaroo grass on one of the creek flats I flushed several adult birds, and afterwards a brood of eight young ones just able to fly.

No. 16. ŒDICNEMUS GRALLARIUS. Southern Stone-Plover.

The weird notes of these birds were frequently heard at night, but the birds themselves could not be found, although their tracks were frequently seen in the sandhills. Mr. Cowle has since forwarded me their eggs, which are identical with those in my collection from other parts of Australia.

No. 17. EUPODOTIS AUSTRALIS. Bustard.

These birds were occasionally seen, but owing to the number of their enemies were nowhere numerous. At Heavitree Gap we were informed that in summer

time many of them are killed by the natives, dingoes, and wedge-tailed eagles; but as our visit was in cool weather, the birds at that time were further north. They prefer the open plains, but also frequent the sandhills in search of lizards and locusts.

No. 18. *EUDROMIAS AUSTRALIS*. Australian Dottrel.

Although not successful in obtaining specimens, we saw these birds and picked up a recently-killed one near the telegraph line, against which it had no doubt accidentally struck itself. Professor Spencer found a pair of their eggs on the camel track, laid on the bare ground without the least pretension to a nest.

No. 19. *CHILAMYDOCHIEN JUBATA*. Maned Goose.

These birds are met with in considerable numbers near the permanent waters, and appeared to have just reared their broods, as our black boys caught several unable to fly on 19th May, and a few days later others were found on a waterhole.

No. 20. *CASARCA TADORNOIDES*. Chestnut-coloured Sheldrake.

A pair of these birds was seen on the Palmer River, where they were disturbed without being secured.

No. 21. *ANAS SUPERCILIOSA*. Wild Duck.

In the course of the journey we were somewhat surprised to find young birds, "flappers," in May and June, thus showing that no exact breeding time can be fixed for these birds throughout the continent, and when the young broods are strong on the wing in other parts, the old birds in Central Australia have not even mated. I have since heard that one of Mr. Cowle's black boys found a nest of wild-duck eggs in September.

No. 22. *NYROCA AUSTRALIS*. White-eyed Duck.

Several of these ducks were shot at Owen Springs.

In addition to the birds shot or noted on our journey, I was shown a small collection of skins, or fragments of skins, of a number of birds which had been killed near the Alice Springs telegraph station. In one of the operators' rooms several picture frames were covered with wings and tails of the porcupine parrot





(*Geopsittacus occidentalis*) which had been caught by a cat last summer. Nailed on the wall were skins of the Darter (*Plotus novæ-hollandiæ*), *Podargus* (? sp.), Bee-eater (*Merops ornatus*), &c. In the quarters of Mr. Crick were specimens of a Pelican (*Pelecanus conspicillatus*) and an Avocet (*Recurvirostra rubricollis*). In cages were young Warbling Parrakeets (*Melopsittacus undulatus*), cockatoo parrots (*Calopsitta novæ-hollandiæ*) and rose-breasted cockatoo (*Cacatua roseicapilla*). I was here informed that the only time to obtain a fair idea of the number of species of birds in the country was in summer, when many birds not otherwise met with come to dwell near the water and are easily captured. Dr. Stirling reported seeing two Cormorants at Illara Creek, too distant to identify.

EXPLANATION OF PLATES.

PLATE V.

SPATHOPTERUS ALEXANDRÆ. *Gould*. Princess of Wales' Parrakeet. One half natural size.

PLATE VI.

Upper figure. Ptilotis keartlandi. *North*. Keartland's Honey-eater.

Lower figure. Rhipidura albicauda. *North*. White-tailed Fly Catcher.

Both figures are of the natural size.

PLATE VII.

Upper figure. Xerophila nigricincta. *North*. Black-banded Xerophila.

Lower figure. Climacteris superciliosa. *North*. White eye-browed Tree-creeper. Male.

Both figures are of the natural size.

REPTILIA.

By A. H. S. LUCAS, M.A., B.Sc., and C. FROST, F.L.S.

(PLATES 8, 9, 10, 11, 12).

I.—LACERTILIA.

INTRODUCTION.

Geographical Distribution.—The assemblage of forms collected includes the following groups:—(1) A series of what must at present be considered as species purely Eremian (Tate); (2) a series of species characteristic of Northern Australia; (3) a series of species characteristic of Western Australia; and (4) a number of species which are distributed generally over all Australia.

The Eremian group comprises the new species *Ebenavia horni*, *Ceramodactylus damæus*, *Diplodactylus byrnei*, *Tympanocryptis tetraporphora*, *Diporophora winneckeii*, *Varanus eremius*, *V. gilleni*, *Rhodona tetradactyla*.

The Northern species are *Heteronota bynoei*, *Nephrurus asper*, *N. lævis*, *Diplodactylus ciliaris*, *Physignathus longirostris*, *Varanus giganteus*, *V. punctatus*, *V. acanthurus*, and *Hinulia fasciolata*.

The Western species include *Amphibolurus maculatus*, *A. imbricatus*, *A. reticulatus*, *Moloch horridus*, *Egernia stokesii*, *Rhodona gerrardii*, *R. bipes*, *Ablepharus greyi*, while *Amphibolurus pictus*, *Tiliqua occipitalis* and *Tympanocryptis lineata* extend through the southern colonies as far east as western Victoria.

The species widely spread over Australia are *Gehyra variegata*, *Lialis burtonii*, *Delma fraseri*, *Amphibolurus barbatus*, *Varanus gouldii*, *Egernia whitii*, *Hinulia lesueurii*, with *H. tæniolata*, *Ablepharus boutonii* and *A. (lineo-ocellatus)*.

Variation.—The collection has proved of great interest in consequence of the great amount of variation which occurs amongst the individuals of many amongst the species, notably *Nephrurus lævis*, *Heteronota bynoei*, *Amphibolurus maculatus*, *A. imbricatus*, *A. reticulatus*, *A. pictus*, *A. barbatus*, *Physignathus longirostris*, *Egernia whitii* and *Hinulia lesueurii*. The colour variations are most conspicuous, but of equal importance are the variations in the number of præanal and femoral

pores, in the relative dimensions of parts, and in the scaling. Full particulars are recorded in the account of each species.

Adaptation to Environment.—This is most noticeable in the presumably protective colouration of the species of diurnal habits. Many of these exhibit a very marked general rustiness, or even bright redness, in their general colouring, which is quite wanting in the forms met with in the south and east, and which agrees well with the colour of the red sands upon which they were captured.

Definitions of Species.—It is the usual course of events for the species described from a new field to be apparently more sharply defined than are those from well-explored regions. When sufficient numbers of individuals have been examined with sufficient care, this sharpness disappears, and the definition of the species has almost always to be modified and extended, especially in the case of common or dominant forms. The result of fuller information and closer study is to cause the systematist to admit a considerable range of variation of characters into his definition of the species. Forms at first defined as distinct are found to be so linked together by intermediate forms that the true relationship between them is best expressed by combining them all under one specific designation, and distinguishing as named varieties or sub-species such groups as are of importance from their local occurrence, distinctness to the eye, or abundance. This process will no doubt take place largely in connection with our Australian lizards. Mr. Boulenger, in his admirable Catalogue, has set an example in this direction in the case of *Delma fraseri*, *Lialis burtonii*, *Ablepharus boutonii*, and other wide-spread species. In the present study we have had the wisdom of adopting this course borne in upon us in the case of several other lizards, especially of *Egernia whitii* and *Hinulia lesueurii*. Thus we shall be prepared to include as varieties of the last-named *H. spaldingi*, Macleay (= *H. dorsalis*, Blgr.), *H. leæ*, Blgr., *H. strauchii*, Blgr., *H. inornata*, Gray, *H. essingtonii*, Gray, *H. muelleri*, Fischer, and *H. tenuolata*, White. There is the same kind of justification for this proposal as exists, e.g., for the union of the equally distinct forms *Lacerta tiliguerta*, *L. lilfordii*, *L. oxycephala*, &c., as varieties of *Lacerta muralis*, which has been forced upon European herpetologists.

State of Preservation.—The large number of individuals collected during the Expedition were all in an excellent condition for examination. To have obtained, preserved, and conveyed under the exceptional circumstances so many specimens without damage speaks volumes for the skill and energy of Professor Spencer.

We have to thank Professor Spencer for very kindly placing at our disposal

the whole of the colour-notes and the water-colour sketches which he made of the living animals. Of these we have availed ourselves to the fullest extent in drawing up the colour-descriptions.

DESCRIPTION OF SPECIES.

The following list includes a number of species which were collected by Professor Spencer during a second visit to the same district during January and February, 1895, shortly after a heavy rainfall had taken place.

GECKONIDÆ.

- (1) *Nephrurus asper*, Günther.
- (2) *Nephrurus lævis*, De Vis.
- (3) *Rhynchodura ornata*, Günther.
- (4) † *Ceramodactylus damicus*, L. and F.
- (5) *Heteronota bynoei*, Gray.
- (6) * *Ebenavia horni*, L. and F.
- (7) *Diplodactylus ciliaris*, Blgr.
- (8) † *Diplodactylus byrnei*, L. and F.
- (9) *Gehyra variegata*, D. and B.

PYGOPODIDÆ.

- (1) *Lialis burtonii*, Gray.
- (2) *Delma fraseri*, Gray.

AGAMIDÆ.

- (1) *Amphibolurus maculatus*, Gray.
- (2) *Amphibolurus imbricatus*, Peters.
- (3) *Amphibolurus reticulatus*, Gray.
- (4) *Amphibolurus pictus*, Peters.
- (5) *Amphibolurus barbatus*, Cuvier.
- (6) *Tympanocryptis lineata*, Peters.
- (7) *Tympanocryptis cephalus*, Günther.
- (8) * *Tympanocryptis tetraporphora*, L. and F.
- (9) † *Diporophora winneckeii*, L. and F.
- (10) *Physignathus longirostris*, Blgr.
- (11) *Moloch horridus*, Gray.

* P.R.S.V., vol. vii. (N.S.), pp. 264 et seqq.

† P.R.S.V., vol. viii. (N.S.), pp. 1-4.

VARANIDÆ.

- (1) *Varanus giganteus*, Gray.
- (2) *Varanus gouldii*, Gray.
- (3) *Varanus punctatus*, Gray.
- (4) *Varanus acanthurus*, Blgr.
- (5) **Varanus eremius*, L. and F.
- (6) **Varanus gilleni*, L. and F.

SCINCIDÆ.

- (1) *Egernia whitii*, Lacép.
- (2) *Egernia stokesii*, Gray.
- (3) *Tiliqua occipitalis*, Peters.
- (4) *Hinulia lesueurii*, D. and B.
- (5) *Hinulia fasciolata*, Günth.
- (6) **Rhodona tetradactyla*, L. and F.
- (7) *Rhodona gerrardii*, Gray.
- (8) *Rhodona bipes*, Fischer.
- (9) *Ablepharus boutonii*, Desj.
- (10) *Ablepharus linco-ocellatus*, D. and B.
- (11) **Ablepharus lineo-ocellatus*, var. *ruficaudus*, L. and F.
- (12) *Ablepharus greyi*, Gray.

GECKONIDÆ.

Nephrurus, Günth.

- (1) *Nephrurus asper*, Günth.

Two specimens, typical in structure. The ground colour is pale pinkish brown; a short blackish band crosses the neck, and the black network so conspicuous on the head is continued irregularly along the middle of the back to the base of the tail.

DIMENSIONS.

Total length	...	...	...	114 mm.
Head	...	...	...	27 „
Width of head	...	...	...	25 „

* P.R.S.V., vol. vii. (N.S.), pp. 264 *et seqq.*

† P.R.S.V., vol. viii. (N.S.), pp. 1-4.

Body	...	...	...	...	68 mm.
Fore-limb	...	...	...	...	39 ,,
Hind-limb	...	...	...	...	44 ,,
Tail	...	...	...	...	19 ,,

Locality.—Alice Springs.

Distribution.—Peak Downs, Queensland (B.M.C.); (Lungholtz).

(2) *Nephrurus laevis*, De Vis. Native name *Illchiljera*.

All the smooth individuals belonging to the genus *Nephrurus* hitherto obtained from this district have been described under the name of *N. platyurus*, Blgr. The specimens collected by this Expedition, although subject to variation, evidently all belong to one species. We have compared them with a typical specimen of *N. laevis*, De Vis, supplied by Mr. De Vis to the Macleay Museum, Sydney, from Thargomindah, Queensland. The result of our examination has been to identify the Central Australian form with that from Queensland, and we therefore propose to unite *N. platyurus* with *N. laevis*, the latter name having the claim of priority.

The characters by which the species are distinguished* are—

- (i.) In *N. laevis* the tail nearly as long as the fore-limb, as long as the head; in *N. platyurus* the tail a little longer than the fore-limb, longer than the head.
- (ii.) In *N. laevis* the limbs rather short; in *N. platyurus* limbs long, slender.
- (iii.) In *N. platyurus* there are only four tubercles across the middle of the interorbital space.
- (iv.) In *N. laevis* the number of labials twenty on each side above and below; in *N. platyurus* seventeen.
- (v.) In *N. platyurus* there are eighteen distinct transverse grooves on the upper and lateral surfaces of the tail.

The variation in characters (i.), (ii.) and (iv.) will be best illustrated by means of a comparative table of measurements and enumeration.

* B.M.C., vol. iii., pp. 477, 478.

	Horn Expedition Specimens.			N. laevis.	N. laevis.	N. platyurus.
	<i>a</i>	<i>b</i>	<i>c</i>	(B.M.C.).	Macleay Museum.	(B.M.C.).
	mm.	mm.	mm.	mm.	mm.	mm.
Total length - - -	130	85	61	94	60	87
Head - - - -	27	20	15	21	14	20
Width of Head - - -	22	16	12	18·5	11	15
Body - - - -	66	43	30	52	30	39
Fore-limb - - - -	33	24	18	22	19	25
Hind-limb - - - -	42	29	23	29	22	30
Tail - - - -	37	22	16	21	16	28
Number of times the length of the Hind-limb is contained in the total length - -	3·1	2·9	2·65	3·24	2·7	2·9
Upper labials—Right - -	19	17	16	20	15	17
„ Left - - - -	19	17	18	20	17	17
Lower labials—Right - -	19	21	19	20	17	17
„ Left - - - -	18	22	20	20	16	17

- (i.) Of the present series (*a*) agrees with *N. platyurus*, while (*b*) and (*c*) agree with *N. laevis* in the relative lengths of head, tail and fore-limb.
- (ii.) The terms short and long applied to the limbs being presumably in relation to the length of the body, we see that (*a*) is as short-limbed as the type *N. laevis*, (*b*) as long-limbed as the type *N. platyurus*, while (*c*) agrees in length of limb with the specimen of *N. laevis* in the Macleay Museum. It is noteworthy that the type *N. platyurus* is intermediate in this respect between the type *N. laevis* (B.M.C.) and the specimen of *N. laevis* in the Macleay Museum.
- (iii.) In *N. laevis* of the Macleay Museum there are only four tubercles across the middle of the interorbital space, while in (*a*), (*b*), (*c*), there are in each case at least five.

(iv.) The number of labials is by no means constant, but varies in the same individual on the two sides, and above and below on the same side. In our table *N. lævis* of the Macleay Museum agrees very closely with the type *N. platyurus*. Specimen (*a*) agrees more nearly with the type *N. lævis* in the number of labials, while it approaches *N. platyurus* in the relative lengths of head, tail and fore-limb.

(v.) The transverse grooves are conspicuous only in the specimen of *N. lævis* in the Macleay Museum, and in (*c*). These are both quite young individuals.

Colour.—Upper surfaces soft rusty-brown or greyish-brown, with darker brown areas and pinkish-white cross bands, best defined on the occipito-scapular region and on the sacrum; crown of the head darker than ground colour; a pinkish-white band across the occiput, a second curved one on the nape, and a third, more angular, over the shoulders; a dark triangular band behind the occiput, a second crescentic dark band between the second and third light bands, and a third behind the third light band; two very broad dark brown cross bands on the sacrum, separated by a narrow pinkish-white cross band, the latter sometimes assuming a T shape; usually about four faint curved light bands on the back; all the light bands bearing rows of white tubercles; border of the eye and a spot in front of and one below the same white; a brown horizontal streak below and another vertical streak in front of the white spot before the eye; upper surface of tail darker, with rows of white tubercles. Under surfaces uniformly tender pinkish-white.

It will be seen from the above facts that all the characters which have been relied upon to distinguish *N. platyurus* from *N. lævis*, singly or collectively, fail to establish the distinction.

Habits.—Found under logs and stones.

Localities.—Charlotte Waters, Alice Springs, Tempe Downs, Illamurta.

Distribution.—This species is met with freely in Central Australia. We have seen several specimens in addition to those collected by this Expedition Thargomindah, Queensland (De Vis.), Victoria Springs, and between Everard and Fraser Ranges (Elder Exped., 1892).

Rhynchœdura, Günth.(3) *Rhynchœdura ornata*, Günth.

One specimen.

Ground colour pinkish; markings pale reddish-brown, rings more complete.

Locality.—Charlotte Waters.

Distribution.—Nicol Bay (B.M.C.), Everard Range (Elder Exped.), North Queensland (L. and F.), Central Australia.

Ceramodactylus, Blanford.(4) *Ceramodactylus damœus*, L. and F. (Plate IX., Fig. 2).

Description.—Head large, high; snout obtusely pointed, a little longer than the distance between the orbit and the ear-opening. Ear-opening narrow, elliptical, oblique. Body slightly depressed. Limbs moderate, the fore-limb stretched forward reaches to between the eye and the nostril. Digits long, slender, inferiorly with small, imbricate, pointed scales. Head and upper surfaces of body covered with small granular scales. Rostral quadrangular, twice as broad as high, with median cleft above. Nostril pierced between the rostral, first labial, and four nasals, the supero-anterior nasals large, forming a suture with one another behind the rostral. Eleven upper and as many lower labials. Mental rather large, trapezoid; no chin shields. Gular scales very small, granular. Abdominal scales flat, subimbricate. Male with two or three blunt spines on each side of the base of the tail, and two widely-separated præanal pores. Tail missing.

Colour.—Pale whitish-grey above, darkest on the sides; a brownish more or less broken band from the snout along each side of the back to tail; a broad median whitish band from neck to base of tail; head spotted or reticulated with dark brown; sides with two longitudinal series of roundish white spots; limbs and under surfaces uniform whitish.

DIMENSIONS.

Total length	...	...	...	?	mm.
Head	...	...	...	11	„
Width of head	...	...	...	9	„
Body	...	...	...	37	„
Fore-limb	...	...	...	15	„
Hind-limb	...	...	...	20	„
Tail	...	...	...	...	wanting.

Locality.—Charlotte Waters.

The genus has hitherto only been recorded from Arabia and Persia.

In a second complete specimen received by Professor Spencer from Mr. P. M. Byrne since the above was published, and which we figure, there are no pores; the whitish-grey colour is replaced by reddish-brown; the band on each side is continuous, of a bright red spotted and edged above with black; the whitish median band is broader and is continued over the occiput with a red, black-dotted, V-shaped mark on the nape, indicated in the first specimen by a blotch; the white spots on the sides are larger. The tail is slender, slightly depressed, tapering gradually. The dark lateral and light median bands are continued to the tip of the tail. Under surfaces uniform whitish.

DIMENSIONS OF SECOND SPECIMEN.

Total length	...	...	...	88 mm.
Head from snout to ear-opening			...	11 „
Width of head	...	...	...	9 „
Body	...	...	...	37 „
Fore-limb	...	...	...	15 „
Hind-limb	...	...	...	21 „
Tail	...	...	...	40 „

Heteronota, Gray.

(5) *Heteronota bynoei*, Gray. (Plate XI., Figs. 1, 2).

The expedition obtained an excellent series of specimens of *Heteronota*. After a careful examination of this series, and of the large series in the Macleay Museum, we conclude with Dr. Günther that *Heteronota (Eublepharis) derbiana*, Gray, cannot be separated as a distinct species from *H. bynoei*, Gray. The specimens which we have had before us exhibit a great range of variation in all the characters which have been regarded as distinguishing features. These variations occur amongst the individuals from the Central Australian region, and as markedly amongst those in the Macleay Museum collected at King's Sound, on the north-west coast. As in the case of *Nephrurus levis* and *N. platyurus*, the characters relied upon to distinguish the species are not constant but vary considerably, and the variations of the different characters are apparently quite independent of each other.

In the B.M.C., Vol. I., p. 75, *H. derbiana* is distinguished from *H. bynoei* by the following characters:—

- (i.) Dorsal tubercles generally less regularly arranged, more distant from one another, those of one series being separated by interspaces at least equal to their length.
- (ii.) Præanal pores four or six.
- (iii.) Colour.—Light brown above, spotted or marbled with darker; some of the tubercles sometimes whitish; a dark temporal streak; lower surfaces whitish.

In *H. bynoei* on the other hand—

- (i.) Dorsal tubercles placed close together in twelve to fourteen very regular longitudinal series.
- (ii.) Præanal pores five.
- (iii.) Colour.—Light brown above; seven dark transverse bands, broader than the interspaces between them, from nape to base of tail; a U-shaped dark streak from eye to eye over the nape; lower surfaces dirty white.

(i.) The appearance of irregularity in the arrangement of the tubercles depends to some extent on the lack of regularity in colour. In all specimens which are irregularly spotted or marbled, and in which some of the tubercles are whitish, the appearance of irregularity is accentuated.

Apart from this, however, we found the irregularity to be as great in specimens which in number of præanal pores and in colour agreed with *H. bynoei*, as in specimens which in these particulars agreed with *H. derbiana*.

(ii.) We found individuals with faint but regular colour bands, possessing respectively four, five and six præanal pores; and we also met with individuals in which the colour was much broken up, and which possessed five, six and seven (one individual) pores respectively.

(iii.) In the specimens from King's Sound in which the lines of tubercles were most regular and compact, the dark colour bands were pronounced, regular and broad, there being only five of these in the space between the nape and the base of the tail.

From the specimens examined a complete series can be arranged in which the colour bands vary gradually from being dark and distinct to faint and

indistinct, in the extreme forms becoming entirely broken up into spots and marblings. In these last the dark temporal streak on either side represents the remains of the U-shaped dark streak from eye to eye over the nape of the distinctly-banded forms.

Localities.—Palm Creek, Storm Creek, Bagot's Creek, Opossum Creek, Crown Point.

Distribution.—Houtman's Abrolhos, Champion Bay (B.M.C.); Barrow Range, Southern Cross (Elder Exp.); King's Sound (Macleay Mus.)—*H. bynoei*. Port Essington, Peak Downs, Rockhampton (B.M.C.); King's Sound, North-west Coast, Port Darwin, and Miriam Vale, Queensland (Macleay Mus.)—*H. derbiana*.

The genus is thus, as far as is known, exclusively Australian, extending across the north of the continent from east to west, but wanting in the south-east.

Habits.—Usually found under logs and stones.

Ebenavia, Boettger.

(6) *Ebenavia horni*, L. and F. (Plate XII., Fig. 1).

Description.—Head long, depressed; snout rather obtuse, about as long as distance between eye and ear-opening. Pupil vertical. Ear-opening small, round. Limbs short and slender. Tail depressed, constricted at the base. Digital expansions twice the diameter of the digit. Lamellæ under fourth toe eight, separated from expansion by rows of granules. Dorsal surface of expansions scaled as in *Phyllodactylus*. Upper surfaces of body covered with uniform, small, oval scales; scales on the head round, smallest on the occiput, largest and flattest on the snout; no keeled or enlarged tubercles. Rostral very low, four-sided, four times as broad as high. Nostril pierced between first labial and three or four nasals, first nasal largest, separated from its fellow on the opposite side by a single equal scale, thus forming a line of three scales behind the rostral. Nine upper labials. Mental narrow, triangular, about as large as adjacent lower labials; latter nine in number. No special chin-shields, but the gular scales near the symphysis larger than those behind. Ventral scales smooth, tessellated, larger than dorsal. Tail with annuli of small smooth scales. *Colour.*—Olive-brown above with four longitudinal dark bands, two converging from the occiput to unite over the sacrum, and one on each side passing from the nostril through the eye and above the limbs. On the side another dark band from the ear, just above the fore-limb, to the groin.

Under surface brownish-grey with scattered brown dots. Tail brown above with lighter ocelli, each occupying about four scales below with intermingled grey and brown scales.

DIMENSIONS.

Total length	...	...	...	55 mm.
Head	...	...	...	10 „
Width of head	...	...	...	5 „
Body	...	...	...	23 „
Fore-limb	...	...	...	9 „
Hind-limb	...	...	...	12 „
Tail	...	...	...	22 „

Since Mr. Boulenger has withdrawn his species *E. boettgeri* (B.M. Cat., Vol. III., p. 482), only one species of *Ebenavia* has been previously recognised, and that only from Madagascar. In general outline the present species closely agrees with Mr. Boulenger's figure (B.M. Cat., Vol. I., pl. viii., fig. 1), and the colour bands agree fairly with those of his Madagascar specimen. The chief points of distinction in the Eremian form is the entire absence of anything like longitudinal series of large tubercles.

The nearest allies to the clawless genus *Ebenavia* are met with in the genus *Phyllodactylus*. Species of *Phyllodactylus* occur in South Africa and Madagascar. Indeed only the most trivial differences can be found between *P. porphyreus*, Daud., from these regions and the widely-distributed Australian form *P. marmoratus*, Gray.

Diplodactylus, Gray.(7) *Diplodactylus ciliaris*, Blgr.

Three specimens.

Locality.—Between Charlotte Waters Station and Crown Point.

Distribution.—Boulenger's specimens were from Port Darwin. The closely-allied species, *D. spinigerus*, Gray, is recorded from Fremantle, Houtman's Abrolhos, Champion Bay (B.M.C.), and Fraser Range (Elder Exped., 1892).

Habits.—Found under the bark of trees.

(8) *Diplodactylus byrnei*, L. and F. (Plate XII., Fig. 2).

Description.—Head short, convex; snout rounded, a little longer than the distance between the eye and the ear-opening; latter very small, rounded. Body short, limbs moderate, the fore-limb stretched forward reaches the anterior border of the orbit, the hind-limb to a little behind the axilla. Digits rather long, moderately depressed, inferiorly with transverse rows of discoid scales, usually two in a row; apical dilations small, the inferior plates sub-oval. Upper surfaces covered with minute granular scales, intermixed on the back with numerous, regularly disposed, rounded, or bluntly conical tubercles. Rostral very low and broad, about four times as broad as high, without median cleft; nostril pierced in a swelling between the rostral, the first labial, and three nasals; internasal space concave. Eleven upper labials, the first very large and incompletely divided from the rostral, twelve lower labials, anterior very long, projecting behind the mental. Mental trapezoid about as broad as long. Scales on the throat minute, granular; abdominal scales flat, roundish, juxtaposed, a little smaller than the dorsal tubercles. Tail cylindrical, tapering, with rings of scales convex above and flat, subquadrangular beneath. Male with three or four blunt spines on each side of the base of the tail. *Colour*.—Brownish-yellow above, with four broad, curved, dark brown bands on the body, and five large spots on the tail; a dark brown spot behind the base of the hind-limb; most of the tubercles on the back dark brown; head, from snout to behind the eyes, uniform dull brown; under surfaces whitish.

DIMENSIONS.

Total length	...	...	...	77 mm.
Head	...	...	...	12 „
Width of head	...	...	...	9 „
Body	...	...	...	32 „
Fore-limb	...	...	...	15 „
Hind-limb	...	...	...	20 „
Tail	...	...	...	33 „

Locality.—Charlotte Waters.

Named after P. M. Byrne, Esq., the chief officer of the Charlotte Waters Telegraph Station.

Gehyra, Gray.(9) *Gehyra variegata*, D. and B. (Plate IX., Fig. 3).

The ground colour varies considerably in these specimens; it may be pale

grey, dark grey, pale brown, bright brown. The last fades in spirit. We figure one of the most aberrant and brightest coloured.

Localities.—Paisley Bluff, Opossum Creek, Palm Creek, Darwent Creek, Blood's Creek.

Distribution.—Houtman's Abrolhos, Champion Bay, Peak Downs, Murray Island, Sunday Island and islands of Torres Straits (B.M.C.). Barrow Range, Everard Range, Fraser Range, Victoria Springs (Elder Exped., 1892).

Habits.—Found under logs and the bark of trees.

PYGOPODIDÆ.

Delma, Gray.

(1) *Delma fraseri*, Gray.

One young specimen.

Locality.—Alice Springs.

Distribution.—All over Australia.

Lialis, Gray.

(2) *Lialis burtonii*, Gray.

Two specimens, examples of var. *E. b.* of Boulenger.

Habits.—Burrows in the ground.

Mode of reproduction.—Two eggs laid in late summer.

Locality.—Palm Creek.

Distribution.—All over Australia, Torres Straits and New Guinea.

AGAMIDÆ.

Amphibolurus, Wagler.

(1) *Amphibolurus maculatus*, Gray. (Plate IX., Figs. 4, 5).

An extensive series of this conspicuous lizard enables us to describe in detail the colours of both male and female as found in this area.

Male.—Bright brick-red to dull reddish-brown above with roundish black spots and pale yellow or greyish ocelli ; the latter, which are bordered by a narrow black line, more or less confluent into longitudinal bands on each side of the body, commencing on the nape and extending along the tail. A broad black band on each side, meeting its fellow on the tip of the snout, passing through the eye, above the fore-limbs, and along the front of the hind-limbs to below the knee. The light markings on the head and lips bright chrome-yellow. A pale yellow line dividing the black band from axilla to groin. Under surfaces yellowish-white. A large jet-black area covering nearly the whole of the throat, chest and anterior half of the abdomen, and extending along the front of the fore-limbs to the elbow, leaving a yellow band from snout along the lips to the shoulder.

Female.—The colour and pattern of the female are similar to that of the male, except that the conspicuous black markings on the sides and ventral surfaces are entirely absent. Under surfaces pale buff, throat mottled or speckled with grey.

The light spots on the brightly-coloured specimens are yellow or yellowish, those on the dull-coloured greyish.

DIMENSIONS.

		Male.		Female.
Total length	...	201 mm.	...	215 mm.
Head	...	14 „	...	17 „
Width of head	...	11 „	...	12 „
Body	...	47 „	...	48 „
Fore-limb	...	27 „	...	28 „
Hind-limb	...	57 „	...	60 „
Tail	...	140 „	...	150 „

Localities.—Idracowra, Charlotte Waters.

Distribution.—Champion Bay (B.M.C.), Barrow Range, Victoria Desert, Queen Victoria Springs (Elder Exped.).

Habits.—Found under logs.

Mode of reproduction.—Four or five eggs laid during February or March.

(2) *Amphibolurus imbricatus*, Peters.

Amongst the numerous specimens which we refer to this species there is very considerable variation, both amongst themselves and from the accepted type. But

they all agree with the typical *A. imbricatus*, except in the number of pores and in the colouring.

The ground colour of head and body varies from brownish-grey, through yellowish-brown, to rusty-brown or brick-red. The intermediate ones agree best with the type. The specific identity of all these forms will appear from the following table of particulars in the case of six individuals, A—F, chosen for the purpose :—

—	A	B	C	D	E	F
Ground Colour - -	Brownish-grey. mm.	Brownish-grey. mm.	Yellowish-brown. mm.	Yellowish-brown. mm.	Brick-red. mm.	Brick-red. mm.
Total Length - - -	165	—	216	210	190	171
Head - - - -	15	18	17	17	15	15
Width of Head - -	13·5	15	14	14	13	12·5
Body - - - -	43	48	51	52	40	41
Fore-limb - - -	27	30	32	33	27	25
Hind-limb - - -	55	60	65	62	56	50
Tail - - - -	107	—	148	141	135	115
Number of Pores - -	38	30	40	30	34	30

The pores form a series interrupted on the præanal region. It will be seen that in all our specimens the number of pores is greater than in the type (22). We shall meet, however, with a similar but even greater variation in the number of pores in *A. reticulatus*. The same thing occurs in *A. pictus*. The number is clearly not a hard-and-fast one in these species.

The longitudinal series of black spots and the white transverse bands are most conspicuous in C and D. In E and F, where the ground colour becomes brick-red, the black spots greatly diminish in size and the white bands disappear. In A, B, C, D there are four narrow black bands directed obliquely backward over the supra-orbital region on each side; these are wanting in E and F.

Localities.—Alice Springs, Finke Gorge, Charlotte Waters.

Distribution.—Southern Australia (B.M.C.).

Habits.—Burrows in the sand, also found under stones, is frequently seen about in the open during the daytime.

(3) *Amphibolurus reticulatus*, Gray.

Of this species there is a good series, all of which agree well in the main with the typical description. They differ, however, in having the gular and ventral scales perceptibly keeled.

The number of pores varies considerably. This variation was also noted by Stirling and Zietz in the specimens collected by the Elder Expedition. We give the number in the case of six individuals :—

A	Length ...	...	125 mm.	...	33 pores
B	„ ...	...	157 „	...	36 „
C	„ ...	...	203 „	...	22 „
D	„ ...	...	266 „	...	17 „
E	„ ...	...	180 „	...	20 „
F	„ ...	...	160 „	...	14 „

We also give the colouration of male and female during the breeding season.

Male.—Yellowish or rusty-brown above with narrow black reticulations, forming a more or less regular network on the back and neck; head bright yellow-ochre to orange-red, with black markings; the vertebral series of enlarged scales, and many of the enlarged scales on the back yellow; tail somewhat paler, with dark annuli, faint at the base, regular and conspicuous towards the tip; under-surfaces brownish or greyish-white; throat reticulated with grey. In one specimen the ground colour of the body, with the exception of the vertebral line, becomes brick-red.

Female.—Rusty-brown above, with black blotches and pinkish spots; head orange-red, with narrow black transverse bands and reticulations; body with a median yellow band not continued on the tail, two other interrupted longitudinal pinkish-grey bands; sides thickly studded with small light spots; tail with dark annuli, regular and conspicuous towards the tip; under surfaces dirty white, throat faintly reticulated with grey.

DIMENSIONS.

	Male.	Female.
Total length ...	... 266 mm.	... 180 mm.
Head ...	... 24 „	... 17 „

		Male.		Female.
Width of head	...	22 mm.	..	15 mm.
Body	... ..	83 „	...	57 „
Fore-limb	... ..	41 „	...	31 „
Hind-limb	... ..	62 „	...	47 „
Tail	... ..	160 „	..	105 „

Habits.—Similar to *A. imbricatus*.

Mode of reproduction.—Six to eight eggs deposited probably about the beginning of March.

Localities.—Oodnadatta, Alice Springs, Finke Gorge, Palm Creek, Hermannsburg, George Gill Range, &c.

Distribution.—Perth, Nicol Bay, Champion Bay (B.M.C.), Queen Victoria Springs (Elder Exped.).

(4) *Amphibolurus pictus*, Peters. (Plate X., Fig. 10).

In some of the specimens the gular and ventral scales are just perceptibly keeled. A large series collected during the breeding season enables us to give the nuptial colouration of both sexes.

Colour—Male.—Brick-red above, with faint black reticulations enclosing bright yellow spots on the back and sides. Head pinkish-grey (?), with lighter and darker markings. A broad leaden-blue vertebral band, barred with numerous narrow black bands and a few broader light ones. Tail leaden-blue, with narrow, irregular light bands. Limbs bluish-black with yellow markings, second segment black. Under-surfaces yellowish-white, throat leaden-blue; a jet-black patch on the chest, in contrast with bright chrome-yellow on the upper arm.

Female.—Rusty-brown above, with faint dark reticulations enclosing light spots on the sides. Head brownish, with lighter and darker markings. A vertebral series of short black bars; a few light bands cross the back at regular intervals. Tail rusty-brown, with light narrow cross-bands. Under surfaces whitish.

DIMENSIONS.

		A		B		C
Total length	...	235 mm.	...	225 mm.	...	193 mm.
Head	... ..	21 „	...	20 „	...	19 „

	A	B	C
Width of head ...	17 mm. ...	16 mm. ...	15 mm.
Body ...	59 ,, ...	52 ,, ...	48 ,,
Fore-limb ...	32 ,, ...	30 ,, ...	27 ,,
Hind-limb ...	59 ,, ...	53 ,, ...	50 ,,
Tail* ...	155 ,, ...	153 ,, ...	126 ,,
Number of pores	42 ,, ...	43 ,, ...	45 ,,

Habits.—Usually found under logs and stones.

Mode of reproduction.—About eight eggs laid about the end of February or early in March.

Localities.—Opossum Creek, Charlotte Waters.

Distribution.—South Australia (B.M.C.), Victoria (L. and F., Proc.R.S.V., 1893), between Fraser Range and Southern Cross (Elder Exped.).

(5) *Amphibolurus barbatus*, Cuvier.

Many specimens. In some the upper surfaces are coloured uniformly brown or brownish-grey respectively. In others the lighter spots of the upper surfaces are of a bright orange-brown.

The following interesting notes on this species were made by Professor Spencer :—

(1) “On open country to south of Charlotte Waters, a general yellow-brown colour—similar to general colour of ground, with withered grass, etc.

(2) “At Crown Point, where plenty of red sand was, a peculiarly brick-red colour, much resembling the colour of the sandy hills close to the camp where it was found.

(3) “At Alice Springs—very dark form—dull black. Why? as the surroundings were not of this colour. When ‘nicotined’ (took several doses complacently, or rather it stiffened out, but recovered after the first three), it changed to the yellow-brown colour as in No. 1, but not so bright. These (two specimens) were brought to me in a box, when they were dull black in colour. I gave them nicotine, when they turned lighter colour (yellow-brown). The very dark colour may have been due to their being shut up in comparative darkness, but they changed to the lighter colour after a dose of nicotine while still in the box.”

* The tail tapers gradually to an exceedingly fine point, and the loss by accident of a considerable length makes little difference in the appearance of completeness.

Habits.—Found on the open ground in the daytime.

Localities.—Met with constantly throughout the Expedition.

Distribution.—All over Australia.

Tympanocryptis, Peters.

(6) *Tympanocryptis lineata*, Peters.

Several specimens. Agree with types, except the white longitudinal lines on the sides absent, and the enlarged dorsal scales in some specimens orange-brown.

Localities.—Darwent Creek, Bagot's Creek, Dalhousie.

Distribution.—South Australia, Kangaroo Island (B.M.C.), Victoria (Prod. Z.V., L. and F., *l.c.*), Farina (Elder Exped.).

(7) *Tympanocryptis cephalus*, Günther.

One specimen, young, ground colour brick-red.

Locality.—Oodnadatta.

Distribution.—Nicol Bay (B.M.C.), Murchison District (Elder Exped.).

(8) *Tympanocryptis tetraporophora*, L. and F.

Description.—Nostril nearer to eye than to tip of snout; upper head scales larger and less strongly keeled than in *T. lineata*, Peters, large on the occiput. Dorsal scales strongly keeled, the enlarged ones mucronate. *Colour*.—Light brown or reddish above, with darker more or less indistinct cross-bands on the body; tail and limbs with dark bars.

Resembling *T. cephalus*, Günther, in colouring above, and *T. lineata* on the ventral surfaces; but in one of the two specimens there is a narrow white vertebral line recalling that of *T. lineata*.

DIMENSIONS.

Total length	...	...	...	130 mm.
Head	...	...	...	17 „
Width of head	...	...	...	13 „
Body	...	...	...	35 „
Fore-limb	...	...	...	28 „
Hind-limb	...	...	...	40 „
Tail	...	...	...	78 „

Localities.—Adminga, Dalhousie.

The remarkable feature of these specimens is that there are, in addition to the two præanal pores, two femoral pores, one on each limb.

This character will involve a modification in the definition of the genus.

Apart from the presence of these pores, *T. tetraporphora* serves to connect the two previously described species of the genus.

We allow the above to remain as published in the P.R.S.V., Dec., 1894. We have since received an extensive series of *Tympanocryptis*, collected by Professor Spencer in the same district in February, 1895, during the breeding season. In this collection are several examples of *T. lineata*, both male and female, with two præanal and two femoral pores as well as many others agreeing with our *T. tetraporphora*, which was mainly distinguished from *T. cephalus* by the presence of femoral pores. After considering these additional facts we feel compelled to go further in the union of these forms and to regard them as varieties of one species, *T. lineata*. We now give particulars of the forms. Out of eight specimens for instance :—

- (a) Two typical *T. lineata* (♂ and ♀) with two præanal and two femoral pores.
- (b) Two (♂ and ♀) with faint indication of the longitudinal light lines and dark spots, both with two præanal and two femoral pores.
- (c) Four (two ♂ and two ♀) uniform reddish-brown, each with two præanal and two femoral pores.

The definition of the genus will then stand thus :—

Tympanocryptis, Peters.

Tympanum hidden. Body depressed, covered above with heterogeneous scales. No dorsal crest. No gular sac; a strong transverse gular fold. Tail round. A præanal and a femoral pore on each side, sometimes absent.

Habits.—Ground lizards, usually met with under logs and stones.

Mode of reproduction.—Nine to twelve eggs laid in February or March.

Diporophora, Gray.

- (9) *Diporophora winneckeii*, L. and F. (Plate XI., Fig. 5).

Description.—Habit slender; head rather narrow, with distinct canthus rostralis; covered above with sub-equal keeled scales; nostril equally distant from

the eye and the tip of the snout ; tympanum moderate. A slight transverse gular fold. Dorsal scales large, uniform, feebly keeled, the keels directed obliquely towards the middle of the back ; gular scales smooth ; ventral scales feebly keeled, a little larger than those on the middle of the back ; lateral scales smallest, latero-ventral largest. Limbs and digits rather long, the adpressed hind-limb reaches the tympanum in the male and the shoulder in the female. No pores in our specimens. *Colour*.—Brown above, with darker and lighter spots ; a broad bluish vertebral band, divided on the tail by a narrow line of ground colour ; a narrow white band on each side from behind the eye to the base of the tail, and sometimes a broader one from axilla to groin. Under-surfaces whitish, with two broad, dark edged, bright yellow bands, united on the chest, and again in front of the hind limbs ; a band of the same colour along the front of the hind-limb from its base to the knee. Tail with a series of broad dark spots or annuli.

DIMENSIONS.

	Male.	Female.
Total length ...	215 mm.	206 mm.
Head ...	14 „	16 „
Width of head ...	9 „	9·5 „
Body ...	42 „	45 „
Fore-limb ...	24 „	24 „
Hind-limb ...	38 „	39 „
Tail ...	159 „	145 „

Habits.—Food chiefly grasshoppers.

Mode of reproduction.—Ova in two series, three and four respectively. The larger 14 mm. by 8 mm., the smaller 4 mm. by 4 mm.

Locality.—Charlotte Waters.

Named after Charles Winnecke, Esq., the leader of the Horn Expedition.

Physignathus, Cuvier.

(10) *Physignathus longirostris*, Blgr. (Plate X., Figs. 2, 2a).

Several specimens. In some the middle of the back and the temporal and loreal regions are of a rich plum colour, a black patch enclosing a white spot immediately behind the tympanum ; a red streak on the loreal region.

Habits.—Found among heaps of *débris* in creek beds; will climb trees when pursued.

Mode of reproduction.—Ova in two series of seven and eight respectively in one example. Dimensions of largest, 18 mm. by 10 mm.

Localities.—Oodnadatta, Charlotte Waters, Opossum Creek, Glen Helen, Darwent Creek, Alice Springs.

Distribution.—Nicol Bay, Champion Bay (B.M.C.), Murchison District (Elder Exped.).

Moloch, Gray.

(11) *Moloch horridus*, Gray.

Several specimens.

Habits.—Ground form met with in the open during the day. Sluggish in habits. Feeds on ants.

Mode of reproduction.—About eight eggs laid in late summer.

Localities.—Met with throughout the Expedition.

Distribution.—Central and Western Australia, Swan River (B.M.C.), Onkaringa Creek, near Everard Range, near Barrow Range, Fraser Range (Elder Exped.).

VARANIDÆ.

Varanus, Merrem.

(1) *Varanus giganteus*, Gray. Native name, *Parentlie*.

One young specimen, 84 cm. In every way typical except that the black reticulations of large pattern extend over the whole of the under surfaces of the head, trunk, and limbs. Thus the belly is not immaculate as described in the type. Pincal cornea distinct, not large.

Habits.—Found on the rocky hills. Is said to reach eight feet in length.

Locality.—Alice Springs.

Distribution.—North coast of Australia (B.M.C.).

(2) *Varanus gouldii*, Gray.

One specimen, 42 cm. Typical in structure and markings. Ground colour of head and trunk rusty-brown, of tail and limbs greyish-brown.

Habits.—Ground form, enters holes in the ground when pursued.

Locality.—Charlotte Waters.

Distribution.—Over all Australia, and islands adjacent to the north coast.

(3) *Varanus punctatus*, Gray.

Several specimens. *Colour.*—Upper surfaces: Head brown, body and limbs black, with transverse rows of light ocelli with black centres; the ocelli and spots over the sacrum and on the hind limbs rustier; tail with light spots on proximal fourth, distal three-fourths uniformly jet-black. Under surfaces: Chin cream-coloured, nearly immaculate; throat and limbs with black reticulations; belly with irregular black spots; groin rustier; tail on proximal fifth scales irregularly cream or brown, distal four-fifths uniformly sooty-black. Pineal cornea small, inconspicuous.

Habits.—Found amongst rocks.

Locality.—Alice Springs.

Distribution.—Distributed over North and West Australia from Endeavour River to Perth. It is common at Port Darwin and Port Essington. It was met with in the Elder Expedition on Fraser Range. A very closely-allied species, *V. timorensis*, Gray, extends over North Australia from Cape Yorke and Thursday and Murray Islands to Port Darwin and Timor (B.M.C.).

(4) *Varanus acanthurus*, Blgr.

Several specimens. Agrees entirely with description in B.M. Catalogue. On the palmar and plantar surfaces in both *V. punctatus* and *V. acanthurus*, the scales present series of brown flattened discs.

Habits.—Found under stones and logs, burrowing in suitable places.

Locality.—Alice Springs.

Distribution.—Distributed over North and West Australia according to B.M.C., the only precise locality mentioned being Nicol Bay.

(5) *Varanus gilleni*, L. and F. (Plate VIII., Fig. 2).

Description.—Snout slightly projecting, depressed at the end, measuring rather less than the distance from the anterior angle of the eye to the ear;

canthus rostralis indistinct. Nostril broadly oval, as in *V. punctatus*, *V. acanthurus*, etc., directed backwards and outwards, slightly nearer the end of the snout than the anterior angle of the eye. Limbs and digits moderate, latter strongly compressed, with strongly re-curved claws. Tail round, flattened ventrally, depressed at the base, not keeled. Head covered with flat granular scales, unequal in size, largest between the orbits, smallest on the supraocular region and about the nostrils. Scales of upper surfaces small, oval, convex, rather longer than broad, each scale on the body and limbs, except those on the pre-axial surface of the carpus and to a less extent the tarsus, surrounded by a conspicuous ring of small granules. About eight rows of flat, smooth, sub-equal genal scales. Gular scales similar to abdominal, but more convex. Abdominal scales smooth, in eighty-five to ninety transverse rows between gular fold and groin. Caudal scales all tricarinate, the central keel strongest, raised posteriorly, almost mucronate. Pineal cornea distinct, inconspicuous. *Colour*.—Light brown above, with darker spots and streaks, arranged more or less plainly in longitudinal series or continuous lines on the head and distal three-fourths of the tail, and in transverse series or bands across the neck, trunk and proximal fourth of the tail. The markings on the trunk of a dull red. Six narrow longitudinal bands on the head and front part of the neck, on each side one commencing behind the ear and another more continuous along the temporal region commencing behind the eye, the two median dorsal bands anastomosing with one another and with the temporal streak. Lips with vertical streaks. Under surfaces cream-coloured; chin dark spotted.

DIMENSIONS.

Total length	...	...	...	341 mm.
From tip of snout to gular fold	...	...	...	51 „
From gular fold to vent	...	...	...	93 „
Maximum width of head	...	...	...	17 „
Fore-limb	...	...	...	38 „
Hind-limb	...	...	...	46 „
Tail	...	...	...	197 „

Habits.—Found on trees.

Locality.—One specimen, caught up a *Casuarina decaisneana* tree between Glen Edith and Deering Creek; another caught up a gum-tree near Charlotte Waters.

Named after F. J. Gillen, Esq., the chief officer of the Alice Springs Telegraph Station.

(5) *Varanus eremius*, L. and F. (Plate VIII., Fig. 1).

Description.—Snout depressed at the end, measuring less than the distance from the anterior border of the orbit to the ear, canthus rostralis sharp. Nostril round, nearer the end of the snout than the orbit. Digits moderate, slightly compressed, with nearly straight claws. Tail round, depressed at the base, compressed posteriorly. Head scales small, sub-equal, supra-ocular scales very small. Scales of the upper surfaces small, elongate, keeled. Abdominal scales smooth, in seventy to seventy-five transverse rows; caudal scales strongly keeled, the caudal keel with a low doubly-toothed crest. Pineal cornea conspicuous.

Colour.—Rusty brown above, with small lighter and darker spots; a dark narrow curved line across the back of the head, and another from above the ear passing through the orbit; lower eye-lid with a large brownish-grey spot; sides greyish; a white streak from ear to fore-limb. Tail greyish, with four (six on the anterior half) black longitudinal bands. Lower surfaces white; throat mottled with grey.

DIMENSIONS.

Total length	...	...	...	300 mm.
From tip of snout to gular fold	...	...	...	39 „
From gular fold to vent	...	...	...	73 „
Maximum width of head	...	...	...	13 „
Fore-limb	...	...	...	32 „
Hind-limb	...	...	...	46 „
Tail	...	...	...	188 „

Habits.—Found on the ground under logs and *débris*.

Locality.—Idracowra (one specimen).

One of three specimens secured by Professor Spencer since the return of the Expedition measured as follows:—

Total length	..	...	...	392 mm.
From tip of snout to gular fold	...	...	...	47 „
From gular fold to vent	...	...	...	88 „
Maximum width of head	...	...	...	15 „
Fore-limb	...	...	...	38 „
Hind-limb	...	...	...	55 „
Tail	...	...	...	257 „

Locality.—Charlotte Waters.

SCINCIDÆ.

Egernia, Gray.

(1) *Egernia whitii*, Lacép. (Plate XI., Figs. 3, 4).

A very fine series of this species was obtained, which is especially of interest as exhibiting a remarkably wide range of variation in colouring.

In none of the forms, however, did we find any structural peculiarities which could separate them from the type.

The abundance of material at our disposal enables us to describe a number of definite colour patterns.

In the normal colouring of this species we have a succession of longitudinal bands on the back and sides, arranged in the following order from the median line outwards:—

On the back—

- (1) A median band of ground colour, without spots, with a trace of a black vertebral line on the nape;
- (2) A broad black band bearing a longitudinal series of white or light spots;
- (3) An uninterrupted white or light dorso-lateral band.

The sides bear lighter spots and darker streaks and spots, sometimes forming longitudinal series. None of the specimens obtained were quite normal in colouration.

The following were the most conspicuous variations:—

SPECIMENS 1, 2, 3 (Oodnadatta).—The median band of ground colour is replaced by a black vertebral line; on each side is a band of the light brown ground colour, beyond which is another black band, in places broken up into short continuous streaks; the dorso-lateral light band is absent, the dorso-lateral area and sides with irregular lighter spots and black spots and streaks; under surfaces pinkish-white; throat greyish speckled with black.

SPECIMEN 4 (Alice Springs).—Pale olive-brown above, with numerous light spots, and black spots and streaks; each light spot occupies one entire scale; the black streaks on each side of the vertebral region more or less continuous into longitudinal lines; sides greyish-brown with lighter and darker spots; under surfaces greyish, throat pinkish.

SPECIMEN 5 (Alice Springs).—Above pale brown, with black spots and streaks, the latter arranged more or less in continuous longitudinal series; sides pinkish-brown, with faint oblique lighter and darker bands; under surfaces creamy-white.

SPECIMEN 6 (Palm Creek).—Bright brick-red above, with a few black spots, a faint, dark longitudinal line between each row of scales, the posterior edge of each scale tipped with lighter colour; sides pinkish-brown, with numerous black spots arranged in somewhat regular oblique bands; under surfaces creamy-white.

SPECIMENS 7, 8 (Palm Creek, Alice Springs).—Dark olive-brown above, the posterior margin of some of the scales tipped with lighter colour, a black longitudinal line marking the interspace between adjacent rows of scales on the dorsal surface and upper portion of the sides; sides pinkish-brown, with lighter and darker spots; under surfaces creamy-white, throat greyish.

SPECIMEN 9 (Alice Springs).—Upper surface of head and anterior half of body of a uniform dull reddish-brown, of tail and hind limbs olive-brown; sides similarly uniform pinkish-brown in front, greyish-brown behind. The whole of the scales on the upper surfaces, sides, and limbs each with narrow dark margins, the whole forming a uniform reticulation; under surfaces of body greyish, throat pinkish.

SPECIMEN 10 (Lawrie's Creek).—Upper surfaces of head and anterior half of body burnt umber, of posterior half of body, tail, and limbs pale brown. The whole of the scales of the upper surfaces of body, tail, and limbs each with narrow dark margins forming uniform reticulations. The scales of upper surface of body each with a light spot, thus giving the appearance of faint alternately darker and lighter longitudinal lines. Sides yellowish, under surfaces cream colour.

Habits.—Found under logs and stones and in burrows.

Localities.—Met with throughout the Expedition.

Distribution.—All over Australia and Tasmania.

(2) *Egernia stokesii*, Gray.

Three specimens.

Habits.—Found on open stony plains.

Locality.—Oodnadatta.

Distribution.—Houtmann's Abrolhos, Dirk Hartog Island (B.M.C.).

Tiliqua, Gray.(4) *Tiliqua occipitalis*, Peters.

Two specimens of this lizard were collected. Both exhibit slight variations from B.M.C. description of the type. The præfrontals are in contact in the middle line. This point was noted by McCoy (Prod. Zool. Vic., pl. 171) in the Victorian specimens. Ear-lobes five (B.M.C. three). The fore-limb shorter than head, contained three and a half times in the distance between axilla and groin. *Colour*.—Bands across the body brown, numerous (11–12), each only about two scales wide. All the limbs black on the upper surfaces.

Two specimens subsequently obtained from the same locality by Professor Spencer agree with Boulenger's description in both structure and colouration. From this it might be assumed there are two well-marked varieties. Victorian examples, however, exhibit the same variation in structure as the former specimens, but have the broad bands of the latter.

Habits.—Found under logs; not seen in the open during the daytime.

Localities.—Oodnadatta, Charlotte Waters.

Distribution.—Swan River (B.M.C.), Fraser Range (Elder Exped.), Western and North-western Victoria (McCoy and Lucas and Frost).

Hinulia, Gray.(4) *Hinulia lesueurii*, D. and B.

An extensive series, exhibiting a remarkable range of variation. We accordingly describe a number of examples somewhat in detail.

A.—Typical in structure and colouring. Ground colour from pale brown to dark olive-brown. Several specimens.

B.—Typical in colouring. Præfrontals separated.

C.—Typical in structure, except that præfrontals are separated.

Dorsal surface of body.—Ground colour pale olive-green, a black vertebral band edged on either side with a narrow band of ground colour; a light dorso-lateral line from above the ear to the tail; the whole of the space between this and the light border of the vertebral band, except on the nape, occupied by a broad black band. *Sides*.—A broad black band, bearing a linear series of light spots, from

above the ear to base of tail. A continuous white line from ear to tail. A broken black band from axilla to groin.

D.—Typical in structure, except that præfrontals only just meet at inner angles, and frontonasal and rostral completely separated.

Dorsal surface of body.—Ground colour bright reddish-brown; a faint but distinct dark vertebral band, edged on each side with a continuous series of light spots; a light dorso-lateral line from the supraciliary border to the base of the tail; between this and the line bordering the vertebral band a regular longitudinal series of light spots occupying the centres of alternate scales. *Sides.*—A broad black band, more or less broken up into spots, from eye to base of tail. A longitudinal series of narrow white streaks from ear to base of tail. An uninterrupted band of ground colour between axilla and groin.

E.—Typical in structure.

Dorsal surface of body.—Ground colour reddish-brown; each scale with a light spot in the centre; five black longitudinal lines; a white continuous dorso-lateral line on each side from supraciliary border to the base of the tail; thus in all six dorsal light longitudinal lines. *Sides.*—A broad black band, with numerous light vertical streaks from eye, above ear, to base of tail. A narrow light interrupted line from ear above limbs to base of tail. A linear series of faint grey spots between axilla and groin.

F.—Typical in structure. Scales round the body thirty-two.

Dorsal surface of body.—Ground colour reddish-brown; with five longitudinal black bands; a white dorso-lateral line from supraciliary border to tail. *Sides.*—A broad black band bearing a uniform series of reddish spots from eye to base of tail; a narrow white band from ear to tail; a black band from axilla to groin, extending also in front of fore-limb and behind hind-limb.

G.—Typical in structure, except præfrontals separated. Scales round the body twenty-eight.

Dorsal surface of body.—Ground colour olive-brown, with five longitudinal black bands, those next the vertebral bifurcating behind; a light dorso-lateral line from supraciliary border to tail, thus forming five black and six light longitudinal bands along the back. *Sides.*—A broad black band bearing a linear series of light spots, more or less confluent into longitudinal streaks, from eye to base of tail. A narrow white band from ear to hind-limb. A broken black band from below the ear to groin.

H.—Typical in structure, except rostral and frontonasal separated. Scales round the body twenty-eight. The colouration agrees entirely with that of the typical *H. teniolata*, White. It will be seen that the series furnishes us with several connecting links between *H. lesueurii* and *H. teniolata*.

I.—Typical in structure, except præfrontals separated and rostral not in contact with frontonasal. Scales round the body twenty-six.

Dorsal surface of body.—Ground colour burnt umber; each scale with a faint zone of darker; an intermittent series of black spots on each side near the dorso-lateral border. *Sides.*—A broad black band, broken up by light spots and streaks, from eye to tail. A narrow white line from ear to base of tail. A faint grey band from axilla to groin. (Probably equivalent to *H. strauchii*, Blgr.)

Habits.—Found under logs and stones. Seen about in the daytime.

Localities.—Alice Springs, Finke Gorge, Reedy Hole, Bagot's Creek, Palm Creek, Dalhousie, Tempe Downs.

Distribution.—Fairly well distributed over the whole of Australia and adjacent islands.

(5) *Hinulia fasciolata*, Günther.

Several specimens.

Habits.—Found actively running in the open. Will enter houses.

Localities.—Charlotte Waters, Bagot's Creek, Tempe Downs.

Distribution.—Port Curtis, Rockhampton (B.M.C.), Gayndah, Q. (L. and F.).

Rhodona, Gray.

(6) *Rhodona tetradactyla*, L. and F. (Plate XII., Fig. 3).

Description.—Body much elongate, limbs weak, tetradactyle, the distance between the end of the snout and the fore-limb is contained twice to twice and a half in the distance between axilla and groin. Snout moderate, obtusely conical. Lower eyelid with a transparent disc. Nostril pierced in a large nasal which is in contact with its fellow; frontonasal large, and forming a broad straight suture with the frontal; præfrontals small and widely separated; frontal broader than the supraocular region, longer than the frontoparietals and interparietal together, in contact with the first and second supraoculars; four supraoculars, six supra-

ciliaries ; frontoparietals and interparietal distinct, subequal ; two or three pairs of nuchals. Ear-opening minute, about the size of the nostril. Twenty smooth scales round the middle of the body, dorsals largest. A pair of enlarged præanals. The length of the hind-limb equals the distance between the eye and the fore-limb ; toes slender, third about twice the length of second, which is twice as long as the first ; subdigital lamellæ smooth, about fourteen under the third toe. Tail slightly longer than head and body. *Colour*.—Greyish above, with four regular series of and black dots, almost confluent into lines along the back, sides darker, a longitudinal blackish lateral band from snout to tail, the lower edge of which is scarcely distinct from the darker ground colour on the sides ; tail brownish, covered with irregular blackish dots ; lower surfaces greyish or brownish with a darker colour around the margin of each scale.

DIMENSIONS.

Total length	...	...	...	...	77 mm.
Head	...	...	...	...	5 „
Width of head	...	...	...	...	3 „
Body	...	...	...	...	30 „
Fore-limb	...	...	...	...	4 „
Hind-limb	...	...	...	...	8 „
Tail	...	...	...	...	42 „

Locality.—Tempe Downs. One specimen.

This species is intermediate between *R. bougainwillii*, Gray, and the group with rudimentary limbs.

(7) *Rhodona gerrardii*, Gray.

Several specimens all fully agreeing with the type except that the fore limbs are didactyle and the hind limbs tridactyle. This variation is noted by Stirling and Zietz (*l.c.*).

Localities.—Palm Creek, Reedy Creek, George Gill's Range.

Distribution.—Swan River, Champion Bay (B.M.C.), Barrow Range (Elder Exped.).

(8) *Rhodona bipes*, Fischer.

Two specimens.

Locality.—Palm Creek.

Distribution.—Nicol Bay (B.M.C.), Barrow Range (Elder Exped.).

Ablepharus, Fitzing.(9) *Ablepharus boutonii*, Desj.

Locality.—Palm Creek.

Distribution.—Irregularly distributed over the hotter parts of both hemispheres (B.M.C.).

(10) *Ablepharus lineo-ocellatus*, D. and B.

Two specimens.

Locality.—Reedy Hole.

Distribution.—All Australia.

(11) *Ablepharus lineo-ocellatus*, var. *ruficaudus*, L. and F. (Plate X., Fig. 3).

Differs from type as follows:—Body much depressed. Twenty-eight scales round the middle of the body. Nuchals nearly as large as parietals. *Colour*.—Upper surfaces greenish-black, with conspicuous longitudinal white band on either side of the back and head, converging in front to meet on the tip of the snout, and behind extending to base of tail. Tail and hind limbs red. Under surfaces of body bluish-white, of tail reddish.

Localities.—Goyder River, Bagot's Creek.

(12) *Ablepharus greyi*, Gray.

One specimen.

Locality.—Palm Creek.

Distribution.—Swan River and North-western Australia (B.M.C.), Everard Range (Elder Exped.)

II.—OPHIDIA.

The following list includes those which were secured during the Expedition, and also others which were obtained by Professor Spencer during a second visit to Charlotte Waters during January and February, 1895.

BOIDÆ.

Liasis, Gray.

- (1) *Liasis childreni*, Gray.

Python, Daud.

- (2) *Python spilotes*, Lacép.

Aspidites, Peters.

- (3) *Aspidites melanocephalus*, Krefft.

ELAPIDÆ.

Diemenia, Gray.

- (1) *Diemenia reticulata*, Gray.

Pseudonaja, Günth.

- (2) *Pseudonaja nuchalis*, Günth.
 (3) *Pseudonaja affinis*, Günth.

Pseudechis, Wagler.

- (4) *Pseudechis australis*, Gray.

Furina, D. and B.

- (5) *Furina ramsayi*, Macleay.

Vermicella, Gray.

- (6) *Vermicella annulata*, Gray,

Hoplocephalus, Cuv.

- (7)
- Hoplocephalus stirlingi*
- , sp. n.

Hornea, gen. n.

- (8)
- Hornea pulchella*
- , sp. n.

VIPERIDÆ.

Acanthophis, Daud.

- (1)
- Acanthophis antarctica*
- , Wagler.

BOIDÆ.

Liasis, Gray.

- (1)
- Liasis childreni*
- , Gray. (Plate XII., Fig. 4).

Three specimens of this snake were collected, all with thirty-eight rows of scales only (B.M.C. 41 to 45); in structure and colouration they agree fairly well with the description of the type, but differ somewhat in the shape of head-shields from the B.M.C. figure, and to a less extent from each other.

The species is evidently a variable one. We have in our collection a specimen from Townsville, Q., also with thirty-eight rows of scales, which cannot in any way be distinguished from these.

Locality.—Alice Springs.

Distribution.—N.W. Australia, Port Essington, Port Darwin, Gulf of Carpentaria, Islands of Torres Straits.—(B.M.C.).

Python, Daud.

- (2)
- Python spilotes*
- , Lacép.

One young individual, twenty-two inches long, example of var. C.—(B.M.C.).

Locality.—Alice Springs.

Distribution.—All Australia, except southern portion of Victoria and South Australia.

Aspidites, Peters.

(3) *Aspidites melanocephalus*, Krefft.

Unfortunately the head only of this specimen was collected. The head-shields and number of scales round the neck agree with the type, but the colour is uniform pale brown.

Locality.—Alice Springs.

Distribution.—Townsville, N.Q., Port Denison.

ELAPIDÆ.

In dealing with the species of this family we have met with considerable difficulty, owing to the unsatisfactory state of the literature. Since the publication by Dr. Günther in 1858 of the Catalogue of the Snakes in the British Museum, little alteration has been made in the nomenclature of the Australian Elapidæ, although about eighty species have been added to the list since that date. Our work upon the few genera dealt with here has shown us that a revision of the genera, in this family, has become absolutely necessary. Many of the characters relied on to establish the genera are variable, and in some instances—*e.g.*, “two nasals, nostril between,” in *Diemenia*, *Pseudonaja*, and *Pseudechis*—not even of specific value.

It would not be convenient to deal fully with this subject here, and as Dr. Boulenger is now engaged in preparing a Catalogue of the Venomous Colubrine Snakes, we prefer to await the result of his investigations.

In the following list we have adopted the nomenclature as it at present stands, adding a few remarks under the different species as suggested.

Diemenia, Gray.

(1) *Diemenia reticulata*, Gray.

Two young specimens. Typical in structure and colouration.

Locality.—Alice Springs, Charlotte Waters.

Distribution.—From North Victoria to North Queensland.

Pseudonaja, Günth.(2) *Pseudonaja nuchalis*, Günth.

The five specimens which we refer to this species all have the scales in seventeen rows, but exhibit a considerable amount of variation in colouration, and to a less extent in the structure of the head-shields. In none are the nasals completely divided, but some are semi-divided by a deep groove above or below. We give below the colouration of each specimen. A.—Uniform pale brown. B.—Pale greyish-brown above, with an indistinct blackish band across the back about three inches broad, commencing about three inches from the snout, and faint, narrow, greyish bands across the whole length of the body. C.—Uniform dark brown. D.—Pale brown above, each scale with a broad dark brown margin, head and neck black. E.—Pale greyish-brown with numerous indistinct undulated greyish bands.

Localities.—Alice Springs, between Laurie's Creek and Glen Edith.

Distribution.—N. Victoria, N.S.W., Port Essington, Port Darwin.

(3) *Pseudonaja affinis*, Günth.

The single specimen assigned to this species agrees well with the description of the type, except that the scales are in twenty-one rows.

Locality.—Reedy Creek, George Gill Range.

These two species do not present any generic differences sufficient to separate them from the genus *Diemenia*.

Pseudechis, Wagler.(4) *Pseudechis australis*, Gray.

Two specimens, exhibiting slight variations.

A.—Sc. 17, V. 217, C. $40\frac{1}{8}$. Temporals, 2 + 2. *Colour*.—Dark brown above, many of the scales, especially on the sides, with a pale yellow spot on the anterior margin; ventral plates deep yellow, each with a darker margin.

B.—Sc. 17, V. 204, C. $8\frac{5}{8}$. Temporals, 1 + 2; nasal single. *Colour*.—Uniform dark brown above, yellowish beneath.

Locality.—Charlotte Waters.

(5) *Furina*, D. and B.*Furina ramsayi*, Macleay.

Two specimens of this handsome snake were collected. In structure they agree well with Macleay's description of the type. *Colour*.—Deep salmon colour, or brownish-red above, with five narrow, widely separated grey bands; upper-surface of head dark grey, a narrow pale yellow band across the occiput followed by a broad black band; rostral, and a spot in front of the eye yellow, under-surfaces pale yellow.

Localities.—Crown Point, Horse Shoe Bend, Finke River.

Distribution.—Milparinka.—(Macleay).

Vermicella, Gray.(6) *Vermicella annulata*, Gray.

One young individual four and a half inches long. The ground colour is bright orange, and the rings polished jet-black.

Locality.—Crown Point, Finke River, burrowing in sand.

Distribution.—All Australia.

Hoplocephalus, Cuv.(7) *Hoplocephalus stirlingi*, sp. n. (Plate XII., Fig. 5).

Description.—Head flat, with broadly-rounded snout. Rostral broad and low, just visible from above; internasals broader than long; prefrontals broader than long, bent down on the sides, in contact with the second labial; frontal about one-third longer than broad, as long as its distance from the rostral, shorter than the parietals; supraoculars rather narrow, about half the width of the frontal; eye rather small, prominent; one anterior and two posterior oculars; temporals, 1 + 2; six upper labials, third and fourth entering the eye. Scales in nineteen rows. Ventrals, 158-176; anal, entire; subcaudals, 31-35.

Colour.—Uniform bright-brown to greyish-brown above; upper surface of head much darker, becoming almost black where it ends on the back of the head; upper labials, rostral, and sometimes a line from the temple through the eye to nostril, pale yellow; under surfaces whitish or yellowish; total length, 522 mm.; tail, 70 mm.

Locality.—Charlotte Waters, Oodnadatta, Alice Springs, Hermansburg. The specific name is associated with that of Dr. E. C. Stirling, a member of the Expedition.

Hornea, gen. n.

Description of the Genus.—Head not distinct from neck; snout flat and trenchant; eye small, with round pupil; nostril in the middle of a single nasal, which is separated from the præocular by the loreal; one anterior and two posterior oculars. Body cylindrical; scales rather short and polished, in seventeen rows; anal bifid; subcaudals in two rows.

(8) *Hornea pulchella*, sp. nov. (Plate XII., Fig. 6).

Description.—Rostral broad, depressed, extending on the upper surface of snout, with angular horizontal edge in front; internasals trapezoid, the width behind equals the length; præfrontals as long as or a little longer than internasals; frontal large, hexagonal, about two-thirds as broad as long, with an obtuse angle in front and an acute one behind, shorter than the parietals; nasal single, nostril in the middle, separated from the præocular by a loreal of about equal size and shape; one anterior and two posterior oculars; temporals 1 + 1; six upper labials, first small, sixth as large as fourth and fifth together; scales in seventeen rows; ventrals 172; anal divided; subcaudals $\frac{20}{20}$.

Colour.—Pale greyish-yellow above, with numerous, alternate, bright red and dark brown or black, slightly undulated, transverse bars on the back and tail. Nearly all are broken up into transverse series of spots. Head yellowish, with a large black patch covering the interocular space and the parietals, and separated by a narrow interspace from a broad black collar; undersurfaces greyish-white. Total length, 344 mm.; tail, 25 mm.

Locality.—Charlotte Waters.

VIPERIDÆ.

(1) **Acanthophis**, Daud.

Acanthophis antarctica, Wagler.

One specimen (♂), rather slender. *Colour.*—Brick-red, with numerous, darker, not very distinct, narrow, transverse bands; tip of tail black.

Locality.—Charlotte Waters.

Distribution.—All Australia.



Fig 2

Fig 1



Fig 1

Fig 2

Fig 5

Fig 3

Fig 4

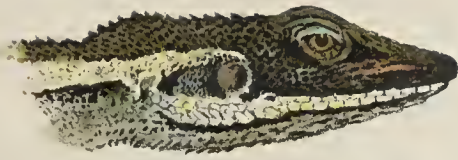


Fig. 2ª



Fig. 2



Fig. 1



Fig. 3



Fig. 1



Fig. 2



Fig. 3



Fig. 4

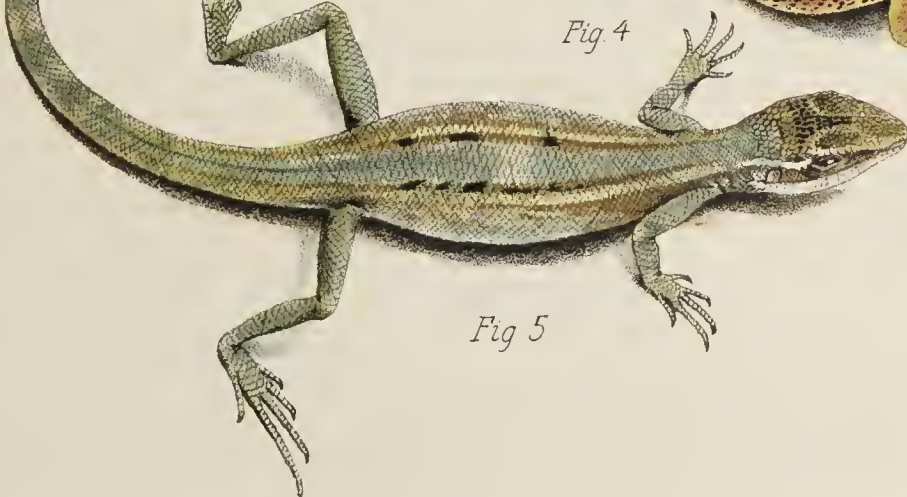


Fig. 5

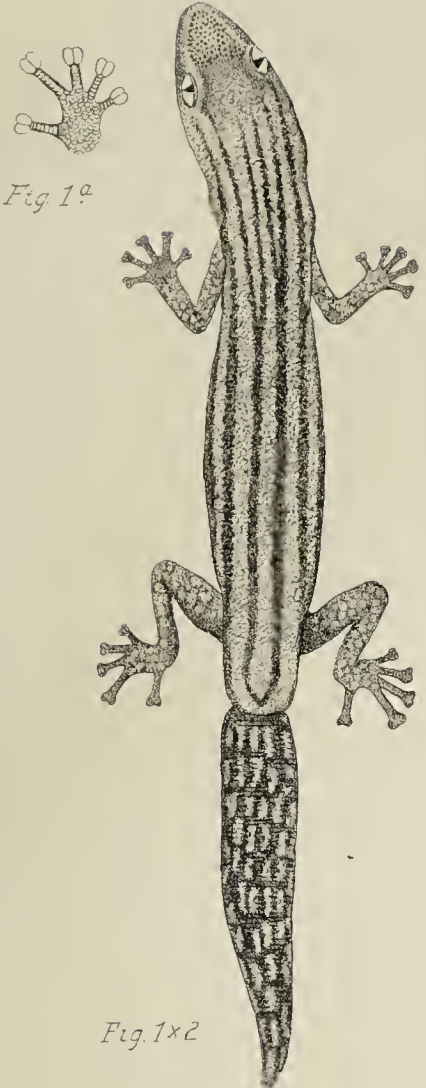


Fig 1^a

Fig. 1x2



Fig. 2

2^a

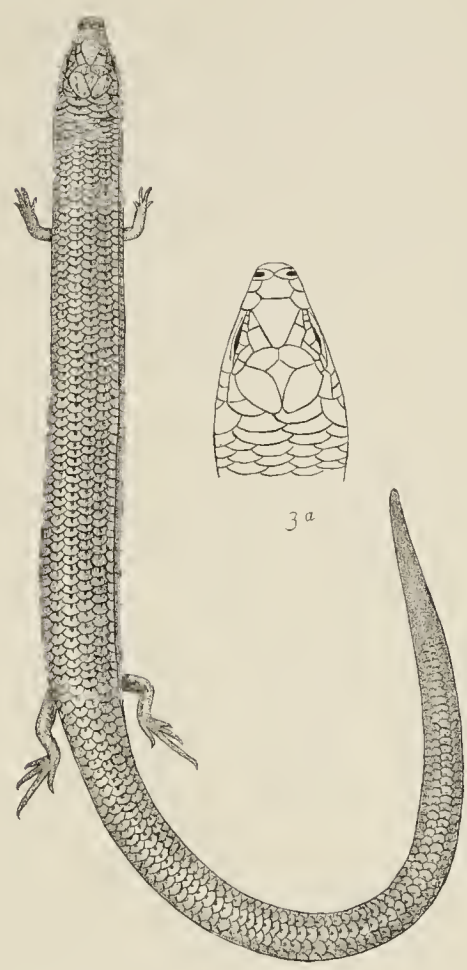


Fig 3x2

3^a

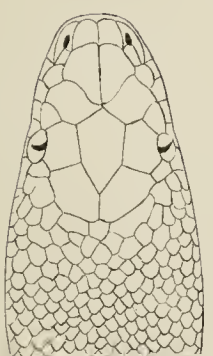


Fig 4.

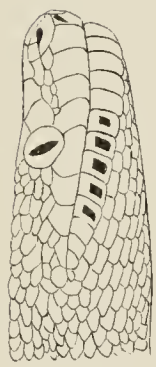


Fig 4^a

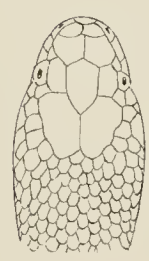


Fig 5



Fig 6



Fig. 6^a



Fig. 5^a

DESCRIPTION OF PLATES.

PLATE VIII.

- Fig. 1.—*Varanus eremius*, L. and F.
 „ 2.—*Varanus gilleni*, L. and F.

PLATE IX.

- Fig. 1.—*Nephrurus lævis*, De Vis.
 „ 2.—*Ceramodactylus damæus*, L. and F.
 „ 3.—*Gehyra variegata*, D. and B., var.
 „ 4.—*Amphibolurus maculatus*, Gray. ♂
 „ 5.—The same, under surface.

PLATE X.

- Fig. 1.—*Amphibolurus pictus*, Peters. ♂
 „ 2.—*Physignathus longirostris*, Blgr.
 „ 2a.—The same, side of head.
 „ 3.—*Ablepharus lineo-ocellatus*, var. *ruficaudus*, L. and F.

PLATE XI.

- Fig. 1.—*Heteronota bynoei*, Gray, var.
 „ 2.—*Heteronota bynoei*, Gray, var.
 „ 3.—*Egernia whitii*, Lacép., var.
 „ 4.—*Egernia whitii*, Lacép., var.
 „ 5.—*Diporophora winneckeii*, L. and F.

PLATE XII.

- Fig. 1.—*Ebenavia horni*, L. and F. × 2.
 „ 2.—*Diplodactylus byrnei*, L. and F.
 „ 3.—*Rhodona tetradactyla*, L. and F. × 2.
 „ 4.—*Liasis childreni*, Gray.
 „ 5.—*Hoplocephalus stirlingi*, sp. n.
 „ 6.—*Hornea pulchella*, sp. n.

AMPHIBIA.

By *BALDWIN SPENCER, M.A., C.M.Z.S., Professor of Biology in the Melbourne University.*

(PLATES 13, 14, 15).

INTRODUCTION.

Owing to the climatic conditions of Central Australia considerable interest attaches to its Amphibian fauna.

Up to the present time very few amphibians have been described from the central regions of the continent, and though there may be a greater number of species in the more northern and tropical parts, those which are found in the Finke River basin and in the sandy deserts to the south-west of this as far as Ayer's Rock and Mount Olga seem to be few in number.

It is of course quite possible that, though we searched carefully for them, several other species do exist; but if so they are probably very local in distribution, or else, what is quite likely, are only to be met with at certain seasons.*

The Horn Expedition passed through the country in the winter succeeding a rather more than average wet season. Excepting in the immediate vicinity of water-holes everything was perfectly dry and not favourable to a search for amphibians, which, if they are to exist, must hide themselves in dry, secluded spots. Wherever there were water-holes, there we found frogs in fair numbers; but the most striking feature was that these frogs in and round about the water-holes almost all belonged to two species, viz., *Hyla rubella* and *Limnodynastes ornatus*. Twice only we saw specimens of the young forms of other species found in water-holes. On one occasion in the Opossum Creek, to the south of Charlotte Waters, the tadpoles of *Chiroleptes platycephalus* were found, and on another in a small water-hole at Ayer's Rock, right amidst the sandy deserts to the south of Lake Amadeus, a few tadpoles of *Heleioporus pictus* were found. Of the two first mentioned, *Hyla rubella* was never found away from water-holes.

On the occasion of a subsequent visit to Charlotte Waters, immediately after

* Mr. J. J. Fletcher has remarked upon this in the case of certain frogs such as *Notaden bennettii*. For most valuable information regarding the habits of Australian frogs Mr. Fletcher's series of papers in the Proc. Linn. Soc. N.S.W. should be consulted. I have to thank Mr. Fletcher for much valuable advice and assistance during the writing of this report.

a very heavy rainfall, the creeks and clay-pans were swarming with frogs; but though they were so numerous I could only find examples of four species, and no trace of any which we had not seen during the dry season; so that on the whole I am inclined to think that, though the number of individuals is considerable, the number of species is very few.

It must be remembered that the central portion of Australia, drained by the Finke River and its tributaries, and which adopting the native name of the Finke may appropriately be called the *Larapintine Region*, is now and has been probably for long shut off by desert regions from especially the north and eastern parts of the continent, where frogs are more plentiful; while to the south and west are also vast stretches of desert land continuous in the latter direction with the equally dry wastes of West Australia.

All travellers have been impressed with the remarkable way in which in these dry regions frogs appear as if by magic, fully grown, immediately after a heavy rainfall, even if this has been preceded by, it may be, two or more years of drought. The moment the creeks run and the clay-pans fill, the incessant croaking of frogs is heard everywhere. As the water dries up the frogs disappear, and remain hidden until the next rainfall.

Under conditions such as these one of two methods must have been adopted if the frogs are to continue living and reproducing in such desert regions.

They must either have adapted themselves to their surroundings so as to do without the tadpole stage passed in the water, that is, they must develop directly into the adult without the necessity of the eggs being deposited in water, or they must have adopted some habit which will enable them to tide over it may be a year or two of drought, and so to wait patiently until there is water enough for them to deposit their eggs, and for the latter to develop into tadpoles in the ordinary way.

As Mr. Fletcher says :* “The rainfall is a most important factor in regulating the date of oviposition, inasmuch as a heavy downpour of rain is often necessary to release frogs from their aestivation, and in many cases to provide a water supply in which the spawn can be deposited. A heavy downpour of rain succeeding a period of dry weather will set some frogs spawning at any time of the year; and, on the other hand, in whatever month the frogs spawn, as a general rule they do so as soon as the weather clears up after rain.”

* Proc. Linn. Soc. N.S.W., vol. iv., 1889, p. 362.

In other parts of Australia forms such as *Limnodynastes dorsalis*, *Chiroleptes platycephalus*, *Notaden bennettii*, etc., have long been known to burrow, and it is by a strongly-marked development of this habit that the Central Australian frogs are enabled to survive.

Especially from the inland parts of New South Wales and Queensland there have frequently been received accounts of water-holding frogs which burrow, and from the bodies of which, in times of drought, the blacks will secure water enough to drink.

The identity of this frog has not been hitherto determined, but in Central Australia, by the aid of the blacks, we found its burrows, and took the frogs out of them all swollen with water. In this instance it proves to be *Chiroleptes platycephalus*, and as this species is found in the dry inland districts of New South Wales and Queensland, and is the one form which, in Central Australia, has most strongly developed the habit, it may perhaps be safe to conclude that it is the most important water-holding frog, though at the same time other forms have developed the same habit. For example, another species of the same genus (*C. brevipalmatus*) also burrows, but though it holds a certain amount of water it does not become so noticeably swollen out as in the case of the first-mentioned species.

The habits of the different species will be dealt with as each form is described. In this place it may be stated generally that out of the six species which we came across (and though the number of species is small the number of individuals is very considerable—in fact, after the rainy season very great) three, viz., *C. platycephalus*, *C. brevipalmatus*, and *H. pictus*, form what may be called *permanent* burrows, in which they lie dormant until the return of rain. One, *L. ornatus*, forms *temporary* burrows, from which it frequently emerges and then burrows again, while of two, *H. rubella* and *H. gilleni*, there is no direct evidence to show that they burrow at all. Of the two latter species we did not secure the second alive; and it seems to be comparatively local, and is, I think, an immigrant from the north. At the same time, as this species is only procured after rain, it is quite possible that it burrows. The other species, *H. rubella*, is met with at almost every water-hole, and we found it nowhere else.

Possibly the little species of *Hyla* may also burrow, but there is no evidence of its doing so. It evidently breeds very freely, and may thus in times of flood be carried about for long distances. Once, at Illamurta in the James Range, it was found in the damp ground close by the creek; but in this spot there was a permanent soakage and no indication of its forming anything like a permanent burrow.

The forms which do burrow are those which, as in the case of the genera *Chiroleptes*, *Heleioporus* and *Limnodynastes*, have a shovel-shaped metatarsal tubercle on the hind foot, such as the *Hylas* do not possess.

There is probably a very frequent transport of the eggs of Amphibia from one water-hole to another. Immediately rain falls birds appear in great numbers, flying about from one water-hole to another. In one instance I saw a crow rise from the side of a water-hole with a pellet of earth attached to it fully three-quarters of an inch in diameter. In this way the eggs of frogs can easily be carried about. When once the floods sweep down the water-courses they carry away logs and shrubs for great distances, and along with these must go numbers of smaller animals.

At intervals along the Finke River wells have been sunk, and around these little *Hylas* are always to be found, so that now, without burrowing, they can survive at isolated spots which will serve as centres from which other parts can be stocked in wet seasons.

Whilst the *Hylas* and *Limnodynastes ornatus* were found in and around the wells, we never found the larger frogs such as *Chiroleptes platycephalus* here; in fact, the latter, as well as *Heleioporus pictus*, seems to prefer to live in parts where the water periodically dries up, so that they must burrow and lie dormant.

Along with this burrowing habit has probably been acquired the capacity of rapid development. Standing by a water-hole which is drying up one can easily realise the paramount importance which it is for the perpetuation of the species that the embryos should be able to develop as rapidly as possible, so as to reach a size at which they can take advantage of the abundance of food in the form of caterpillars, etc., which abound during a short space of time, and at which also they can form burrows. If they do not succeed in developing rapidly, then their chance of survival must be small indeed.

The general conclusions to be drawn from our observations are:—

- (1) That Central Australia possesses but few species of Amphibia.
- (2) That these are in the main identical with certain forms found in the dry inland parts of New South Wales and Queensland.
- (3) That they are to be regarded as immigrants from the latter regions which have been able in the majority of cases to adapt themselves to unfavourable climatic conditions by means of a marked

development of the burrowing habit, to which, in certain cases, has been added a capacity for absorbing and holding water.

The following is a list of the forms obtained, and it will be observed that of the three dominant Australian families, viz :—Cystignathidæ, Hylidæ and Bufonidæ, no representative of the latter was obtained.

Family CYSTIGNATHIDÆ.

1. *Limnodynastes ornatus*, Gray.
2. *Chiroleptes platycephalus*, Günther.
3. *Chiroleptes brevipalmatus*, Günther.
4. *Heleioporus pictus*, Peters.

Family HYLIDÆ.

5. *Hyla rubella*, Gray.
6. *Hyla gilleni*, sp.n.

(1) *Limnodynastes ornatus*, Gray. (Plate XIII., Figs. 3, 4. Plate XV., Figs. 18-25).

The adult.—In its adult condition this frog has little resemblance in form to the other species of the genus. It was recorded for the first time from the Northern Territory by Gray, under the name of *Perialia ornata*.*

In certain points the specimens collected by us (about fifty in number) differ from the description given in the British Museum Catalogue. The extreme varieties, in the absence of intermediate forms, would scarcely be placed in the genus *Limnodynastes* if the character, "toes free or slightly webbed," were insisted upon as essential.

The vomerine teeth are in two sets, with, except in one or two instances, a clearly-marked break between them. In rare cases this break is indistinct.

All the larger specimens possess a character present in *L. peronii* and *L. dorsalis* but not recorded in *L. ornatus*, viz., the presence of a tubercle between the first and second and second and third fingers.

In the younger and smaller specimens, when the hind-limb is carried forward the tibio-tarsal joint reaches just to the eye, in the larger forms it does not reach so far.

* Eyre's Journal Expd. Cent. Aust., I., App., p. 407. Pl. ii., fig. 2.

The most important variation is concerned with the webbing of the hind-foot. In the British Museum Catalogue the species is described as having its "toes rather short, one-third webbed, the webbing extended as a fringe to their tips."

The expression "rather short" may be applied to some but not by any means to all. It may be said with regard to the webbing that in the young forms (measuring about 8 mm. from snout to vent) that the description quoted above applies. Such young forms were found either amongst herbage on damp ground or under stones right by the side of water-holes. In them the webbing is developed to the same extent as in typical examples of *L. salminii*, *L. tasmaniensis* and *L. dorsalis*, and also in a medium-sized specimen of *L. ornatus* which Mr. Fletcher kindly sent me from New South Wales.

L. ornatus is, however, a burrowing frog, and with the change in habit, occurring in the case of each individual, from life by or in a water-hole to burrowing in sand comes apparently a change in the structure of the foot.

The figures (Pl. XV., Figs. 20-23), drawn from actual specimens, have been chosen to show the variation in the amount of webbing, which is carried to its greatest extent in a specimen from Palm Creek, in which a complete and fringed web may be described as present. This particular specimen happens to be a male, but there is apparently no appreciable difference in the matter of webbing between the two sexes.

In Fig. 24 I have drawn a foot in which the outer line of webbing refers to the extreme form met with in my specimen of *L. ornatus*, while the lower dotted line indicates the least amount of webbing present in the same species, and also that which is present in specimens of *L. dorsalis*, another burrowing species of the same genus; in fact, the lower line indicates the amount of webbing which is usually present in this genus.

With regard to colour the range of variation is very considerable. The species is described in the British Museum Catalogue as "olive above, marbled with darker; generally a light dark-edged cross-band between the eyes; sometimes a light spot on the occiput; sometimes a light vertebral stripe, beneath immaculate."

In Fig. 3 is represented, as seen from the dorsal surface, what may be regarded as the typical pattern of the Central Australian form. The most characteristic marking is a light lyre-shaped patch, the two limbs of which extend forwards, one on to each upper eyelid. In front of this is a somewhat T-shaped light patch, the cross-line extending over the anterior part of each upper eyelid

and the mid-line stretching forwards to the tip of the snout. Posteriorly is a light patch stretching backward on either side of the urostyle, and the two patches may be confluent across the median line at about half the length of the body. These light patches are surrounded by darker masses, which gradually shade off towards the sides of the body. The ventral surface is light-coloured, and the front and hind limbs are always banded. From this well-marked pattern the considerable variations seen in different specimens may be derived. The lighter ground colour of the body is usually a cream-white, the darker patches varying in tint from silvery to dark grey. On them are scattered numerous small tubercles tipped with salmon-pink. The first and second fingers of the front feet are often umber in colour. Sometimes the darker markings may be scarcely visible at all and the whole body have a light silvery colour. Light and dark specimens are found close together in the same spot-burrowing in the sand. When placed in spirit the salmon-pink colour may become diffused over the lighter patches.

The Tadpole.—In February, 1895, I secured a few specimens in water-holes between Oodnadatta and Charlotte Waters, and have to thank Mr. E. C. Cowle for further specimens from Illamurta in the James Range. The tadpoles are not so plentiful as those of *C. platycephalus* or *H. rubella*, though judging by the considerable number of adult specimens met with during the dry season they must exist somewhere in fair numbers. In February, 1895, after the rains, whilst adults of the two forms just named were often seen, those of *L. ornatus* were not met with, though three or four half-grown specimens were secured.

The following are the dimensions of the tadpoles :—

Length of body not quite twice the width and about three-quarters the length of the tail.

Nose nearer to the tip of the snout than to the centre of the eye.

Eye on the upper surface of the head not visible from below.

The spiraculum is on the left side, not visible from above.

The anus opens in the median line at the base of the tail.

The tail is about a third as long again as the body, rounded at the extremity with the dorsal and ventral crests continuous round the end of the muscular part. The upper crest thins away at the base of the tail ; the ventral passes forwards to the anus.

The beak is broadly edged with black.

The lips are bordered with papillæ, which are numerous at the interval between the upper and lower series of labial teeth. The papillæ are absent in the median anterior part; at either side of this and in the median posterior region they are arranged in a single series.

Series of labial teeth $\frac{2}{3}$. The second anterior and first posterior row are somewhat more broadly interrupted in the mid-line than in *H. rubella*.

The upper part of the body is dark with darker mottlings; between the eye and the hind-limb is a lighter part on which the mottlings show distinctly. The ventral surface is pearl-coloured with no mottlings. The hinder half of the muscular part of the tail has strongly marked mottlings, and the crests of the tail have a dark network which may be strongly marked.

The following are the dimensions of the specimen figured:—Total length, 52 mm.; length of body, 22 mm.; length of tail, 30 mm.; width of body, 14 mm.; height of tail, 11 mm.; spiraculum from end of snout, 12 mm.; spiraculum from centre of eye, 9.5 mm.; nostril to tip of snout, 4 mm.; snout to centre of eye, 7.5 mm.

Distribution.—This species has been previously recorded from northern parts, such as Ports Essington and Denison and Cape Yorke, from the Peak Downs and the Clarence River. When recording it from an inland part of New South Wales Mr. Fletcher speaks of “the unexpected occurrence of *L. ornatus* and *H. lesueurii*, both of which, from previous records, would appear to be coastal species.”* It will thus be seen that *L. ornatus* has a comparatively wide distribution. In Central Australia it extends from the south of Charlotte Waters all up the Finke basin to the Alice Springs and to the west in the James Range, and is also found on the south side of the George Gill Range.

Habits.—It is distinctly, as Mr. Fletcher surmised from its structure,† a burrowing form, but yet its habits in this respect differ considerably from those of *Chiroleptes platycephalus*.

In the adult form it is always found in relatively soft, sandy ground, most generally in the beds of creeks which are dried up, but in which, after digging down for a short depth, the sand is more or less damp.

It does not make a permanent burrow, but appears to come to the surface in the cool of the night and to remain hidden in the sand perhaps a foot or more

* Vol. V., Proc. Linn. Soc. N.S.W., 1890, p. 672.

† Vol. VI., Proc. Linn. Soc. N.S.W., 1891, p. 271.

underground during the daytime. Its tracks can often be traced over the sand to a spot at which they disappear, and by digging down here the animal is usually to be found. It does not appear to store up water and aestivate as does *C. platycephalus*, and it feeds upon beetles, many of which are to be found in its stomach.

When placed on the sand it immediately begins to burrow, moving its hind legs downwards and slightly outwards, so as to make a way for its body, and it disappears from sight in a very short time. Under these conditions, as a means of moving the soft sand aside, the use of its strong web and metatarsal tubercle is easily seen.

(2) *Chiroleptes platycephalus*, Günther. (Plate XIII., Fig. 1. Plate XIV., Figs. 5-9).

The adult.—As Mr. Fletcher has pointed out, in the original description of the genus the pupils are stated to be vertical, but when living specimens are examined it is at once seen that they are horizontal. The figure in the British Museum Catalogue (Pl. xvii., Fig. 4) also needs correction in this respect. In the description given in the latter work, as well as in the synopsis of species,* it is stated that the tympanum is indistinct. This statement is scarcely borne out by the figure alluded to, and in the numerous specimens secured by us the tympanum is very distinct.

The hind-foot is peculiarly solid in appearance, the webbing in addition to being complete is notably strong and thick and the metatarsal tubercle very well developed. These features are correlated with its essentially burrowing habits.

In respect of its colours the description given of the living form would vary remarkably according to the season at which in Central Australia the animal happened to be found. Dr. Günther describes it as “uniform greenish-olive above, throat with a few small greenish spots.” In May, 1894, we found specimens both in water-pools which were nearly dried up and also in burrows. These specimens certainly justified Mr. Fletcher’s statement that, “in keeping with its retiring habits, *C. platycephalus* is clad in sombre tints, which are not very seriously interfered with by the action of alcohol; my specimen when alive might have been described as above of an olive-grey or greyish-brown much freckled with darker spots and blotches, but without any definite pattern; beneath white, the throat of the male slightly and finely dotted with darker.”

* Brit. Mus. Cat., Batr., 1882, p. 268.

✓ Our early specimens, secured during the dry season from water-holes and burrows, were of a dirty yellow colour with indefinite darker splotches upon the back, which was also marked with tubercles.

In January and February, after rain had fallen, the change in colour was remarkable—so much so that at first I could hardly believe that the brightly-coloured and lively frog which was to be seen and heard in and about every water-hole was the same species as the lethargic, dull, and dirty form which we had but rarely seen before.

I came across it first in a shallow clay-pan, to which I was attracted by a croak closely resembling that of the common (around Melbourne) *Hyla aurea*. At first no frogs could be recognised, but whilst walking round the edge of the pool I saw bright emerald-green patches suddenly disappear beneath the surface. These were the heads of half-grown specimens of *C. platycephalus*. Their heads are coloured yellow with bright green markings, and so, as long as they remain still, they are not at first easy to detect in a pool of yellow, muddy water dotted over with the bright, floating leaves of the nardoo plant (*Marsilea quadrifolia*).

Both the colour and the croak of these half-grown forms is not at all unlike that of a lightly-coloured *Hyla aurea*. As they grow older and larger they become somewhat duller, and the green patches more diffuse. The iris is golden with dark brown specks, the tympanum a yellowish-brown and the sides of the body an orange-brown. The limbs are of the latter colour, though the hinder ones may be of a lighter tint, and the web is often distinctly pink. There is no difference in colour between males and females.

Their colour on the banks of the water-pools, amongst sand and green herbage, is, at first sight, as deceptive as when they lie in the water. It is possible that this may serve, to a certain extent, to conceal them so long as they remain still, but it must also be noticed that when once he is accustomed to their appearance the human collector can easily distinguish them, even if they remain quiet, whilst when aware of your presence they at once move away, and are then, of course, easily seen.

At all events they seem to pass through a seasonal change of colour, which accords, speaking generally, with that of their surroundings, becoming dull and dirty yellow as the vegetation withers and the water-holes dry up, and acquiring their brighter tints after rain, when everything is fresh and green.

The Tadpole.—In one water-hole along the Opossum Creek, between Oodnadatta and Charlotte Waters, we found large tadpoles in May—that is, in
x

the dry season. In the following January and February several water-holes in the same district were swarming with them, in various stages of development.

They were not present in, by any means, all the water-holes, being found, presumably, only in those by the sides of which the adults had been aestivating.

Their distribution is undoubtedly influenced largely by the periodicity of the rainfall. It will make, for example, a very considerable difference whether during one season one or more falls of rain occur; if only one fall takes place, then the creeks rapidly dry up, and the tadpoles which are developed subsequently are confined to the water-holes in which they happen to have been developed, as the creeks will only run for perhaps a very few days, and so the water-holes are rapidly isolated. If, after the tadpoles have developed to a certain stage a second rainfall takes place, then they will be carried away to stock other water-holes, by the side of which they will in their turn aestivate when the dry season returns.

By far the greater number of tadpoles never attain maturity. In addition to extermination by their natural enemies, as can be seen any time when the shallower parts of water-holes begin to dry up, numberless tadpoles are killed which have not had time enough to develop to the youngest stage at which they can begin to burrow and thus are enabled to aestivate.

They must, if they are to survive, develop rapidly, and side by side in the same pool, within two weeks of the rainfall, will be found tadpoles of the smallest size, together with those in which the hind limbs are large, and others in which the front limbs have also appeared and the tail is beginning to dwindle. It is, as before stated, only those which develop the most rapidly which have any chance of surviving under the ordinary conditions of life in Central Australia.

The following are the dimensions of the tadpoles:—Length of body about one and a half times the width and about two-thirds the length of the tail; nose somewhat nearer to the tip of the snout than to the centre of the eye; eyes on the upper surface not visible from below; the spiraculum is on the left side, not very prominent, and not visible from above.

The anus opens at the end of a tubular projection lying to the right side of the ventral crest and projecting backwards beyond the base of the tail. This tubular projection is longer relatively in the smaller than the larger tadpoles.

The tail is about half as long again as the body, the upper crest thins away at the base of the tail, the lower crest is united anteriorly with the tubular projection at the end of which is the anus.

The beak is broadly-edged with black.

The lips are bordered with papillæ arranged in a double series which are broadly interrupted on the anterior margin. The papillæ increase slightly in size posteriorly.

Series of labial teeth $\frac{2}{3}$. The first upper row is complete, the second somewhat broadly interrupted. The first lower row is narrowly interrupted in the middle line. The first upper row does not extend so far outwards as the second. The three lower rows diminish in lateral extension from before backwards.

The body is dull yellow colour, without or with only faint splotches of darker colour. The muscular part of the tail like the body, but with the muscle segments indicated by dark lines. Darker mottlings on the crest.

Measurements of the larger specimen figured:—Body, 28 mm. long; tail, 41 mm. long; width of body, 17 mm.; height of tail, 14 mm.; snout to nose, 4 mm.; nose to centre of eye, 5 mm.; spiraculum from end of snout, 17 mm.; spiraculum from centre of eye, 10·5 mm.

Distribution.—This form was first described by Dr. Günther* from Bourke in New South Wales. Since then it has been observed alive and described by Mr. Fletcher as occurring at Euroka and Dandaloo. All these localities lie to the west, that is to the inland, side of the Eastern Dividing Range of Australia. Mr. Fletcher† says “it is at present peculiar to New South Wales, but not improbably it will be found to range further to the north and west, and as it seems to follow the Darling and its tributaries it should also occur further to the south.”

All the specimens which we obtained came from creeks and clay-pans along our route for some 160 miles to the north of Oodnadatta. It is probably very widely spread over the dry central districts, for a life in which it is peculiarly adapted. During the dry season it can only be obtained by digging.

Habits.—Various observers have noted the presence of a water-holding burrowing frog. One writer‡ has described the occurrence of water in the burrows, and others such as Sanger and Lumholtz have stated that their bodies contain water, but I am not aware that the animal has hitherto been identified. Lumholtz§ says that in Western Queensland he heard people on the Diamantina River speak

* Ann. Mag. Nat. Hist. (4), XI., p. 350.

† Atkin, Trans. New Zealand Inst.

‡ Proc. Linn. Soc. N.S.W., vol. viii., 2nd Series, 1893, p. 531.

§ Among Cannibals, p. 344.

of such a frog, which was said to contain about a wine-glassful of "clear sweet water," and to bury itself under little mounds like mole-hills.

Judging by its habits and distribution, this frog is probably identical with the Central Australian burrower, as, though other species burrow, it is *C. platycephalus* which appears to be especially known to the blacks as the water-holding animal.

The first authentic account of its burrow appears to be that quoted by Mr. Fletcher on the authority of Mr. Rose.* The latter found the frogs buried in not very hard ground, but never found, nor did we, any water in the burrow.

In Central Australia *C. platycephalus* seems to prefer the hard clay-pans rather than the sandy creeks, as the sand-beds of the latter are too loose for the formation of its burrow. We came across the animal first when camped by the side of a very shallow clay-pan, the floor of which was deeply cracked with the sun's heat. Around the edge were withered shrubs of *Chenopodium nitrariaceum*, and it was at the base of these that the blackfellows looked for the burrow. In the hard-baked clay were imprints made by the frog as it burrowed, and about a foot underground we came across the animal, puffed out into a spherical shape and just filling up a cavity, the walls of which were moist but not wet. The ground was so hard that it had to be chipped away. When one side of the burrow was opened the frog remained perfectly still; its lower eyelid was drawn up over the eye, and was very opaque, giving rise to the belief amongst the blacks that the animal is blind (Fig. 9). In the sunlight, after a short time, it opened its eyes.

On squeezing the body water was forced out of the cloaca; this was apparently accumulated principally in the urinary bladder. On cutting the body open, it was seen that there was a certain amount of water in the subcutaneous spaces, but that the greater portion, which caused the great swelling-out of the body, was contained in the body cavity itself; and it was also observed that the lungs were considerably distended and lengthened, their apices lying right in the pelvic region. They contained air and not water, but their outer faces were bathed with the water in the body cavity.

The skin becomes very tense, and will sometimes, after immersion of the animal in spirits, maintain more or less its spherical shape.

It is somewhat difficult to understand how the water becomes stored in the body cavity, but there is no doubt as to its being so in these forms.

* Proc. Linn. Soc. N.S.W., vol. vi. (2nd Series), 1891, p. 269.

In the burrow the animals have the dull colour previously described ; after rain has fallen they come to the surface and must start breeding at once. In all probability they are capable of burrowing and æstivating at a comparatively young age, for though they grow rapidly, the water-holes evaporate often in a very short time, and they were not found in any of the permanent pools amongst the ranges. In clay-pans and holes along various creeks, where the banks were made of clayey sand and were thus fit for their burrows, they are found after rain in various stages of development. There is first the full-grown form, which is often puffed-out and swollen, but at this time not with water ; secondly, there is the half-grown and very lightly-coloured animal, and thirdly there is the tadpole in all stages of development. Unfortunately I have not been able to secure either the eggs or the very young form—to do this you must be on the spot within a day or two of the fall of rain, as the excessive heat renders the development a very rapid one. The more rapid the development the better chance the animal has of surviving. In January and February many of the water-holes were swarming with tadpoles, an enormous number of which perish as they dry up ; it is only in the somewhat deeper ones that the animals can possibly live long enough to enable them to attain to the burrowing stage ; and, as a general rule, only the most rapidly-developing ones which can do this.

In such parts as Central Australia it might have been thought that frogs would have developed without the necessity of passing through a water-living stage, but there is here no alternative between an extremely wet and an extremely dry condition. In other moister parts of Australia, such as Gippsland in Victoria for example, there is moisture enough retained under the shelter of fallen logs to serve the purpose, so that here certain frogs, such as species of *Crinia*, do not lay their eggs actually in water but in damp spots under logs and stones. But in Central Australia, except when rain is actually falling, the only spots which are damp lie in the water-holes themselves. A foot away from these everything is as dry as possible, and so it is essential that the eggs should be laid in the water-holes, for if they were not they would immediately be dried up. It is probably in the moister rather than in the very dry country that we might expect a water-living stage to be absent in the life-history of a frog.

(3) *Chiroleptes brevipalmatus*, Günther.

This species was only found on one occasion in the adult state. While digging the earth out around the root of a gum-tree (*E. rostrata*) at the very edge of a water-hole in course of drying up I came upon eight specimens all buried in hard mud

and each in a separate cavity. The body was somewhat swollen out with water, but nothing like so much as in the case of *C. platycephalus*.

The body colour when alive, during the dry season, is a dull yellow-brown with darker brown mottlings and a light vertebral line. A dark streak runs backwards from the snout through the eye (the upper eyelid having a dark border), over the tympanum, and, to a greater or less extent, along the side of the body where the band may be broken up into spots.

In the eight specimens there is no variation in the webbing, the toes being about one-third webbed.

Though not previously recorded as such, this form, in Central Australia at all events, is a burrower. Where we found it the water could not last very long, and the animals were evidently aestivating in burrows, the ground around which would soon be too hard to allow of their coming out until it was softened by water. Their habits in this respect are closely similar to those of *C. platycephalus*, but in marked contrast to the latter, the foot has very little web developed, though the tubercle is strong and shovel-shaped.

They have previously been recorded from Queensland.

On a subsequent visit, after a rainfall, I only found one tadpole—an advanced one with both limbs visible, and no trace of the adult, so that, presumably, it is not a common form in the district.

The length of the largest adult is 35·5 mm. from snout to vent.

(4) *Heleioporus pictus*, Peters. (Plate XIII., Fig. 2. Plate XIV., Figs. 10-13).

The adult.—This is a comparatively rare frog, being only recorded in the British Museum from Sandhurst in Victoria and Rylstone in New South Wales. During the Expedition we only found the adult form twice (a single specimen in each instance). The tadpole was only found once in a water-hole at Ayer's Rock. Subsequently, after heavy rains, I found the adult in abundance in water-holes around Charlotte Waters.

There are two points worthy of notice—(1) the colouration, (2) the webbing.

In typical specimens the metatarsal tubercle is black. In the great majority of specimens from Central Australia the tip of the first toe is also black, and some or all of the other toes may also have black tips. It is rare to find a specimen with only the tubercle black, though this is the most constant feature.

The two specimens obtained during the dry season were of the dull colour hitherto described, but as in the case of *Chiroleptes platycephalus* there is a very distinct brightening in colour immediately after the rainy season. In all specimens secured at this time the ground colour of the upper surface is yellow, with very light green mottlings. The toes and web are usually pink or warm-yellow. In the lightest ones the ground colour of the upper surface of the head and back is orange with green mottlings, on which are splotches of brown.

The iris is deep orange, with dark brown spots.

The ventral surface is a light yellow or yellowish-green.

The whole body is puffed out, and becomes still more so if the animal be irritated.

Along the middle of the body runs a light vertebral line, which in spirit specimens frequently turns pink in colour. This pink colouration of certain parts under similar circumstances has been already noticed by Mr. Fletcher in the case of *L. salmini*, and is true also of *L. ornatus*, in which the pinkish tinge present in the living form on small tubercles may spread to adjacent parts when the animal has been in spirit.

The webbing varies considerably. Mr. Fletcher, in describing specimens from the Emu Plains, New South Wales, noted that the toes were fully webbed, whereas in the British Museum Catalogue they are described as two-thirds webbed.

In my specimens there is a certain amount of variation which does not seem to depend upon the sex, or even upon the maturity of the specimen. They vary, males and females, mature and immature ones, from two-thirds to fully webbed. The webbing usually extends to the tip of the first, second, third, and fifth toes, and in the most webbed ones a fringe runs right to the tip of the fourth toe.

The question of webbing has been previously referred to by Mr. Fletcher in dealing with other species.* Judging from the examples of *L. ornatus* and *H. pictus*, it is somewhat difficult to determine how far webbing may be relied upon even as a specific character; as a generic character it may probably be regarded as of very little value indeed. Within the limits of the genus *Chiroleptes* we have one species, *C. platycephalus*, which is normally fully webbed, and another, *C. brevipalmatus*, which is not more than one-third webbed. In the case of *Limnodynastes*, again, we have a genus the species of which are as a general rule but

* Vol. iii., Proc. Linn. Soc. N.S.W., 1892, p. 18.

little webbed, but in which individuals amongst certain species, which live under certain special conditions of environment, may develop a very strongly-marked web. At the same time it may be pointed out that, so far as can be determined, precisely similar conditions of environment have not necessarily been accompanied in the case of allied species by a similar development in the matter of webbing. Thus *Chiroleptes platycephalus* and *C. brevipalmatus* will live side by side and burrow and aestivate in the banks of the same water-hole, and yet, whilst the former is fully, the latter is not more than one-third webbed. Possibly the capacity of developing a strong web, which is undoubtedly of service in burrowing, has been one of the factors in determining the dominance of the species; at all events, *C. platycephalus* exists in far greater numbers than its ally, *C. brevipalmatus*.

Distribution.—The distribution of this form is very wide, though the actual number of specimens hitherto secured is comparatively small. As Mr. Fletcher has noted in the case of *Notaden bennettii*, a great deal depends upon the season or time of year at which a search is made.

In New South Wales Mr. Fletcher describes it as essentially an inland species; in Victoria Mr. Lucas has obtained specimens from both inland and coastal districts; and since then I have obtained several adults and a very large number of tadpoles from around Melbourne. Possibly this species is to be regarded as typically an inland form, with stragglers in the coastal region, as it appears to be essentially adapted to live in parts where a constant and abundant supply of water is not obtainable. In Central Australia it must be widely distributed, as we secured it near Charlotte Waters, in the middle of the desert region at Ayer's Rock, and again, a single small specimen at Darwent Creek, in the sand-hill country to the west of the McDonnell Ranges.

Habits.—It appears to be essentially a burrowing form. During the Horn Expedition we only found in all two small specimens (not adult), and a few tadpoles in a small rock water-hole. The water at Ayer's Rock is not permanent, and the nearest permanent water lies in the George Gill Range, eighty-five miles to the north, across the absolutely dry sand-hills, in the midst of which lies Lake Amadeus. There can, therefore, be little doubt but that the tadpoles at Ayer's Rock were the offspring of specimens which had passed through a drought season aestivating in their burrows.

The next heavy rains which fell after our visit brought out plenty of adult specimens in places where we had not previously, owing to the dryness, seen a

trace of the animal. At the same time it is nothing like so general a form in and around water-holes as is *C. platycephalus*, and whilst the tadpoles of the latter were very common, I could not find any of *H. pictus*—a somewhat remarkable fact, as the adult was plentiful in parts.

In all the specimens obtained after rain the body was very much swollen out, due in the main to the fact that the alimentary canal was gorged with food. The stomach was always widely distended, occupying the greater part of the body cavity and containing caterpillars (the latter were swarming over the ground in thousands for a few days after the rain) and beetles; the small intestine was pushed to one side, and the rectum was always very much swollen out and filled with undigested matter and particles of dirt. Its walls were distended, so that it had the appearance of a thin bag filled with dirt. The fat bodies were also very largely developed, and altogether the animals looked as if they were simply gorging themselves with food preparatory to returning to their æstivating condition.

The Tadpole.—Length of body once and two-thirds its width, and about four-fifths the length of the tail. Height of the tail rather more than half its length.

The distance between the tip of the snout and the nose and the latter and the centre of the eye equal.

Eyes on the upper surface not visible from below.

The spiraculum is on the left side, not very prominent and not visible from above.

The anus opens to the right side of the ventral fin at the base of the tail.

The beak is not very broadly bordered with black.

The lips above bordered with a single row of papillæ, which are interrupted in the mid-anterior line, and longest in the mid-posterior.

Upper lip with a long series of teeth followed on each side by three series, which are separated from their fellows on the other, and gradually decrease in length.

Three series of teeth in the lower lip diminishing in size backwards, the first interrupted narrowly in the middle.

The body is of a light bluish tinge, dorsally when alive with darker mottlings, the ventral surface and tail crest a yellowish grey.

Total length of body and tail, 60 mm.; body, 27 mm.; tail, 33 mm.; width of body, 16 mm.; height of tail, 18 mm.; spiraculum from end of snout, 16 mm.; spiraculum from centre of eye, 9 mm.; nose to end of snout, 5 mm.; nose from centre of eye, 5 mm.

(5) *Hyla rubella*, Günther. (Plate XV., Figs. 26, 27, 28).

Adult.—Amongst the numerous specimens collected from various localities there is considerable variation in form and colouration.

In most specimens the head is scarcely as long as broad.

The vomerine teeth are arranged in two straight or slightly-curved rows immediately behind the choanæ, the distance between them varying somewhat.

The tympanum varies in size from one-half to two-thirds the diameter of the eye. It also varies in distinctness considerably.

The discs vary within considerable limits. In some specimens those on the hands and feet are of equal size, though, in the majority, those on the hand are larger than those on the feet. In the larger-sized specimens (measuring 33 mm. from snout to vent) from Palm Creek, the discs of the hand are as large as the tympanum, but in the majority they are smaller, though their relative size in regard to the tympanum varies.

As stated in the British Museum Catalogue, when the extreme forms are placed together the difference is a striking one, but in a good-sized collection all intermediate forms occur.

The colouration varies very much indeed. A very common form is as follows: dorsal surface greyish with a tinge of rusty-brown shading off towards the sides of the body. A dark band commencing at the snout runs back above the tympanum and half-way along the body. Fore and hind legs a dirty white, or light grey on their upper surfaces, spotted with darker grey markings. The anterior and posterior faces of the thigh yellow, as is also the side of the body in contact with the thigh when the latter lies against the body.

In others the upper surface may be a dull brownish grey with faint indications of dirty white splotches, and dark purple grey lines running roughly, longitudinally, and not infrequently dark splotches run along the sides of the body.

At one spot—a water-hole on the Adminga Creek—the colouration was distinct, and differed somewhat from that of specimens met with elsewhere,

though, as usual, intermediate forms may be found in various localities. At the Adminga Creek all the specimens were coloured as follows:—Dorsal surface greyish-brown, ground colour with a more rusty tint in the middle of the back. A light line runs from the tip of the snout to the level of the top of the eye and a little above the tympanum. Below this line is a dark band continuous along the side of the body with a series of dark spots. The position of the ilia correspond to dark elongate patches running backwards to the vent, which is surrounded by dark splotches. The upper surface of the limbs right to the tips of the fingers and toes are covered with splotches of dark umber, most prominent on the thigh and foot. Yellow patches are well-marked as described above.

The Tadpole.—I was able to secure a few specimens of the tadpole in February, 1895, and have also to thank Mr. F. J. Gillen, of Alice Springs, and Mr. E. C. Cowle, of Illamurta, for further specimens. Unfortunately, the great heat and long and rough carriage did not render it easy to adequately preserve tadpoles, and the greater number of my specimens are more or less spoilt.

After rain the tadpoles are fairly numerous, about as much so as those of *C. platycephalus*. In February, 1895, along the track between Oodnadatta and Charlotte Waters, these two forms were found almost to the exclusion of others.

The following are the dimensions of the tadpoles:—

Length of body about one-and-a-half times the width and rather more than half the length of the tail.

Nostril considerably nearer to the tip of the snout than to the centre of the eye.

Eyes on upper surface not visible from below.

The spiraculum is on the left side, not very prominent, and not visible from above.

The anus opens to the right side of the ventral tail crest, at the base of the tail.

The tail is somewhat less than twice the length of the body, pointed at the extremity. The upper crest thins away at the base of the tail; the lower one is broad, extending right to the abdomen.

The beak is not very broadly edged with black. The lips are bordered with papillæ, which are especially numerous at the interval between the upper and

lower series of labial teeth. The papillæ are absent in the median anterior part, and are arranged in a single row in the median posterior line.

Series of labial teeth $\frac{2}{3}$, the second upper and first lower being narrowly interrupted in the middle line. The first upper does not extend quite so far out as the second.

The body dorsally and laterally is a dark grey colour, marbled plentifully with umber splotches. The ventral surface is pearl-coloured, with splotches across the anterior part. Muscular part of the tail as the body, but lighter, and the crests are whitish, with faint spots.

Total length of an average-sized specimen, 45 mm. ; body, 16 mm. ; width of body, 10 mm. ; tail, 29 mm. ; depth of tail, 5.5 mm. ; spiraculum from end of snout, 8 mm. ; spiraculum from centre of eye, 8 mm. ; nostril to end of snout, 2.2 mm. ; nostril to centre of eye, 4 mm.

Distribution.—This species is evidently widely distributed. It has been recorded from various parts of North Australia, from Queensland and New South Wales, and from the Abrolhos Islands lying off West Australia. In Central Australia it is one of the commonest forms, being met with at almost every water-hole in the open plain districts as well as amongst the ranges. We did not, however, find it at Ayer's Rock in the sand deserts, away from permanent water, in spots which are not in communication during flood times with streams which might carry it down from the permanent water-holes amongst the ranges.

It is apparently both a coastal and an inland species.

Habits.—As yet we do not appear to know of any burrowing form of *Hyla*, and there is no evidence that this species is able to live away from water. It is always found either hopping about on the edge of the water-holes or else lying under stones, and is often very numerous. At Illamurta, in the James Range, by the side of a probably permanent soakage, were a fair number of specimens, together with young ones of *L. ornatus* ; but whilst the latter were turned out of the damp earth while digging, the *Hylas* always seemed to be on the surface. It is certainly found at water-holes which are frequently dried up, but which lie along the course of creeks, and can thus be stocked in rainy seasons from other spots. I saw no traces of it in clay pans far away from creeks. At Alice Springs, on emptying out small casks lying in the open with only a small bung-hole and containing water, specimens could always be secured.

(6) *Hyla gilleni*, sp.n. (Plate XV., Figs. 14-17).

Tongue large, distinctly notched and free behind.

Vomerine teeth in two distinct groups at the level of the hinder edge of the choanæ.

Head large, as long as broad.

Snout broadly truncate and slanting downwards and backwards, so that the nares are vertically in front of the anterior edge of the lower jaw.

Canthus rostralis distinct, the loreal region nearly vertical and somewhat concave.

Interorbital space considerably broader than the upper eyelid.

Tympanum distinct, from three to four-fifths the diameter of the eye.

Fingers slightly webbed.

Toes two-thirds webbed.

Discs on the fingers larger than those on the toes, and from a half to two-thirds the size of the tympanum.

Subarticular tubercles well developed.

A well marked inner and small outer metatarsal tubercle developed.

A distinct fold is present across the chest, and another extending from behind the eye over the tympanum to the shoulder.

The hind limb being carried forward along the body, the tibio-tarsal joint just reaches the eye.

Skin smooth above, granulate beneath.

Colour green above. A white patch at the hinder and lower edge of the tympanum and another on the anterior face of the arm close to the body. White spots may be present irregularly scattered along the sides of the body and on the anterior face of the hind limbs.

Length of largest specimen (mature ♀) in spirits from snout to vent 63 mm.

Locality.—Alice Springs.

I am indebted to Mr. Gillen, of the Alice Springs, for three specimens of this frog, which is only obtainable after rain. One specimen was kindly given to me whilst at Alice Springs by Mr. Crick.

Two specimens are mature, one a male and the other a female. There is no difference between them, except that in the male the webbing of the toes is very slightly less than that in the female; but the difference is so slight that it may be due to a greater contraction caused by the spirit in the one case than in the other.

With regard to its habits we know nothing as yet. The fact that it is found after rain may possibly indicate that it aestivates in burrows, but there is no direct evidence of this.

Hyla rubella is found in and around water-holes at Alice Springs during the dry season, when no trace of *Hyla gilleni* can be found.

I have much pleasure in associating with this species the name of Mr. Gillen, to whom I am indebted for very valuable assistance in many ways.

EXPLANATION OF PLATES.

PLATE XIII.

- Fig. 1.—*Chiroleptes platycephalus*. Life size drawing of a specimen captured shortly after a heavy fall of rain, to show the brighter colouring present at this time. When aestivating the animal is a dull yellow.
- „ 2.—*Heleioporus pictus*. Life size drawing of a specimen captured shortly after a heavy fall of rain. At other seasons the orange colour is wanting, and the brighter green changes into a dull olive.
- „ 3.—*Limnodynastes ornatus*. Showing the typical pattern. A small specimen, life size.
- „ 4.—*Limnodynastes ornatus*. Life size drawing of a specimen taken from a burrow in the sandy bed of the Finke River showing the usual colouration.

PLATE XIV.

- Fig. 5.—*Chiroleptes platycephalus*. Advanced tadpole from the dorsal surface. $\times 1$.
- „ 6.—*Chiroleptes platycephalus*. Younger tadpole seen from the ventral surface. $\times 1$.
- „ 7.—*Chiroleptes platycephalus*. Young specimen. $\times 1$.



Fig.



Fig 2



Fig 4



Fig 3.



Fig 5



Fig. 6



Fig 7



Fig. 10



a.



b.

Fig. 13



Fig 9



Fig 11



Fig. 8



Fig 12



Fig 14



Fig. 15



Fig 16.



Fig 28



Fig. 17



Fig 27



Fig 18

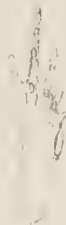


Fig. 22



Fig 21



Fig. 25



Fig. 19



Fig 24



Fig 23



Fig 20



Fig. 26

- Fig. 8.—*Chiroleptes platycephalus*. Mouth of tadpole represented in Fig. 6.
× 7.
- „ 9.—*Chiroleptes platycephalus*. Life size drawing of a small specimen
taken from a burrow, showing the body swollen out with
water.
- „ 10.—*Heleioporus pictus*. Advanced tadpole seen from the ventral surface.
× 1.
- „ 11.—*Heleioporus pictus*. Mouth of tadpole. × 7.
- „ 12.—*Heleioporus pictus*. Tadpole seen from the side. × 1.
- „ 13.—*Heleioporus pictus*. Hinder feet of two adult specimens, to show the
variation in the amount of webbing and the black tips, which
may be present in all the toes. × 1.

PLATE XV.

- Fig. 14.—*Hyla gilleni*. Life size drawing.
- „ 15.—*Hyla gilleni*. Side view of head. × 1.
- „ 16.—*Hyla gilleni*. Hind foot. × 1.
- „ 17.—*Hyla gilleni*. Front foot. × 1.
- „ 18.—*Limnodynastes ornatus*. Side view of tadpole. × 1.
- „ 19.—*Limnodynastes ornatus*. Mouth of tadpole. × 10.
- „ 20–24.—*Limnodynastes ornatus*. Hind foot to show variations in webbing.
In Fig. 24 the outer line represents the greatest amount of
webbing in the species, and the dotted line indicates the usual
amount in the genus. The figures are life size, except Fig. 24,
which is enlarged.
- „ 25.—*Limnodynastes ornatus*. Under surface of front foot. × 1.
- „ 26.—*Hyla rubella*. Side view of tadpole. × 1.
- „ 27.—*Hyla rubella*. Under view of tadpole. × 1.
- „ 28.—*Hyla rubella*. Mouth of tadpole. × 10.

PISCES.

By A. ZIETZ, F.L.S., Assistant Director of the South Australian Museum, Adelaide.

(PLATE 16.)

In the following account seven species of fish are described, representing five genera. Five of them, representing four genera, are new to science. Professor Spencer has supplied me with the following information. All the specimens, except those of *Gobius eremius*, were caught in water-holes along the Finke River or its tributaries, such as the Ellery, Walker, and Palm Creek. None were seen in the water-holes along the southern side of the George Gill Range. In several instances, along the Finke and its branches, the fish were very numerous in the isolated water-holes, and as these were rapidly drying up they would all sooner or later perish, except in the deeper and more secluded pools amongst the ranges, from which they are periodically carried down in flood time. There is apparently no evidence of the adoption by any fish of a burrowing habit to enable it to tide over periods of drought.

Of the new species, four, viz., *Nematocentris tatei*, *N. winneckeii*, *Eleotris larapinta*, and *Chatæssus horni*, are characteristic of the Finke basin, and may be regarded as having become modified during the period in which they have been isolated by climatic conditions from their allies in other parts of the continent.

One form, *Gobius eremius*, is as yet known only from the small water-pool which forms the overflow of the artesian spring at Coward Springs. Although it is known of some European species of Gobiidæ that they attach their spawn to stones, wood, etc., it has also been found floating on the surface of the water, and it is therefore possible that the eggs of the species in question have been brought here attached to the feet of the numerous birds which appear suddenly and fly from one water-hole to another during the rainy season.

(1) *Therapon truttaceus*, Macleay.

Proc. Lin. Soc. N.S. Wales, 1880. Vol. V., p. 366.

D. 12/10. A. 3/8. L. lat. 46. L. transv. 9-10/18.

The height of the body is about one-third of its length without the caudal fin; the length of the head is contained two and one-half times in the length of the

body; interorbital space flat. Its width is twice as much as the diameter of the eye, and rather more than the distance from the tip of the snout to the anterior margin of the eye. The maxillary reaches to about one-third below the diameter of the eye, and its length is about equal to the distance from the tip of the snout to the anterior margin of the eye; lips thick, cleft of the mouth oblique; præorbital smooth and not serrated on its lower margin; præoperculum nearly semicircular, denticulated on its posterior margin, but this can only be noticed after the skin has been removed. Operculum with two flat obtuse spines, which terminate in two blunt points in the largest specimen; but these points are single, and sharp in the smaller ones. Coracoid denticulated on its upper margin; lateral line distinct, bending downwards below the soft portion of the dorsal fin. It occupies about forty-six scales. Scales semicircular, ctenoid. Upper region of the head and neck scaleless, supraorbital space with four shallow longitudinal grooves. Præoperculum with seven or eight rows of scales, operculum with four or five rows.

Colouration.—Dark above, yellow beneath. All the scales, except on the belly, are more or less tinged and spotted with a bright steel-blue tint; those on the belly are silvery. All the fins, except the ventrals, are of a blackish colour. The teeth are strong, pointed, and curved inwards. Innerside of lips with numerous fleshy papillæ.

The type specimen described by the late Hon. Sir W. Macleay was caught in the Endeavour River.

Localities.—Red Bank Creek, Finke River, Palm Creek, and Walker's Gorge.

(2) *Therapon percoides*, Günth. (Fig. 1.)

Ann. and Mag. Nat. Hist., Vol. XIV., p. 374.

D. 13/9. A. 3/7. L. lat. 39. L. transv. 7/13.

The length of the largest specimen from Red Bank Creek, McDonnell Ranges, is three inches without the caudal fin; the height of body one and one-eighth inch; the length of the head is contained three and one-half times in the total length. Upper surface of head scaleless; interorbital space with four longitudinal grooves, the length of the snout is equal to the diameter of the eye and a little longer than the width of the interorbital space. Mouth small, the maxillary does not reach to below the anterior margin of the orbit. Præorbital with six small, sharp, pointed, slightly-curved spines on its lower margin. Præoperculum serrated, but

this gradually disappears on its lower margin; operculum with two flat, broad spines, of which the lower is the smaller. The first dorsal spine is very small, the second and third longer, the next four are the longest and of about equal length, the following gradually decrease in length towards the soft dorsal fin. A single row of long, narrow scales partly cover the roots of the dorsal spines. Anal fin with three strong spines, of which the second is the largest.

Colouration.*—Back silvery bluish-green, passing into a creamy-white below. Body with five black vertical bands—the first in front of the spinous dorsal fin, the second from the fifth and sixth, the third from the last dorsal spine, the fourth from about the middle of the soft dorsal, and the fifth across the tail. Specimens about two inches in length show three longitudinal rows of black spots, which are indistinctly seen in the larger ones.

Localities.—Palm Creek, Red Bank Creek, McDonnell Ranges.

(3) *Nematocentris tatei*, sp.n. (Fig. 2.)

D. $1/5$, $1/10$. A. $1/18$. L. lat. 32-34. L. trans. v. 10-12.

The height of the body is a little more than one-fourth of the total length; the length of the head is equal to the height of the body; the length of the snout, the diameter of the eye, and the width of the operculum are equal. Interorbital space scaleless, rugose, and forming a well-marked canthus rostralis. Body strongly compressed and elevated on the ventral region. Head small and pointed towards the snout; eye large, silvery; mouth oblique; villiform teeth in both jaws and on the vomer and palate. No lateral line. A broad, silvery, lateral band occupies four to five rows of scales; scales large, cycloid. Dorsal and anal fins elongate, reaching nearly to the root of the caudal.

Colouration.—A dirty yellow above the lateral band, and changing into a pinkish tinge below the same. Each scale of the body is marked with a small square-shaped silvery-tinted spot. These spots form about seven longitudinal rows which extend over the whole length of the body. Fins transparent, with a black margin.

Length of largest specimen $3\frac{7}{8}$ inch.

Localities.—Horse-shoe Bend, Finke River, Ellery's Creek, Red Bank Creek, Idracowra, Finke River.

* In all cases the colouration is described from specimens preserved in spirit.

(4) *Nematocentris winneckeii*, sp.n. (Fig. 3.)

D. 1/4-1/12. A. 1/21. L. lat. 31. L. transv. 11-12.

The height of the body is contained three times in its length without the caudal, the length of the head nearly four times. Snout attenuated, but not pointed; lower jaw projecting and thicker than the upper; mouth oblique. Teeth in upper jaw in a single row, unequal in size, pointed and curved; teeth in lower jaw villiform, outer series the largest. Interorbital space flat and cavernous, the whole surface scattered with numerous minute tubercles. The first dorsal spine pungent, the others filiform; the last dorsal nearly reaches the root of the caudal.

The colour is of a dirty yellow, with a bluish silvery tinge. A silvery lateral band instead of a lateral line.

I examined several specimens of this fish, which were caught in the Finke River at Idraecowra, but owing to the peculiar difficulty of preserving such tender objects on such a rough and long journey the specimens in question had the fins injured, and on this account I am not certain whether their outlines are correct in the drawing.

Locality.—Near Horse-shoe Bend, Finke River.

(5) *Eleotris larapintæ*, sp.n. (Fig. 4.)

D. 8/13. A. 11. L. lat. 42. L. transv. 18-19.

Sixteen series of scales between the origin of the second dorsal fin and the anal. Scales of head and body equal, minutely ciliated. Height of body a little more than one-fourth of the total length, the length of the head about the same. The diameter of the eye is one-fifth of the length of the head, but less than half the width of the interorbital space. Mouth oblique, the maxillary nearly reaches the anterior margin of the eye.

Colouration.—A brownish-yellow with a series of dark brown spots along the middle of the side of the body, commencing between the second dorsal and anal fin and terminating at the root of the tail; three oblique, narrow, brownish stripes from the eye to the gill-opening. The fins are shaded with black. This species seems to approach nearest *E. mogurnda*, but it differs in the dimensions and number of fin-rays.

Localities.—Palm Creek, Red Bank Creek, McDonnell Ranges.

(6) *Gobius eremius*, sp.n. (Fig. 5.)

D. 6/9. A. 8. L. lat. 45-50. L. transv. 13

Height of body $\frac{3}{8}$ inch; head flat, with the interorbital space more than the width of the eye; eyes looking oblique upwards; mouth oblique, villiform teeth in both jaws. The first dorsal commences at about the first third of the total length, the second is in advance of the anal fin. The anal papillæ opposite to the first rays of the second dorsal fin. Total length of largest specimen, $2\frac{1}{8}$ inch.

Colouration.—Upper surface and sides of the body with large light-tinged spots upon a blackish-brown background. Under surface yellowish; fins blackish, dorsal and anal fins with a white margin, tail fin with faint undulated dark lines.

Locality.—Coward Spring, in a small pool of water around an artesian well.

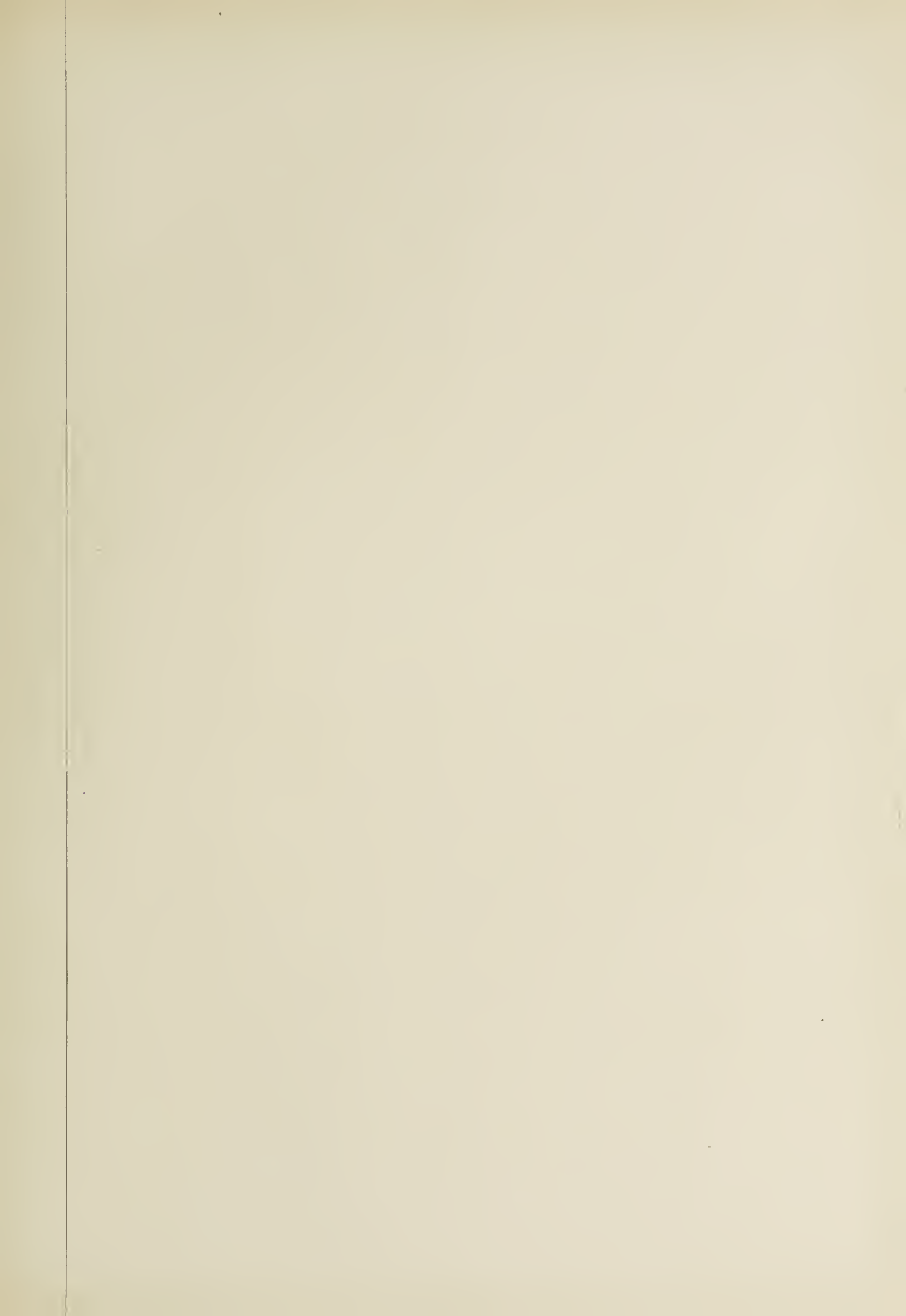
(7) *Chatoessus horni*, sp.n. (Fig. 6.)

B. 13. D. 12. A. 18. V. 8. P. 15. L. lat. 39-40. L. transv. 17-18.

Length of head contained more than three times in the total length; height of body three and one-third of the same. The diameter of the eye is about equal to the distance from its anterior margin to the tip of the snout, and also equal to the width of the interorbital space. Snout obtuse; mouth oblique, directed downwards. Dorsal a little in advance of the ventral; dorsal filament about equal in length to the longest fin-rays. If a line were drawn across the body following the direction of the notch between the operculum and the suboperculum it would terminate just behind the dorsal.

Colouration.—Silvery, with a faint bluish tinge.

Locality.—Red Bank Creek, McDonnell Ranges, Idracowra.



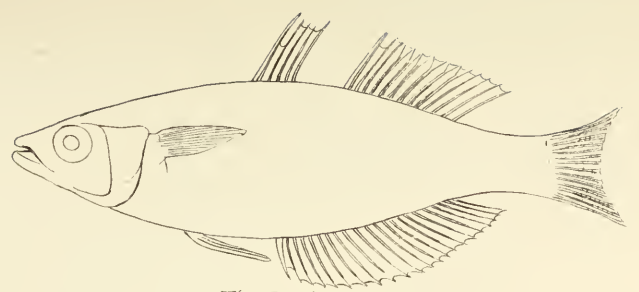


Fig 3 x 1.

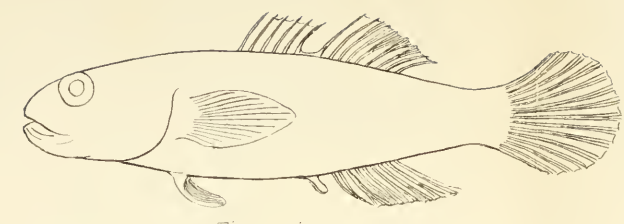


Fig 5 x 1.

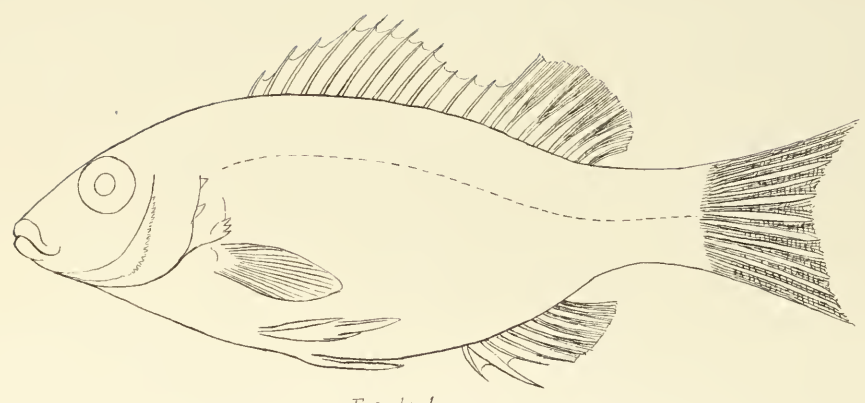


Fig 1 x 1

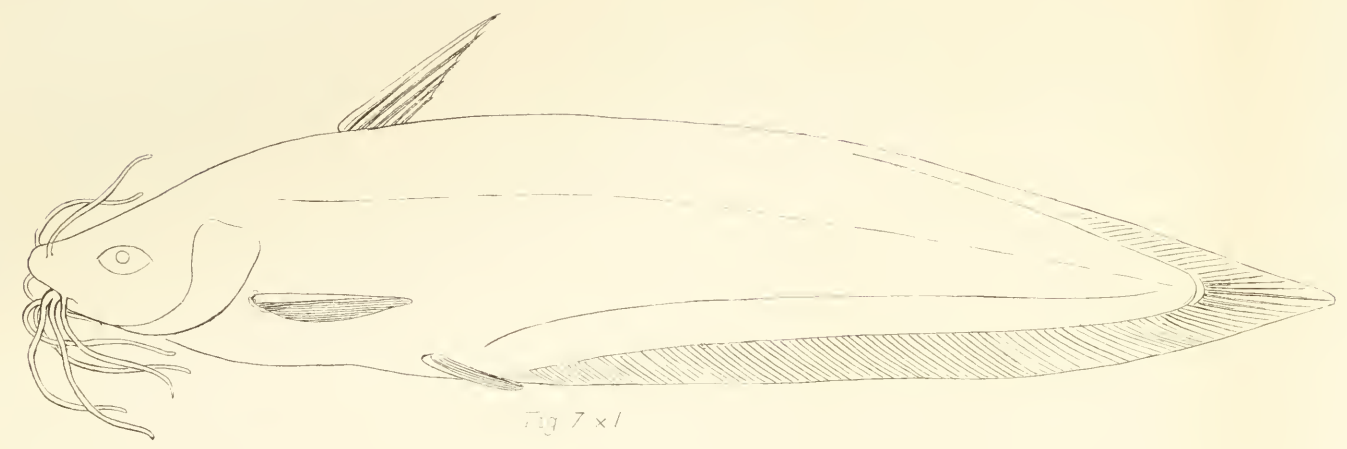


Fig 7 x 1

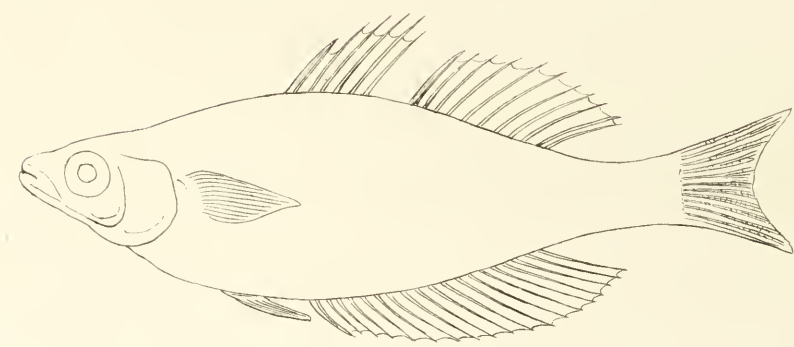


Fig 2 x 1.

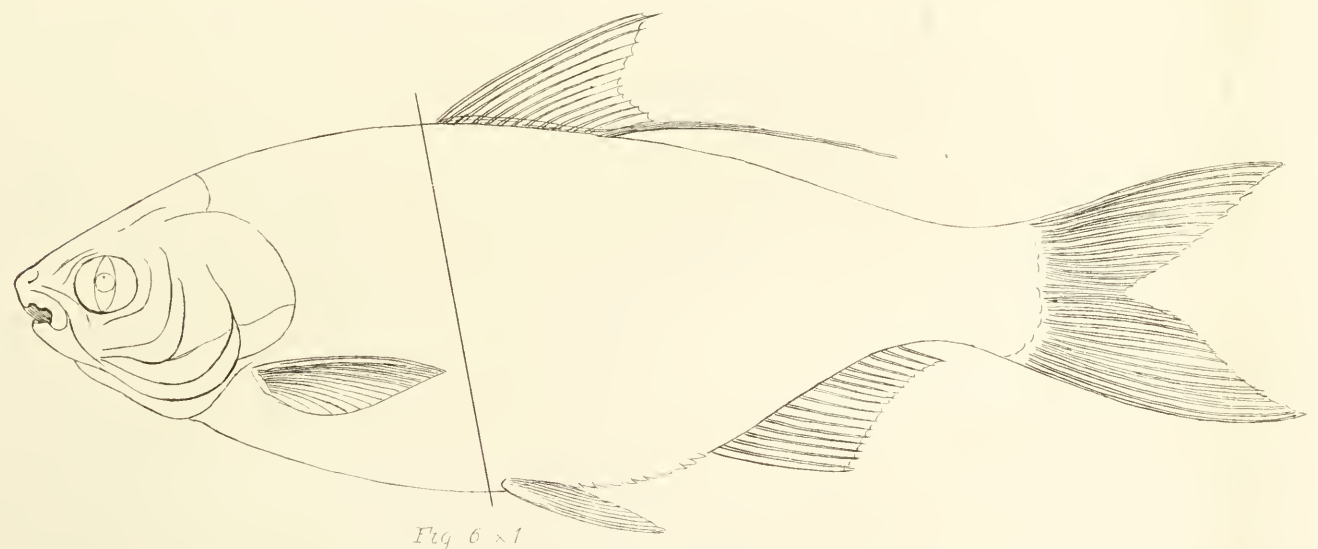


Fig 6 x 1

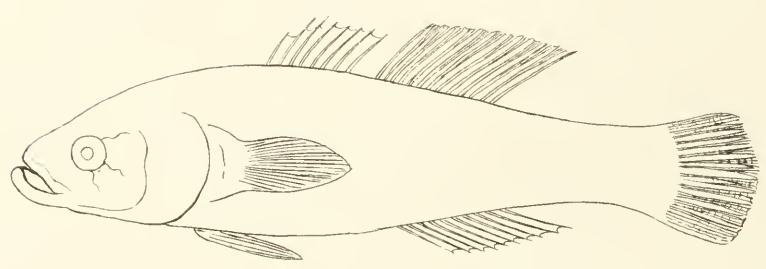


Fig 4 x 1.

MOLLUSCA.

By RALPH TATE, Professor of Natural History in the University
of Adelaide.

With an Appendix on Anatomical Characters by C. HEDLEY, F.L.S., Assistant in
Zoology to the Australian Museum, Sydney.

(PLATES 17, 18, 19).

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CHAPTER I.—Land Mollusca.

- 1.—Previous Records and Introductory Remarks.
- 2.—Affinities and Geographic Relationships.
- 3.—Descriptive List of Species.

CHAPTER II.—Fluviatile Mollusca.

- 1.—Previous Records.
 - 2.—List of Species and Remarks on their Distribution.
-

CHAPTER I.—Land Mollusca.

1. PREVIOUS RECORDS AND INTRODUCTORY REMARKS.

Prior to the advent of the Horn Expedition, the published information respecting the land-mollusca of the region investigated by the Expedition was restricted to three species.

Waterhouse, the naturalist to Stuart's Transcontinental Expedition, gathered specimens of a snail in the McDonnell Range which Pfeiffer described, P.Z.S., 1863, as *Helix perinflata*; a second species seems to have been collected ("Features of Country on Stuart's Track," Parl. Rep., 1862, p. 8), but has hitherto escaped determination. The Rev. Mr. Kempe communicated to the writer examples of three species of land snails, two of which are referred to in Trans. Roy. Soc. S. Aust., vol. iv., p. 140, 1882, viz., *Helix cyrtopleura* (non. Pfr.), herein

described as *Thersites clydonigera*, and *Helix*, *n.sp.*, herein described as *Angasella papillosa*; the third species, which is *Angasella setigera (mihi)*, is represented by a single bleached example.

Mr. J. East, who was attached to an exploring party which visited the eastern part of the McDonnell Range and the country to the east, obtained at the first locality a single abraded example of *Angasella setigera*, and at the latter several live specimens of *Thersites perinflata*.

Since the return of the Expedition there has appeared a description of *Hadra adcockiana*. This species was abundantly collected by me, and proved to be very variable in shape, sculpture and colouration; whilst the few specimens communicated by Mr. Thornton, late of Tempe Downs, to the author of the species belong to a somewhat rare and extreme variation.

Because of the risk of being anticipated in the authorship of other species collected by the Expedition, arising from the considerable lapse of time before publication in this volume, I communicated "Brief Diagnoses" of the new species to the Royal Society of South Australia, which were published in its Transactions, 1894. Therein *Charopa* is used in its restricted sense, and *Hadra* as the equivalent of *Thersites*.

The comparisons with defined species are based on authentic specimens, except when otherwise stated. All measurements are in millimetres.

It is much to be regretted that I neglected to preserve the animals as they were collected, instead of trusting to the hope that they would survive the journey to Adelaide. The larger species did exhibit that amount of endurance, but all the smaller ones were hopelessly dessicated. In this way the opportunity has been lost of ascertaining the visceral structure of many species, which would have furnished a key to their classificatory position. What material has been secured has been reported on by Mr. C. Hedley in the accompanying appendix.

2. AFFINITIES AND GEOGRAPHIC RELATIONSHIPS.

The number of species of land mollusca now known to inhabit that portion of Central Australia which I have named Larapintine (see Botanical Report) is twenty-five. Four of them extend beyond the area and five others are near allies of extra-limital species. The remaining sixteen offer such distinctive characters that they must be regarded as restrictively endemic. These facts are expressed in the following list of species and their exoteric representatives:—

Larapintine Species.	Extralimital Representative Species.
<i>Microphyura hemiclausa</i> , Tate.	
<i>Endodonta æmula</i> , Tate.	———— <i>E. antialba</i> , Beddome.
<i>Endodonta planorbulina</i> , n.sp.	
<i>Flammulina retinodes</i> , Tate.	———— <i>F. (?) paradoxa</i> , Cox.
<i>Angasella setigera</i> , Tate.	
<i>Angasella euzyga</i> , Tate.	
<i>Angasella winneckeana</i> , Tate.	
<i>Angasella papillosa</i> , Tate.	
<i>Angasella arcigerens</i> , Tate.	
<i>Chloritis squamulosa</i> , Tate.	———— <i>C. victoria</i> , Cox.
<i>Thersites clydonigera</i> , Tate.	
<i>Thersites sublevata</i> , Tate.	
<i>Thersites adcockiana</i> , Bednall.	
<i>Thersites perinflata</i> , Pfr.	———— <i>T. perinflata</i> , Pfr.
<i>Thersites fodinalis</i> , Tate	———— <i>T. fodinalis</i> , Tate.
<i>Thersites grandituberculata</i> , Tate.	
<i>Thersites wattii</i> , Tate.	
<i>Liparus spenceri</i> , Tate.	
<i>Stenogyra interioris</i> , Tate.	———— <i>S. gracilis</i> , Hutton.
<i>Pupa ischna</i> , Tate.	———— <i>P. lepidula</i> , Ad. and Ang.
<i>Pupa contraria</i> , Smith.	———— <i>P. contraria</i> , Smith.
<i>Pupa ficulnea</i> , Tate.	———— <i>P. australis</i> , Ad. and Ang.
<i>Pupa larapinta</i> , Tate.	———— <i>P. wallabyensis</i> , Smith.
<i>Pupa mooreana</i> , Smith.	———— <i>P. mooreana</i> , Smith.
<i>Succinea interioris</i> , Tate.	———— <i>S. scalarina</i> , Pfr.

The facies of the fauna approximates more to that of subtropical and temperate West Australia than to any other part of the continent, and is in strong contrast with the highly differentiated fauna of tropical and subtropical Queensland, situated to the east of the Cordilleras, to which it is geographically equally near. The limited number of genera represented, together with the facts of their geographic distribution, would seem to indicate a primitive population, which has been maintained in an isolated condition by climatic and geologic changes.

The genus *Microphyura* has hitherto been diagnostically known by its unique type-species, *Helix microphis*, Crosse, from New Caledonia. Mr. C. Hedley considers it to be an Antarctic constituent in our fauna.

The four species of *Angasella* make a relatively large addition to that section which is entirely confined to the Eremian region;* from this centre there radiate *cyrtopleura* to the south of Lake Eyre and to the Great Australian Bight, *phillipsiana* to the south of Lake Eyre, *oligopleura* to the Great Bight, and *gascoynensis* to the Gascoyne district in West Australia. Though it is noteworthy that the central portion of the Eremian region is almost devoid of land mollusca, the few species within its boundaries are restricted to the limited, elevated tracts to the westward of Lake Eyre.

Badistes perinflata and *B. fodinalis* may also be regarded as endemic, having outliers in the southern parts of the Eremian region in South Australia and West Australia. The *Endodontæ* and *Flammulina* belong to genera largely Tasmanian, whilst the few continental representatives belong to the cooler and moister coastal tracts of southern and eastern Australia. The *Pupæ* and *Stenogyra*, either by identical or representative species, are also largely coastal in habitat and chiefly Pacific in origin. The species of *Liparus* and *Succinea* are also insular representatives of coastal species.

There is every reason for the opinion that the elevated parts of the Larapintine region have been land-surfaces from pre-Cretaceous times, and that great climatic extremes have prevailed since that period. During the deposition of the Rolling Downs formation (Lower Cretaceous) this area was one of the insular masses constituting the archipelago to which Australia was then reduced. At this period a more or less cosmopolitan fauna and flora prevailed, and it was doubtlessly then that the Larapintine area acquired its species of *Microphyura*, *Charopa*, and *Flammulina*, and those species of a more or less maritime habitat belonging to *Liparus*, *Stenogyra*, *Pupa*, and *Succinea*. How else is it possible to account for the presence of about eight species of land snails in the very centre of the continent, absolutely isolated from allied or identical species, which are to-day circumferential in their occurrences? The insularity of its geographic position was partially maintained during the deposition of the Desert Sandstone (Upper Cretaceous)—a fresh water area, or largely so, replacing the maritime one. Favourable climatic conditions ensued in Pliocene times, which permitted migration over the largely reclaimed lacustrine areas. It was then that *Badistes perinflata* and *B. fodinalis* spread south and south-west; so also the *Angaselle*, but under new modifications; whilst there may have been received a few northern types out of which have been evolved *Badistes grandituberculata*, *B. wattii*, *Chloritis squamulosa*, *Thersites*

* See Aust. Assoc. Adv. Sc., Vol. i., p. 315, 1887.

sublevata and *T. adcockiana*. The final climatic phase was the creation of the "Dry Zone," which effectually cuts off migration in a southerly direction. The limited community of species of the areas north and south of the axis of the "Dry Zone" is the result of migration prior to its existence, as is partly evidenced by the fact that, over much of the country from Ooramiina Pass to Crown Point, *Badistes fodinalis* occurs in vast numbers in a subfossil state, where shelter from soil or herbage is non-existent; with it occurs in places *Pupa contraria*. The desiccating climate may have killed off many of the mollusean inhabitants of this region, whilst the survivors found refuge in the rocky fastnesses of the country. These main deductions I have set forth in my Report on the Botany of the Expedition, and the facts of the distribution of the land mollusca lend them some support. Like the truly endemic plants, the land snails live on the southern escarpments of the elevated land, or in the deeply-shadowed gorges of the same, and occur in very constricted areas, sometimes as one colony only, or, if in more, then usually widely-separated from one another, thus *Liparus spenceri*, *Angasella* (except *A. setigera*), *Glyptorhagade*, *Badistes wattii*, *B. grandituberculata*, *Thersites sublevata*, and *Charopæ*, were each found constituting a single colony; but in the aggregate the species are distributed over a few thousand square miles.

3. DESCRIPTIVE LIST OF SPECIES.

Family ENDODONTIDÆ.

Microphyura hemiclausa, Tate. (Plate XVII., Fig. 1.)

Reference—*Planispira hemiclausa*, Tate, Trans. Roy. Soc. S. Aust., vol. xviii., p. 192, 1894.

Shell depressed, spire slightly prominent. Whorls three and a half of very slow increase, somewhat gradated, irregularly convex, roundly convex anteriorly, rapidly declining to the broadish and shallow spiral excavation at the suture. Last whorl regularly convex from the sutural furrow to the circum-umbilical angulation. Aperture not deflected; lunate; peristome much thickened, continuous all round, the parietal incassation obliquely in advance and forming a vertical plate half-closing the aperture. Umbilicus relatively wide (about one-third the width of the shell), scalar within; the margin defined by an obtuse angulation terminating in the outer basal angle of the aperture, the side of the umbilicus inclines precipitously from the basal angulation.

Colour.—Uniformly pale horn, pellucid and glossy.

The sculpture consists of distant and regularly-disposed spiral incised lines, and fine transverse striæ.

Dimensions.—Diameter, 1·5; height, about ·5.

Localities.—Taken at most localities alive and in abundance, sheltering beneath fig-trees. Ilpilla Gorge, Spencer Gorge, Finke Gorge, Redbank Gorge, Palm Creek, Alice Springs.

“A dozen specimens of this species, unnamed, and labelled Victoria River, North Australia, are in the British Museum” (*vide* Edgar A. Smith).

Remarks.—The original reference of this interesting shell to *Planispira* was a *lapsus mentis* for *Polygyra*. The species offers no near analogy to any Australian land-shell, though it recalls *Plectopylis*; the name has reference to the half-closing of the aperture by the parietal plate.

At the suggestion of Mr. C. Hedley I have transferred the species to *Microphyura*, it is cognate with *Helix microphis*, Crosse, for which Anstey has proposed the sectional name *Microphyura* (see Pilsbry, *Man. Conch.*, 2nd ser., vol. ix., p. 84), but which Mr. Hedley considers of generic value.

Endodonta (Charopa) æmula, Tate. (Plate XVII., Fig. 2.)

Reference—*Charopa æmula*, Tate, *Trans. Roy. Soc. S. Aust.*, vol. xviii., p. 192, 1894.

Shell planorbiform, spire very slightly sunken. Whorls four and a half, slowly increasing in width, deeply channelled at the suture, convex, abruptly ascending from the posterior suture, gently sloping to the front suture. Last whorl not descending at the aperture, channelled at the suture, rising abruptly and narrowly to the ante-sutural angulation, thence regularly and tumidly convex to the more gently-curved base. Umbilicus about one-sixth of the width of base, deep, conical, exposing the penultimate whorl, with regularly-sloping walls. Aperture lunate, very slightly oblique, peristome sharp, straight, except for the slight columella-reflection; outer lip slightly produced medially, behind which there is a faint constriction; margins joined by a thin callus which projects backward beyond the alignment of the peristomial junctions with the body-whorl.

Colour.—The thin subpellucid test is pale horn.

Sculpture on the ordinary spire whorls consists of sharp, erect, lamelliform costæ, having a slight forward trend on the upper surface; on the last whorl they

are about 150 in number, and curve gently backwards on the periphery, thence nearly straight to the umbilical margin, and continued perpendicularly on its side; the costæ are slightly wider than the interstitial furrows, which are apparently devoid of parallel striæ or transverse threadlets.

Dimensions.—Diameter, 2; height, .75 (vix.)

Locality.—At Penny Springs, in George Gill's Range, on damp earth in the shade of cycads.

Affinity.—This interesting addition to the pulmonate fauna of Australia closely resembles *Helix antialba*, Beddome, Proc. Roy. Soc. Tasmania for 1879, p. 23, 1880, which has been figured and amply diagnosed by Hedley in Proc. Lin. Soc., N. S. Wales, 1892, pl. i, figs. 5-8, p. 166, from which it differs by its flat spire, very much smaller umbilicus, and by the absence (apparently) of secondary sculpture.

Endodonta (Charopa) planorbulina, sp. nov. (Plate XVII., Fig. 3.)

Shell flatly discoidal; spire flat but not sunken. Whorls three and a half of moderately rapid increase; suture well-defined but not channelled. Last whorl inconspicuously elevated at the suture, thence flatly convex to the narrowly-rounded periphery, merging into the flatly-convex base; umbilicus wide and perspective, about one-third the width of the shell. Aperture not descending, lunate; peristome thin, margins not callously joined.

The sculpture consists of very narrow, elevated, arched riblets, which on the last whorl are about one hundred, and extend from the suture to the umbilicus. They show here and there a tendency to bifurcate at the periphery; the much wider concave interspaces are smooth.

Dimensions.—Major diameter, 1.5; height, .5.

Locality.—Five examples among *M. hemiclausula*, probably at Palm Creek, Krichauff Range. This species is one of the smallest and is the most depressed of the genus. It resembles *C. lottah*, but is more depressed, with a flatter base, finer and closer riblets. *C. gadensis* is a stouter shell with a channelled suture.

Flammulina retinodes, Tate. (Plate XVII., Fig. 4.)

Reference.—*Charopa retinodes*, Tate, Trans. Roy. Soc. S. Aust., vol. xviii., p. 192, 1894.

Shell depressedly conoidal, spire slightly elevated, with an obtuse summit. Whorls four, of moderately rapid increase, suture impressed but not channelled. Last whorl flatly convex, broadly convex peripherally, merging into the flatly convex base; umbilicus wide and perspective, about one-third the width of the shell. Aperture not descending, roundly lunate; peristome thin, margins callously joined, the columella-border distinctly everted. The sculpture consists of slender, elevated, acute, deeply-arched riblets extending from the suture to the umbilical crater, with smaller intermediate ones which arise on the peripheral area. The interspaces are spirally striate, and, intercrossing with the minor riblets, produce a reticulate ornament.

The colour is pale horn: feebly flame-painted with rufous, more conspicuous on the base of the shell.

Dimensions.—Basal diameters, 2.75 and 2.5; height, 1.25 (vix.)

Locality.—Reedy Creek, in George Gill's Range.

This species resembles *Helix paradoxa*, Cox, but is more depressed, the spiral sculpture more distant and the umbilicus wider. The animal was not studied, but by shell characters it should be conspecific with the forenamed species, which Suter (Ann. Mag. Nat. Hist., Jan., 1894, p. 64) refers to *Laoma*, section *Phrixgnathus*. On the other hand, it is also comparable with an undescribed species of *Flammulina*, inhabiting South Australia, which possesses the caudal gland, pedal suture, jaw and dentition proper to that genus, whilst the form of the shell is more consonant with *Flammulina* than with *Laoma*.

Family HELICIDÆ.

Group EPIPHALLOGONA.

Genus ANGASELLA.

This name was proposed by Adams for the reception of *Helix cyrtopleura*, Pfr., which at that time was so isolated from all other known helicoid shells. Pilsbry places *Angasella* subordinate to *Planispira*, and includes four species; to this number must be added *gascoynensis*, Smith, and five described by me in 1894. All these, excepting *eyrei* and *subsecta*, group themselves around the type-species, differing little in shape from one another except in being more planulate or more elevated than *A. cyrtopleura*. Unfortunately none of the species are anatomically known, if we except the jaw, which is ribbed; whilst the granulated apex of some of the species further removes *Angasella* from *Planispira*. A revision of the genus is

much to be desired, with the view to better delimitation and more exact relationship to cognate groups. As a conchological group it exhibits a relation to *Glyptorhagada*, through *arcigerens* to such species of the latter as *clydonigera*, which supply intergradations of shape and sculpture; nevertheless the typical members of the section have a complete peristome, whilst the peristome of *Glyptorhagada* is incomplete; *subsecta* and *eyrci* are not happily placed by Pilsbry in *Angasella*.

Authentic specimens of *A. cryptopleura* are not extant in any cabinet in Australia, so far as I know, and I cannot learn that the shell has been retaken or its accompanying congener, *phillipsiana*, at the original locality. Pfeiffer's description is not detailed enough for safe delimitation of allied species; but a shell, which I found numerous on the Bunda plateau of the Great Australian Bight, I had ventured to refer to his species. It presents the following characters:—The body-whorl much descends in front, and is ornamented with about sixty "thread-like ribs;" the intercostal spaces are coarsely granular, the granules having a tendency to coalesce to form rugæ. The peristome is reflected and its margins united by a thick callus; the elevation of the spire varies from almost flat to as much as 4.5 mm. above the plane of the last whorl towards the front; the embryonic shell, which consists of one and a half turns, is relatively large and smooth.

Diagnostic characters are furnished by the number and strength of the costæ, taken in conjunction with the build of the shell, though in this last respect the majority of the species approximate to a planorbiform contour.

The well-developed periostracum, elevated into hairs, as possessed by *A. setigera* and its two allied species, imparts a new character to the group, and is suggestive of an alliance with *Chloritis*, though the embryonic shell of *A. setigera* is apparently smooth: in *A. euzyga* and *A. winneckeana* it is, however, minutely granulated.

Angasella setigera, Tate. (Plate XVII., Fig. 6.)

Reference—*Hadra setigera*, Tate, Trans. Roy. Soc. S. Aust., vol. xviii., p. 194, 1894.

Shell depressed, somewhat planorbiform, spire very shortly elevated. Whorls five, of moderate increase and of a low degree of convexity, separated by a deeply impressed linear suture. Last whorl very abruptly and far-descending in front, somewhat widening in the anterior third, regularly convex from the suture to the

more flatly convex base. Aperture oval (nearly circular), almost parallel with the base of the shell; the plane of the aperture very oblique to the vertical axis of the whorl; margins united and reflected all round; peristome bordered by a broad and deep constriction extending from the umbilical edge to the suture; umbilicus wide and deep, two and three-fourths the diameter of the base.

Colour.—Uniformly light brown, beneath a thin periostracum which is raised into short, somewhat distant, bristles coincident with arched growth-lines on the test beneath.

Sculpture.—The one-and-a-half apical whorls are minutely granulated. Beneath the periostracum the test is raised into very slender, crowded, raised lines, abruptly bent back, and surmounted here and there by granule-like bosses on which the bristles arise. The growth-lines extend on the body-whorl from the suture into the umbilical concavity.

Dimensions.—Diameters, 13·5 (incl. lip) and 11; height, 6; height of last whorl behind peristomial deflection, 5; diameters of aperture, 7 and 6·5.

Localities.—Rev. H. Kempe (one bleached example); McDonnell Range, J. East (one fresh specimen). This species proved to be rather widely distributed, and individually very abundant. It extends from the Krichauff Range (as in Glen of Palms and Palm Creek) to the Finke Gorge and to the glens about Mount Sonder and Brinkley Bluff, and as far north as Painta Spring on the north margin of the foot hills of the McDonnell Range bordering Burt Plain.

Affinity.—This species is similar to the depressed forms of *A. cyrtopleura*, Pfr., but apart from its bristly periostracum it differs by growth-lines, very much more slender and numerous, umbilicus wider, and by the presence of a deep constriction behind the aperture. The species-name, setæ-bearing, has reference to the bristles on the periostracum; it is, however, occupied in the genera *Helicigona* (*Helix setigera*, Zygl.) and *Nanina* (*Helix setigera*, Gow), and if there is valid objection to its employment in the epiphallogonous Helicidæ, I propose the name *larapinta* in substitution.

Angasella euzyga, Tate. (Plate XVII., Fig. 7.)

Reference—*Hadra euzyga*, Tate, Trans. Roy. Soc. S. Aust., vol. xviii., p. 194, 1894.

Shell planorbiform, spire flat or hardly perceptibly raised. Whorls four, of rather slow increase, flatly convex, separated by a deeply-impressed suture; apical

whorls minutely granular. Last whorl precipitously and far-descending at the front; obtusely angled posteriorly, more regularly convex with the revolution of the whorl; base rather tumidly convex around the umbilicus. Aperture as in *A. setigera*, but the more abrupt descent of the aperture and the deeper peristomial constriction impart a greater deformation to this part of the shell. Umbilicus about two and a half the diameter of the base.

Colour, ornament and sculpture as in *P. setigera*, but the rows of bristles are more distant.

Dimensions.—Diameters, 8 and 7; height, 3.

Locality.—Among rocks shaded by fig-trees about Alice Springs (numerous specimens, living and dead).

Affinity.—This species is fairly constant in its characters, which are substantially those of *H. setigera*, of which it might be regarded as a dwarf state, but the flat shape, the more-deflected aperture, and fewer rows of bristles render the separation easy.

The species-name, *euzyga*, well-yoked, has reference to the complete union of the apertural margins.

Angasella winneckeana, Tate. (Plate XVIII., Fig. 8.)

Reference—*Hadra winneckeana*, Tate, Trans. Roy. Soc. S. Austr., vol. xviii., p. 194, 1894.

Shell planorbiform, spire flat, whorls three and a half of rather slow increase, convex, more abruptly convex at the anterior suture and more gradually sloping to the posterior suture, separated by an impressed linear suture; in all other characters the shell is similar to *A. euzyga*, except in dimensions, in the sparsely-developed setæ and the finer and closer sculpture.

Dimensions.—Diameters, 5 and 4.5; height, 2.

Locality.—Spencer Gorge, by Brinkley Bluff.

The species-name is in compliment to Mr. C. Winnecke, the Surveyor to the Expedition.

Angasella papillosa, Tate. (Plate XVIII., Figs. 9.)

Reference—*Hadra papillosa*, Tate, Trans. Roy. Soc. S. Aust., vol. xviii., p. 194, 1894.

Syn.—*Helix*, n.sp., Tate, *op. cit.*, vol. iv., p. 140, 1882.

Shell depressedly subglobose, spire rather short. Whorls five, of rather slow increase, flatly convex, separated by a linear suture. Last whorl rapidly descending at the front to below the middle line of the penultimate whorl: regularly convex except at the anterior one-third, where it is a little narrowed, anterior to which it rapidly widens to the wide and shallow post-peristomial constriction; base rather tumidly convex. Aperture oval-elliptic, the major axis oblique, the plane of the aperture very oblique; margins horizontally expanded, hardly reflected, thin, united all round. Umbilicus nearly one-third the width of the base.

Colour unknown. Sculpture consists of coarse and somewhat interrupted arched growth-lines, about four to a millimetre on the penultimate whorl, wider than the interspaces; large depressed papillæ are scattered over the surface, which, as in *A. setigera*, doubtlessly supported hair-like prolongations of the epidermis; the one-and-a-half embryonic whorls are smooth (possibly the granulation has been destroyed, as all the specimens are much bleached).

Dimensions.—Diameters, 13 (excl. lip) and 11; height, 8.5; height of last whorl behind peristomial constriction, 6.

Locality?—Rev. H. Kempe (three bleached examples).

Affinity.—This species differs from other members of the "Angasella group" by its conoidal shape.

The species-name has reference to the pimple-like granules on the test.

Angasella arcigerens, Tate. (Plate XIX., Fig. 27.)

Reference—*Hadra arcigerens*, Tate, Trans. Roy. Soc. S. Aust., vol. xviii., p. 193, 1894.

Shell sublenticular, spire almost flat. Whorls four and a half, of somewhat rapid increase, nearly flat, separated by a linear-impressed suture. Last whorl abruptly descending at the front, moderately inflated, obtusely keeled posteriorly, gradually becoming roundly convex at the front; flatly convex from the periphery to the suture, interrupted by a slight concavity adjacent to the periphery in the posterior part, gradually disappearing towards the front; the medial area sharply curved, merging into the somewhat tumid base. Aperture oblong-oval, the major axis slightly oblique, the plane of the aperture oblique to the vertical axis; margins broadly expanded and reflected, united and reflected all round; the expansion of

the columella on the body and over the umbilicus is excessive; columella arched. Umbilicus wide and deep, about one-fourth the diameter of the base.

The ground colour is a pale brown, varied by three rufous bands, one at the suture, one adjacent to the periphery on the upper face, and one subperipheral.

Sculpture.—The two apical whorls (relatively large) are minutely granulated; the rest of the surface is ornamented with elevated, compressed, acute, arched ribs; the intercostal spaces densely granulated; the ribs on the body-whorl number about forty, and are continued from the suture into the umbilicus as shallow sigmoid curves.

Dimensions.—Diameters, 17 (with lip 18) and 15; height, 18; height of last whorl behind anterior deflection, 7; width of umbilicus, 4.25.

Locality.—On the southern slope of the escarpment, bounding Horn Valley on the south, at the Finke Gorge on its eastern side. Dead shells in vast abundance, but only a few individuals taken alive beneath the large loose blocks of sandstone after a couple of hours' toil.

The specific name, *arcigerens* (bow-bearing), is in allusion to the arched costæ.

Affinities.—This shell exhibits a somewhat similar sculpture to *T. silveri*, *T. kooringsis*, *T. bordaensis*, Angas, approaching in shape most to the last, but is flatter, less angulated, and the corrugations regular, sharply elevated and distant. From all it differs by its expanded aperture, reflection of the outer lip, and extensive deflection of the united margins of the peristome, in which particular it assimilates to *T. grandituberculata, mihi*.

Chloritis squamulosa, Tate. (Plate XVIII., Fig. 10.)

Reference—*Hadra squamulosa*, Tate, Trans. Roy. Soc. S. Aust., vol. xviii., p. 193, 1894.

Shell depressedly subglobose, regular convex on the side and broadly convex below; spire short. Whorls five, of moderate increase, moderately convex, separated by a well-defined suture. Last whorl roundly flattened at the suture, then broadly curved to the base, not at all inflated, rather abruptly descending a little at the aperture. Aperture nearly circular, its plane oblique to the vertical axis of the shell; peristome incomplete, its margins moderately approximating and united by a thin callus, the outer lip slightly everted, columella dilated and reflected over the umbilicus. Umbilicus about one-fifth of the width of the base, somewhat abruptly descending, its margin being somewhat flatly rounded.

Colour.—A rich brown above and on the sides, base straw-coloured, sometimes with a faintly green tinge.

Sculpture.—The embryonic whorls are immersed, except a quarter of a turn, which is smooth; the surface of the first spire-whorl is ornamented with quincunally-arranged granules merging with the revolution of the spire into the prevailing ornament, which consists of crowded, elevated scales arising from elongate, granular bosses arranged more or less coincidentally with the slightly-arched inconspicuous ridges and lines of growth. Worn surfaces present the appearance of elongated granulations, and in this respect recalls *Chloritis victoriæ* and *Badistes evandaleana*.

Dimensions.—Basal diameters, 15 and 12.5; height, 9.5; height of last whorl, 7.25; width of umbilicus, 3.

Affinities.—This species is congeneric with *Chloritis pseudoprunum* and *C. coxeni*, as determined by identical characters presented by the early whorls of each. In shape it is somewhat intermediate between *C. victoriæ*, Cox, and *Badistes evandaleana*, Angas, and to which it is allied by ornament, except that the granulations are not setiferous. *C. victoriæ* is distinguished by more globose shape, inflated body-whorl and small umbilicus; *B. evandaleana* is more depressed and the last whorl is obtusely carinated.

Locality.—Moderately abundant under rocky ledges in Palm Creek and its branches, Krichauff Range.

Note.—The species-name, *squamulosa*, has already been employed in the genus *Helix* (in its old acceptation), but as I had used it restrictedly to *Thersites* and now to *Chloritis*, it should not be regarded as a double employment, the original *Helix squamulosa* being transferred to *Eulota*. If, however, my ruling is not acceptable, I suggest in substitution the name *ophioderma*.

GENUS THERSITES.

SECTION GLYPTORHAGADA, Pilsbry.

“The South Australian expression of the *Badistes* type,” writes the founder of this section, “are depressed, keeled *Badistes*, with corrugated surface.” This definition should be extended not only to bring two of the four species which he enumerates into the group but also to embrace others now herewith associated. Briefly, the section may be retained for the sculptured *Badistes*, but that definition will exclude *T. howardi*, which has the lenticular shape of *T. kooringsensis*, but is

not sculptured. *T. bordaensis* is depressed and somewhat carinated, which, through *T. tomsetti*, connects with *T. evandaleana* to *Badistes*. The corrugations of *T. bordaensis* have disappeared in *T. tomsetti*, though the shape remains. The modification of form in another direction is to *T. silveri*, which is globosely conic, but with a subangulated periphery; *T. clydonigera* has a rounded periphery, and by its regular sculpture connects with *Angasella*. In all these species the peristome is incomplete, but in *T. howardi* it is continuous, and extensively projects forward; the last whorl is moreover strongly deflected at the front. *T. arcigerens* offers the same features, though not so lenticular in shape. By the form of the aperture they approach *Angasella*.

Thersites (Glyptorhagada) clydonigera, Tate. (Plate XIX., Fig. 24).

Reference—*Hadra clydonigera*,* Tate, Trans. Roy. Soc. S. Aust., vol. xviii., p. 193, 1894.

Shell globosely conical, spire elevated; test thin. Whorls five, of somewhat rapid increase, moderately convex, separated by a linear suture. Last whorl moderately and abruptly descending at the front, moderately inflated, rounded at the periphery, base convex. Aperture oblique, suboval; peristome narrowly expanded and slightly reflected, margins connected by a thin callus; columella oblique, straight, thinly reflected, half-concealing the umbilicus. Umbilicus small, about one-eighth the width of the base.

Colour unknown, but apparently without bands.

The sculpture consists of flexed regular acute costæ, narrower than the interspaces, which, on the body-whorl, form deep sigmoid curves, extending from suture to within the umbilicus. The embryonic one-and-a-half turns are devoid of costæ but are minutely granulated. The intercostal spaces are obscurely, transversely, and distantly striated.

Dimensions.—Diameters, 16 and 14; height, 11.5.

Locality.—McDonnell Range, received from Rev. H. Kempe (one bleached example).

Affinity.—This species resembles *H. silveri*, Angas, from which it differs by its convex periphery and more numerous and less interrupted costæ, 65 on the body-whorl of the former and 50 on that of the latter.

* Bearing, *kludon* (the surge), in allusion to wavy surface.

Thersites sublevata, Tate. (Plate XVII., Fig. 5.)

Hadra sublevata, Trans. Roy. Soc. S. Aust., vol. xviii., p. 192, 1894.

Shell depressedly orbicular, slightly convex above, flatly rounded at the side, convex below. Whorls five, of slow increase, moderately convex, narrow, separated by an impressed suture. Last whorl obtusely angled at the periphery, thence convex to the suture; the side flatly rounded, becoming nearly perpendicular in the anterior one-fourth, thence widening to the post-labial constriction; the base regularly and broadly convex. Aperture oval, its posterior angle considerably in advance of its outer basal margin; peristome white-lipped, its margins approximate and connected by a thin callus, thinly reflected, more thickly on the columella; basal lip bordered by a shallow constriction commencing at the umbilical margin and continued to about the middle of the side, producing a conspicuous elevated ridge within the aperture; anterior part of body-whorl slightly descending; columella obliquely arched. Umbilicus wide, about one-sixth width of base, slightly narrowed by the columella-reflection.

Colour.—Yellowish-brown above, opaque-white beneath.

Sculpture densely granulate all over; growth-folds in deep sigmoid curves from the suture to the umbilicus, with interstitial growth-striae on the side and base of last whorl.

Dimensions.—Diameters, 15 and 14; height, 8; height of last whorl, 6; width of umbilicus, 2.5.

Affinities.—In the presence of the constriction at the base of the aperture and the elevated ridge within the aperture the present species assimilates to *H. wesselensis*, Cox, from which it differs by depressed shape, less deformation in the anterior part of the body-whorl, short arched columella, absence of a colour-band, and more particularly by its granulated test (*H. wesselensis* is absolutely devoid of this style of sculpture).

The specific name is in allusion to the up-raising of the base of the aperture to form the internal ridge.

Locality.—Hart Ranges.

Thersites adcockiana, Bednall, sp. (Plate XIX., Fig. 26.)

Hadra adcockiana, Bednall, Trans. Roy. Soc. S. Aust., vol. xviii., p. 190, wdets., 1894.

Localities.—This is one of the few species of the genus which extends throughout the Larapintine area, having been collected in its southern part at Ilpilla Gorge and in the ravines about Illamurta, in the north-west in the gorge of the Darwent River, in the north in the gorges of the Upper Finke and its tributaries, Finke River Gorge, the ravines about Stuart's Pass, at Painta Spring, Alice Springs, and Maude River in Hart Range, in more central localities at Tempe Downs (type *J. Thornton*), Glen of Palms, and Palm Creek.

Variation.—*T. adcockiana* proves to be an exceedingly variable species, and various attempts on my part to delimitate subordinate groups have failed. The variations can therefore be treated only in the following general terms:—

1st. *Sculpture.*—In the type this consists of arched subacute growth-ridges, rather crowded, being wider than the interspaces, hardly conspicuous to the unaided eye, excepting at the suture. This condition passes to an extreme form, wherein the ribs are elevated, less numerous, and as wide or narrower than the interspaces.

2nd. *Colour (a).*—The epidermis is usually well-developed and of a yellowish-horn colour, that of the underside yellow or greenish-yellow; but the type-form is devoid of a periostracum, or it is so thin and pellucid as not to conceal the opaque-white ground-colour of the test. (*b*) *Colour-bands.*—The type shows two rufous bands on the body-whorl, one sutural, the other peripheral. In addition to these there is more frequently than not a broad infra-peripheral infuscation. This colouration belongs chiefly to the coarsely sculptured individuals. Whilst some of them have two bands only, some individuals of the finely-sculptured sort have a third colour-band.

3rd. *Shape.*—The variation in shape is chiefly in the amount of the elevation of the spire, but more or less co-ordinate therewith is a variation in the outline of the aperture and the width of the umbilicus.

A planulate specimen with fine sculpture measures 12 by 6.25, that is, the proportion of the major diameter to the height is 100 to 52; the type, as well as others with coarse sculpture, the proportion is 100 to 70; an intermediate stage, not infrequent, measures 100 to 59, whilst an extreme in the opposite direction has the proportion 100 to 74.

In the planulate forms the lips of the aperture approximate much nearer, and the aperture is consequently oboval instead of elliptic-oval.

The major diameter of the umbilicus of the planulate forms bears to the greatest width of the base, the proportions varying from 1 : 4·1 to 1 : 4·8 (averaging 1 : 4·3). In the type the measures are 1 to 5, and with increasing height of the spire the umbilicus becomes smaller.

4th. *Summary of Varietal Characters*.—Without attaching any undue value to the characters about to be utilised, it may be convenient to view the species as comprising the following groups:—

Forma typica, in which the spire is about seven-tenths in length of the major diameter of the base, the transverse ridges feebly developed, and the umbilicus of moderate dimensions.

Forma a.—Spire and umbilicus as in *forma typica*, the transverse ridges conspicuously elevated and usually fewer in number.

Forma b.—Spire about five-tenths the major diameter of the base; peristome nearly complete; aperture oboval, and the umbilicus large.

Of the many dozen specimens which I have collected of this composite species *forma b* is the least frequent, *forma a* the most common, whilst the type-form is most commonly represented by individuals of the largest dimensions.

Forma b makes a connection with *T. clydonigera*, Tate, and through that species with *T. silveri*, Angas. The acute ridges are from 50 to 60 in number on the posterior part of the last whorl, but become finer and about double in number on the base.

Thersites (Badistes) perinflata, Pfeiffer.

Helix perinflata, Pfeiffer, Pro. Zool. Soc., 1863, p. 528; *id.*, Cox, Aust. Landshells, p. 45, pl. xx., fig. 2, 1868; *id.*, Hedley, Proc. Roy. Soc. Queensl., vol. vi., pl. xv. (anatomy), p. 251, 1889.

Hadra perinflata (Pfr.), Pilsbry, Man. Conch., ii., vol. vi., p. 183.

Helix (Galaxias) *perinflata* (Pfr.), Bednall, Trans. Roy. Soc. S. Aust., vol. xvi., p. 62, pl. i., fig. 6, 1892.

H. pachystyloides, Cox = *H. jannellei*, Le Guille, was considered by Angas, Quart. Journ. Conch., vol. i., p. 135, 1876, to be identical with the McDonnell Range species, a determination unanimously rejected.

Localities.—McDonnell Range for type, Waterhouse; Hart Range, J. East; Burt Plain, Horn Exped.; Everard Range, in S.A., Cavanagh Range and between Fraser Range and Yilgarn in W.A., Elder Exped.; Lake Eyre basin, at most localities as bleached shells; Mann's Creek, twenty-eight miles north of Peake, J. Chandler!; Mount Margaret, J. East!; Kewson Hill, Dr. Cleland; Mount Nor-west!; Teetulpa, J. Macleod!; Wilson and Carrieton in Flinder's Range, Bednall.

Thersites (Badistes) fodinalis, Tate.

Reference—*Hadra fodinalis*, Tate, Trans. Roy. Soc. S. Aust., vol. xvi., p. 63, pl. i., figs. 1a-1c, 1892.

Localities.—Waukaringa, between Petersburg and the boundary of New South Wales, for type, extending thence to the Broken Hill district! Between Victoria Spring and Fraser Range, one ex., Elder Exped.

Central Australia:—This is by far the most widely-spread and abundant snail over the region explored by the Horn Expedition. Its most southern station is on the Cretaceous outliers about Sullivan's Creek; dead shells, however, had been observed much further south, either strewn over the surface or in river-rejectamenta, as about Crown Point, at the Goyder, and Lilla Creek; on the bare limestone surfaces between Waterhouse Range and the sources of Alice Creek, and thence to the River Hugh, dead-shells are very abundant, and, in the absence of shelter, it may be inferred that the species is there extinct. Generally this species may be found secreting under rocky ledges in the James and George Gill Ranges on the south and McDonnell and Hart Ranges and Burt Plain on the north, but it also burrows in marshy places, as at Illamurta.

Variation.—The colour of the epidermis varies from a mahogany-brown to pale straw; sometimes unicolorous, but usually the basal half or third is paler.

The size of the shell varies within the following extremes:—24 by 21.5 = 100 : 90 and 14 by 12 = 100 : 89. A common size of the smaller sorts agrees with that of the type, which is 17 by 14.5 = 100 : 85. The large form prevails in the moister habitats, though both occasionally occur together. The shape varies from subglobose to almost planulate, the extremes being indicated by the following proportions of width to height:—100 : 90 and 100 : 66.6. The following table of measures exhibit a gradation between the extremes:—

Width.		Height.		Proportion.
24	...	21·5	...	100 : 90
22	...	19·5	...	100 : 88·6
21·5	...	17	...	100 : 84·3
17	...	13	...	100 : 76 (type specimen)
17·25	...	13	...	100 : 75·3
15·5	...	11·5	...	100 : 74·2
15	...	11	...	100 : 73·3
14·5	...	10·5	...	100 : 72·3
16	...	11·5	...	100 : 71·8
14	...	10	...	100 : 71·4
14·75	...	10	...	100 : 68·4
15·75	...	10·5	...	100 : 66·6

The flatter forms make a near approach to *Planispira eyrei* through less planulate forms of that species.

The sculpture of the majority of the large examples is in the form of fine engraved spiral lines on the body-whorl, which in rare instances becomes exaggerated as to produce a macro-ornamentation of tessellatedly-grouped rugosities; a less number show only a feeble sculpturing, whilst in not a few it is obsolete. The majority of the dwarfed specimens fall into the two latter variabilities. The large forms recall the shape of *Chloritis pseudoprunum*, but they are devoid of the granulated test.

Thersites (Badistes) grandituberculata, Tate. (Plate XVIII., Fig. 11.)

Reference—*Hadra grandituberculata*, Tate, 1894, Trans. Roy. Soc. S. Aust., vol. xviii., p. 193.

Shell globosely conical, spire elevated. Whorls five, of somewhat rapid increase, convex but slightly flattened at the suture, separated by a moderately impressed suture. Last whorl gradually descending to about the middle of the penultimate whorl, moderately inflated, flatly convex in front of the suture, gently curved on the side to the umbilical margin. Aperture oblong-elliptic, the major axis oblique; the plane of the aperture oblique to the vertical axis; margin broadly expanded and reflected, united and reflected all round, the expansion of the columella on to the body and over the umbilicus is excessive; columella arched. Umbilicus about one-fifth the diameter of base.

Colour.—The ground colour is a pale straw, ornamented by rufous-brown bands; two on the spire-whorls, one at the posterior suture and one adjacent to the anterior suture; three on the body-whorl, one at the suture, a broader one at the periphery and a still broader one beneath.

Sculpture.—Irregular, rounded, growth-ridges following shallow sigmoid curves on the body-whorl; the whole surface densely covered with relatively large scabrous tubercles; the embryonic whorls are finely granulated in arched rows.

Dimensions.—Diameters, 15 (excl. lip) and 13·75; height, 13 (excl. lip); height of last whorl posterior to anterior deflection, 8·75.

Locality.—Maude River, Hart Range.

The remarkably dilated continuous peristome of this species is a character which separates it from all Australian species, though some approach is made by *Angasella cyrtopleura* and its allies; moreover the gross granulation is another peculiarity.

***Thersites* (*Badistes* ?) *wattii*, Tate. (Plate XVIII., Fig. 12.)**

Hadra wattii, Tate, Trans. Roy. Soc. S. Aust., vol. xviii., p. 192, 1894.

Shell depressedly orbicular, slightly convex above, sides flatly rounded and proportionately high, convex below. Whorls seven of very slow increase, convex, very narrow, separated by a deeply-impressed suture. Last whorl obtusely angled at the periphery, thence flatly convex to the deep narrow suture, the side at first nearly perpendicular, then flatly convex to the more regularly and broadly convex base. Aperture lunate, its posterior angle considerably in advance (vertically) of its outer basal margin; slightly descending on the penultimate whorl; peristome white-lipped within, reflected, thin and sharp posteriorly, becoming thick and obtuse at the base. Umbilicus very small, not at all, or hardly, concealed by the reflected columellar margin.

Colour.—Light brown above, paler beneath.

Sculpture minutely granulate all over, curved striæ of growth on the spire-whorls descending to the umbilical margin as deeply sigmoid curves.

Dimensions.—Diameters, 10·5 and 9·25; height, 5·5; height of last whorl, 4.

Affinity.—This species simulates *H. leucocheila*, Cox, from the unicolorous variety of which it differs, particularly, by its very narrow whorls; more whorls

(seven in place of five), smaller size and very small umbilicus, not at all concealed by the columella-reflection.

The species-name is in compliment to one of my colleagues of the scientific staff of the Expedition who discovered the species.

Locality.—Maude River, in Hart Range, east of Alice Springs.

Family BULIMIDÆ.

Liparus spenceri, Tate. (Plate XVIII., Fig. 13.)

Reference—Trans. Roy. Soc. S. Aust., vol. xviii., p. 192, 1894.

Shell oval, spire less than half the length of the shell; test thin, diaphanous. Embryonic whorls two, the tip immersed at the bottom of a shallow crateriform summit; the first whorl regularly convex, its posterior margin sharply rounded, the second whorl of more rapid increase. Ordinary whorls two and a half, convex, rather tumid post-medially; suture linear, moderately impressed; last whorl moderately inflated. Aperture roundly oval, oblique; peristome simple, straight, acute; columellar margin white, expanded and reflected, almost concealing the narrow umbilical fissure.

Colour of a uniform dark horn.

Sculpture.—That of the apical whorls consists of oblique, slightly raised, wavy threads, narrower than the interspaces. That of the ordinary whorls consists of oblique, rather crowded, unequal folds of growth and spiral, rather distant threadlets; the latter at their junction with the former are elevated into more or less elongate pustulations. The last form of ornamentation is most conspicuous on the penultimate whorl, becoming fainter with the revolution of the spire, and is altogether obsolete on the anterior half of the body-whorl.

Dimensions.—Length, 20; width, 12·5; diameters of aperture, 11·5 and 8.

Locality.—Burrowing in loose earth under the shade of fig trees in Glen of Palms by the junction with Palm Creek.

Affinity.—This species is similar in shape to the short and broad variety of *L. melo*, but differs by its thin test, more convex whorls abruptly arched towards the posterior suture, and slightly oblique and wider aperture. From all congeners it is distinguished by the style of the sculpture of its embryonic whorls.

The species-name is in compliment to my colleague, to whose assistance the rich gathering of specimens of this species is largely due, and to whose co-operation in other field-work I now tender my grateful acknowledgments.

Family STENOgyRIDÆ.

Stenogyra interioris, Tate. (Plate XVIII., Fig. 14.)

Reference—Trans. Roy. Soc. S. Aust., vol. xviii., p. 191, 1894.

Shell cylindrical, spire very long and tapering to an obtuse apex ; very thin, shining, greenish-white or pale yellowish ; ornamented with slender, crowded, slightly arcuate axial riblets, approximately as wide as the interspaces. Whorls nine, almost flat, but abruptly descending to the deeply impressed suture. Aperture elongate-oval ; peristome simple acute ; columellar margin nearly straight, thinly and narrowly reflected, and almost concealing a minute umbilical fissure.

Dimensions.—Length, 10·5 ; width, about 2·25.

Localities.—One of the commonest snails of the Larapintine region, extending east and west from Hart's Range to Stokes' Pass, and north and south from the north and outer flanks of McDonnell Range to Ilpilla Gorge.

Affinities.—The only species of the genus hitherto recorded for Australia is *Bulimus tuckeri*, Pfr., of which Cox, in his *Mon. Austral. Land Shells*, says, p. 70, that it "varies considerably in size and slightly in acuteness of the spire, and also in the distinctness of the longitudinal striæ."

Compared with numerous specimens of *S. tuckeri* taken by me at Port Darwin, *S. interioris* presents the following combination of characters, which show no perceptible variability, more slender form and narrower whorls. Thus in a length of 10·5 mm. *S. interioris* has nine whorls, *S. tuckeri* has eight, and the greatest width of the latter is near three as against 2·25 ; moreover, the whorls are less convex, the suture profound, and the riblets finer, more regular, and closer together.

Mr. Hedley suggests that if the C. Aust. shell be considered of specific rank it should be called *S. novemgyrata*, Mousson, *J. de Conch.*, vol. 1876, p. 126, 1870. Unfortunately that particular volume is not accessible. But in view of the isolation of *S. interioris* in contrast to the coastal habitat of *S. gracilis* and its varieties, there is every probability a careful comparison of actual specimens will justify the retention of the Central Australian shell as a distinctive species.

Family PUPIDÆ.

Pupa ischna, Tate. (Plate XIX., Fig. 16.)

Reference—Trans. Roy. Soc. S. Aust., vol. xviii., p. 191, 1894.

Shell pyramidally oval, thin, translucent, shining, yellowish-brown, apex obtuse; whorls five-and-a-half, moderately convex, separated by an impressed suture, finely obliquely striated. Aperture sinistral, oval, truncated behind; peristome white, broadly reflected, especially over the columella, which does not conceal a narrow umbilical fissure; the lips are callously united and there is a prominent tubercle at the insertion of the outer lip.

Dimensions.—Length 4·25, width 1·25.

Localities.—Alice Springs and Palm Creek.

A more slender shell and more attenuate apically than *P. contraria*; in its sinistral spire and apertural characters it agrees with *P. myoporine*, Tate, which is possibly only a sinistral form of *P. pacifica*, from which it differs in its narrow elongate shape and flatter whorls. It may prove on comparison of actual specimens conspecific with *Chondrula lepidula*, Ad. and Ang.

Pupa contraria, E. A. Smith. (Plate XVIII., Fig. 15. Plate XIX., Fig. 17.)

Reference—Proc. Malac. Soc., June, 1894, p. 96.

Synonyms—*Pupa eremicola* and *P. beltiana*, Tate, Trans. Roy. Soc. S. Aust., 1894, p. 191.

Pupa eremicola was founded on a large form of *P. contraria*, and *P. beltiana* is the dextral state of that species; these opinions are confirmed by the author of *P. contraria*. *P. contraria* is, however, not a sinistral form of *P. adeluidæ*, Ad. and Ang., as it differs conspicuously by its pyramidal outline.

Localities.—This is the most widely distributed of the pupæ-form shells met with by the Expedition; it has the same range within the Larapintine area as *Stenogyra interioris*, and like it extends to Hart Range, whilst in a southerly direction it reaches beyond the Larapintine area to the Cretaceous hills about Sullivan Creek. The original locality of the species is Houtman's Abrolhos, on the north-west coast of Australia.

Pupa ficulnea, Tate. (Plate XIX., Fig. 18.)

Reference—Trans. Roy. Soc. S. Aust., vol. xviii., p. 191, 1894.

Shell dextral, shortly cylindric-elliptical; apex obtuse, pale brown, shining. Whorls six, flatly convex, separated by a channelled suture, obliquely striated. Aperture roundly-oblong, rounded in front and somewhat obliquely truncated behind, furnished with two folds, one parietal large, blunt, situated centrally and far within, the other, nearly as large and similar, is situated far within on the columella; a small denticle is sometimes developed at the insertion of the outer lip; peristome white, flatly expanded, the columellar expansion not concealing the deep narrow umbilical fissure.

Dimensions.—Length, 3.5; width, 1.75 (vix.)

Locality.—Palm Creek, off Glen of Palms, in Krichauff Range.

This species has the apertural characters of *P. australis*. The form is less pointed at the ends, but it is proportionately very much narrower, the suture more channelled, and is dextral and smaller. With these differences I cannot accept the prospective objection to the validity of the species that it represents the dextral form of *P. australis*. Smith has recorded, Proc. Mal. Soc., No. 3, p. 96, 1894, *P. lincolniensis*, Cox, from the north-west coast of Australia. That species is essentially confined to the coast, and I have traced it from St. Vincent Gulf along the coastal sand-hills into West Australia, and am unfamiliar with an associate form at all like *P. ficulnea*.

Pupa larapinta, sp. nov. (Plate XIX., Fig. 19.)

Shell dextral, oblong-elliptic, pellucid, white, narrowly umbilicated. Spire cylindrical, obtuse at the apex; whorls five, very convex, separated by a deep suture, ornamented by very oblique striae of growth; last whorl slightly ascending at the front; aperture roundly oblong, multidentate within; peristome narrowly and horizontally expanded, the margins united by a thin parietal callus.

The dentition of the aperture consists of two lamelliform contiguous plaits on the parietal wall, the outer one of which is the larger, an equally large plait on the columella, one on the basal margin, and one on the outer lip. All these are approximately equidistant. In addition, denticles occasionally appear, one exterior to the large plait on the parietal wall, one anterior to the columella plait, and one or two on the outer lip.

Dimensions.—Length, 3; diameter, 1.25.

This species comes near *P. wallabyensis*, Smith, but according to that author differs in its apertural armature.

Pupa mooreana, E. A. Smith. (Plate XIX., Fig. 20.)

Reference—Proc. Malac. Soc., June, 1894, p. 97, t. 7, f. 25.

A shell which I refer to this species was collected in considerable numbers in Central Australia. The majority of the specimens have the denticulation of the aperture as figured and described by Smith, which consists of a strong plait in the middle line of the body-whorl, one on the columella, and two palatal, the four being approximately equidistant, whilst a denticle is situated at the insertion of the outer lip. Some variation in this arrangement is supplied by my specimens, the parietal and columellar plaits are relatively very large, and occasionally a denticle is interposed, as also another between the two palatal plaits, whilst the tubercle at the insertion of the labrum is often absent.

Localities.—Tempe Downs, Reedy Creek, Palm Creek, Stuart's Pass, Painta Spring, and Alice Springs.

Family SUCCINEIDÆ.

Genus SUCCINEA.

The test of the Australian species of this genus, except *S. strigillata* and *S. legrandi*, which have not been under observation, possesses on the outer surface, between the growth-folds, a micro-ornament consisting of two sets of oblique striæ which, intersecting, produce a rhombic reticulation. In *S. scalarina*, *S. interioris*, *S. eucalypti* and *S. tamarensis*, this kind of ornamentation is bold; in *S. nortoni* and *S. macgillivrayi* it becomes somewhat granulose; in *S. strigata*, *S. australis*, and *S. aperta* the ornament is feebly developed, and in the last approximates to granulose. The only exotic species examined are the European *S. putris* and *S. elegans*, in which the sculpturing is absent, and the Central American *S. recisa*, in which the ornamentation is like that of the Australian *S. macgillivrayi*.

The diversity of this character, as exhibited in the above-named species, renders possible its employment as an aid to the discrimination of species. It is significant that *S. interioris* and *S. scalarina*, and *S. australis* and *S. strigata* should have similar ornamentation, well-developed in the former pair and feebly so in the latter, as there is no doubt that the species of each couple are closely related and perhaps conspecific.

Succinea interioris, Tate. (Plate XIX., Fig. 21.)

Reference—Trans. Roy. Soc. S. Aust., vol. xviii., p. 191, 1894.

Shell oval-elliptical in outline; test thin, pellucid, shining, yellowish or reddish-horny, raised into folds of growth and ornamented with microscopically-reticulate striæ. Whorls four; spire elongated, rather acute, its whorls moderately convex in the posterior-third, thence gradually sloping to the anterior suture, being much constricted anteriorly; last whorl moderately convex, somewhat attenuate at the base. Aperture oblique, oval, scarcely acuminate posteriorly, its length two-thirds that of the shell; peristome thin, its margins connected by a thin callous deposit, columellar margin feebly reflected posteriorly.

Dimensions.—Length, 17; greatest and least diameters, 9·25 and 6·5; length of aperture, 11·5; greatest width of aperture at $\frac{3}{4}$ ths of the axial length from the front.

Localities.—Wet banks at Illara Water, Laurie's Creek, Carmichael Creek, Redbank, Palm Creek, and in the rejectamenta of the Finke River at Crown Point. Also "at Eversham, a station due west from Rockhampton towards the South Australian boundary," communicated by Dr. Cox.

I cannot reconcile this *Succinea* to any of the described species; it, however, closely approximates to *S. scalarina*, with which it agrees in dimensions as set forth in the subjoined table, but the last whorl is more attenuate and not so convex, the spire is shorter and narrower, the shell is nearly twice the dimensions, whilst two thousand miles intervene between their respective habitats.

RELATIVE MEASUREMENTS.

	Shell.			Aperture.	
	Length.	Maximum Width.	Minimum Width.	Length.	Width.
<i>Succinea interioris</i> - -	100	54·4	39	66·2	41
<i>Succinea scalarina</i> - -	100	55·2	42	68·3	42

CHAPTER II.—The Fresh-water Mollusca.

Thirteen species of fresh-water shells were gathered by me, of which only one, *Melania balonnensis*, had previously been recorded from the region (Trans. Roy. Soc. S. Aust., vol. iv., p. 140). Seven are additions to the faunula of extra-tropical South Australia. The species of the Larapintine region belong for the most part to Queensland and the Northern Territory. It is noteworthy that *Unio stuarti* does not occur in the Finke River basin; its most northern station in South Australia is the River Coglin, as at Charlotte Waters, but it reappears at Newcastle Waters in the Northern Territory. The species are :—

		* <i>Planorbis fragilis</i> , Brazier.
* <i>Melania venustula</i> , Brot.	————	<i>Ancylus australicus</i> , Tate.
<i>Melania balonnensis</i> , Conrad.		
* <i>Bithinia australis</i> , Tryon.		
* <i>Limnæa vinosa</i> , Ad. and Angas.	————	* <i>Corbicula lævigata</i> , Smith.
<i>Bulinus texturatus</i> , Sow.	————	* <i>Sphærium translucidum</i> , Sow.
* <i>Bulinus dispar</i> , Sow.		
<i>Bulinus pectorosus</i> , Conrad.	————	<i>Unio stuarti</i> , Ad. and Angas.
<i>Isidorella newcombi</i> , Ad. and Ang.		
<i>Isidorella newcombi</i> , var. <i>inflata</i> .		
<i>Isidorella newcombi</i> , var. <i>brazieri</i> .		

Family MELANIADÆ.

Melania venustula, Brot.

References.—Brot, in Martini and Chemnitz Conch. Cabinet, p. 331, t. 34, figs. 5, 5a, 1874; *id.*, Tate and Brazier, Proc. Lin. Soc., N.S. Wales, vol. vi., p. 560, 1881; *id.*, Smith, Proc. Lin. Soc., vol. xvi., p. 260, t. 4, figs. 9, 10, 1882.

Locality.—Dead shells in the bed of the River Finke, at Crown Point.

Exoteric distribution. In addition to Port Denison, the locality of the type, Mr. Brazier records it from Cape Upstart, in the same province of Queensland, and Mr. E. A. Smith reports it from the Victoria River, North-west Australia, on a specimen in Brit. Mus. collected by the Gregory Expedition. The Finke River specimens are much more elongated than the Cape Upstart specimens received from Mr. Brazier, or that figured by Brot, but agree with the form from Victoria River figured by Mr. E. A. Smith.

* Species new for extra-tropical South Australia.

Melania balonnensis, Conrad.

Conrad* described two Australian species of highly ornate Melaniæ as *M. tetrica* and *M. balonnensis*, and Smith† added a third, *M. subsimilis*. After a careful examination of a large series of Melaniæ of this type from various parts of Australia, I conclude that the three so-named species are only individual modifications of a highly variable one.

M. tetrica, which Brazier re-named *M. tatei*, because the species-name was pre-occupied by Gould, represents a shell with the subquadrate whorls having acute nodulations (about ten on last whorl) on the shoulder, and between which and the anterior suture are interposed three spiral threads.

M. balonnensis has non-angulate whorls, five or more spiral threads on the anterior slope, the axial costæ more pronounced especially on the last whorl, and the peripheral coronation is almost obsolete (consisting of about twenty nodulations).

These extremes of ornamentation are connectable, and few pools inhabited by these Melaniæ fail to afford the number of intermediate keels; though at the same time there is a tendency at each locality to develop towards one or the other extremes. Thus in the Cooper River at Innamincka the *tetrica*-form prevails, though the *balonnensis*-form also occurs as well as individuals showing gradation of the ornament from one to the other; the converse is the case in the lower Murray River and in the basin of the River Finke.

With regard to shape, the *balonnensis*-form shows a tendency to elongation, much more so than the *tetrica*-form, and thus in the lower River Murray, as also in the Finke basin, passages occur from a shell in which the proportion of length to breadth is 100 to 55, to one in which it is 100 to 32. This extreme elate form has received the name of *M. subsimilis*.

Localities.—River Finke, at Finke Gorge, at Glen of Palms and Palm Creek (alive), at Running Water (alive), at Crown Point; River Walker, at Tempe Downs (alive); River Palmer, at Illara Water. Living specimens inhabit shallow pools with a sandy bottom; they often leave the water, pushing forward in the moist sand as a *Natica* on the sea-strand. This species is ovoviparous.

* American Journ. Conchol., 1866, vol. ii., p. 80. t. 1, figs. 9, 10.

† Journ. Lin. Soc., 1883, p. 262, t. 5, fig. 13.

Family PALUDINIDÆ.

Bithinia australis, Tryon, sp.

1865. *Gabbia australis*, Tryon, Amer. Jour. Conch., vol. i, p. 220, t. 22, f. 7.
1875. *Bithinia hyalina*, Brazier, Proc. Lin. Soc. N.S.W., vol. i., p. 9.
1881. *Bithynia australis* (Tryon), Tate and Brazier, Proc. Lin. Soc., vol. vi., p. 562 (incl. *B. hyalina*, Braz.).
1882. *Bithinia australis*, Smith, Proc. Lin. Soc., vol. xvi., p. 267, t. vii., f. 18.
1882. *Bithinia smithii*, Tate, Trans. Roy. Soc. S. Aust., vol. v., p. 54.

The genus *Gabbia* was founded on an erroneous interpretation of the characters of a fresh-water shell inhabiting New South Wales, the original diagnosis being as follows:—"Shell like *Amnicola*, operculum paucispiral and calcareous." Stimpson in his "Resarches on the Hydrobiinæ" writes of it, p. 56, "The figure of the unique species, *G. australis*, reminds us of *Bythinia* rather than any other genus, for in it the operculum is represented as decidedly concentric, although said to be paucispiral in the description." Later, Brazier described a shell also from New South Wales as *Bithinia hyalina*. An examination of typical specimens of that species proves the correctness of the generic position assigned, but a comparison with the figure of *Gabbia australis* leaves no doubt as to the specific identity of the two; therefore Tate and Brazier, in their check-list of Australian fresh-water shells, catalogue it as *B. australis* (incl. *B. hyalina*). Smith, in his memoir on the fresh-water shells of Australia, describes as new a *Bithinia australis*, and quotes *B. hyalina* and *Gabbia australis* as different species. As the name of Smith's species was thus pre-occupied in the genus, and judging from the figure of it I took it to be a different species, and renamed it *B. smithii*. On reconsideration of the figure and the text, it is probable that *B. smithii* is not distinct from *B. australis*, though the figure shows a slight angularity of the body-whorl not possessed by *B. australis*; but as the text reads "whorls very convex," this may be a defect in the drawing.

Mr. Brazier has communicated to me his opinion that *B. schraderi*, Fld., and *B. australis* are one and the same; but as Frauenfeld's diagnosis, Verh. der Kaiser Kong. Zool.-bot. Gessellschaft in Wien, Vol. XII., p. 1153, 1862, was unaccompanied by figures and without comparison with any other species, except his *B. vertiginosa*, to which the same criticisms are applicable, and which may after all be only an elate form, of a composite species, the question of priority in

respect of exact definition may reasonably be raised. Frauenfeld did not figure his two species till late in 1865, whereas the publication of Tryon's species is dated July, 1865. The question of identity of these three species should be remitted to Europe, as the type of *B. schraderi* is in the Cummingian Collection and that of *B. vertiginosa* in the Imperial Museum at Vienna.

Localities.—River Neales and Storm Creek, near Oodnadatta (taken alive), and in dry bed of Blood's Creek and Boggy Flat, near Mt. Daniel; also in Pliocene travertine, near Dalhousie Springs.

The South Australian examples fairly agree with those from the east coast of New South Wales, though reaching to a larger size. Some variability in shape must be allowed in shells of this group, which also exhibit a slight sexual dimorphism.

The sporadic distribution of this species is quite exceptional among the fresh-water mollusca of Australia. The known occurrences are Mulgoa Creek, near Penrith, and about Parramatta and Chatsworth in New South Wales for *B. hyalina*, Braz.; Victoria River, N. Australia, for *B. australis*, Smith; and in the more central parts of the continent as above recorded.

Family LIMNÆIDÆ.

Limnæa vinosa, Ad. and Ang.

Amphipectea vinosa, A. Adams and Angas, P.Z.S., 1863, p. 415.

Limnæa vinosa, Reeve, Icon. Conch., t. 6, f. 37, 1872.

From analogy of shell-form I had inferred in 1882 that this species was a *Limnæa*, and I am now in a position to affirm that generic position.

The vinous colour is not constant, not only among the specimens of the present collection, but also of those obtained by myself in the Mary River—the locality of the type. The present examples compared with those of Arnheim Land are smaller, more shouldered, and the last whorl is not so ventricose.

Localities.—Palm Creek, off Glen of Palms; and Ollara Water on the Darwent River (taken alive). Dead shells in Walker River at Tempe Downs, and in Finke River at Running Water.

Family PHYSIDÆ.

Genus BULINUS.

The differentiation of the Australian and Tasmanian species of *Bulinus* is fraught with the greatest difficulty, as an extensive study of numerous so-called species leaves no doubt of their extreme mutability, and that the majority have been established on local races. A very large reduction in the number of names (sixty-two) is inevitable, and until the species have been satisfactorily delimited, it may not be possible to employ in every case a nomenclature in accord with the rules of priority. It is with some reluctance I admit three species of the genus collected by the Expedition, and the names which I employ are not used in a collective sense, but rather as a racial expression, whose real affinities have yet to be worked out. Thus I have little doubt that *B. texturatus*, *B. puncturatus*, and *P. tenuistriatus* are variants of one species; but of these, the figure and description of *B. texturatus* best applies to the shells which I have so named.

Bulinus texturatus, Sowerby in Reeve's Icon.

Storm Creek, River Stevenson, Blood's Creek, Bagot's Creek, Palm Creek, Lawrie's Creek, River Darwent and its tributaries.

Stumpy forms approach *B. pectorosus*, whilst narrow elate forms approach *B. dispar*.

Bulinus dispar, Sowerby in Reeve's Icon.

Ollara Water, on the River Darwent; Palm Creek. Among those from the latter locality, it is not infrequent to find individuals with loosely-coiled spires, or even with the last whorl detached.

Bulinus pectorosus, Conrad.

Adminga Creek and Reedy Creek.

ISIDORELLA, gen. nov.

Since my first acquaintance with the Australian Physidæ of the group typified by *P. newcombi* I have considered them entitled to generic distinction on conchological grounds. The shell-characters are—form oval, last whorl much inflated; peritreme continuous, adnate to the parietal wall, and forming a false umbilicus; no columella, strictly, or columella without a fold. These conform

with those of *Isidora* (Ehrenberg), included under *Bulinus* by H. and A. Adams, Gen. Moll., ii., p. 260, 1858.

The first application of the name *Isidora* to an Australian species is by Tryon when describing *Physa* (*Isidora*) *hainesi* in Amer. Jour. Conch., vol. i., p. 9, 1866; but the same author, in his Syst. Conchology, vol. iii., p. 103, places it as a synonym with *Bulinus*.

The figure of *Physa newcombi*, in Reeves' Icon. Conch., shows apparently a columella-fold. This is certainly an incorrect interpretation, as I have satisfied myself by an examination of the co-types received from the original collector, whereas it is really an exaggeration of an angulation produced by the retroversion of the peritreme on the body-whorl.

Mr. Cooke has described (Quart. Journ. Conch., vol. v., pp. 241-243, pl. ii.) some of the anatomical characters of *Physa inflata*, Adams and Angas, from which he concludes that because the dentition is similar to that of *Limnea* the shell is a sinistral example in that genus, and names it *L. physoides*. He has however overlooked the fact that the tentacles are filiform-cylindrical, a character in association with a reversed spire, which should serve to maintain the species in the family Physidæ. My observations on the external anatomy of *P. inflata* are that the tentacles are slender, suddenly dilated at the base of the upper outer side, the eyes on the inner base of the tentacles (see fig. 25, pl. xix.), the mantle not exert with a plain margin. The animal of these *Isidora*-like shells, as observed by me in the species *newcombi*, *inflata* and *brazieri*, is thus related to *Bulinus* by its non-exserted and plain-margined mantle, but differs from the rest of the family by its dentition, which allies it with *Limnæidæ*.

The animal of *Isidora* has not been described, and until its dentition has been diagnosed it will be unsafe to refer the Australian shells of the *newcombi*-type to it. On the assumption that the lingual ribbon will afford differential characters, I propose the name of *Isidorella* for the Australian shells. This course will be more convenient than the use of *Isidora*, in the belief that the anatomical characters are alike.

LIST OF ISIDORELLÆ ARRANGED CHRONOLOGICALLY.

- 1863.—*Physa newcombi*, A. Adams and Angas.
- 1863.—*Physa ferruginea*, A. Adams and Angas.
- 1864.—*Physa inflata*, A. Adams and Angas.
- 1866.—*Physa* (*Isidora*) *hainesi*, Tryon.

1873.—*Physa latilabiata*, Sowerby.

1873.—*Physa subinflata*, Sowerby.

1883.—*Physa brazieri*, Smith.

1883.—*Physa schayeri*, Troschel.

1888.—*Limnæa physopsis*, Cooke.

The species known to me are *I. newcombi*, *I. inflata*, and *I. brazieri*, and it is a grave question with me whether or not they are but modifications of one species. *Limnæa physopsis* is too much like *I. inflata* or the short-spined forms of *I. newcombi* to merit varietal distinction. *Physa subinflata* would seem to be from the figure an elongate individual of *I. newcombi*: the figure shows, however, a slight twist on the columella, but this may be an error, as in the case of Reeves' figure of *I. newcombi*; at any rate I am unacquainted with any other South Australian shell of the family to which the figure and description of *Physa subinflata* is applicable. *P. latilabiata* is regarded by Smith as synonymous with *P. hainesii*, and *P. schayeri* also belongs there. By these reductions the genus comprises three species—*I. newcombi*, with its two varieties, *inflata* and *brazieri*, *I. hainesii*, and *I. ferruginea*. Paetel, Cat. Couch., vol. ii, p. 410, 1889, includes *Physa aperta*, Sow., in the genus *Isidora*, which is the only Australian species of the genus admitted by him; this is a grave error, and at variance with the original diagnosis, "columella tortuous, fold rather prominent," and with the figure.

I. newcombi and its varieties have the test covered by a horny periostracum raised into spiral fringes of hairs and into imbricating folds at the suture; the spiral rows of hairs are superimposed on the spiral striae of the test; the periostracum is more developed in some individuals than in others, may be partly or wholly removed by abrasion in adult shells, and is usually lost in dead ones. This feature has been unnoticed by the describers of the several species, which may be explained on the probability that their types were dead shells. The colour of the test is mainly light-horn, but varies from olive-green to brown and reddish, and cannot be used as a specific character.

I. newcombi and its varieties have the habit of burrowing in the mud on the drying up of the water of the pool in which they live, and of forming a hemispheric operculum of fine silt, thus closing the aperture. The fine nature of the material forming the operculum contrasts strongly with the varied texture of the mud of the pool, which leads me to infer that the fine sediment has been selected by swallowing and ejected per anum. The associated species of *Bulinus* may secrete themselves under stones or logs, but the majority are left high and dry by the receding water.

Isidorella newcombi, Ad. and Ang., sp. (Plate XIX., Fig. 25.)

As an aggregate species *I. newcombi* includes *Physa inflata* and *Physa brazieri*, the distinctions between which reside in the comparative lengths of the spire. In *forma typica*, as studied in co-types from the original locality, the spire is very prominent and the apex is acute. In *forma inflata*, as studied in specimens from the type locality, the apex is obtuse and its two or two-and-a-half whorls are barely elevated above the plane of the penultimate whorl. In *forma brazieri*, as studied in authentic examples from Rylstone, N.S.W., the shape is somewhat intermediate between the other two, but its acute apex and less inflated body-whorl link it more to *forma typica* than to *forma inflata*. The dimensions of the type are—total length 12, length of aperture 7.5, which agree with the specimens obtained by me in Hugh River. But examples from the River Darwent have a shorter spire, though the last whorl is not so much inflated as *forma inflata*, and attain a total length of 15 mm. and length of aperture of 10, whilst the largest examples measure 16 and 11. These agree exactly with the short-spined examples associated with the typical shells at the original locality. Thus, briefly, *forma typica* is long-spined, *forma brazieri* is short-spined, and *forma inflata* is very short-spined. The relative dimensions of axial length of shell and of aperture is stated in the following table:—

	Length.	Aperture.	Ratio.
Forma typica - - -	20.5	12.5	100 : 60
Forma brazieri, Rylstone -	12	7.5	100 : 62.5
R. Hugh { <i>a</i> - - -	15	10	100 : 66.5
{ <i>b</i> - - -	16	11	100 : 69 (vix).
Forma inflata - - -	15	11	100 : 73

Forma brazieri merges so gradually into *forma typica* that I can only regard the type of *Physa brazieri* as a mere individual variation of *I. newcombi*; on the other hand *Physa inflata* may have some little claim to varietal distinction, as though it is approached and even equalled in shape by extremely inflated individuals of *forma brazieri*, yet it seems to retain the depressed spire and the more distant ciliate lines characteristic of extreme examples of that so-called species.

Localities Forma typica.—Storm Creek, Laurie's Creek, Alice Springs, Maude Creek. *Forma brazieri*—River Stevenson, Sullivan's Creek, Laurie's Creek, River Darwent, River Hugh (north of Brinkley Bluff). *Forma inflata* (but spire slightly exsert)—Storm Creek and River Stevenson, mixed with *forma newcombi* and *forma brazieri*; Boggy Flat (between Charlotte Waters and River Goyder), River Darwent.

Sub-family PLANORBINÆ.

Genus PLANORBIS.

Planorbis fragilis (Brazier), Smith. (Plate XIX., Fig. 23.)

Reference—Proc. Linn. Soc., vol. xvi., 1882, t. 7, figs. 1, 3, p. 294.

Syn.—*P. brazieri*, Clessin, Conch. Cab., 2nd ed., Band i., p. 166, t. 24, fig. 6, 1886.

Localities.—Dead shells in the rejectamenta of the River Finke at Crown Point and Running Water; living in Palm Creek, off Glen Palms, and in the Hugh River at Stuart's Pass.

The shells of this species are more compressed and more acutely keeled than those of *P. gilberti*, as stated in the original diagnosis. A more valuable diagnostic character is afforded by the position of the keel, and in consequence the form of the aperture. In *P. gilberti* the keel is central, and in *P. fragilis* it is far below the middle. In Figs. 22 and 23, Pl. XIX., I have endeavoured to show these differences.

Clessin, *op. cit.*, has renamed *P. fragilis* on the ground that Smith's name is pre-occupied in the genus, whereas Dunker's *P. fragilis* was not published till 1886, or four years after.

Sub-family ANCYLINÆ.

Genus ANCYLUS.

Ancylus australicus, Tate.

Reference—Trans. Roy. Soc. S. Aust., vol. iii., p. 102, t. 4, f. 4, 1880; Smith, Proc. Linn. Soc., vol. xvi., t. 7, figs. 36, 37, 1882.

Localities.—Bagot's Creek, Laurie's Creek, Ollaroo Water-hole on the Darwent River, Arumbera Creek, and Palm Creek; taken alive at all the stations.

This species has a wide distribution in the northern parts of the continent in Arnheim Land and North Queensland, in the central parts as above indicated, and in Cooper's Creek at Innamincka, in the south about Adelaide and Melbourne.

Family CORBICULIDÆ.

Genus CORBICULA.

Corbicula sublævigata, Smith.

Reference—Proc. Linn. Soc., vol. xvi., p. 304, t. 7, figs. 30, 31, 1882.

Bleached valves in the River Finke at Hermannsburg and Crown Point. The identification is not certain because of the scanty and inferior material, though there can be no good reason why it should not be *sublævigata*.

Genus SPHÆRIUM.

Sphærium translucidum, Sowerby.

Reference—Couch. Icon., f. 46; *id.*, Smith, *op. cit.*, p. 305, t. 7, f. 32.

Six living examples taken alive at Reedy Creek and Penny Springs, in George Gill's Range. The determination is based on Smith's figure.

Family UNIONIDÆ.

Genus UNIO.

Unio stuarti, Adams and Angas.

Unio (*Alasmodon*) *stuarti*, Adams and Angas, P.Z.S., 1863, p. 417.

Anodon stuarti, Reeve, Icon. Con., t. 54, f. 279.

Living examples in the River Neales at Oodnadatta, in the River Stevenson, and in the Coglin at Charlotte Waters.

As already pointed out by me in 1882, Trans. Roy. Soc. S. Aust., p. 55, this shell is a true *Unio*.

EXPLANATIONS OF PLATES.

In all cases the natural size of the shell is indicated or the exact magnification is stated on the plate.

PLATE XVII.

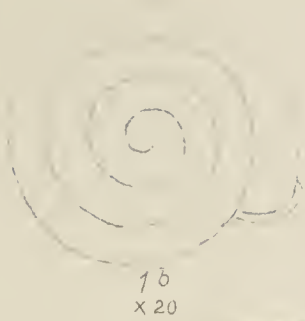
- 1.—*Microphyura hemiclausa*, Tate.
a, three-quarter ventral aspect, showing aperture ; *b*, dorsal aspect.
- 2.—*Charopa æmula*, Tate.
a, *b*, *c*, lateral, dorsal and ventral aspects.
- 3.—*Charopa planorbulina*, Tate.
a, *b*, *c*, lateral, dorsal and ventral aspects ; *d*, ornament, highly magnified.
- 4.—*Flammulina retinodes*, Tate.
a, *b*, lateral and ventral aspects ; *c*, ornament, highly magnified.
- 5.—*Thersites sublevata*, Tate.
a, *b*, lateral and ventral aspects.
- 6.—*Angasella setigera*, Tate.
a, *b*, *c*, dorsal, lateral and ventral aspects ; *d*, ornament, highly magnified.
- 7.—*Angasella euzyga*, Tate.
a, *b*, *c*, dorsal, lateral and ventral aspects.

PLATE XVIII.

- 8.—*Angasella winneckeana*, Tate.
a, *b*, *c*, dorsal, ventral and lateral aspects.
- 9.—*Angasella papillosa*, Tate.
a, *b*, lateral and ventral aspects.
- 10.—*Chloritis squamulosa*, Tate.
a, *b*, lateral and ventral aspects ; *c*, ornament, highly magnified.
- 11.—*Badistes grandituberculata*, Tate.
a, *b*, lateral aspects ; *c*, view of base ; *d*, ornament, highly magnified.
- 12.—*Badistes wattii*, Tate.
a, *b*, *c*, dorsal, ventral and lateral aspects.
- 13.—*Liparus spenceri*, Tate.
a, front view ; *b*, ornament of embryo, highly magnified.



1a
x 20



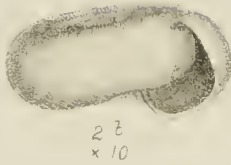
1b
x 20



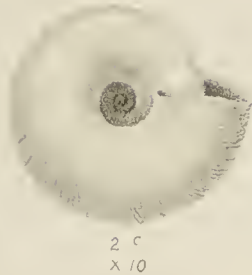
3b
x 17



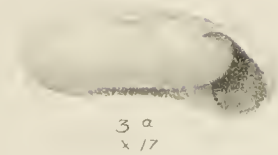
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x 10



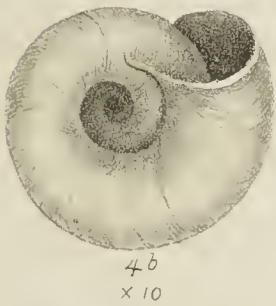
2b
x 10



2c
x 10



3a
x 17



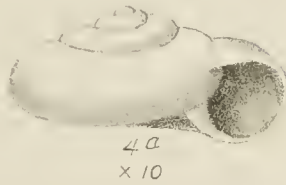
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x 10



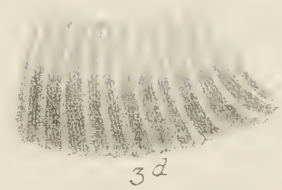
4c



3c
x 17



4a
x 10



3d



5a



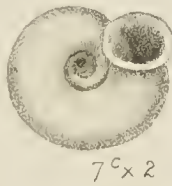
6a x 2



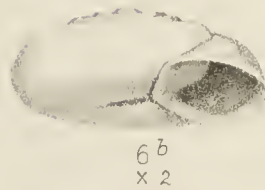
6c
x 2



5b
x 1 1/2



7c x 2



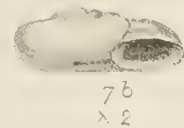
6b
x 2



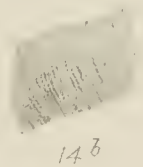
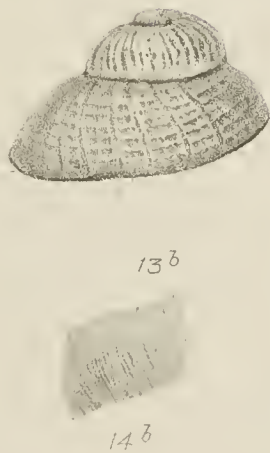
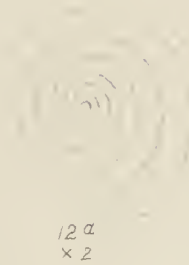
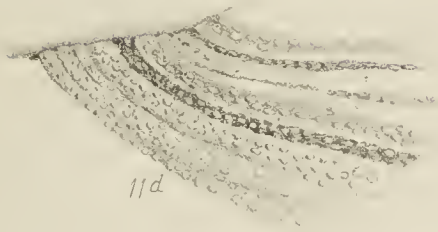
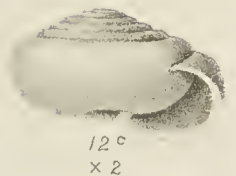
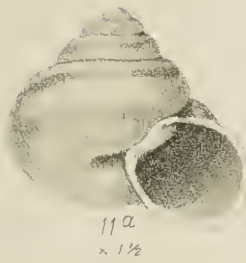
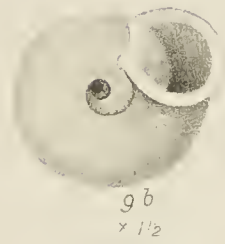
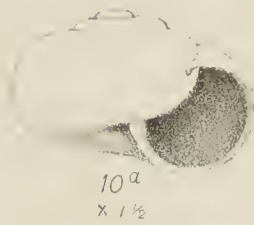
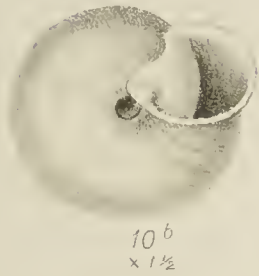
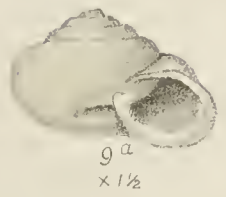
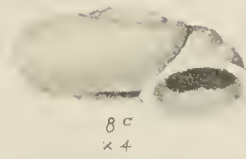
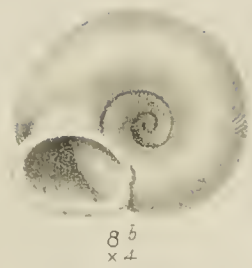
6d

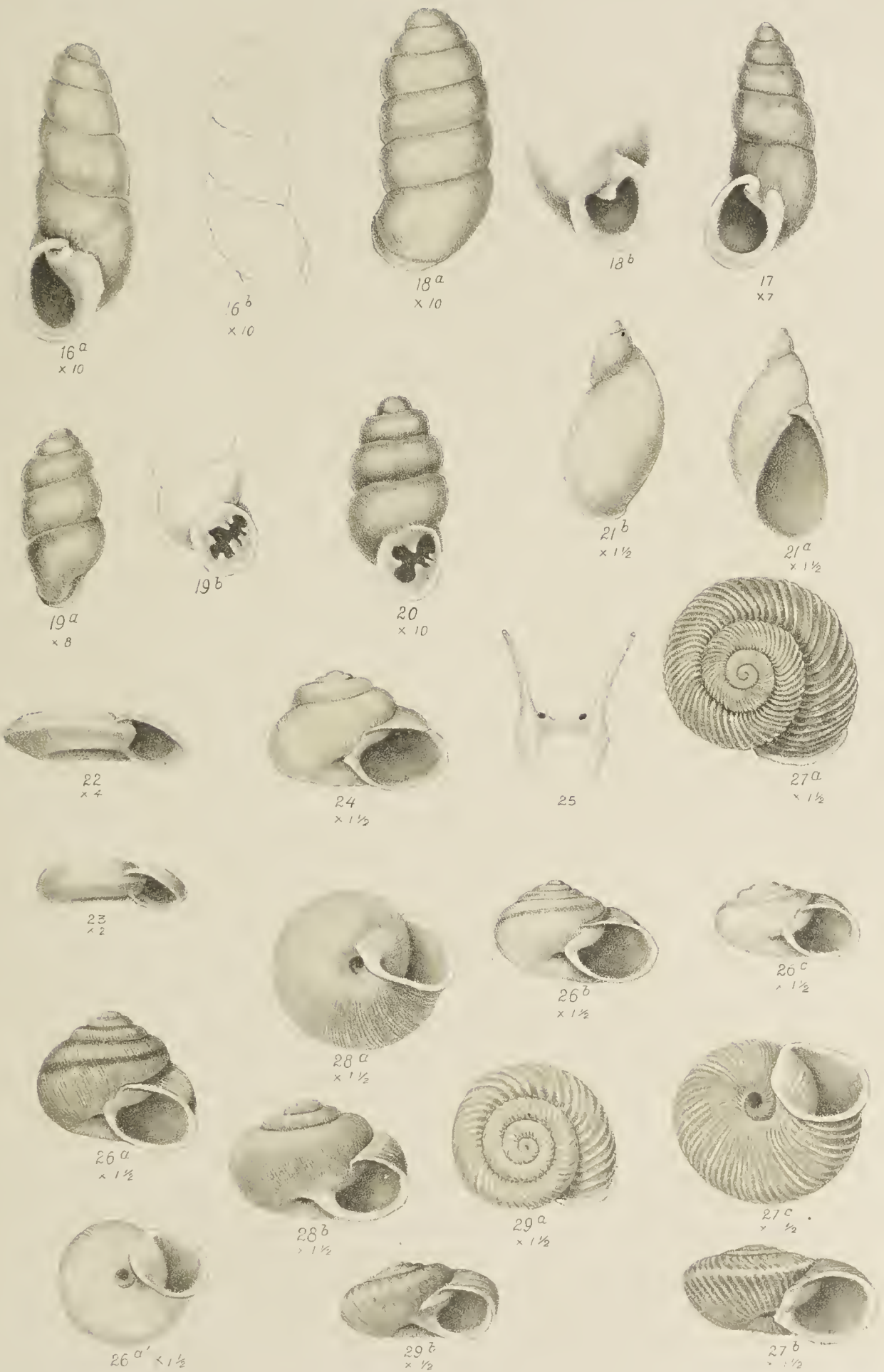


7a x 2



7b
x 2





14.—*Stenogyra interioris*.

a, front view ; *b*, ornament, highly ornamented.

15.—*Pupa contraria*, Smith, dextral form (*P. beltiana*, Tate).

a, *b*, front and back views.

PLATE XIX.

16.—*Pupa ischna*, Tate.

a, *b*, front and back views.

17.—*Pupa contraria*, Smith, sinistral form (*P. eremicola*, Tate).

18.—*Pupa ficulnea*, Tate.

a, back view ; *b*, aperture.

19.—*Pupa larapinta*, Tate.

a, back view ; *b*, aperture.

20.—*Pupa mooreana*, Smith.

a, front view, showing aperture.

21.—*Succinea interioris*, Tate.

a, *b*, front and back views.

22.—*Planorbis gilberti*, Dunker.

Lateral aspect of body-whorl, seen from the front.

23.—*Planorbis fragilis*, Brazier.

Lateral aspect of body-whorl, seen from the front.

24.—*Glyptorhagada clydonigera*, Tate.

25.—*Isidorella newcombi*, forma inflata ; dorsal view of head.

26.—*Thersites adcockiana*, Bednall.

a, *a*¹, lateral and basal aspects of a planulate variety ; *b*, lateral aspect of a corrugated variety ; *c*, lateral view of a subplanulate variety.

27.—*Angasella arcigerens*, Tate.

a, *b*, *c*, dorsal, lateral and ventral aspects.

28.—*Thersites wilpenensis*, Tate. Eyre's Sand-patch, W. Australia.

a, *b*, ventral and lateral aspects.

29.—*Angasella oligopleura*, Tate. Flinders Range, S. Australia.

a, *b*, dorsal and lateral aspects.

APPENDIX.

NOTES ON ANATOMICAL CHARACTERS.

By C. HEDLEY, Assistant in Zoology to the Australian Museum, Sydney.

As Professor Tate has already stated, the specimens upon which he relied for the examination of soft parts unfortunately perished before he was able to investigate them. These notes are therefore based on few species, and are necessarily meagre. The material studied consisted of snails killed for the most part in spirits and collected and forwarded by Professor Spencer. These were specifically determined from shells named and sent by Professor Tate to the Australian Museum. Some interesting results were however yielded by an examination of this small collection. Viewing the fields of anatomy and phylogeny from the standpoint to which Pilsbry's "Guide to the Study of Helices" has lately advanced science, the facts, hereinafter detailed, show that between some Australian snails, whose dentition and shells are much alike, a line of cleavage is indicated by the reproductive system; while the same feature knits together species hitherto sundered by the systematist. From its neighbours the genus *Xanthomelon* is distinguishable by the shortness of the spermatheca stalk, and by a peculiar form of the male organ here interpreted as an invagination of the epiphallus. It is submitted that these characters entitle *Xanthomelon* to full generic recognition.

Another result of these inquiries is a more correct classification of the genus *Microphyura*, hitherto considered a member of the carnivorous group Rhytididæ. From this it is disassociated by a jaw and radula which I was able, but indistinctly, to view. Sketches of these now presented will, to my malacological readers, suggest *Laoma* and *Flammulina* as the next of kin.

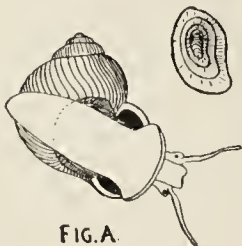
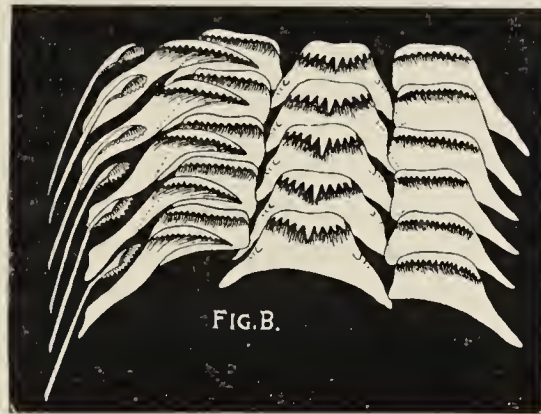


FIG. A.

Bithinia australis, Tryon.

Some specimens dried in mud for more than a year revived promptly on being placed in water. From one of these I sketched the figures of animal, operculum (Fig. A)

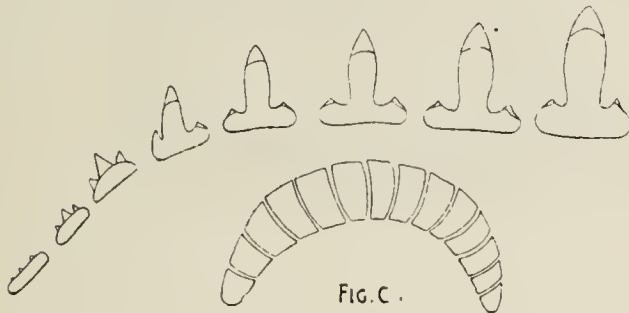
and radula (Fig. B). The penis is distant from the tentacle, and is two-pronged. Except that the operculum seemed corneous instead of



calcareous, the observed features of this species harmonised generically with those of *Bithinia tentaculata*.

Microphyura hemiclausa, Tate.

In a matchbox of small shells and soil from Palm Creek, I detected several examples of *Planispira hemiclausa*, Tate. Most contained the dried remains of the animal. These I soaked in water for a day in the hope that life was not extinct in all, but without success. I then crushed some of the shells and boiled the animals in potash to extract the radula. The minute size of this rendered the task



one of great difficulty, and I failed to distinguish the dentition as clearly as I wished. The jaw (Fig. C) appeared to be composed of numerous separate plates; the odontophore (Fig. C) to contain about seventy transverse rows, each row numbering

about fifteen teeth. The rachidian is tricuspid, a long slender mesocone flanked by two small cusps. This type is repeated in the laterals; the marginals are serrated. As I failed to see plainly the basal plates, I have not drawn them.

I have identified as *M. hemiclausa* a shell collected at Bowen, Queensland, by Mr. A. Simson, who tells me that the species was also taken at Cardwell by Mr. Beddome. The shell characters of this species indicate its position in the genus *Microphyura*, the only previously-described species of which is *M. microphis*, Crosse, inhabiting New Caledonia and the Loyalty Archipelago. Judging from figures the Australian shell bears a strong, if superficial, likeness to the American *Pyramidula lineata*. The genus would seem from its distribution and anatomy to be of high antiquity and of Antarctic origin. It is, perhaps, one of the most primitive of Australian snails.

The structural details now given are not reconcilable with the accepted position of this genus in Rhytididæ, and I apprehend that it should correctly appear in the Endodontidæ, intermediate between *Laoma* and *Flammulina*.

The very short transverse rows of the radula, compared with that of the average Endodontidæ, suggest specific degeneration in size from a larger ancestor. The diminution of the radula having been effected by reducing the number rather than the size of the individual teeth, as the latter process would have rendered it a less serviceable instrument.

Thersites setigera, Tate.

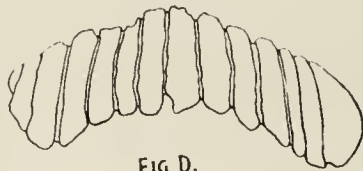


FIG. D.

Several specimens from Palm Creek were dissected. The jaw (Fig. D) is stout, arcuate, with fourteen broad strong ribs denticulating both margins, and separated by very narrow interstices.

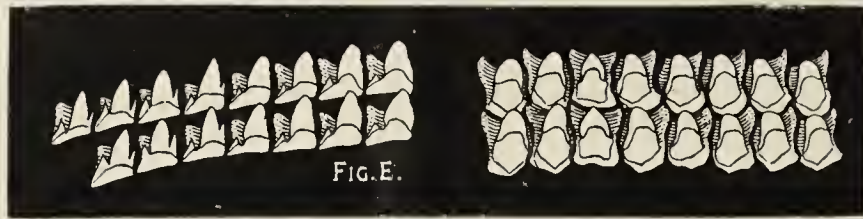


FIG. E.

In the odontophore (Fig. E) were counted 137 transverse rows of 18 : 16 : 1 : 16 : 18. The rachidian is reflected in a stout ovate cusp, the length of the basal plate; laterals a single broad blunt cusp overlapping the basal plate and slightly inclined to the rachidian. In the transition teeth the basal plate shrinks in size, the ectocone first develops, then the mesocone exhibits an emargination which buds into an ectocone cusp. Marginals trifold.

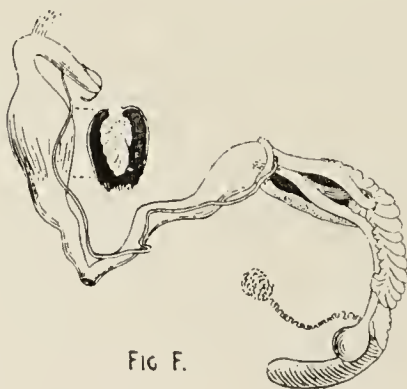


FIG. F.

As regards the reproductive system (Fig. F) the right tentacle is retracted between the branches. The penis sac is clavate, containing a conical papilla, and produced past the retractor muscle into a moderately thick epiphallus half its length; a very small flagellum springs from the latter near the entry of the vast deferens. The prostata at its junction with the vas deferens is twisted round the

conjoined uterus and spermatheca duct in an unusual way. The spermatheca duct, which ends in a globose head, is bent like the letter Z before reaching its destination.

Xanthomelon fodinalis, Tate.

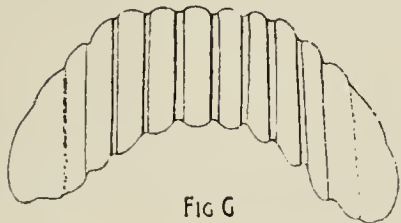
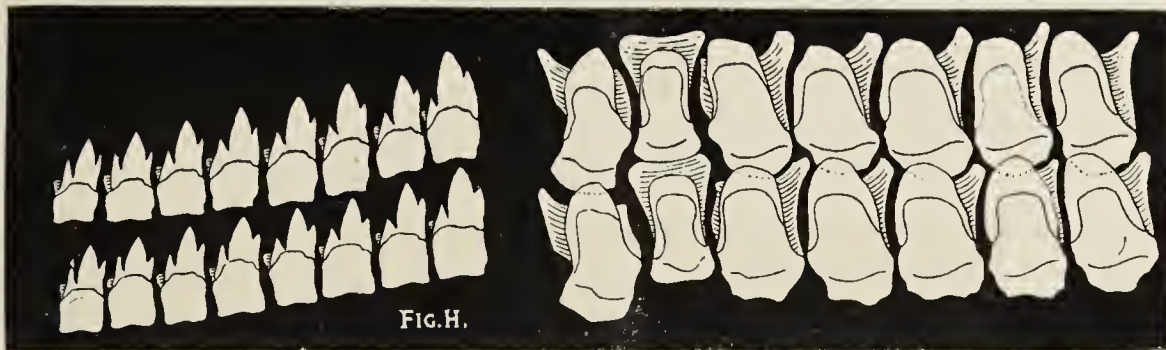


FIG. G.

Two examples from Palm Creek were dissected. The jaw (Fig. G) is crossed by a dozen ribs, well developed in the centre, but evanescent at the sides. These denticulate both margins, and are divided by deep interstices of half their breadth.



The radula (Fig. H) has for formula 140 transverse rows of 36 : 12 : 1 : 12 : 36. Rachidian a single ovate cusp shorter than the basal plate. Rudimentary side cusps appear to be indicated at its base. Laterals longer and stouter. In the transition teeth the ectocones appear two or three rows before the entocones. The marginals show a sharply-pointed ectocone and a blunt longer mesocone united at half its length to the entocone.

In the genitalia (Fig. I.) the right tentacle is retracted between the branches. Spermatheca oval, seated on a very short twisted duct. Vagina short. Vas deferens

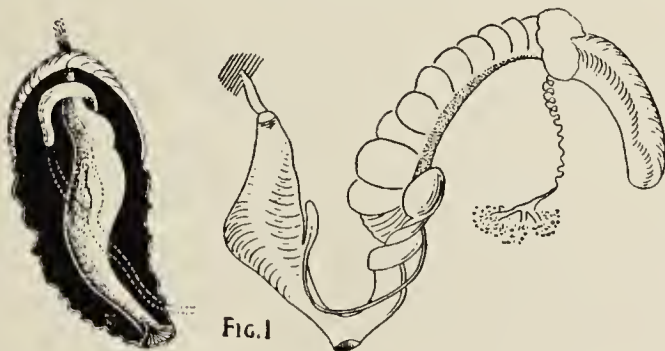


FIG. I.

having ascended the penis for half its length, describes a free loop and then plunges into the wall of the penis sac. On opening the latter the vas deferens is recovered after having tunneled the integument for a quarter of its length. It then takes a half turn round the

retractor muscle and finally enters a tube, which occupies the penis sac, but from which, except at each end, it is free. This I interpret with some hesitation as an invaginated epiphallus, of which the distal end has grown to the atrium wall, and which has drawn after it into the penis sac both the vas deferens and the retractor muscle. No vestige of a flagellum is apparent. On opening the epiphallus, as in *X. adcockiana* (Fig. L.), two fleshy protuberances are seen near the entrance of the vas deferens, thence to the atrium the interior is ridged longitudinally by numerous corrugations.

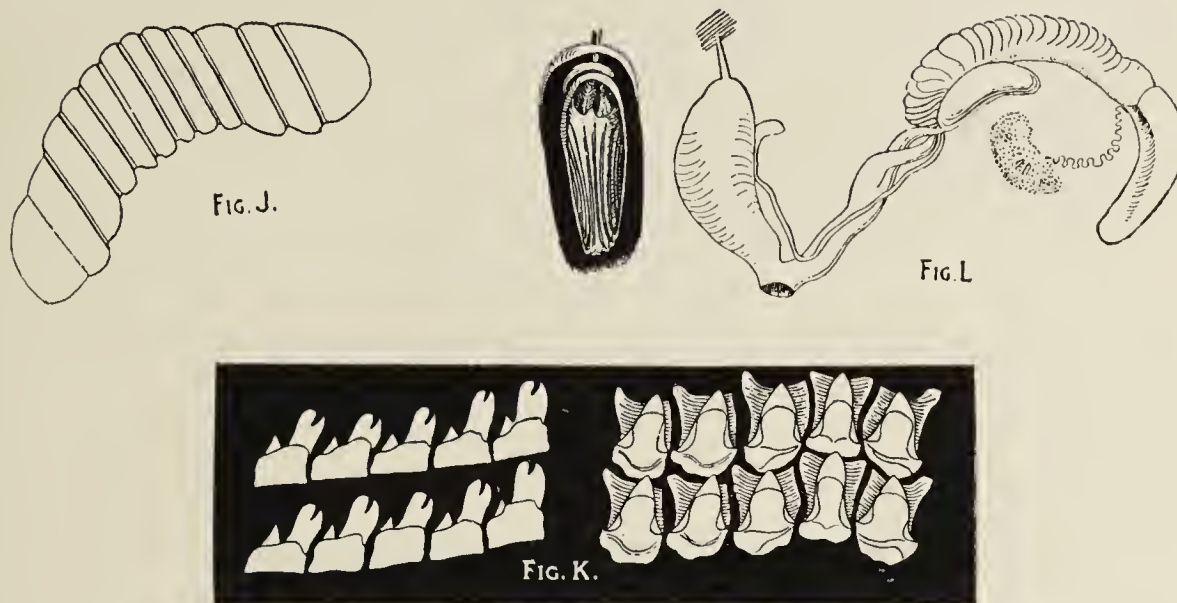
Whether this growth represents a degeneration from the Epiphallagonous type (as I have here assumed) or an evolution of the Haplogonous model (in which case the tube of *Xanthomelon* might be the homologue of the pilaster of *Polygyra*) is a puzzle awaiting further data for solution. With reference to the latter it may be remarked that the penis of *Dorcasia* (Guide to Helices, Frontispiece, Fig. 3), in its lack of epiphallus and flagellum and in its mode of entry of the vas deferens outwardly resembles the arrangement of *Xanthomelon*. To descend to lower levels of classification, the extraordinary character of the supposed introverted epiphallus, correlated with the remarkable and persistent feature of the shortness of the spermatheca duct, gives sufficient warrant for promoting *Xanthomelon* to full generic rank. For, not only does it stand apart from *Thersites* with regard to these points, but it is also thereby distinguished from the supergeneric group of *Thersites* + *Chloritis* + *Planispira* + *Papuina* + *Ganesella*. My examination of *X. pachystyla*, *perinflata*, *adcockiana*, *squamulosa*, *grandituberculata*, and *arcigerens* induces me to unite to the typical members of *Xanthomelon*, catalogued by Pilsbry, Guide to Helices, p. 135, both his "group of *biteniata*," p. 131, and the members of *Angasella* enumerated on p. 114. The attitude of *Xanthomelon* towards *Rhagada* and *Glyptorhagada* is beyond my knowledge.

The territory now inhabited by *Xanthomelon* suggests that it spread from the Western Region, where, with *Liparus*, *Succinea*, *Pupa*, etc., it formed the oldest surviving Australian snail-fauna. If, as seems improbable, it entered this continent, as *Papuina* and *Chloritis* certainly did, by way of Torres Straits, its arrival must have preceded theirs by a long interval of geological time.

***Xanthomelon adcockiana*, Bednall.**

An examination of a single specimen from Palm Creek discovered a jaw (Fig. J) differing little from that of the preceding species.

The radula (Fig. K) has 128 transverse rows of 32 : 11 : 1 : 11 : 32 of essentially the same pattern as *X. fodinalis*.



From that species the genitalia (Fig. L) differed by a more oblong spermatheca and by the higher ascent of the vas deferens on the penis.

Xanthomelon squamulosa, Tate.

In a dissection, imperfect as to the spermatheca and neighbouring parts, received from Professor Tate, the type of penis characteristic of *Xanthomelon* was recognised; the vas deferens entered near the retractor muscle.

Xanthomelon grandituberculata, Tate.

A dissection of the genitalia made and forwarded by Professor Tate showed the characteristic short spermatheca duct of this genus.

Xanthomelon arcigerens, Tate.

I note a particularly short and thick penis (Fig. M) with vas deferens entering near the adductor muscle, in a dissection prepared and sent by Prof. Tate. By shell characters this species is so intimately allied to (*Helix*) *cyrtopleura*, Pfeiffer, the type of Adams' group *Angasella*, that it is here proposed, on the strength of the above anatomical note and illustration, to subordinate *Angasella* to *Xanthomelon*.

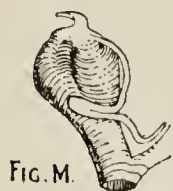


FIG. M.

Liparus spenceri, Tate.

Several drowned specimens from Palm Creek were examined. Jaw (Fig. N) unsymmetrically arched, three times as long as broad, brown, with numerous dark

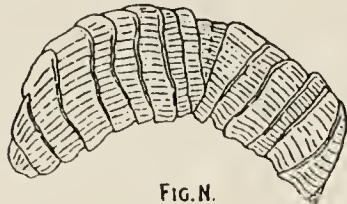
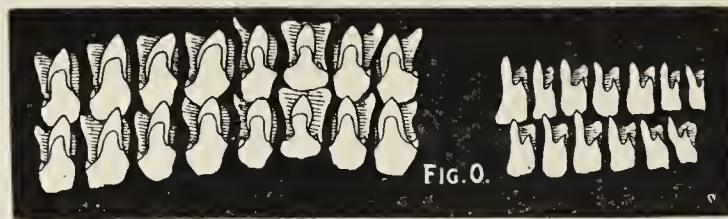


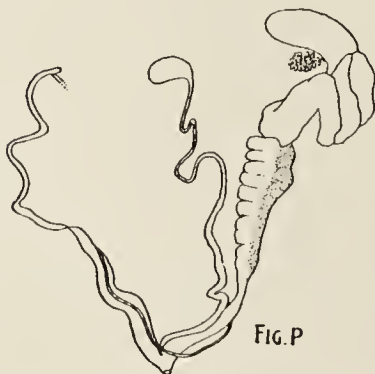
FIG. N.

longitudinal lines arranged as in an agate; translucent, thin, thinnest on the convex, thicker on the concave margin. Folded into nine pleats on the right and seven on the left towards a central triangular area, which does not reach the lower margin, denticulating the lower but not the upper

margin; seen in front the free edge of the fold is nearest the jaw's centre. This jaw is straighter, with fewer pleats than either that of *L. mastersi* (Pro. Roy. Soc. Qland., VI., Pl. XIV.) or that of *L. tasmanicus* (P.L.S. N.S.W., 2, VI., Pl. II., f. 2).



Radula (Fig. O) two-and-a-half times as long as broad; rows nearly straight, crossing the ribbon squarely. Formula 113 rows of 32 : 15 : 1 : 15 : 32. Rachidian base rather longer than broad, slightly expanded anteriorly; reflection tricuspid, consisting of a large ovate mesocone, a little shorter than the basal plate and two minute side cusps, the latter a Buliminoid feature to be expected, but not previously recorded in this genus. Laterals larger, with entocone suppressed; ectocone developed and mesocone broader than the rachidian. Transition teeth decrease rapidly in size, with a slender mesocone less inclined to the rachidian. To the remotest marginals the mesocone dominates the ectocone.



Tentacle retracted to the right, not between the branches of the genitalia (Fig. P). Penis sac without papilla, ridged within, very long, much coiled, and tapering slowly. Vas deferens free beneath, above bound to wall of penis sac. Retractor muscle extremely slight, attached to the membrane enveloping the uterus. Spermatheca oblong, seated on a very long and tortuous duct which follows the convolutions of the uterus. This system agrees with

that of *L. melo* studied by Semper. Reis. im Phil. Band, III., p. 154, Pl. XV., f. 14.

CRUSTACEA.

By *BALDWIN SPENCER, M.A., Professor of Biology, and T. S. HALL, M.A., Assistant Lecturer and Demonstrator of Biology in the Melbourne University.*

(PLATES 20, 21, 22, 23).

INTRODUCTION.

The following account deals with the collection made during the course of the Horn Expedition, and also with other forms secured by one of us during a subsequent visit to Charlotte Waters. We are also indebted to the courtesy of the authorities of the Adelaide Museum for the opportunity of examining the specimens secured during the Elder Expedition, to Professor Tate and Mr. Zietz for specimens from their own collections, and to Mr. P. Squire, of Alice Springs, for the first specimens of *Limnadopsis squirei* which were secured.

The crustacea collected naturally vary to a great extent with the season, and to secure certain forms, such as *Apus* and some of the *Estheriadae*, it is essential to be on the spot shortly after rain has fallen, because even if water does remain in the deeper pools, only particular species remain alive, the others being only represented by empty carapaces.

During the Horn Expedition, which extended over the dry months from May to August, we only obtained living specimens of *Astacopsis bicarinatus*, *Telphusa transversa* and *Estheria packardi*. The remnants of a single indistinguishable carapace of one of the *Apodidae* (abdomen wanting) was found, and dried carapaces of *Estheria lutraria*, *E. dictyon* and of *Limnadopsis squirei*. Immediately after rain *Apus australiensis* is to be found in hundreds in small clay-pans and pools in the creek beds—in fact anywhere where there is water which is clouded with mud particles.

The same is true, except as regards numbers, of the two species of the new genus *Limnadopsis*, and also of *Estheria lutraria*.

In the Macumba Creek, for example, when the muddy flood waters occupied the broad bed *Apus* and the two species of *Limnadopsis* were found; but only ten

days afterwards when the water had subsided and that which remained in the deeper holes had become clear there was not a trace of living ones to be seen.

The rate of growth of the *Apus* and *Estheriadae* must be very great. Certainly not more than two weeks after the fall of rain and probably only a few days numberless specimens of *Apus* measuring in all about $2\frac{1}{2}$ -3 inches in length were swimming about and as not a single one was to be found in the water-pools prior to the rain these must have been developed from the egg. The same is true of the large *Limnadopsis*. It is difficult to understand why on the one hand *Estheria packardi* should persist as long as there remain suitable water-holes, and why on the other hand from the same water-holes its close allies, *Limnadopsis squirei* and *L. tatei*, should so completely disappear.

At Conlon's Lagoon, for example, not far from Alice Springs, one special part of the low land close to the lagoon was studded with the dried-up carapaces of *L. squirei* but not a single one was to be found in the muddy water of the lagoon close by though in this *E. packardi* was swimming about.

Estheria packardi, with its three well-marked varieties, may certainly both in numbers and persistency be regarded as the dominant species. One form, *E. dictyon*, is evidently very local. We only found it once in a dried-up condition in the bed of the Palm Creek and a few spirit specimens (locality uncertain) containing the soft parts were included in the collection of the South Australian Museum.

It is worth noting that every species yielded specimens of both males and females. In the *Estheriadae* the numbers may, roughly speaking, be said to be about equal and amongst fifty-eight specimens of *Apus* six are males. There is no difference in size between the sexes.

All the *Estheriadae* swim with the dorsal surface uppermost and the valves of the carapace open widely enough to admit of free movement of the appendages. *Apus*, on the contrary, as is well known swims with the ventral surface uppermost. Possibly this difference in habit may be attributable in part to the fact that in the former the valves can be rapidly closed so as to cover the softer and more vulnerable parts, whilst such closure is impossible in *Apus*.

Whilst watching *Apus* swimming about, one was seen to come suddenly to the surface struggling violently and on being caught was found to have three water-beetles tearing its soft appendages. These beetles are always darting up and down in search of food and if the *Apus* swam with its ventral surface downwards it would probably more often fall a prey to such voracious enemies.

Most of the pools in the river-beds have very gradually-sloping sandy beds so that the water at the edge is very shallow. In this part the animals are always found floundering about with the carapace uppermost and making their way towards the margin. Here they immediately begin to scoop out a hole in the sand deep enough for the body to lie in and remain there as the water dries up making, apparently, no attempt to get back again into the deeper parts. This may possibly serve as a protection for the eggs which are thus covered by the carapace and preserved from drying up too quickly. With regard to the Decapoda secured *Astacopsis bicarinatus* is fairly common in the more permanent water-holes and evidently grows to a large size. It is much appreciated in common with a species of *Unio* as an article of food by the blacks. Whether it forms burrows and so can exist if the water-pool be dried up for some time is unknown but there is little doubt but that it can do so as this habit is adopted by the same species in other parts of Australia.

In the case of *Telphusa transversa*, the freshwater crab, the banks of certain water-holes are riddled with its burrows; but it is probably more local in distribution than the crayfish as we did not meet with it north of Charlotte Waters and it was especially abundant in one or two water-holes along the Adminga Creek.

It will be seen that so far as their habits are concerned the Crustacea of the central district may be divided into two groups:—

(1). Those which can burrow and so tide over a certain length of dry season (*Astacopsis*, *Telphusa*). Both species included in this group have a very wide distribution over Australia.

(2). Those which require that their eggs shall be dried up prior to development (*Apus*, *Estheria*, *Limnadopsis*, *Limnetis*, *Eulinmadia*). These are naturally well adapted to such a district though none of the genera named are by any means confined to the Eremian region.

The most prevalent species *Estheria packardi* is widely distributed. *Apus australiensis* is known from Victoria, New South Wales and West Australia, whilst the species *Limnadopsis squirei* and *L. tatei* are so far as yet known confined to the central region the range of the former extending from Alice Springs in the north to Oodnadatta in the south.

The following is a list of the forms recorded:—

Sub-order PHYLLOPODA.

Family APODIDÆ.

Apus.

- (1). *Apus australiensis*.

Family LIMNADIADÆ.

Sub-family ESTHERIANÆ.

Estheria.

- (2). *Estheria lutraria*.

- (3). *Estheria dictyon*.

- (4). *Estheria packardi*.

Eulimnadia.

- (5). *Eulimnadia rivolensis*.

Limnadopsis.

- (6). *Limnadopsis squirei*.

- (7). *Limnadopsis tatei*.

- (8). *Limnadopsis brunneus*.

Sub-order MACROURA.

Family ASTACIDÆ.

Astacopsis.

- (9). *Astacopsis bicarinatus*.

Sub-order BRACHYURA.

Family TELPIUSIDÆ.

Telphusa.

- (10). *Telphusa transversa*.

The different species will now be dealt with separately.

Apus.

(1) *Apus australiensis*, Spencer and Hall. (Figs. 1, 2, 3.)

Reference—Spencer and Hall, Victorian Naturalist, April, 1895.

Carapace a short oval. Its length about equal to the length of the portion of the abdomen which is not covered by the carapace, though this is liable to considerable variation.

Proportion of greatest breadth of carapace to its median length, 4 : 3.

Length of carina compared with that of carapace, 2 : 3.

Length from posterior end of carina to posterior angle of carapace, 1 : 2.

Length of carina compared with median length of carapace, 2 : 3.

Carina minutely and irregularly serrated and ending in a spine posteriorly.

Sinus of the carapace with about eighteen minute teeth on each side of the mid-line ; sometimes rudimentary or absent in some parts of the margin.

Posterior outer margin of the carapace with minute serrations which gradually become more minute on passing forward until they disappear at about half the length of the carapace.

Dorsal surface of the carapace sparsely covered with irregularly scattered minute blunt projections.

Number of abdominal segments uncovered about twenty-nine.

Number of abdominal segments not bearing limbs about twelve.

Each limbless segment of the abdomen with about fifteen sub-equal, short, conical spines, arranged in a single row with numerous smaller ones irregularly scattered over the under surface.

The exposed limb-bearing segments with spines on the upper surface and sides, becoming obsolete in the anterior segments.

Telson a little less than twice as long as broad.

Upper surface of telson with three or four median spines ; a spinous posterior border and sides and two or three spines forming a group on each side anteriorly.

Lower surface of telson minutely spinulose, with a median and two lateral depressions, free or nearly free from spines.

Caudal appendages considerably longer than the median length of the carapace.

Second antennæ absent.

The fifth endite of the first thoracic appendage varying much in length. It may reach as far back as the fifteenth exposed abdominal segment, or it may reach only to the posterior end of the carina.

No difference in size or proportions between the males and females.

Colour. - The carapace is light yellow, with dark brown along the carina and the margin; the transverse ridge behind the eye is outlined in brown. The eyes are dark, with a red margin. The tail is light yellow, with at times a greenish tinge, and the spines stand out as dark brown, with a small circle of yellow-brown around their bases. When alive the gill-plates are prominent, owing to the presence of red blood in them. In spirit the carapace darkens somewhat.

Total length of the largest male, from the anterior margin of the carapace to the end of the telson, 70 mm.

Total length of the largest female, 64 mm.

Out of a total of fifty-eight individuals, six are males, fifty-two females.

This is the only species of *Apus* as yet described from Australia. We are indebted to Mr. J. J. Fletcher for calling our attention to two brief notices which have already been published indicating that specimens belonging to this genus have previously been observed though not described.

Mr. Sangster* mentioned that one was to be found in water-pools after rain in Central Australia. This is in all likelihood the one which we describe, though, as Mr. Sangster has given no description, we are unable to state definitely what species he found.

Mr. Tryon† notes that Dr. Bancroft brought back a specimen from Wompah, in the south-west corner of Queensland, but as the specimen is not named or described, we are unable again to say whether ours is or is not identical with the Central Australian form.

* We are indebted to Mr. Fletcher for a copy of this paper, published in the *Am. Naturalist*, xviii., 1884, p. 9.

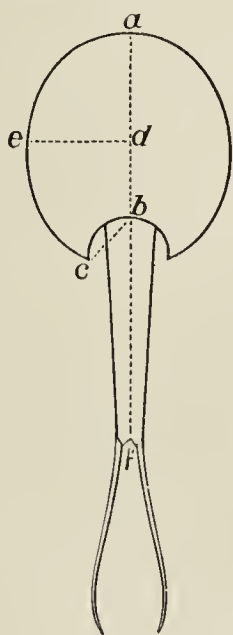
† *Nat. Hist. Soc. Queensland*, vol. i., p. 64.

Judging, however, from the fact that an investigation of Australian specimens of the allied genus *Lepidurus* procured from New South Wales, Victoria, South Australia, Tasmania and New Zealand has revealed the fact that they are all referable to the single species *Lepidurus viridis* and that specimens of *Apus* from Central Australia, South Australia, New South Wales, Victoria and West Australia are all referable to the single species *Apus australiensis* it is most probable that this may be safely regarded as the only Australian species of the genus. Further than this, we venture to think, after the examination of a large collection of *Lepidurus* hitherto referred to some four species and after seeing the great variations existing amongst the members of these, that an examination of the species of both the genera from various parts of the world would result in materially reducing the number of species.

For the present, and partly in consequence of its geographical isolation, we have thought it advisable to distinguish the Australian *Apus* specifically.

Distribution.—Cooper's Creek and Farina (S. A. Museum), Upper Onkaringa Creek (Elder Expedition), Whyehogga Lake, Darling River (Nat. Museum, Melbourne), Hunter River, Macquarie River, and Mossgiel, N.S.W. (Aust. Museum, Sydney); Gunbower Island, Murray River, and Kewell, Victoria (J. A. Kershaw, Esq.); Adminga and Stevenson Creeks, Charlotte Waters and Alice Springs, Central Australia; Coolgardie, West Australia (C. French, Esq.); Hannan, West Australia (H. Berry, Esq.).

The variations in dimensions are of considerable extent. Those of four male specimens and eleven females are as follows, the length from the anterior edge of the carapace to the posterior end of the carina being taken as the standard:—



MALES.

—		(1)	(2)	(3)	(4)
Length	$a - b$ -	100	100	100	100
	$b - c$ -	33	31	30	32
	$d - c$ -	65	65	60	63
	$b - f$ -	147	116	88	136

FEMALES.

—	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Length <i>a-b</i> -	100	100	100	100	100	100	100	100	100	100	100
<i>b-c</i> -	30	31	31	41	35	37	29	37·8	30	27	29
<i>d-e</i> -	63	62	62	64	62	63	57	63	64	67	64
<i>b-f</i> -	70	67	100	119	108	107	95	103	117	119	97

It will be noticed that male specimens are not relatively infrequent, though their number is considerably less than that of the females. Miss Lambert, B.Sc., of the Melbourne University, has been kind enough to carefully examine, by means of serial sections, the reproductive organs of *Lepidurus* and *Apus*, but there is no trace of any development of sperm in the ovaries indicating the possible existence of hermaphroditism such as has occasionally been noticed in *Apus*.*

It will also be noticed that, whereas *Apus* is extremely common at certain times in the central district, *Lepidurus* was not found there; on the other hand, in the more coastal districts, it is *Lepidurus* which is common and *Apus* but rarely met with.

Estheria.

(2) *E. lutraria*, Brady. (Figs. 4, 5.)

Reference—Proc. Zool. Soc., 1886, p. 85, Fig. B.

Brady's description is as follows:—"Valves oblong, compressed, membranous; beak near the anterior extremity, lines of growth about twelve; seen laterally, the dorsal line is quite straight, ventral convex, anterior extremity broadly-rounded, posterior narrowed and somewhat oblique; seen from above it is much compressed behind the middle and sharply pointed at the extremity; broadly rounded in front. Colour yellowish-brown. Length $\frac{7}{16}$ of an inch; height $\frac{4}{16}$."

Dr. Brady further remarks that he had but a single specimen of the species—a dried empty shell which Professor R. Tate sent him from Innaminka, Cooper's Creek. We have therefore described the species more in detail than it was possible for Mr. Brady to do.

* Cf., H. M. Bernard, The Apodidae, p. 308.

MEASUREMENTS OF AN AVERAGE SPECIMEN.

	Length.	Height.	Thickness.
Male ...	13.5 mm.	8 mm.	6 mm.
Female ...	12 ,,	7 ,,	5 ,,

Colour in spirits a rich brown.

Lines of growth ridge-like, from about twelve to sixteen in number. Setae and spines absent. Sculpture between lines of growth irregularly reticulate.

Head.—Cervical region rounded. Upper (posterior) part of frontal region projecting as a horizontal flat shelf, from the outer margin of which the frontal line is continued vertically downwards. Eyes confluent, situated on a very slight elevation. Frontal region curving downwards and backwards into the rostrum, which is blunt and broad in the male, while in the female it is still blunter and shorter. First antennae in the male reaching about half the length of the flagellum of the second antennae, and slightly shorter in the female. Second antennae with about thirteen joints in each of the distal divisions. Inner surface of the proximal portion as in *E. packardi*. Number of appendages twenty-seven in both sexes.

The labrum and appendages generally are practically identical with those of *E. packardi*.

Telson with dorsal edge armed with a very small number (three or four) of short stout spines.

The collection comprised seventeen specimens, nine being females and eight males, in addition to a few empty carapaces.

Locality.—Valley of Stevenson River, Central Australia, in a clay-pan.

We also received three examples from Professor R. Tate, from the head of the Anna Creek.

So far as is yet known, this species is peculiar to the Eremian region.

The general form of the carapace approaches that of *E. compleximanus* from Kansas, as figured by Packard.* The two species, however, differ in many points, the dissimilarity in the telsons being one of the most striking.

* Phyllopods of North America. Twelfth Annual Report of U.S. Geol. and Geog. Survey. Part I. 1883. p. 305.

(3) *Estheria dictyon*, sp. n. (Figs. 6, 7, 8.)

Carapace moderately tumid, seen from side ovoid, beaks prominent. Dorsal margin behind umbones straight, anteriorly to umbones curving downwards to meet the almost straight ventral margin, then curving obliquely upwards to the dorsal margin. Lines of growth about nine in number, not crowded at the margin, strongly marked, of a light colour, and provided with short, stout setæ. Interspaces of lines of growth marked with strong raised white lines, arranged so as to enclose roughly hexagonal spaces.

The head differs slightly from that of *E. packardi*, in that its upper edge projects at right angles to the cervical segment, instead of sending a lingual projection upwards to overlap it. The two eyes are not confluent, and can be clearly distinguished from one another, being separated by a narrow line which completely isolates them from one another. The antennules have about seventeen small projections on the anterior border. Antennæ with about twelve to fourteen joints. The legs are about twenty-five in number. Telson with about eight to eleven spines of varying size on the dorsal margin. The spines on the inner distal face of the caudal appendages are very minute. In other respects the species agrees closely with *E. packardi*.

Locality.—A large number of dried specimens of the species were obtained during the Expedition at the Palm Creek in the James Range.

About a dozen spirit specimens, all females, were received from the Adelaide Museum, and labelled South Australia.

(4) *Estheria packardi*, Brady. (Figs. 9, 10, 11, 12, 13, 14.)

Reference—Brady, Proc. Zool. Soc. London, 1886, p. 85, Fig. C.

Sars, Archiv for Mathematik og Naturvidenskab, B. XVII., Nr. 2, pp. (of reprint) 28-35, Pls. 4, 5.

Brady's definition and figure of the species leave much to be desired, but Professor G. O. Sars has described the general structure of the typical variety with great minuteness and accuracy. For the loan of a copy of his paper we are indebted to Mr. J. Whitelegge, of the Australian Museum, Sydney.

Specific characters.—We extract the following from Professor Sars' description:—"Shell rather tumid and, seen from the side, of oval or elliptic form, with the umbones well defined and occurring much nearer the anterior than the

posterior extremity, dorsal margin almost straight in the middle, ventral gently curved, anterior extremity short and broad, blunted at the tip, posterior extremity somewhat produced and narrowly rounded at the tip." Seen from above, the anterior is bluntly and the posterior narrowly pointed. "Valves with numerous very distinct and somewhat elevated lines of growth." On these, setæ are usually present in spirit-preserved specimens, and in some varieties are extremely numerous. The colour of the carapace varies from light yellow to dark brown. Length of adult (male and female) varies from 4 mm. to 9 mm.

Locality.—Common in water-holes along the Finke and its tributaries, also in the Macumba and Stevenson Rivers.

We have found it convenient to separate the species into three varieties, the extreme forms of which are clearly distinct from one another, but the occurrence of intermediate forms renders it impossible to place them in separate species. For the purpose of distinguishing the varieties we have taken the form of the carapace, its size and sculpturing, the number of lines of growth, and to a lesser extent the form of the telson.

E. packardi, var. *typica*.

Measurements of an average-sized specimen—Length of carapace 7.2 mm., height 5 mm., thickness through both valves 3 mm. Some specimens reach the length of 9 mm. Lines of growth about 24, well marked. Setæ usually present on the lines of growth, but sometimes absent. Sars says none are present. The interspaces between the lines of growth are marked with raised lines which are vermiculate in the umbonal region. Towards the outer margin they gradually become more definitely arranged in a radiate manner as well defined straight lines with their inner ends branching and anastomosing.

The carapace is more compressed than in the two succeeding varieties, and its colour in spirit is chestnut-brown with a broad, light band round the margin.

The spines on the dorsal edge of the telson are numerous and fairly equal in size and shape.

E. packardi, var. *cancellata*.

Carapace very tumid.

Measurements of average-sized specimen :—Length, 8 mm. ; height, 6 mm. ; thickness, 4 mm.

Lines of growth, 30–50, crowded towards the margin. Setæ rarely present except round the outer margin. The sculpturing of the umbonal portions of the shell resembles that of var. *typica*. Towards the margin, owing to the crowding of the lines of growth and the strong development of the radial lines, which are unbranched in this region, the ornament becomes cancellated. The lines of growth have minute rounded prominences at the junction of the radiating lines with them, and thus have a moniliform appearance. The strongly-marked cancellation is a very characteristic feature of the variety.

The dorsal spines on the telson are fewer in number than in var. *typica*, and very irregular in shape and size.

Colour reddish-brown, darker than var. *typica*.

E. packardi, var. *minor*.

Carapace tumid.

Measurements of average specimen:—Length, 4 mm.; height, 2·7 mm.; thickness, 2 mm.

Lines of growth about thirty. Numerous long white setæ on all the lines of growth. Sculpture much as in var. *cancellata*, but the deep cancellated ornament not so marked, and the moniliform ornament absent.

Telson and colour of carapace as in var. *typica*.

Eulimnadia.

(5) *Eulimnadia rivolensis*, Brady.

Reference—Brady, Proc. Zool. Soc. London, 1886, p. 82.

The first specimens of this were sent to Mr. Brady by Professor Tate, who obtained them from Rivoli Bay, South Australia.

Two specimens were secured by the Elder Expedition.

Localities.—Rivoli Bay (South Australia), Upper Onkaringa Creek (Central Australia).

Limnadopsis, gen. nov.

Carapace ovate, compressed, narrower in the male than in the female, transparent in life, in dried specimens translucent; very thin and parchment-like; the

union between the two halves of the carapace extending along the whole length of the dorsal line, which is raised into a much-compressed spined keel. Lines of growth ten to fifteen clearly-marked, thread-like ridges; the intervals between the more recent lines of growth continued on the dorsal keel into backwardly-directed spines, the posterior edges of which are formed by the lines of growth. Spines decreasing in size from behind forwards. Beaks well marked. First pair of antennæ much smaller than the second. Number of feet, twenty-six to thirty-two pairs. Haft-organ present.

This genus may be distinguished from *Estheria* by the presence of a haft-organ; from *Limnadia* and *Eulimnadia* by the spinous processes on the dorsal edge of the carapace, by the different number of lines of growth and of pairs of feet; from *Limnadella* by the difference in size of the two pairs of antennæ.

(6) *Limnadopsis squirei*, sp. n. (Figs. 15, 16, 17, 18, 19).

Carapace ovate, much compressed. Dorsal margin marked off from the anterior margin by a distinct angle, and from the posterior margin by a prominent spine, into which the latter is continued. Dorsal margin from anterior angle to umbo straight, sloping upwards and backwards; from the umbo it rises more or less abruptly, then falling gradually towards the posterior and usually rising slightly near its termination. A varying number (one to twelve) of backwardly-directed serrations correspond to the intervals between the lines of growth. Anterior, inferior and posterior margins forming a fairly regular ellipsoidal curve. Lines of growth forming thin, ridge-like elevations, eleven to fifteen in number. Interspaces between the lines of growth very minutely punctate, the punctations being only visible with a power as high as a Zeiss A.

SIZE OF SPIRIT SPECIMENS.

	Male.	Empty shell.	Female with ova.
Length	23.5 mm.	27 mm.	22.5 mm.
Height	16 „	20 „	16 „
Thickness through both valves	4 „	5 „	5 „

The whole body of the animal is contained within the carapace, to which the animal is attached in the region of the umbones and by the adductor muscles.

Head bluntly rounded. Haft-organ present; eye more conspicuously stalked in male than in female; rostrum shorter and blunter in female than in the male,

scarcely defined in the female from the frontal region, but in the male forming a well-marked angle with it. Legs thirty-two pairs in both sexes. Telson about equal in length to the seven preceding segments of the abdomen, and with very many anal denticles.

The shell-gland is clearly visible, takes its origin at the place where the adductor muscle joins the inner face of the valve and reaches backwards and downwards to about half the distance between the dorsal and ventral margins of the carapace.

The part of the body in front of the umbonal region is abruptly deflexed, the dorsal line running vertically downwards for about 3.5 mm., forming the so-called cervical segment. From the latter the head is sharply marked off. The head is very different in the two sexes. In the female, seen from the side, the dorsal margin is bent at an acute angle, which is occupied by the eye. The lower edge is directly continuous backwards with that of the rostrum, which is small in the female. The haft-organ is situated midway along the upper edge, and is pear-shaped, being attached by its smaller end. The division between the two eyes is just visible. In the male the head is not so massive as in the female; rostrum bent at right angles to the lower surface of the head, and very prominent. The projection bearing the eyes is more clearly marked off from the head than in the female.

First antennæ much smaller in the female than in the male, and in both sexes very irregularly jointed. In the female they are as long as the proximal undivided part of the second antennæ. Lower edge of antennule straight, upper edge pectinate, with sixteen small, blunt, rounded projections. In the male the antennule reaches some distance beyond the level of the proximal undivided part of the second antennæ, the pectinate projections being more prominent than in the female.

The second antennæ consist each of a proximal and a distal portion. The former is unjointed, and is pectinated on its upper edge, the projections being about eleven in number. These projections correspond to transverse lines on the inner face of the basal portion, which divide the inner face into a series of segments. A few plumose setæ arise from the denticles. The distal portion consists of two rami, the upper being slightly shorter than the lower. Each ramus is divided into a series of joints, which may be as many as eighteen in number in the lower. Each joint bears on its upper surface a number of short, stout setæ, and on its under surface a larger number of long plumose setæ. Labrum running backwards and upwards, ending bluntly and bearing just before its termination a small setose projection.

Mandibles seen from the side pyriform, with the pointed end uppermost, covered with light brown chitin, which at the inner lower end bears one or more blunt tooth-like processes, those of opposite sides biting one against the other; maxillæ ribbon-shaped.

Legs thirty-two pairs in number, increasing in size from before backwards to about the fifth pair. At about the sixteenth pair they begin to gradually diminish, till at the posterior end of the body they are extremely small. In the female the proximal lobe of the exopodite of the ninth and tenth pairs is extended into a thread-like appendage, to which the egg-masses are attached. In the male the first and second pairs of legs are modified to form grasping organs. The fourth and fifth endites form the pincer-like organ, the fourth being shortly rounded and bearing numerous short, stiff setæ at its distal end. The fifth forms a curved claw movable upon the fourth, and bearing a short, stiff process at its distal end. The fourth bears on its inner face a small lobe, which is setose at its extremity. Inside the fifth is a longer lobe, also setose at its extremity. This lobe is much longer in the first than in the second leg. The remaining appendages, except the ninth and tenth, are similar to those of the female.

The telson is equal in length to about the seven preceding abdominal segments. The spinous plate processes of the dorsal edge of the telson bear each about fifty spines, which increase in length posteriorly to the terminal spine. At about a quarter of the length from the anterior end a pair of long caudal setæ are given off, which are divided at about half their length by a transverse joint, the distal half being plumose. The caudal appendages are long and slender, and are clothed at their inner proximal end by a large number of plumose setæ, the distal dorsal edge being finely-toothed.

Localities.—Alice Springs and country between Oodnadatta and Charlotte Waters, in muddy water of clay-pans and flooded creeks. None were found in the same water on the return journey, when the floods had subsided and the water was clear. We are indebted to Mr. P. Squire for the first carapaces secured.

Six spirit specimens were obtained, three male and three female, together with over one hundred dried carapaces.

(7) *Limnadopsis tatei*, sp. nov. (Figs. 20, 21, 22, 23, 24, 25, 26, 27.)

Carapace oblong rounded, much compressed. Dorsal margin variable, generally straight, but at times slightly convexly curved, much as in *L. squirei*

Anterior margin varies from nearly straight to convex, posterior margin more distinctly convex than in *L. squirei*; ventral margin fairly uniformly rounded. Lines of growth ten to thirteen in number. Backwardly-directed spines of similar structure to those of *L. squirei*, and from about two to thirteen in number. Punctations on carapace much coarser than in the preceding species, but still not discernible with an ordinary hand lens.

SIZE OF SPIRIT SPECIMENS.

	Male.	Male.	Female with ova.
Length of carapace	13.5 mm.	13.5 mm.	13 mm.
Height	7.2 „	8.7 „	8 „
Thickness through both valves	3 „	3 „	3 „

Body attached to carapace as in *L. squirei*.

Head in both sexes shaped like that of the female of *L. squirei*, and showing no difference in the two sexes excepting in the rostrum. This in the male is similar in form and proportions to that of *L. squirei*, while in the female it is shorter than in the male, but is also bent at an angle to the front line of the head.

First antennæ in the male reaching as far as the distal end of the proximal portion of the second antennæ. Those of the female are slightly shorter. The projections are more strongly marked in the male than in the female.

Second antennæ on the same plan as in *L. squirei*, with the following differences. The basal part has about nine spines instead of eleven. The lower division of the flagellum has about fifteen joints and the upper about fourteen.

The setose projection of the labrum is proportionately longer than in *L. squirei*.

Legs twenty-six pairs in number and similar to those of *L. squirei*.

The telson is about equal in length to the seven preceding abdominal segments. There are about ten to fifteen spines on the dorsal edges, varying irregularly in size. Caudal setæ and caudal appendages as in the preceding species, the spines on the latter, however, being more strongly marked. The telson can be readily distinguished from that of *L. squirei* by its much smaller number of spines on the dorsal edge, by its greater curvature, and by the presence of a pair of very large backwardly-curving spines which greatly modify the general outline of the dorsal edge.

Locality.—Between Oodnadatta and Charlotte Waters, associated with *L. squirei*. Eight spirit specimens, seven male and one female with ova. At Conlon's Lagoon, near Alice Springs, where numerous dried carapaces of *L. squirei* were found, none of *L. tatei* were to be seen.

We have much pleasure in associating with this species the name of Professor Tate, the colleague of one of us during the Expedition, and to whom we are also much indebted for his kindly placing at our disposal named specimens of various *Estheriadæ*.

(8) *Limnadopsis brunneus*, sp. nov. (Figs. 28, 29).

Carapace in general form resembling that of *L. tatei*, with the difference that the dorsal spines are not so strongly developed; the umbones are slightly more prominent and the shell is more compressed. The lines of growth are from 30-34 in number, prominent and standing out as whitish lines. The colour of the dried carapace is very striking, being of a rich brown, excepting for a broad band of lighter colour extending round the margin, excepting in the region of the umbo. The carapace looks exactly as if it were formed of tortoise-shell, whereas that of *L. squirei* and of *L. tatei* are pale horny. Whole surface minutely and irregularly pustulate.

Measurements of average specimen :—Length, 10 mm. ; height, 6 mm. ; thickness, 1.5 mm.

Locality.—Four dried specimens from Knuckey's Lagoon, near Port Darwin, Northern Territory. We are indebted to Professor R. Tate for the specimens.

SYNOPSIS OF SPECIES.

Length over 20 mm. ; legs 32 pairs. Telson with dorsal spines numerous and about equal in size. Carapace very minutely pitted	...	...	...	...	...	...	...	...	<i>squirei</i> .
Length less than 15 mm. Legs 26 pairs. Telson with dorsal spines few and very irregular in size. Carapace rather coarsely pitted	...	...	...	...	...	...	...	...	<i>tatei</i> .
Dorsal spines regular but very small. Carapace pustulate.	...	...	...	...	...	...	...	...	<i>brunneus</i> .

(9) *Limnetis eremia*, sp. nov. (Figs. 30, 31, 32.)

Carapace globose; umbones indistinct, near anterior; dorsal edge very slightly convex. Surface of carapace very finely reticulate, the interspaces being very shallow. No lines of growth. Translucent. Spirit specimens pale horny.

MEASUREMENTS OF AVERAGE EXAMPLES.

	Length.	Height.	Thickness.
Male	- 5 mm.	... 4 mm.	... 3.5 mm.
Female	- 5.5 „	... 4.5 „	... 4 „

Head resembles that of *L. macleayana* (King) in general appearance and structure, but is clearly separable from that species and from *L. tatei* (Brady) by the shape of the rostrum. Seen from the front it is more constricted in the middle than in either of the former species, and as in them the termination is rounded in the female and truncate in the male. The eyes are distinctly separate from one another, and below and in front of each is a small finely setose patch. Owing to the truncation of the rostrum in the male there is no sharp angle formed between the inner surface of the rostrum and the lower surface of the labrum.

The second antennæ have from twenty-four to twenty-seven joints in the distal portion, each joint being provided with a long plumose seta.

The female has twelve pairs of feet, but owing to the poor state of preservation of the specimens it was found impossible to count them in the males. The first leg in the male has the movable claw sharply bent at right angles at about half its length. This claw bites against a rounded pad of very much larger size than that described by Sars in *L. macleayana* and *L. tatei*. The other appendages resemble those of the above species as described by Sars.

Locality.—Cooper's Creek (S.A. Museum).

Astacopsis.(10) *Astacopsis bicarinatus*, Gray.

The specimens differ from the form found near Melbourne in one or two particulars, but not sufficiently, apparently, to make the definition of a new species advisable. The rostrum, viewed from above, has a convex outer border, whereas the Victorian form usually has the sides of the rostrum straight. A series of twenty-six specimens from Melbourne afforded one example which exhibited a

small degree of convexity, though not as pronounced as in the Running Waters example. The usual small spine on each side of the rostrum near its distal end is absent. The chelæ are broader in proportion to their length than in the typical form, and the claws are stouter and stronger. Taking the greatest length of the propodite as 100, the average measurements of the Running Waters specimens, as compared with those of a series of twelve taken from the Melbourne University pond, are as follows :—

	Length of dacty- lopodite.	Length of pro- podite.	Breadth of propodite.
Running Waters specimen -	- 47 ...	100 ...	44
Melbourne specimen -	- 44 ...	100 ...	35·2

The tubercles on the inner edge of the propodite are only nine or ten instead of about fourteen, and those on the upper edge of the meropodite are somewhat smaller than in the southern form. The outer antennæ are only three-quarters of the usual length.

In all other respects the specimen agrees exactly with the description and figure as given by Prof. Sir F. McCoy in his Prodrômus of the Zoology of Victoria.

Locality.—One spirit-specimen was brought from Running Waters and two dried chelæ from Hermannsburg. It occurs frequently in water-holes along the Finke, Macumba and Stevenson Rivers, etc.

Telphusa.

(11) *Telephusa transversa*, von Martens.

Reference—E. von Martens, Monatsber. Akad. Wiss. Berlin, 1868, p. 609. Haswell Catalogue of the Australian Stalk and Sessile-eyed Crustacea. Aust. Mus. Sydney, 1882, p. 85.

This was found in considerable numbers forming burrows in the muddy banks of water-holes. As the latter were rapidly drying up, the animal in all likelihood is able to retain moisture enough in its burrow to enable it to withstand a considerable period of drought. It was never met with in the more sandy creeks, but only in the water-holes, the sides of which, during the dry season, form a hard clayey material. The carapace of a large male measures 48 mm. in breadth and 36·5 mm. in length; that of a large female measures 44·5 mm. in breadth and 33 mm. in length.

Distribution.—Water-holes along the Adminga and Stevenson Creeks and Charlotte Waters (Central Australia), Cape York (Dämels), Thursday Island (Haswell).

DESCRIPTION OF PLATES.

PLATE XX.

- Fig. 1.—*Apus australiensis*. Dorsal view. $\times 1$.
 „ 2.—*Apus australiensis*. Dorsal view of posterior end of abdomen, telson, and proximal end of caudal appendages. $\times 3$.
 „ 3.—*Apus australiensis*. Antennæ, labrum and mandibles seen from below. $\times 2$.
 „ 4.—*Estheria lutraria*. Portion of carapace highly magnified to show the sculpturing.
 „ 5.—*Estheria lutraria*. Telson. Highly magnified. Drawn under the camera lucida.
 „ 6.—*Estheria dictyon*. Dorsal and lateral view of carapace. $\times 6$. Drawn under the camera lucida.
 „ 7.—*Estheria dictyon*. Portion of carapace highly magnified to show the sculpturing.
 „ 8.—*Estheria dictyon*. Telson. Highly magnified. Drawn under the camera lucida.

PLATE XXI.

- Fig. 9.—*Estheria packardi*, var. *typica*. Dorsal and lateral view of carapace. Much enlarged, the natural size is indicated by the cross lines.
 „ 10.—*Estheria packardi*, var. *typica*. Portion of carapace highly magnified to show the sculpturing.
 „ 11.—*Estheria packardi*, var. *cancellata*. Dorsal and lateral view of carapace. Much enlarged, the natural size is indicated by the cross lines.
 „ 12.—*Estheria packardi*, var. *cancellata*. Portion of carapace highly magnified to show the sculpturing.

- Fig. 13.—*Estheria packardi*, var. *minor*. Dorsal and lateral view of carapace. Much enlarged, the natural size is indicated by the cross lines.
- „ 14.—*Estheria packardi*, var. *minor*. Portion of carapace highly magnified to show the sculpturing.
- „ 15.—*Limnadopsis squirei*. Lateral view of two carapaces. $\times 1\frac{1}{2}$.
- „ 15a.—*Limnadopsis brunneus*. Portion of dorsal margin of carapace, highly magnified, drawn under the camera lucida.

PLATE XXII.

- Fig. 16.—*Limnadopsis squirei*. Portion of the carapace highly magnified to show the sculpturing.
- „ 17.—*Limnadopsis squirei*. ♂. Side view of head region. Highly magnified; drawn under the camera lucida.
- „ 18.—*Limnadopsis squirei*. ♀. Side view of head region. Highly magnified; drawn under the camera lucida.
- „ 19.—*Limnadopsis squirei*. ♀. Telson. Highly magnified; drawn under the camera lucida.
- „ 20-22.—*Limnadopsis tatei*. Much enlarged drawings of the carapace, the natural size of which is represented by the cross lines.
- „ 23.—*Limnadopsis tatei*. Portion of the carapace highly magnified to show the sculpturing.

PLATE XXIII.

- Fig. 24.—*Limnadopsis tatei*. ♀. Side view of head region. Highly magnified; drawn under the camera lucida.
- „ 25.—*Limnadopsis tatei*. ♂. Side view of head region. Highly magnified; drawn under the camera lucida.
- „ 26.—*Limnadopsis tatei*. ♂. Telson. Highly magnified; drawn under the camera lucida.
- „ 27.—*Limnadopsis tatei*. ♀. Telson. Highly magnified; drawn under the camera lucida.
- „ 28.—*Limnadopsis brunneus*. Dorsal and side view of carapace. Much enlarged; the natural size is indicated by the cross lines.

- Fig. 29.—*Limnadopsis brunneus*. Portion of the carapace highly magnified to show the sculpturing.
- „ 30.—*Limnetis eremia*. Dorsal and side view of carapace. Much enlarged; the natural size is indicated by the cross lines.
- „ 31.—*Limnetis eremia*. ♂. Front view of head. Highly magnified; drawn under the camera lucida.
- „ 32.—*Limnetis eremia*. ♀. Front view of head. Highly magnified; drawn under the camera lucida.
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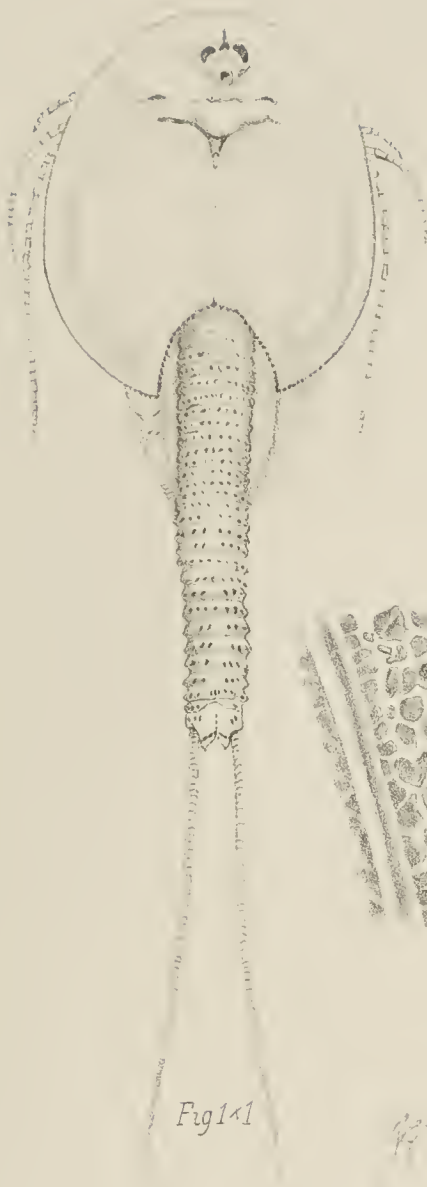


Fig 1 x 1



Fig 2 x 3



Fig 3 x 2

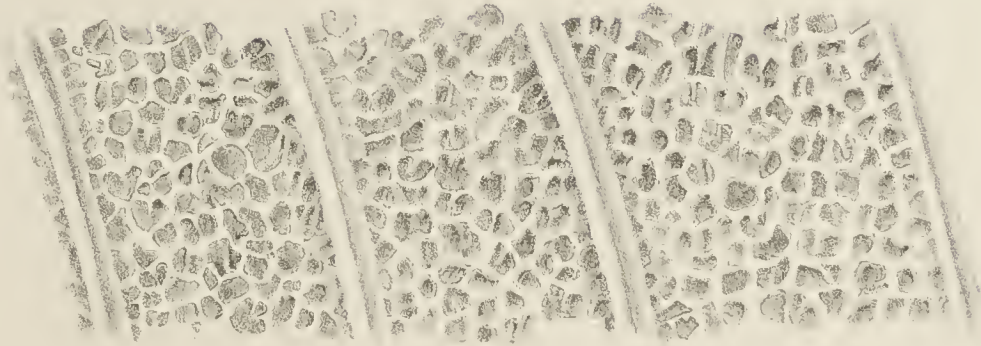


Fig 4



Fig 5



Fig 6

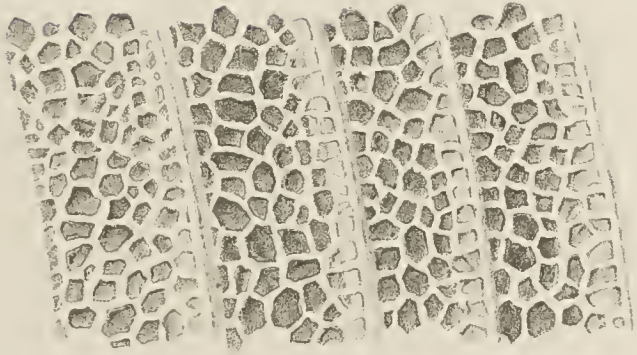
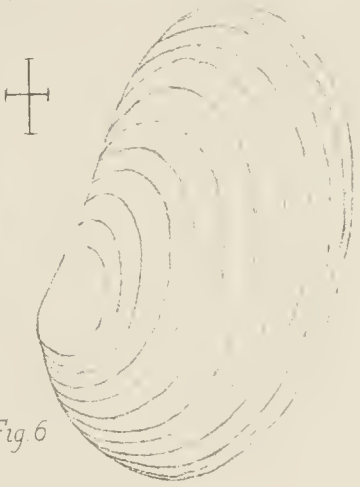


Fig 7

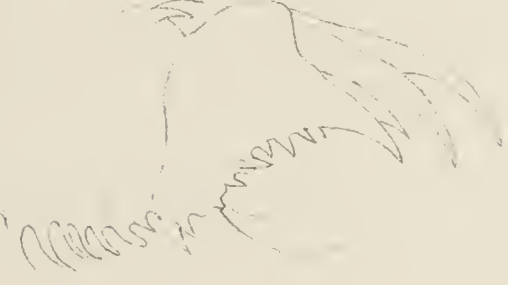


Fig 8

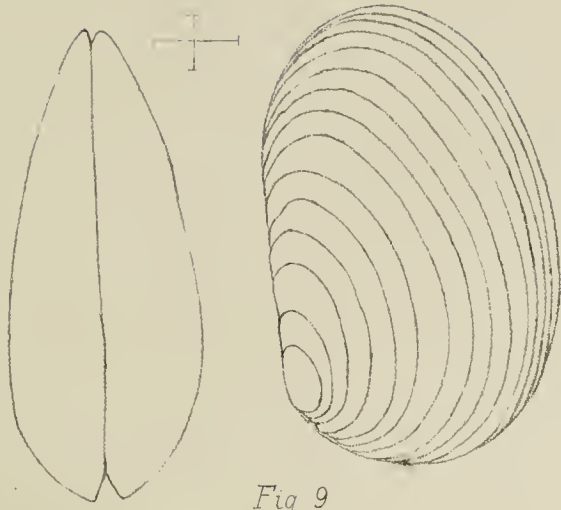


Fig 9



Fig 10

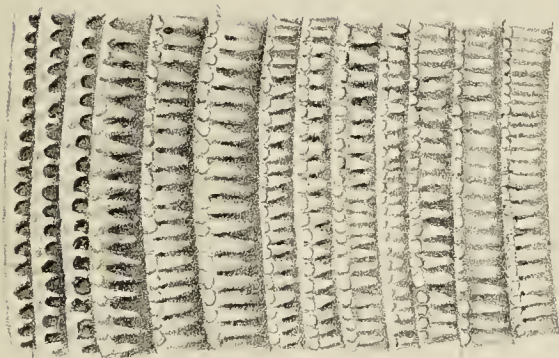


Fig 12

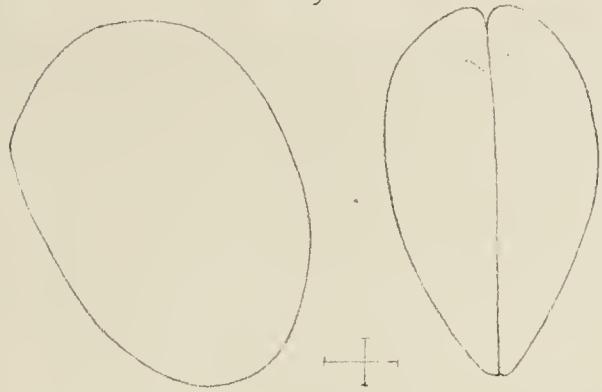


Fig 11

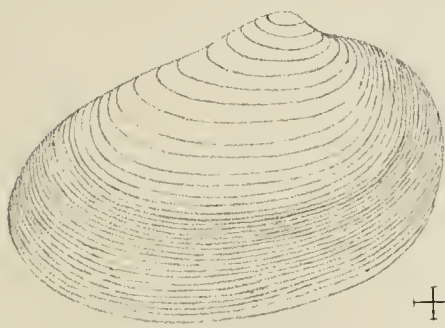


Fig 13

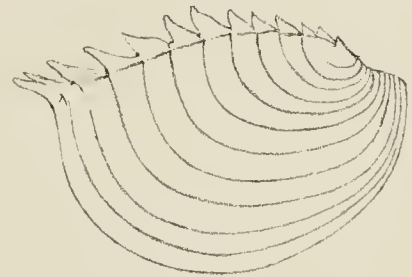


Fig 15

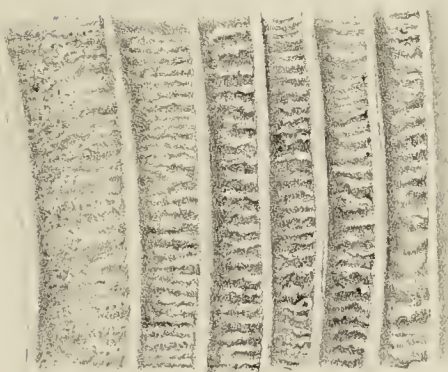


Fig. 14

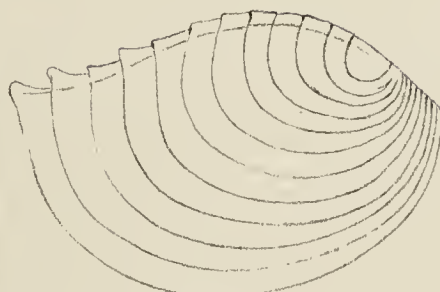


Fig 15.

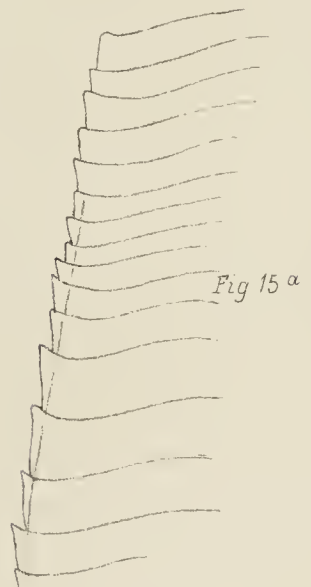


Fig 15 a



Fig. 17.



Fig. 18.



Fig. 19.

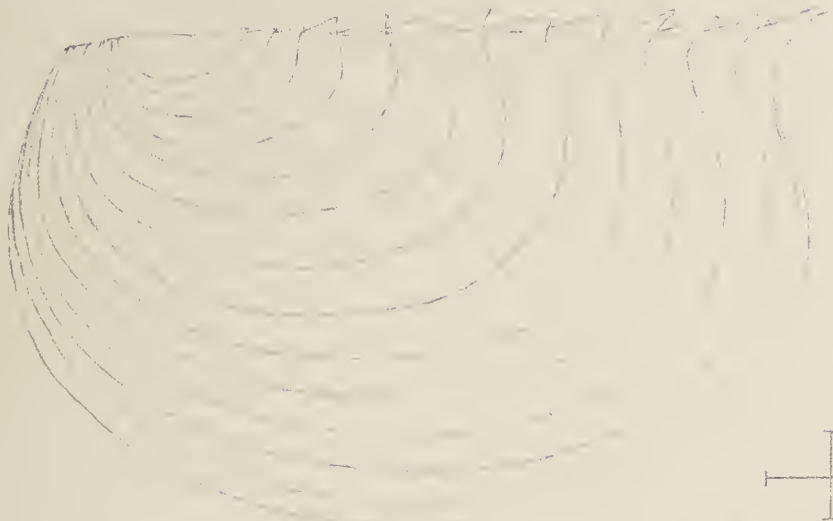


Fig. 20.

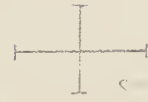


Fig. 21.



Fig. 22.



Fig. 16.

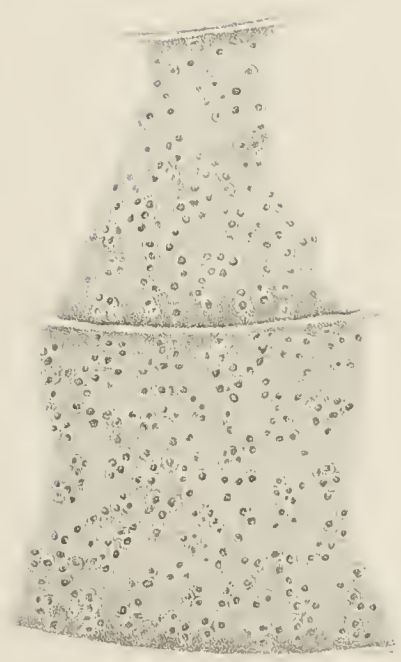


Fig. 23.



Fig 24



Fig 25



Fig.26

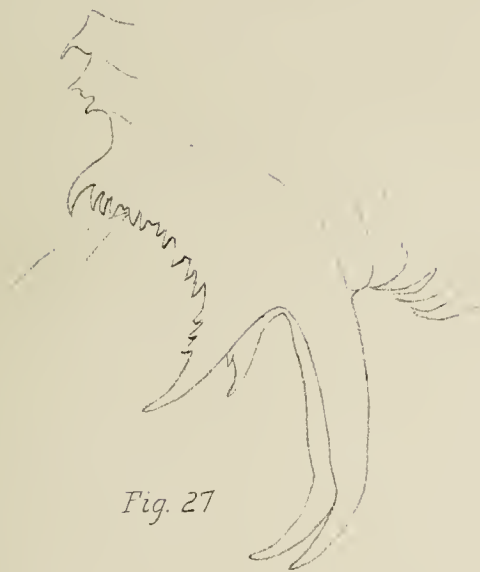


Fig. 27

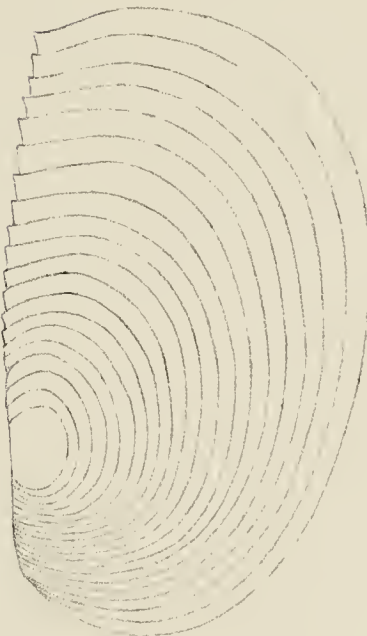


Fig 28

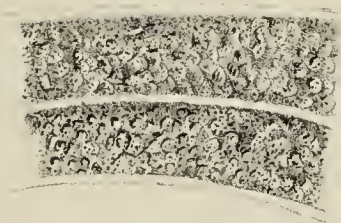
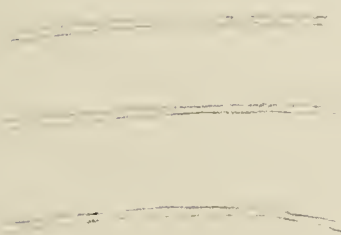


Fig. 29



a



Fig.30

b

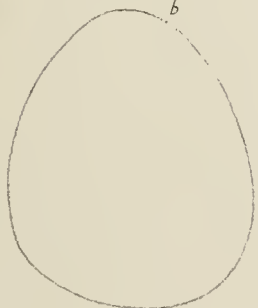


Fig 31



Fig.32

LEPIDOPTERA.

By OSWALD LOWER, F.E.S.

Professor Baldwin Spencer has handed me for identification a small consignment of Lepidoptera collected by himself during the progress of the Horn Scientific Expedition. The specimens totalled about seventy, the majority of which, notwithstanding the length and duration of the journey, are determinable. I might here mention that the Professor captured the specimens during his leisure moments, his other duties precluding him from giving more time to this branch, so that the specimens submitted must not be considered as any more than a mere indication of the fauna of the country traversed. The whole of the species are of the Southern type, most of the species being met with in and around the metropolis. No doubt, had more time been given to systematic collecting, we should have discovered some very interesting and novel species. A very small consignment sent me by Mr. A. Zeitz, of the Adelaide Museum, during his sojourn at Lake Mulligan, contained several new species. Besides the one new species described, the consignment has established the fact that Donovan's *Bombyx curvata*, described and figured in Ins. New. Holl. (1805), is identical with Doubleday's *Spilosoma* (*Chelonia*) *fuscinula* described in Eyre's Discoveries I., 438, Plate V., 4 (1845). Donovan's being the older name, takes precedence over Doubleday's. This species, of which one specimen was obtained, is somewhat smaller than ordinary typical specimens, but is in all other respects substantially the same. Appended are names of species and localities:—

RHOPALOCERA.

PIERIDÆ.

Terias, Swain.

Terias smilax, Don.

Dwarfed specimens.

Locality.—Illamurta, James Range.

NYMPHALIDÆ.

Danais, Latr.

Danais petilia, Stoll.

Locality.—Met with throughout the whole Expedition.

Junonia, Hb.*Junonia vellida*, Fab.*Locality*.—Opossum Creek.

LYCÆNIDÆ.

Lycæna, Fab.*Lycæna biocellata*, Feld.*Locality*.—Idracowra, Finke River.**Ogyris**, Westw.*Ogyris amaryllis*, Hew.*Locality*.—Stevenson River.

HETEROCERA.

BOMBYCINA.

ARCTIADÆ.

Thallarcha, Meyr.*Thallarcha albicollis*, Feld.*Locality*.—Goyder River.**Spilosoma**, Steph.*Spilosoma curvata*, Don (*fuscinula*, Dbld.).*Locality*.—Illamurta, James Range.**Deiopeia**, Steph.*Deiopeia pulchella*, Linn.*Locality*.—Stevenson River, Horseshoe Bend, Finke River.

HYP SIDÆ.

Nyctemera, Hb.*Nyctemera amica*, White.*Locality*.—Running Waters, Finke River.

LIPARIDÆ.

Pterolocera, Walk.*Pterolocera amplicornis*, Walk.*Locality*.—Crown Point, Finke River.

GEOMETRINA.

HYDRIOMENIDÆ.

Xanthorhœ, Hb.*Xanthorhœ subidaria*, Gn.*Locality*.—Illamurta, James Range.

MONOCTENIADÆ.

Darantasia, Walk.*Darantasia flavicapitata*, Gn.*Locality*.—Illamurta, James Range.

NOCTUINA.

NOCTUIDÆ.

Dasygaster, Gn.*Dasygaster mundoides*, Lower.*Locality*.—Stevenson River.**Orthosia**, Tr.*Orthosia lucasii*, Butler.*Locality*.—Stevenson River.*Orthosia tortisigna*, Walk.*Locality*.—Stevenson River.*Orthosia mesombra*, Lower.*Locality*.—Charlotte Waters.

Agrotis, Ochs.*Agrotis infusa*, Bdv.*Agrotis munda* (?), Walk.

Specimens mutilated.

Locality.—Stevenson River, Adminga Creek, Illamurta.**PYRALIDINA.****BOTYDIDÆ.****Tritœa**, Meyr.*Tritœa ustalis*, Walk.*Locality*.—Stevenson River, Adminga Creek.**SCOPARIADÆ.****Scoparia**, Hw.*Scoparia philonephes*, Meyr.*Locality*.—Illamurta, James Range.**CRAMBIDÆ.****Talis**, Gn.*Talis longipalpellus*, Meyr.*Locality*.—Stevenson River.*Talis mesochra*, n.sp.

Male and female 25-27 mm. Head whitish-ochreous. Labial palpi twice as long as head, whitish-ochreous, externally fuscous tinged. Thorax and abdomen ochreous-whitish, abdomen silvery-grey. Legs whitish, fuscous tinged. Forewings elongate, rather dilated. Costa straight, hind margin rounded. Ochreous-white thickly and irregularly sprinkled on fine black scales; a broad ochreous-yellow fascia angulated above middle and edged with fuscous on margins. Containing a silvery, metallic, median line throughout, from about two-thirds of costa to two-

thirds inner margin. Two oblique, narrow, ochreous-yellow parallel bands from costa near apex, edged with fuscous, anterior one continued as a fine line along hind-margin to inner margin. Beyond this line on lower two-thirds of hind-margin is a line of white, on which are placed eight conspicuous black dots arranged in pairs. The third pair sometimes divided into three. An interrupted, golden, metallic line along hind-margin, most conspicuous on edges of spots. Cilia ochreous-whitish with a fuscous basal line; hind-wings and cilia opalescent-white. At first sight this species appears identical with *longipalpellus*, Meyr. In fact I at first was inclined to regard it as a variety of that species. It differs however in being a stouter-built insect, and the crescentic silver wing and elongate black marks are absent; the hind-wings are of a different colour, and the hind-margin of fore-wings is apparently rounded and not subdentate. Several specimens, both male and female, taken at the Stevenson River.

COLEOPTERA.

(EXCLUSIVE OF THE *Carabidæ*).

*By the Rev. T. BLACKBURN, B.A., Hon. Curator for Entomology of
the South Australian Museum.*

The material on which this memoir is founded consists of about eight hundred specimens, representing about one hundred and forty-five species. Of these species I describe sixty-two as new to science, and among these latter are four for which I find it necessary to propose new generic names. There are also several species which are no doubt undescribed, but owing to their imperfect condition or the lack of examples of a sex indispensable to a satisfactory diagnosis, are not able to be dealt with at present. Considering the length of time spent in the work of the Expedition, the extent of the collection will probably appear meagre to those who have not collected in Central Australia. But my own experiences of the difficulty of obtaining specimens in that desert region assure me that the result is far from being unsatisfactory, and when it is taken into account that the naturalists of the Expedition had to divide their attention among a great diversity of objects, there appears to be reason for regarding the collection as an exceptionally rich one considering the circumstances under which it was made.

DYTISCIDÆ.

BIDESSUS.

B. bistrigatus, Clk. (2), Storm Creek and Reedy Creek.

HYPHYDRUS.

H. australis, Clk. (1), Rudall's Creek. A very brightly-coloured female example.

ANTIPORUS.

A. Gilberti, Clk. (2), Illara Water and Palm Creek.

NECTEROSOMA.

N. arcuatum, Shp. (1), Illara Water. (The exact habitat of this species was previously unrecorded.)

N. dispar, Germ. var. ? (1), Rudall's Creek. The example of this insect is unfortunately a female, so that its species cannot be determined with certainty. It does not differ from *N. dispar* of the same sex except in the absence of dark markings on the prothorax and perhaps a slightly narrower form.

PLATYNECTES.

P. decempunctatus, Fab. (2), Palm Creek.

RHANTUS.

R. pulverosus, Steph. (14), Finke River, Oodnabarrina, Painta Spring, Ellery Creek.

SANDRACOTTUS.

S. guttatus, Shp. (14), Painta Spring, Bagot's Creek.

ERETES.

E. australis, Er. (41), Finke River, Palm Creek, Storm Creek.

CYBISTER.

C. tripunctatus, Oliv. (2), Illara Water, Possum Creek.

GYRINIDÆ.

DINEUTES.

D. australis, Fab. (1), Finke River.

HYDROPHILIDÆ.

HYDROPHILUS.

H. albipes, Cast. (15), Oodnadatta, Macumba Creek, Possum Creek. This species appears to me identical with *H. ruficornis*, Dej., Cat., 3 ed. The latter is the older name, but there is a *H. ruficornis*, Klug., older still, and it does not seem at all clear that it is identical with *H. ruficornis*, Dej. I do not see any reason, judging by the description, to regard *H. brevispina*, Fairm. as distinct. Fairmaire's name, however, is much later.

STERNOLOPHUS.

S. nitidulus, Macl. (35), Painta Spring, Palm Creek, Bagot's Creek, Carmichael Creek, Ellery Creek, Glen Helen, Deering Creek, Illara Water. I see no reason to doubt the identity of these specimens with Macleay's insect although the original description is a very insufficient one, as I have examples from Queensland (Macleay's locality) in my own collection from which these Central Australian examples are quite indistinguishable. The sexes differ in the male being of narrower form, with the sternal carina slightly more produced, the palpi a little more elongate, and the apical ventral segment minutely notched at its apex.

HYDROBIUS.

H. assimilis, Hope (14), Adminga, Macumba Creek, Ellery Creek, Bagot's Creek, Illara Water, Storm Creek, Carmichael Creek. I have already (Proc. Linn. Soc. N.S.W., 1888, p. 818) discussed the identity of this insect with *H. assimilis*, Hope, and am still of the opinion there expressed that it is very doubtful. But as this is the insect commonly regarded as *H. assimilis*, I give it the name provisionally.

HYDATOTREPHIS.

H. Mastersi, Macl. ? (4), Bagot's Creek. This insect agrees well with Macleay's description and therefore is presumably his species; but it is possible that a comparison with the type might indicate differences. I have found this insect in Victoria. The type of *H. Mastersi* was taken in Queensland.

PARACYMUS.

(Subg. *Paranacæna*).

P. Spenceri, sp. nov. (4). Nitidus; niger, palpis (apice excepto) antennis (clava excepta) prothoracis lateribus (basi excepta) elytris (his hic illic indeterminate infuscatis) pedibusque testaceis; supra subtiliter sat confertim punctulatus; puncturis in elytris nullo modo seriatim dispositis; his (stria suturali antice abbreviata excepta) haud striatis. Long. 1 l. Lat. $\frac{1}{2}$ l.

This little species (if its colour is constant) may be readily distinguished by its head and prothorax being brilliantly black (except the front part of the declivous sides invisible from above of the latter) in contrast with the testaceous and brown elytra. The only described Australian species of the genus at all approaching it in colour is *P. Lindi*, Blackb., from which it is distinguished by its

very much finer and closer puncturation and the absence of linear disposition in the punctures of its elytra. The black colour of its prothorax and head has a slightly brassy tone.

Paisley Bluff, Reedy Creek.

P. Horni, sp. nov. (2). Nitidus; nigro-fuscus; capite ad latera ante oculos palpis antennis pedibusque testaceis, prothorace elytris abdomineque testaceo-brunneis obscure fusco-adumbratis; capite prothoraceque vix manifeste, elytris subtiliter lineatim, punctulatis; his (stria suturali antice abbreviata excepta) haud striatis. Long. $1\frac{1}{5}$ l. Lat. $\frac{1}{2}$ l.

Extremely close to *P. Lindi*, Blackb., but differing from it by the sparser and much finer puncturation of its elytra, which moreover has a more decidedly linear arrangement. In the examples observed the hinder part of the under surface is of a much darker colour in *P. Lindi* than in this species.

Palm Creek.

P. eremita, sp. nov. (2). Nitidus; niger, vix picescens, palpis antennis (clava excepta) capite ad latera ante oculos prothoracis elytrorumque lateribus tarsisque dilutionibus; capite prothoraceque subtilissime, elytris distincte sat subtiliter, punctulatis; in his puncturis regulariter lineatim dispositis, stria suturali bene determinata antice abbreviata. Long. $1\frac{1}{5}$ l. Lat. $\frac{1}{2}$ l.

This species is notable for its dark colour. The puncturation of its elytra is not so fine as in the preceding species and runs in perfectly well-defined lines.

Paisley Bluff.

N.B.—The collection contains also an example of another species (apparently a *Paracymus*) from Paisley Bluff, which, being unique, I do not like to subject to the treatment necessary to be sure of its structural characters.

PHILHYDRUS.

P. Andersoni, sp. nov. 16). Ovalis; nitidus; piceo-niger, palpis (apice summo excepto) antennis (clava excepta) tibiis tarsisque rufis vel testaceis, capite prothorace elytrisque luridis vel testaceo-brunneis plus minusve fusco-adumbratis; supra crebre sat æqualiter sat subtiliter punctulatus; elytris puncturis nonnullis (his seriatim dispositis) paullo majoribus vix manifeste impressis. Long. $2\frac{1}{2}$ l. Lat. $1\frac{1}{5}$ l.

This species seems to be common all over Southern Australia, but appears to have escaped description hitherto. Its pallid upper surface distinguishes it from the described Australian species except *elongatulus*, Macl., *maculiceps*, Macl., and *laevigatus*, Blackb., from which it is at once distinguishable *inter alia* by its larger size and the much better defined puncturation of its upper surface. Its colouring is much like that of the European *P. maritimus*, Thoms., but it is much smaller than that species, with the apex of its palpi infusate and the puncturation of its upper surface less strongly impressed. It should be noted that the ill-defined patches of infuscation on the upper surface are variable, and that in some examples the head is entirely infusate. Named after Mr. John Anderson, of Port Lincoln, who has done good service in the investigation of the *Coleoptera* of Eyre's Peninsula, and in whose company I first met with this insect.

Glen Helen, Reedy Creek, Ellery Creek, Carmichael Creek, Paisley Bluff, Storm Creek.

P. deserticola, sp. nov. (18). Ovalis; nitidus; piceo-niger, palpis antennis tibiis tarsis et capitis prothoracis elytrorumque marginibus lateralibus rufis vel rufo-testaceis; supra-subtiliter (in capite prothoraceque subtilissime) punctulatus, elytris puncturis nonnullis (his seriatim dispositis) paullo majoribus impressis. Long. 2 l. Lat. 1 l. (vix).

In colour and markings (except in its tibiæ being reddish) this species closely resembles the European *P. ovalis*, Thoms., but it is of narrower and more elongate build and its puncturation is very much finer (so fine indeed that a strong lens is required to see it at all). I do not know of any other Australian (or indeed European) *Philhydrus* with puncturation so fine.

Paisley Bluff, Ellery Creek, Reedy Hole, Glen Helen, Palm Creek.

HYDROBATICUS.

H. Tatei, sp. nov. (16). Ovalis; minus convexus; minus nitidus; supra sordide testaceo-brunneus, piceo-adumbratus; subtus piceo-niger, antennis palpis tibiis tarsisque sordide testaceis; capite prothoraceque fortius crebre (quam *H. australis*, Blackb., magis crebre minus fortiter) punctulatis, puncturarum interstitiis haud puncturis minutis impressis; prothorace transverso subquadrato antice quam postice paullo angustiori; elytris punctulato-striatis, interstitiis quam prothorax multo minus fortiter punctulatis subconcavis, interstitiis singulis utrinque linea subtili elevata marginatis. Long. 2—2 $\frac{2}{5}$ l. Lat. $\frac{4}{5}$ — $\frac{9}{10}$ l.

This interesting little species may be at once distinguished from its congeners by the peculiar sculpture of its elytral interstices, each side of which is bordered by a very fine smooth elevated line.

Palm Creek, Ellery Creek, Reedy Creek.

H. australis, Blackb. (4), Palm Creek, Ellery Creek, Rudall's Creek.

BEROSUS.

B. macumbensis, sp. nov. (2). Late ovalis; convexus; nitidus; supra testaceus, hic illic fusco-adumbratus; subtus niger, antennis palpis pedibusque testaceis; capite prothoraceque æqualiter fortius sat crebre punctulatis; elytris apice emarginatis (parte emarginata extus spiniformi) subtiliter punctulato-striatis, interstitiis planis antice sparsim postice confertissime subtiliter punctulatis. Long. $3\frac{4}{5}$ l. Lat. $1\frac{9}{10}$ l.

This fine large species bears much general resemblance to *B. majusculus*, Blackb., but may be readily distinguished from all the previously-described Australian *Berosi* by the remarkable sculpture of its elytral interstices, which is sparse in front, but towards the apex becomes so crowded as to render the surface of the elytra opaque.

Macumba Creek, Finke River (also taken by Mr. Zietz near Lake Callabonna).

HYDROCHUS.

H. Horni, sp. nov. (40). Elongatus; nitidus; niger, antennis (et nonnullorum exemplorum pedibus) obscure rufopiceis; capite subtiliter creberrime ruguloso; prothorace subcordato, confertim sat grosse ruguloso-punctulato, in disco subobsolete 3-areolato; elytris seriatim sat grosse sat crebre punctulatis, interstitiis alternis carinatis. Long. $1\frac{2}{3}$ l. Lat. $\frac{1}{2}$ l.

At once distinguished from its previously-described Australian congeners by its deep black colour in combination with the distinctly-elevated alternate interstices of its elytra. Compared with the European *H. brevis*, Herbst., it is less nitid and much narrower and more parallel, its head very much more closely and finely sculptured, its prothorax less coarsely rugulose, with the central areola less defined and the seriate punctures of the elytra less coarse and the alternate interstices a little less strongly carinate.

Paisley Bluff, Ellery Creek, Penny's Spring, Rudall's Creek.

H. interioris, sp. nov. (17). Elongatus; minus nitidus; obscure viridis, antennis palpis pedibusque sordide testaceis, femoribus posticis infuscatis; capite cum prothorace minus grosse minus confertim ruguloso, illo (sutura clypeali excepta) æquali; prothorace hic illic obsolete impresso, cordato; elytris seriatim minus grosse sat crebre punctulatis, interstitiis 5° postice 9' que in medio leviter carinatis. Long. $1\frac{1}{5}$ l. Lat. $\frac{2}{5}$ l.

Judging by the description of *H. obsкуро-æneus*, Fairm. (from North Queensland), I should judge that this species much resembles it; but *inter alia*, Fairemaire's insect is said to have a median fovea on the head (of which I find no trace in *H. interioris*) and its elytra are said to be "grosse striato-crenatis," whereas in *H. interioris* the seriate punctures of the elytra are, in comparison with those of an average *Hydrochus*, rather exceptionally small. *H. parallelus*, Macl., also resembles this species, but differs *inter alia* by its longitudinally striate head. Its green colour distinguishes *H. interioris* from the other described Australian *Hydrochi*.

Paisley Bluff, Ellery Creek, Palm Creek.

H. læte-viridis, sp. nov. (1). Minus elongatus; minus nitidus; læte viridis, antennis palpis (his exempli typici plus minusve carentibus) pedibusque flavis; capite confuse nec grosse ruguloso haud foveolato; prothorace subquadrato postice leviter angustato vix cordato, sparsius punctulato, æquali; elytris seriatim minus crebre punctulatis, interstitiis angustis sat æqualibus sat planis. Long. $1\frac{1}{5}$ l. Lat. $\frac{1}{2}$ l. (vix).

The bright grass-green colour of this species, together with its yellow legs and the even surface of its prothorax, will prevent its confusion with any other described Australian *Hydrochus*.

Ellery Creek.

OCHTHEBIUS.

O. novicius, sp. nov. (1). Sat latus; minus nitidus; niger, vix ænescens, femoribus tibiisque rufis; capite prothoraceque fortiter inæqualibus vix perspicue punctulatis; elytris leviter striatis, striis distincte punctulatis interstitiis æqualibus sat planis. Long. $1\frac{3}{10}$ l. Lat. $\frac{2}{5}$ l.

Very distinct from the only previously described Australian *Ochthebius* (*O. australis*, Blackb.) by its larger size, less nitid surface, and much less strongly-impressed elytral striæ. Its head and prothorax are almost exactly like those of the European *O. exsculptus*, Müll., except in their surface being less nitid and the

eyes more prominent. The general form, moreover, is much like that of *exsculptus*. The elytral sculpture resembles that of the European *O. pygmaeus*, Fab., but the striæ are scarcely so strongly-impressed, and the interstices are wider and more conspicuously flattened.

Reedy Hole.

HYDRÆNA.

H. simplicicollis, sp. nov. (9). Oblonga; postice vix dilatata; supra obscure brunnea, capite picescenti; clypeo subtilissime, capite postice magis fortiter-prothorace confertim sat subtiliter punctulatis; hoc fere æquali, lateribus modice arcuatis; elytris subtiliter punctulato-striatis (striis nec puncturis postice obsoletis), ad apicem obtusis; subtus piceo-nigra, antennis palpis pedibusque lividis. Long. $\frac{4}{5}$ l. Lat. $\frac{3}{10}$ l.

Differs from the previously-described Australian *Hydrænæ*, except *luridipennis*, Macl., by the blunt apex of its elytra. *H. luridipennis* is insufficiently described, but one character is mentioned that seems to distinguish it from the present insect, viz., "sides of prothorax bulged out almost angularly in the middle." I have a *Hydræna* from Queensland which appears to me to be *H. luridipennis*, and it differs from *H. simplicicollis* also in the much less fine puncturation of its prothorax.

Paisley Bluff, Reedy Creek, Ellery Creek.

H. rudallensis, sp. nov. (1). Oblongo-ovalis; nitida; supra obscure brunnea, capite picescenti; supra subtilissime vix manifeste punctulata, puncturis in elytris subseriatim dispositis; his postice obtusis. Long. $\frac{7}{10}$ l. Lat., $\frac{1}{4}$ l.

This minute species differs from all the other described Australian species of the genus by its non-striate elytra and excessively fine puncturation.

Rudall's Creek.

CYCLONOTUM.

C. Mastersi, Macl. (6), Palm Creek, Ellery Creek, Rudall's Creek.

N.B.—Besides the *Hydrophilide* enumerated above, the collection contains an exceedingly minute insect (from Reedy Creek) scarcely $\frac{1}{2}$ l. long, which appears to belong to the family, but is too much damaged for satisfactory determination.

STAPHYLINIDÆ.

MYLLÆNA.

M. palmensis, sp. nov. (2). Fusca; subtiliter pubescens; antennarum basi, prothorace elytris et abdominis segmentis apicalibus 2 pallidis; prothorace quam elytra nullo modo angustiori, antice leviter angustato, lateribus manifeste arcuatis; elytris prothoraci longitudine æqualibus; pedibus testaceis. Long. $1\frac{1}{2}$ l.

Coloured differently from any other *Myllæna* known to me. The head and front part of abdomen are blackish fuscous, the prothorax and last two segments very pale fuscous (almost whitish); the elytra very little darker. Compared with *M. intermedia*, Er., this species is markedly larger, with the prothorax larger in proportion, fully as wide as the elytra, and with its sides distinctly rounded.

Palm Creek.

PHILONTHUS.

P. subcingulatus, Mael. (23), Reedy Creek, Penny's Spring, Paisley Bluff, Camp 6, Goyder Range, Palm Creek, Hugh Creek.

P. macellus, Fvl. (1), Rudali's Creek.

P. ornatus, Blackb. (1), Ellery Creek.

ACTOBIUS.

A. semipunctatus, Fairm. (3), Reedy Creek, Hugh Creek.

CRYPTOBIUM.

C. mastersi, Mael. (15), Reedy Creek, Palm Creek, Reedy Hole.

DICAX.

D. deserti, sp. nov. (1). Pilosellum; sat convexum; nitidum; nigrum, elytris metasterno abdominis apice et coxis anticis sanguineis, antennis pedibusque piceis, tarsis rufis; antennis brevibus gracilibus, articulis apicalibus quam longioribus parum latioribus; oculis sat parvis; capite sat elongato sat parallelo, postice et ad latera sat crebre sat fortiter punctulato; prothorace quam caput haud latiori sat elongato, postice leviter angustato, disco utrinque seriatim punctulato (serie utraque puncturis circiter 13 minus regulariter impressa), partibus anticis et lateralibus puncturis nonnullis impressis; elytris quam prothorax latioribus subbrevioribus,

6-seriatim fortiter punctulatis et puncturis nonnullis ad latera confuse impressis; abdomine sat crebre punctulato, segmento apicali (fem.) supra ad apicem acuminato. Long. $5\frac{1}{2}$ l.

Storm Creek.

DOLICAON.

D. Spenceri, sp. nov. (1). Parallelum; sat angustum; sat nitidum; sparsim breviter pilosum; rufo-testaceum, antennis palpis pedibusque pallide testaceis; antennis sat gracilibus sat elongatis, articulis omnibus quam latioribus sat longioribus; oculis sat parvis; capite sat quadrato, sparsim sat fortiter (disco medio lævi excepto) punctulato; prothorace leviter elongato quam caput subangustiori, disco utrinque leviter sulcato, sulcis seriatim (et partibus lateralibus sat confuse) punctulatis; elytris quam prothorax parum latioribus sed tertia parte longioribus, leviter (vix subtiliter) punctulatis; abdomine crebre subtiliter punctulato. Long. $2\frac{2}{5}$ l.

Rudall's Creek.

SCOPÆUS.

S. ruficollis, Fvl. ? (1), Palm Creek. M. Fauvel has not described *S. ruficollis*, but has merely named it and mentioned some characters distinguishing it from a European *Scopæus* (*Erichsoni*, Kolen), of which I do not possess a type. Nevertheless I judge from the description of *S. Erichsoni* that this is very likely to be the insect to which M. Fauvel gave his name.

S. ovicollis, Macl. ? (1). The example to which I give this name conjecturally is in bad condition. It is, I think, distinct from the preceding, and as far as I can judge seems to agree with my type of *S. ovicollis*. I have unfortunately lost the record of the exact locality where it was taken.

N.B.—There is also in the collection an example from Adminga Creek, of apparently a very small *Bledius*, which, as is usually the case with minute *Staphylinidæ* that are not mounted while fresh, is too much distorted to be satisfactorily examined.

HISTERIDÆ.

SAPRINUS.

S. letus, Er. Charlotte Waters.

S. sp.—? (2), Palm Creek, Glen Edith. The specimens here referred to are very like *S. cyaneus*, but their elytral puncturation is evidently closer and more

strongly impressed (almost asperate) than in that species, and the puncturation of the head is well-defined. Unfortunately the nomenclature of the Australian *Sapriini* is in considerable confusion, so that I do not see my way to any definite opinion as to whether the insect before me may not have already received a name.

CUCUJIDÆ.

HECTARTHURUM.

H. brevifossum, Newm. (1), Alice Springs.

LATHRIDIIDÆ.

CORTICARIA.

C. Adelaide, Blackb. (1), Finke River.

DERMESTIDÆ.

DERMESTES.

D. vulpinus, Fab. (1), Hermannsberg.

HETEROCERIDÆ.

HETEROCERUS.

H. multimaculatus, Blackb. (2), Storm Creek, Hugh Creek.

LAMELLICORNES.

ONTHOPHAGUS.

O. consentaneus, Har.? (1), Tempe Downs. Unfortunately, the description of *O. consentaneus* is so defective (especially through the omission of all reference to sexual characters) that it is impossible in the absence of the type to arrive at any certainty as to what insect it was founded on. I have the present species from several localities in Queensland and Central Australia, and it agrees very well with Harold's description such as it is.

ATÆNIUS.

A. goyderensis, sp. nov. (10). Sat angustus; minus parallelus; nitidus; niger, clypei margine prothoracis lateribus antennis pedibusque plus minusve

rufescentibus ; clypeo antice emarginato ; capite minus crebre granulato ; prothorace æquali dupliciter (subtiliter et subfortiter) nec rugulose punctulato, puncturis in disco minus crebre nec æqualiter (ad latera confertim) dispositis ; elytris sat fortiter striatis, striis punctulatis, interstitiis minus convexis nullo modo cariniformibus inter se sat æqualibus intus crenulatis, humeris dentatis. Long., $2\frac{1}{5}$ l. ; lat., 1 l.

This species is very distinct from any other known to me. It is characterised by its comparatively large size, the evenness and but slight convexity of its elytral interstices (none of which are cariniform), and the strong crenulation of the same (on their sutural side) by the punctures of the striae. It is perhaps nearest to *A. australis*, Har., which, however, has cariniform elytral interstices. Sir W. Macleay described a number of species under the name *Ammæcius*, which appear to me to be *Atæni*, and of which the descriptions are for the most part very slight. Most of them are unknown to me, but nearly all of them are much smaller than the present insect, and the few that approach it in size have cariniform elytral interstices.

Goyder Range, Hugh Creek.

BOLBOCERAS.

B. septem-tuberculatum, Bainbr.? Alice Springs. The species to which I doubtfully attribute the example before me is known to me only by the description (which is brief and not very clear) of its author, and by Westwood's figure, which looks as if it might very possibly be founded on the female of the species of which this is the male. Nevertheless, I deem it more probable that this Central Australian *Bolboceras* is an undescribed one ; it could not, however, be prudently described without the knowledge of both sexes.

TROX.

T. insignicollis, sp. nov. (1). Ovatus ; opacus ; niger, indumento griseo-fusco vestitus ; capite ruguloso, carina arcuata in medio divisa instructo ; clypeo antice angulato ; prothorace quam longiori tertia parte latiori, postice in medio modice lobato, ut caput ruguloso, supra costis tuberculisque crassis inæquali (costa 2^a minus determinata, in medio subinterrupta), lateribus leviter 3-sinuatis in medio angulatis, angulis posticis rotundatis ; elytris seriatim sat crebre granulatis, granulis serierum alternarum minutis rotundis ceterarum sat magnis elongatis, seriebus 5^a 9^a que ad basin breviter costiformibus ; tibiis anticis extus in medio dente parvo instructo ; prosterno postice vix prominulo. Long. $6\frac{1}{2}$ l. Lat. 4 l.

The elytra of this species are much like those of *T. euclensis*, Blackb., the granules of the 5th and 9th series (*i.e.*, the 2nd and 4th of those containing the larger granules) running together into costæ as in that species at the base, but the smaller granules run in more regular longitudinal series, and the larger ones are considerably more elongate; the prothorax, however, is very different, its costæ being (not fine nitid lines, but) coarse, ill-defined, opaque convexities, and its hind angles being entirely rounded off; the front tibiæ (disregarding the apical dilatation) have only a single small tooth, which is placed on the middle of the external margin.

Alice Springs.

T. mentitor, sp. nov. (1). Præcedenti affinis, sed prothoracis costibus gracilibus subnitidis (costa 2^a pone medium late interrupta, parte interrupta tuberculo nitido instructa), lateribus vix 3-sinuatis, angulis posticis acute rectis; tibiæ anticarum dente externo mediano vix distincto; cetera ut præcedentis. Long. 7 l. Lat. 4 l.

This species may be roughly described as having the prothorax of *T. euclensis* with the elytra of *T. insignicollis*, but differing from both in its front tibiæ having (the apical dilatation being disregarded) no distinct tooth.

Palm Creek.

N.B.—The collection contains a third specimen of *Trox* (from Storm Creek), which, though with much hesitation, I regard as conspecific with *T. mentitor*. It differs in the front of its clypeus being considerably less acute and in the median tooth of its front tibiæ being quite distinct. I must admit that these differences are of a kind that I do not find usual within the limits of a species; at the same time, as I can find absolutely no other differences, it does not seem desirable to give a new name on the authority of a single specimen. The two species described above differ from nearly all their known Australian congeners in the sculpture of their elytra, inasmuch as the series of larger prominences ought scarcely to be called tubercles, but seem to be formed merely by fine carinæ being broken into short pieces separated from each other by spaces shorter than the pieces, except near the apex, where the pieces become granuliform. *T. candidus*, Har. (at least a type of it which I have received from the collection of M. Thomson), has somewhat similar sculpture, but it differs from these two Central Australian species *inter alia* in the presence of squarish nitid spaces scattered over the elytra and in the absence of regular close-set series of small granules between the series of elongate quasi-tubercles.

COLPOCHILA.

C. deceptor, Blackb. (2), Storm Creek, Alice Springs.

HETERONYX.

H. horridus, Blackb. ? (1), Glen Helen. Its antennæ having been broken off, this specimen (which is otherwise in very bad condition) cannot be named with certainty, but I have little doubt of its being *H. horridus*.

H. addendus, Blackb. ? (1), Oodnabarrina. This specimen also has lost its antennæ and is otherwise in bad condition, but it seems pretty certain to be *H. addendus*.

H. vagans, Blackb. (4), Camp 4, Tempe Downs, Hermansberg, Reedy Hole.

LEPIDIOTA.

L. sp. ? (1), Palm Creek. This specimen is so badly damaged that it is impossible to determine its species, but it is probably not any described one. It is denuded of scales, has lost its antennæ, and has only one entire leg; probably it was picked up dead. The capture is, however, of considerable interest, as no *Lepidiota*, so far as I know, has previously been reported from Central Australia, all the hitherto-described Australian species being from Queensland, West Australia and the Northern Territory.

ANOPLOGNATHUS.

A. macleayi, Blackb. ♂ ? (1), Palm Creek. This species was described (Proc. Linn. Soc. N.S.W., 1891, p. 495) on a specimen concerning the sex of which I was doubtful. I have now little doubt that it is a female, and that the example before me is its male. It is of a reddish-brown colour, with the elytra almost whitish, and with very little trace of the prothoracic infuscation which is so conspicuous in the described female. It differs from the female by the characters that usually distinguish the male *Anoplognathi*. The hinder part of the head, it should be noted, is less closely punctulate than in the female, and the external teeth of the front tibiæ resemble those of the female, except in being smaller and more acute. From the male of *A. Odewahni*, Macl. (to which *A. Macleayi* is closely allied) it differs by the much greater length of its mesosternal process and by the much greater width of its clypeus.

ISODON.

I. pecuarius, Reiche (2), Alice Springs.

SEMANOPTERUS.

S. rectangulus, Blackb. (4), Alice Springs, Idracowra.

CHLOROBAPTA.

C. frontalis, Don. (1), Illamurta.

BUPRESTIDÆ.

CHALCOTÆNIA.

C. Beltanæ, Blackb. (7), Idracowra. A study of these specimens shows me that the previously unique type of *C. Beltanæ* is a female, and that the male differs from it in being of somewhat narrower and more parallel form with longer and more slender antennæ, the joints of which (beyond the third joint) are more or less reddish; and in there being a deep triangular emargination in the hind outline of its apical ventral segment. In both sexes the metasternum is longitudinally flattened (or slightly concave) down its middle space, with sparse, evenly-disposed, very inconspicuous, fine, erect hairs, and bears a strongly-impressed longitudinal line down the centre. The middle part of the metasternum and of the basal ventral segment is strongly and rather closely punctulate; the sides of the metasternum and hind coxæ are closely and strongly but scarcely coarsely rugulose; and the sides of the ventral segments are very closely and finely punctulate; the basal ventral segment is evenly convex. In my description of this species (Proc. Linn. Soc. N.S.W., 1894, p. 100), I remarked the shortness of the antennæ as inconsistent with a place in *Chalcotænia*; but as this character appears to be sexual there is no reason to separate the species from *Chalcotænia*, and moreover there seems to be an error in regarding the length of the antennæ as a generic character of *Chalcotænia*. The female differs in its apical ventral segment being scarcely notched at the apex. The small size of this species (which does not vary in the specimens before me) distinguishes it from all its described Australian congeners except *exilis*, Blackb., which is considerably smaller still.

C. cerata, Kerremans? (2), Stevenson Creek. The two examples which I refer to this species agree very well with M. Kerremans' description, but unfortunately that description (no doubt from want of material) omits all reference to the

sexual characters, which in *Chalcotenia* appear to me of the first importance. In the male specimen before me the metasternum and hind coxæ are traversed by a deep and wide longitudinal concavity, which bears (besides fine sparse hairs similar to those of *C. Beltanæ*) a much denser pubescence in its middle part, and particularly on the sides of the coxæ where they are divided by the projecting process of the basal ventral segment; this pubescence is continued on the front part of the ventral process (which is convex as in *Beltanæ*); the middle part of the metasternum and of the basal ventral segment is sparsely but very coarsely punctured, with some finer puncturation underlying the sexual pubescence; the sides of the metasternum and hind coxæ are coarsely and not closely vermiculate-rugulose, and the sides of the ventral segments are finely and closely punctulate; the apical ventral segment is incised with a deep triangular emargination. In the female the metasternum is scarcely concave and is devoid of close pubescence and fine puncturation, and the apical ventral segment is widely and feebly (but quite distinctly) triangularly emarginate.

C. angulipennis, sp. nov. (4). Lata; supra viridis (hic illic aurata), partibus elevatis apiceque plus minusve cærulescentibus, antennis (articulis basalibus 2 exceptis) rufescentibus; subtus viridis; capite longitudinaliter concavo, inter oculos grosse postice magis subtiliter punctulato; prothorace quam longiori fere dimidio latiori, antice subito sat fortiter angustato, canaliculato, latera versus inæquali et irregulariter oblique impresso, in partibus depressis crebre minus fortiter (in convexis grosse sparsim) punctulato, basi trisinuata; elytris (superne visis) pone humeros angulariter dilatatis, postice extus denticulatis, supra interrupte inæqualiter costatis, partibus depressis crebre minus fortiter (maculis binis quam partes depressæ ceteræ magis crebre magis subtiliter) costis sparsim fortiter punctulatis; metasterno et coxis posticis in parte mediana longitudinaliter planatis setis subtilibus erectis sparsissime vestitis, grosse sparsim punctulatis, latera versus inæqualiter (hic grosse illic magis subtiliter) rugulosis; abdomine in parte mediana grosse sparsim ad latera crebre subtilius punctulato, segmento basali in medio vix planato.

Maris (?) segmento ventrali apicali anguste sat profunde triangulariter emarginato. Long. 14 l. Lat. $5\frac{1}{4}$ l.

The species of *Chalcotenia* belonging to the group of which this is a member (species of green colour, with elytral sculpture consisting of costæ and two feeble roundish impressions on the disc of each elytron) are very numerous and very closely allied *inter se*. The sculpture of their upper surface is too variable to be described in a manner that will enable the species to be confidently recognised.

The sculpture of their underside, however, and especially their sexual characters, render their identification perfectly easy. The present species (which is one of the largest of the group) possesses, nevertheless, a superficial character in the sharp, tooth-like dilatation of the elytral margin behind the shoulders, that distinguishes it at once from all the others known to me. The four examples in the Horn collection are all quite identical *inter se* (saving some little variation in the size of the elytral impressions and the continuity of the costæ). They are almost devoid of the dust-like pubescence that is so dense on many of the *Chalcoteniæ*, but this may be due to abrasion. I cannot feel certain of their sex; they are devoid of the metasternal excavation and dense, erect pubescence that distinguish the males of some species, and the triangular emargination of their apical ventral segment is smaller and narrower than in the males of the other species of which I know that sex; nevertheless I think they are males, as I have not seen any certainly female *Chalcotenia* in which the sculpture of the apex can be called a deep, sharply-triangular emargination. The close, fine puncturation of the ventral segments leaves a median, brightly polished and coarsely but very sparsely punctured space, which gradually narrows hindward from the basal segment; on the last two segments this median space becomes a mere line—too narrow to carry any of the punctures and slightly elevated—which has the appearance of a not quite continuous carina. There is a female *Chalcotenia* in the Horn collection which may possibly pertain to this species, but from several of its characters I suspect rather that it is of a species of which I have not seen the male, and therefore it is better not to characterise it until further evidence is to hand.

Illara Water, Illamurta, Carmichael Creek, Alice Springs.

C. sulciiventris, sp. nov. (2). Minus lata; nitida; supra viridis (hic illic aurata), partibus elevatis plus minusve cærulescentibus, capite antice cupreo, antennis (articulis basalibus 2 exceptis) rufescentibus; subtus viridis, partibus elevatis nonnullis (certo adspectu) violaceis vel cuprascentibus; capite subcirculariter excavato et longitudinaliter canaliculato et inæquali, sat grosse minus crebre (postice magis subtiliter magis crebre) punctulato; prothorace quam longiori minus quam dimidio latiori, antice sat subito sat fortiter angustato, canaliculato, latera versus inæquali et irregulariter oblique impresso, in partibus depressis crebre minus fortiter (in convexis grosse sparsim) punctulato, basi trisinuata; elytris postice extus denticulatis, supra interrupte inæqualiter costatis, partibus depressis crebre minus fortiter (maculis binis quam partes depressæ ceteræ magis crebre magis subtiliter) costis sparsim fortiter punctulatis; metasterno et coxis posticis in parte mediana longitudinaliter planatis, setis subtilibus erectis sparsim vestitis,

inæqualiter (sc. et grosse et subtilius) sparsim punctulatis, latera versus inæqualiter (hie grosse illie magis subtiliter) rugulosis; abdomine in parte mediana grosse sparsim ad latera crebre subtilius punctulato, segmento basali in medio longitudinaliter concavo.

Maris segmento ventrali apicali profunde triangulariter emarginato. Long. 13 l. Lat. $4\frac{2}{5}$ l.

This insect belongs to the same group of *Chalcotenia* as the other species of the Horn collection. It is a long narrow species, distinguished from most if not all of its immediate allies by its basal ventral segment being longitudinally concave in the middle. The collection contains a female *Chalcotenia*, which I have little doubt belongs to this species, although it is much smaller than the male (Long. $10\frac{1}{2}$ l.), since it agrees in all specific characters (especially in having its basal ventral segment sulcate). The hind margin of its apical ventral segment is rounded, but has a small notch-like emargination in the middle. I may add that I have not attempted to set forth a comparison of the *Chalcotenie* of the Horn collection with the allied species (*C. australasie*, etc.) from North-west Australia and Queensland, because I am not certain that my identification of the latter is correct; I, however, possess examples that I refer to them with very little doubt, and these are quite distinct from those of the Horn collection.

Crown Point.

MERIMNA.

M. atrata, L. and G. (1), Alice Springs.

ELATERIDÆ.

MONOCREPIDIUS.

The collection contains a single example each of two small species pertaining to this genus. One of them (from Palm Creek) is considerably broken, and the other (Tempe Downs) has an immature appearance. In so difficult a genus as this it does not seem desirable to found new species on unique specimens—at least unless they present strongly-marked characters, which these do not, especially when (as in the present case) their condition is such as to render it very difficult to determine by description whether they have not already been named. They do not seem identical with any *Monocrepidii* in my collection.

CHROSTUS.

A single example (from Alice Springs) pertaining to this genus does not appear to agree well with the brief description of the single-named species (*C. quadrifoveolatus*, Cand.), which is from Central Australia, but I do not deem it desirable to give the present insect a new name without having an opportunity of comparing it with the type.

RHIPICERIDÆ.

RHIPICERA.

A single female example of this genus was taken at Storm Creek. It does not appear to be conspecific with any *Rhipicera* in my collection, but it would not be desirable to found a new species on an insect of this genus without being able to describe the male, and I cannot identify it with any of the described species that are not represented in my collection.

DASCILLIDÆ.

NOTIOCYPHON (gen. nov. *Dascyllidarum*).

Sclerocyphoni affinis; differt antennis multo magis gracilibus et aliter formatis (sc. articulis basalibus 2 crassis brevibus, 3-6 filiformibus sat elongatis, 7-11 subdilatatis laxe conjunctis clavam debilem simulantibus); prosterno inter coxas lato postice angulato; tibiis ad apicem vix spinosis; tarsis sat brevibus; unguiculis simplicibus.

This genus appears to be certainly allied, like *Sclerocyphon*, to *Artematopus*; it is (as M. Lacordaire characterises *Artematopus*) a *Dascyllid* with the sterna of a *Buprestid*. The very different antennæ, the much more widely-separated front coxæ, and the simple claws forbid its being placed in *Sclerocyphon*. The claws of the latter are distinctly though not strongly toothed, their inner outline being angularly dilated a little distance from the base. In the present insect the apical joint of the maxillary palpi is elongate and much dilated.

N. convexus, sp. nov. (17). Ovalis; convexus; pubescens; sat nitidus; piceus, pedibus abdomineque plus minusve rufescentibus; capite prothoraceque sat subtiliter sat crebre punctulatis, hoc transverso, basi sat fortiter 5-sinuata; clytris obsolete (vix perspicue) costatis, grosse sat crebre punctulatis, interstitiis subtiliter punctulatis. Long. $1\frac{3}{5}$ l. Lat 1 l. (vix).

The antennæ are very slender and thread-like, reaching back scarcely beyond the base of the prothorax. Their apical five joints are together fully as long as the preceding six together, and are oval in form but very little thicker than the preceding joints. Nevertheless they resemble a feeble and very loosely-articulated club. The base of the prothorax shows five sinuations, the middle one slight and receiving the front of the scutellum, the others stronger and corresponding with projections of the front margin of the elytra. The faintly costate surface of the elytra is much as in some species of *Helodes*. The whole surface of the elytra is covered uniformly with fine close puncturation; the coarse punctures are obsolete near the sides and apex.

Palm Creek.

CLERIDÆ.

NATALIS.

N. longicollis, Blackb. (1), Adminga Creek.

TROGODENDRON.

T. fasciculatum, Schreib. (1), Alice Springs.

BOSTRYCHIDÆ.

BOSTRYCHUS.

B. jesuita, Fabr. (2), Alice Springs.

TENEBRIONIDÆ.

HOPATRUM.

H. torridum, Champ. ? (12). Although these specimens present some slight differences *inter se* (chiefly in size and colour, but also to some little extent in the sinuosity of the hind part of the prothoracic margin and the convexity of the elytral interstices), I cannot regard them as representing more than one species, especially since some of the specimens presenting the maximum differences were taken in company. It is so exceedingly close to the South Australian *Hopatrum* mentioned by Mr. Champion (Tr.E.S., 1894, p. 359) as sent to him by me, and regarded by him as identical with his *H. torridum* (from North-west Australia), that I prefer not to treat it as a new species; nevertheless, as it appears to be on

the average a little larger than that insect and a little more roughly sculptured, it is well to mention the existence of a doubt as to its identity.

Palm Creek, Paisley Bluff, Goyder River, Hermannsburg.

CESTRINUS.

C. piceitarsis, Hope (1). This specimen is extremely immature, and therefore difficult to identify; I do not, however, see any reason to distinguish it from the *Cestrinus* that I take to be *piceitarsis*, Hope.

Paisley Bluff.

PTEROHELÆUS.

P. bullatus, Pasc. (1), Charlotte Waters.

P. vicarius, Pasc. ? (1). This specimen seems to be identical with one from Central Australia in my collection which I have doubtfully attributed to *vicarius*, Pasc. Mr. Pascoe's descriptions are such that it is impossible as a rule to identify them with any insect unless it happens to be one presenting very marked characters, which the present one does not.

Painta Springs.

P. bagotensis, sp. nov. (1). Sat anguste ovalis; sat nitidus; minus convexus; piceus, antennis palpis tarsisque dilute rufis, prothorace elytrisque ad latera et femoribus obscure rufis; capite postice crebre subrugulose punctulato; prothorace quam longiori (et postice quam antice) plus quam duplo latiori sparsim subobsolete punctulato, obsolete canaliculato, marginibus latis manifeste (præsertim antice) reflexis, angulis anticis sat productis (posticis acutis leviter retrorsum directis), basi trisinuata; elytris sat late (sed quam prothorax et postice quam antice minus late) marginatis, seriatim punctulatis sed apicem versus fere lævibus, puncturis sat parvis, interstitiis planis; prosterno in medio granulato latera versus strigato; mesosterno metasterno et segmento ventrali basali latera versus granulatis; abdomine in medio subtiliter sparsius punctulato. Long. $7\frac{1}{2}$ l. Lat. $4\frac{1}{5}$ l.

Compared with *P. planus*, Blessig. (which is *peltoides*, Macl.) this species is very similar in outline, except that it is less acuminate and drawn out at the apex of the elytra; it is also considerably more convex than that insect. The margins of its prothorax and elytra are extremely similar in width to those of *P. planus*, but that of its prothorax is more evidently reflexed and its extreme border is more

thickened. The puncturation of its head is very much closer and more rugulose than in *planus*; in the sculpture of its prothorax and elytra it scarcely differs from *planus* except that its elytral sculpture is considerably more obsolete close to the apex. Its front tibiæ are extremely strongly and closely granulate, the intermediate and hind tibiæ increasingly less so. The rufous femora and almost testaceous tarsi are in strong contrast to the dark piceous tibiæ.

Bagot's Creek.

HELÆUS.

H. squamosus, Pasc. (1), Bagot's Creek.

H. ingens, Blackb. (3), Tempe Downs.

SARAGUS.

S. addendus, sp. nov. (1). Ovalis; sat opacus; niger, antennis pedibus et corpore subtus rufescentibus; capite prothoraceque subtiliter crebrius punctulatis; hoc valde transverso, antice fortiter angustato, lateribus sat late deplanatis haud reflexis; elytris bicostatis, inter costas deplanatis vel subconcavis, sutura haud convexa, spatio inter costas in medio sublevi latera versus seriatim punctulato, spatio utrinque inter costam et marginem lateralem seriatim magis fortiter punctulato, serierum interstitiis seriatim granulatis, apicem versus puncturis obsolete et granulis minutis confuse dispositis. Long. 8 l. Lat. $4\frac{1}{2}$ l.

This insect belongs to the group of species which Sir W. Macleay in his Revision of the *Helwides* (Proc. Linn. Soc. N.S.W., 1887, p. 654) calls the 1st group of the 1st section of *Saragus*. It may at once be distinguished by its smaller size from all the previously-described species of that group; from *S. Spinolæ*, Hope, which is scarcely described, it also differs *inter alia* by the absence of long hairs on the elytra, and from all the others of the group by the lateral margins of its prothorax not being reflexed, and by the space on each elytron between the flattened subsutural portion and the lateral margin bearing about eight rows of well-defined punctures, the intervals between which are granulate, or almost subcostate-tuberculate.

Palm Creek.

NYCTOZOILUS.

Of this most perplexing genus there are six examples in the Horn collection which it seems impossible to refer to less than four species—all undescribed. Five of these specimens all resemble each other so much that to a casual glance

they might pass for a single species, but they present differences on close examination which are quite inconsistent with such a supposition. All the species of *Nyctozoilus* are rare in collections. I cannot find in the somewhat numerous published descriptions of and notes on the species of the genus any satisfactory indication of the sexual characters, probably because no one has been in possession of so many conspecific examples as to be able to spare any for dissection, so as to determine the sexes indisputably. After examining a good many specimens (but unfortunately not more than three of any one species) I have satisfied myself that well-defined external sexual characters are wanting, and that the males are only to be distinguished from the females (unless it be *vice versa*) by their narrower and more elongate form. One's first impression on looking for sexual characters is that the presence of tomentosity on the legs is a mark of the male, but I believe this to be a *specific* character. I have of several species two examples of the specific identity of which I do not think doubt is possible, one of which is considerably narrower and more elongate than the other; but in every such instance there is similar tomentosity (if any) on the legs of both. I find the most available characters for specifying the distinctive features of closely-allied species in the antennæ.

N. crassicornis, sp. nov. (2). Opacus, partibus elevatis sat nitidis, corpore subtus pedibusque nitidis; niger, antennis pedibusque picescentibus; capite puncturis obsoletis sat subtilibus suberebre impresso; oculorum orbita sat rotundato; antennis prothoracis basin vix attingentibus, articulis 1° 2° que parvis (his conjunctis quam 3^{us} paullo brevioribus), articulis 4°-10° plus minusve perfoliatis, 4° quam 3^{us} fere duplo breviori fere transverso, 5°-6° que inter se longitudine sat æqualibus quam 4^{us} paullo brevioribus (4° 5° que conjunctis quam 3^{us} parum longioribus), 5° vix transverso 6° fortiter transverso, 7° 8° que inter se æqualibus quam 6^{us} brevioribus sed haud angustioribus, 9° 10° que inter se æqualibus quam 8^{us} et brevioribus et angustioribus sed fortiter transversis, 11° obovato quam 10^{us} sat longiori; prothorace sat fortiter transverso, parum manifeste (fere ut caput) punctulato, antice angustato, ad latera sat late deplanato, marginibus lateralibus incrassatis obsolete recurvis leviter (pone medium plus minusve sinuatim) arcuatis, angulis posticis acutis, disco utrinque fovea magna leviter impresso (hac postice distincte, antice vix manifeste, impressa); elytris costis 5 (suturali inclusa) sinuatis bene elevatis nitidis æqualibus (his inter se irregulariter costis multis transversis similibus conjunctis) ornatis, pone scutellum triangulariter depressis, costarum interspatiis coriaceis paullo rugulosis; femoribus tibiisque posterioribus 4 intus tomento fulvo ornatis; prosterno inter coxas sat fortiter 3-sulcato. Long. 6 l.

Mas. (?) ovalis, lat. $3\frac{3}{5}$ l.

Femina lata, lat. 4 l.

This is the only *Nyctozoilus* I have seen having the sixth joint of its antennæ strongly transverse. The discal impressions on the prothorax in both the examples before me are peculiar in appearing to be below the general surface at their hind margin only and to be gradually effaced forward; this is (partly at least) due to the general surface being a little elevated or gibbous just behind them.

Storm Creek, Stevenson River.

N. approximatus, sp. nov. (2), Fem. ? Opacus, partibus elevatis corpore subtus pedibusque sat nitidis; niger, antennis pedibusque picescentibus; capite prothoraceque fere ut præcedentis (*N. crassicornis*) sed etiam magis obsolete magis sparsim punctulatis; hujus foveis discoidalibus vix manifestis; capite inter oculos longitudinaliter leviter impresso; antennis prothoracis basin fere superantibus articulis 1° 2° que parvis (his conjunctis quam 3^{us} fere duplo brevioribus), articulis 4°-7° gradatim brevioribus quam latioribus (4° multo, 7° paullo) longioribus (4° 5° que conjunctis quam 3^{us} subbrevioribus), 8° transverso quam 7^{us} sat breviori vix latiori, 9° 10° que inter se æqualibus transversis quam 8^{us} et brevioribus et angustioribus, 11° obovato quam 10^{us} sat longiori; elytris fere ut præcedentis sed costarum interspatiis vix rugulosis; femoribus tibiisque haud tomentosus; prosterno inter coxas bisulcato (sulco intermedio fere nullo). Long. $6\frac{1}{5}$ l. Lat. $4\frac{1}{5}$ l.

It will be seen from the above description that this species is very like *N. crassicornis*, but differs from it very widely in the structure of its antennæ and the absence of tomentosity on its legs as well as in several minor characters—the presence of an impression on its head, the almost even surface of its prothorax, the still fainter puncturation of its head and prothorax, etc. I should have been disposed to regard the two as perhaps the sexes of one species, if it were not that it seems impossible to account for one of the specimens of *N. crassicornis* being notably narrower and more elongate than the other, except on the supposition that those two are male and female.

Camp 4, Camp 23.

N. inequalis, sp. nov. (1), Mas. ? Opacus, partibus elevatis corpore subtus pedibusque sat nitidis; niger, antennis pedibusque picescentibus; capite prothoraceque fere ut *N. crassicornis* sed multo magis perspicue punctulatis; hujus disco utrinque ante basin transversim gibbo; oculorum orbitu extus angulato; antennis

prothoracis basin vix attingentibus, articulis 1° 2° que parvis (his conjunctis quam 3^{us} sat brevioribus), articulis 4°-6° gradatim brevioribus quam latioribus (4° multo, 6° paullo) longioribus (4° 5° que conjunctis 3° longitudine sat æqualibus), 7°-10° transversis gradatim paullo brevioribus (7° 8° que et 9° 10° que longitudine æqualibus, sed his quam illi paullo angustioribus), 11° obovato quam 10^{us} sat longiori; elytris ut *N. crassicornis*; femoribus tibiisque haud tomentosis; prosterno ut *N. crassicornis*. Long. 6 l. Lat. $3\frac{7}{10}$ l.

Notwithstanding its great resemblance to the preceding two species, this one presents characters inconsistent with its being conspecific, especially in the structure of its antennæ. Regarding the transverse joints of the antennæ as forming with the last joint a kind of loose "club," this club in *crassicornis* is six-jointed, in *inequalis* five-jointed, and in *approximatus* four-jointed. The present species also differs from both the preceding in its head and prothorax being more closely and much more distinctly (partly I think through its greater opacity) punctured. The absence of tomentosity on its legs associates it with *approximatus*, while in most of its other characters it is nearer *crassicornis*.

Illamurta.

N. irregularis, sp. nov. (1), Fem.? Sat opacus, partibus elevatis pedibusque sat nitidis; niger, antennis pedibusque picescentibus; capite prothoraceque leviter sat crebre sat perspicue punctulatis; oculorum orbitu extus rotundato; antennis prothoracis basin manifeste superantibus, articulis 1° 2° que parvis (his conjunctis quam 3^{us} multo brevioribus), articulis 4° 6° gradatim brevioribus quam latioribus (4° multo, 6° paullo) longioribus (4° 5° que conjunctis quam 3^{us} sublongioribus), 7°-11° ut *N. inequalis*; prothorace parvo modice transverso (quam longiori dimidia parte latiori), antice leviter angustato, ad latera minus late deplanato, marginibus lateralibus leviter incrassatis haud recurvis leviter (pone medium vix sinuatim) arcuatis, angulis omnibus acutis, disco paullo inæquali utrinque ad medium fovea permagna obsoleta impresso et obsolete longitudinaliter canaliculato; elytris costis angustis nitidis reticulatim (harum nullis longitudinaliter continuis) ornatis, pone scutellum triangulariter depressis, costarum interspatiis coriaceis nullo modo rugulosis; femoribus tibiisque glabris; prosterno inter coxas leviter 2-sulcato (sulco intermedio omnino carente); abdomine subtiliter creberrime subrugulose punctulato. Long. $7\frac{2}{3}$ l. Lat. $4\frac{1}{5}$ l.

This species may be at once distinguished from all its described congeners having costate elytra by the entirely reticulate character of its elytral sculpture, none of the costæ presenting any appearance of being continuously longitudinal; the finely rugulose sculpture of its under surface (making the under surface much

more opaque than in most, if not all, of its described congeners) is also a notable character. Its antennæ are much like those of *N. inæqualis*, but are longer and a little more robust.

Emily Gap, near Alice Springs.

HYPOCILIBE.

H. heroina, sp. nov. (2). Late ovata; supra modice subtus etiam magis nitida; aterrima, antennis tarsi-que picescens, illarum articulis apicalibus 3 vel 4 rufescentibus; capite, sternis in media parte abdomineque subtiliter minus perspicue punctulatis; clypei margine cum orbitus ocularis margine haud curvam continuam formanti (ita ut clypeus et orbitus oculares lobas 3 formant); antennis prothoracis basin haud attingentibus, articulis 1° 2° que brevibus (his conjunctis quam 3^{us} multo brevioribus), 4° - 7° inter se sat æqualibus quam latioribus multo longioribus, 8° quam 7^{us} multo breviori sed haud plane transverso, 9° 10° que transversis quam 8° sat brevioribus paullo angustioribus inter se æqualibus, 11° ovali quam 10^{us} paullo longiori; prothorace quam longiori duplo latiori, postice quam antice fere duplo latiori, antice profunde rotundato-emarginato, latitudine majori sat longe pone medium posita, parte laterali a basi ad apicem abrupte sat late planata, margine laterali valde incrassato rotundato-dilatato, ante angulos posticos sinuato, angulis omnibus acutis; elytris subtiliter plus minusve obsolete rugatis; tibiis glabris; prosterni margine antico tuberculo minuto instructo. Long. 11—11 $\frac{2}{3}$ l. Lat. 6 $\frac{1}{2}$ —6 $\frac{3}{5}$ l.

The large size and very broad build (taken together) of this species distinguish it readily from all its described congeners except *major*, Blackb., and *rotundata*, Blackb. The former of these is rather close to it, but *inter alia* is a distinctly narrower insect with the lateral gutter of its prothorax (*i.e.*, the flat space immediately within the thickened margin) effaced considerably in front of the base, whereas in *heroina* the same runs on without any loss of distinctness quite to the basal margin (as in *H. rotundata*). From *H. rotundata* the present species differs *inter alia multa* by the presence of a tubercle on the front margin of its prosternum and the under surface of its head opaque and strongly punctured, whereas in *rotundata* the corresponding surface is nitid and almost lævigata.

Bagot's Creek.

HYPAULAX.

H. orcus, Pasc. (8), Palm Creek, Bagot's Creek, Alice Springs.

CISTELIDÆ.

METISTETE.

M. incognita, sp. nov. (1). Angusta; elongato-ovalis; nitida; glabra; picea, palpis tarsisque testaceo-rufis, tibiis rufescentibus; capite profunde, prothorace obsolete, crebre subtilius punctulatis; hoc quam latiori sublongiori, sat ovali, antice quam postice parum latiori, lateribus sat arcuatis, latitudine majori ad medium posita; elytris punctulato-striatis, puncturis in striis (his leviter impressis) sat magnis subquadratis, interstitiis sat planis sparsim subtiliter punctulatis. Long. 6 l. Lat. 2 l.

Distinguished from the previously-described species of the genus *inter alia* by its elongate prothorax, which to a casual glance appears to be longer than wide, and by measurement is fully as long as wide.

Locality of capture not specified.

LAGRIIDÆ. (?)

LIXIONICA (gen. nov.)

Palpi labiales minuti (articulo apicali dilatato), maxillares elongati (articulo apicali elongato-ovato); mandibula porrecta, ad apicem acuminata arcuata; labrum breve transversum; caput parvum postice angustatum tubulatum; prothorax hexagonalis; oculi (? maris solum) magni, fortiter granulati, supra et subtus subapproximati, antice vix emarginati; antennæ elongatæ, articulis compressis subserratis (basalibus 2 brevibus, 2^o quam 1^{us} breviori, 3^o elongato quam præcedentes conjuncti plus quam duplo longiori, 4^o quam 3^{us} sat breviori, 5^o-10^o ex ordine paullo longioribus, 11^o quam 10^{us} triplo breviori); scutellum modicum; elytra sat parallela, punctulata, costis subtilibus circiter 8 instructis; coxæ anticæ (et inter has prosternum) sat prominentes, postice sat late clausæ; tarsi filiformes simplices, posticarum articulo basali quam sequentes 2 paullo longiori; unguiculi sat elongati, graciles, simplices.

I assign this genus to the *Lagriidæ* on account of its being heteromerous, with the front coxæ closed behind, the claws simple and the front coxæ much raised above the plane of the front part of the prosternum (it is to be noted, however, that the whole hind part of the prosternum rises up from the general plane, so that the coxæ themselves do not project much from this part of the prosternum). A casual glance would assign the genus to the *Cistelidæ*, but I do

not see how it can be placed there, as I cannot detect under a compound microscope any pectination of its claws, and its tarsi are entirely devoid of lamellæ. Its antennæ, with their curious minute apical joint, are extremely suggestive of a place near the *Cistelid* genus *Licymnius*, but other characters are quite inconsistent.

L. costatipennis, sp. nov. (1). Elongata; angusta; parallela; sat opaca; ferruginea, elytris paullo infuscatis; setis adpressis sparsis pallidis vestita; capite prothoraceque confertim subtilissime granulatis (vel potius aspere eoriaceis); hoc quam longiori paullo latiori, antice multo angustato, quam caput sat latiori, disco medio linea subtilissima elevata notato, lateribus ad medium angulatis, pone medium subsinuatis, margine antico truneato (vel etiam late convexo), angulis anticis obtusis posticis rectis, latitudine ad medium sicut ad basin; elytris quam prothorax latioribus et quintuplo longioribus, subfortiter subseriatim sat crebre punctulatis, lineis circiter 9 longitudinalibus subtilibus elevatis instructis; scutello modico, ut elytra punctulato; prosterno vix distincte (corporis subtus ceteris partibus sparsim distincte) punctulatis. Long. 5 l. Lat. $1\frac{1}{5}$ l.

The general appearance of this insect is like that of a narrow, elongate *Cistelid* or *Ædemerid*. Its characters, however, associate it with the *Lagriidæ*, as pointed out above. The prominence of the front coxæ nevertheless is not so marked as in a typical *Lagriid*; the front coxæ rise above the plane of the front part of the prosternum fully as much, but the prosternum itself rises with them so that the narrow piece between them is almost on a level with them; thus their structure seems intermediate between that of a *Lagriid* and a *Tenebrionid*. I have not, however, seen any *Tenebrionid* in the least resembling this insect. The antennæ reach back to about the middle of the elytra. The pallid setæ on the surface are quite conspicuous and have a linear arrangement on the elytra.

Stevenson Creek.

PEDILIDÆ.

EGESTRIA.

E. sulcicollis, sp. nov. (11). Ænea, ore antennis palpis pedibusque rufo-testaceis, labro et antennarum palporum tarsorumque apice plus minusve infuscatis; pallide pilosa et hirtis magis elongatis erectis vestita; capite creberrime subtiliter aspere, prothorace crebre sat subtiliter rugulose, elytris sat crebre subgrosse, punctulatis; prothorace longitudinaliter subtiliter valde perspicue canaliculato,

latitudine longitudini æquali, lateribus ante medium rotundato-dilatatis postice sinuatis. Long. $2\frac{4}{5}$ —3 l. Lat. $\frac{7}{10}$ l.

Ayer's Rock.

RHIPIDOPHORIDÆ.

EMENADIA.

E. Novæ-Hollandiæ, Gerstäck. (3). This insect agrees so nearly in its remarkable colouring and pattern and in almost every other respect with Gerstäcker's description that I cannot see much doubt of its identity, in spite of several slight discrepancies, viz., its small size (Long. $3\frac{1}{4}$ l.), its prothorax being only slightly elevated at the base (the description says "gibboso-elevatus"), and its antennæ being, except at the base, piceous (the description says "antennæ ferruginæ"). The species of *Emenadia* are nearly all very variable in size, and it is quite possible that the description may have been founded on a specimen with antennæ broken, only ferruginous joints remaining. The structure of the base of the prothorax is thus the only certain discrepancy, and even that amounts to no more perhaps than the use by Gerstäcker of a somewhat exaggerated phrase.

CURCULIONIDÆ.

EVADODES, gen. nov. (? *Otiorhynchidarum*).

Rostrum brevissimum crassum, ad apicem triangulariter emarginatum, spatium nitidum nigrum includens; scrobes supernæ cavernosæ breves apicales, retrorsum versus oculos ut sulci lati obsoleti impressæ; oculi parvi rotundati minus convexi; antennæ breves, scapo oculum vix superanti, funiculo 1 articulo, articulis basalibus 2 (his inter se sat æqualibus) quam ceteri (his inter se sat æqualibus haud plane transversis) manifeste longioribus, clava libera ovali; prothorax ad basin sinuatus, lobis ocularibus sat manifestis; elytra elongata postice attenuato-producta, humeris callosis; pedes sat validi sat breves, tibiis anticis intus denticulatis corbulis posticis apertis; tarsis brevibus latis parallelis, unguiculis liberis; metasternum minus breve; abdominis segmenta 3^{um} et 4^{um} conjuncta quam 2^{um} fere breviora; processus intercoxalis sat latus.

The insect for which I propose this new generic name does not appear to me to fit very satisfactorily into any of Lacordaire's "tribes." Its general appearance is quite that of a *Brachyderid*, near *Evas*, but the structure of its rostral scrobes is of an *Otiorhynchid*, being almost exactly as in *Mylloceris*, although owing to the

rostrum not being narrowed near the apex the scrobes seem to be even more entirely upon the upper surface. The scrobes are sharply-defined short triangular cavities (the apex directed forward), from the hind margin of which a wide, scarcely distinct furrow runs hindward along the rostrum, and should perhaps be regarded as a continuation of the scrobe. The general appearance of this insect is extremely like that of *Ochrometa* (as figured Journ. Linn. Soc., 1870, t. 17, f. 6), but its rostrum emarginate at the apex, with a shining black space occupying the emargination (as in many *Leptopsidæ*), its distinct ocular lobes and other characters forbid it a place in that genus.

I may remark that if my type of *Evas lineatus*, Pasc., is rightly named, that species is congeneric with that for which I have founded this genus. It was given to me by Mr. Masters (from whom Mr. Pascoe received *E. lineatus*) as the species Mr. Pascoe so named and seems to agree with the description. But though superficially extremely like an *Evas*, it certainly is not congeneric with the other species Mr. Pascoe placed in the genus, but differs in many characters—its scrobes, its ocular lobes (less developed however than in the present species), its tarsi with their basal two joints scarcely narrower than the third joint, etc. On the whole I think this insect should be placed in the neighbourhood of *Mylocerus* (where also, I cannot but suspect from the description, *Ochrometa* would be more at home than in the *Brachyderide*). Probably if Lacordaire had dealt with it he would have regarded it as representing a distinct "group" of *Otiorrhynchidæ*. It must be admitted that it has very little superficial resemblance to *Mylocerus*.

E. decorum, sp. nov. (2). Dense albido-squamosum, squamis fuscis vittatim ornatum (sc. vitta utrinque a scrobe ad prothoracis basin continuata et vittis in elytrorum interstitiis 2^o 4^o 6^o que positis), antennarum clava nigra; capite inter scrobes bisulcato; prothorace sat fortiter transverso, cum capite sparsim manifeste punctulato, lateribus parum arcuatis; scutello parvo parum rotundato; elytris quam prothorax fere duplo latioribus ad apicem fortiter acuminato-productis sed vix dehiscentibus, fortiter punctulato-striatis, interstitiis leviter convexis sparsim subtiliter punctulatis, humeris sat fortiter calloso-productis. Long. $4\frac{1}{2}$ l. Lat. $1\frac{2}{3}$ l.

The two examples of this insect are both in perfect condition, with scales densely clothing the surface. No doubt the sculpture in an abraded specimen would be very different from what I have described it.

Storm Creek.

EVADOMORPHA, gen. nov. (? *Otiorrhynchidarum*).

Rostrum brevissimum sat crassum, ad apicem (superne visum) vix emarginatum; scrobes supernæ, cavernosæ, breves, apicales, retrorsum versus oculos vix manifestæ; oculi modici, rotundati, modice convexi; antennæ ut *Evadodis* sed clava a funiculo minus distincta; prothorax subcylindricus, lobis ocularibus nullis; clytra elongata postice attenuato-producta, margine basali distincte elevata; pedes modici, tibiis anticis intus denticulatis; corbulis posticis apertis; tarsis modicis, articulo 3^o quam præcedens sat latiori, unguiculis liberis; metasternum et abdomen ut *Evadodis*.

I find it necessary to found this new genus for an insect which I described (Trans. Roy. Soc. S.A., XVI., p. 47) as *Evas everardensis*. Its close alliance with the insect I have mentioned above (as being probably *Evas lineatus*, Pasc.) seemed at the time to justify the location; but if that latter must be taken out of *Evas* (as I am now satisfied it must) my *E. everardensis* cannot remain there. But it could only be in a very polymorphous genus such as *Evas* would be if it contained both (say) *E. acuminata*, Pasc., and the species referred to above as *E. lineatus* that the latter could be regarded as congeneric with *E. everardensis*, and therefore it becomes necessary to regard *E. everardensis* as the type of a new genus closely allied to *Evadodes*, but differing therefrom by its rostrum not being triangularly emarginate nor furnished with a nitid space at the apex, by its prothorax being devoid of ocular lobes—its front margin viewed from the side quite without sinuosity—by its tarsi being distinctly longer and having their third joint (as in most *Curculionidæ*) distinctly wider than the basal two joints, etc.

E. everardensis, Blackb. (19). The specimens taken by the Horn Expedition are all of them more or less abraded—some of them quite devoid of scales. I think it is owing to this alone that they seem to present some differences of sculpture—those entirely denuded of scales appearing as *black* insects with more conspicuous sculpture than is to be seen in the squamose examples.

Palmer River, Alice Well.

MYLLOCERUS.

M. Tatei, sp. nov. (33). Oblongus; squamis læte viridibus confertim sat æqualiter vestitus, squamis in antennis tibiisque magis griseis; rostro sat lato antice leviter angustato; funiculi articulis basalibus 2 elongatis sat æqualibus; prothorace fortiter transverso, ut caput sparsim punctulato, antice vix angustato;

elytris punctulato-striatis, interstitiis planis latis; femoribus omnibus sat fortiter dentatis. Long. (rostr. incl.) $2\frac{4}{5}$ — $3\frac{1}{5}$ l. Lat. 1 — $1\frac{1}{10}$ l.

Near *M. Darwini*, Blackb., but at once distinguishable by *inter alia* the evidently longer basal two joints of the funiculus, the second of which is not at all shorter than the basal one.

Idracowra, on *Dodonæa viscosa*.

POLYPHRADES.

P. tumidulus, Blackb. (68), Oodnabarrina, Tempe Downs, Storm Creek, Reedy Creek.

P. satelles, Blackb. (8), Idracowra, Illamurta (on Cassia).

LEPTOPS.

L. interioris, Blackb. (3), Alice Springs.

L. gravis, Blackb. (5), Crown Point, Idracowra, Illamurta (on Cassia).

L. contrarius, Blackb. (15), Idracowra, Tempe Downs, Alice Well, Charlotte Waters, Finke R., Ayers' Rock, Crown Point (on *Acacia frumentaria*). Some of the examples are so densely clothed with whitish scales that the black derm is scarcely visible.

L. sculptus, sp. nov., fem. (1). Ovalis; minus nitidus; piceo-niger, pube grisea (hac in cavitatibus squamis minus conspicuis aurantiacis variegata) et setis minutis albidis vestitus; rostro supra 5-carinato, carinis ante oculos (haud abrupte) desinentibus; capite inter oculis breviter sulcato; scrobibus rectis bene determinatis; prothorace transverso, crassissime ruguloso, late canaliculato, antice paullo angustato, lateribus modice arcuatis mox ante basin sinuatis, angulis posticis (superne visis) rectis; elytris 3-seriatim tuberculatis, serie 1^a fere ad elytrorum medium cariniformi, in utroque elytro tuberculo suturali ad declivitatis posticæ basin posito, angulis humeralibus (superne visis) obtusis bene determinatis; metasterno postice tuberculo obtuso transverso armato. Long. (rostr. incl.) 14 l. Lat. $5\frac{1}{2}$ l.

A large species, bearing much resemblance to several of its congeners, but distinguished from all of them (at any rate, from all the large species known to me) by its rostral scrobes being linear (as in *L. tribulus*, Fab.) but quite straight. From *L. colossus*, Pasc., *raucus*, Blackb., *biordinatus*, Blackb., and *planicollis*,

Blackb., it differs by the carinæ on the upper surface of the rostrum not being at their base abruptly raised from the general surface. The elytra scarcely differ from those of the same sex in *L. tribulus*, Fab., except in the tubercles being throughout a little stronger and the inner row of tubercles having no tendency to diverge hindward from the suture. The sculpture of the prothorax is as in *L. gravis*, Blackb., being much coarser and more deeply impressed than in *L. tribulus*.

Bagot's Creek.

L. tempeensis, sp. nov. (16). Niger; sat nitidus; squamis albidis vestitus; rostro sat convexo, supra longitudinaliter carinato et utrinque leviter sulcato, inter oculos profunde foveolato, scrobibus (fere ut *L. tribuli*, Fab.) sinuatis bene determinatis; prothorace crebre punctulato et transversim crasse confuse rugato, canaliculato (canali antice abbreviato et ut fovea magna terminato), longitudine latitudini æquali, lateribus ante medium rotundato-dilatatis (latitudine majori ante medium posita), angulis posticis (superne visis) rectis subdentiformibus; scutello minuto; elytris crassissime seriatim punctulatis, transversim rugatis (interstitiis longitudinalibus a transversis haud disparibus), elytro utroque pone medium tuberculis 4 quadratum positis armato (horum anterioribus 2 majoribus, posteriori-externo minuto vel obsoleto, posteriori-interno juxta suturam posito), angulis humeralibus acutis antrosum prominentibus. Long. 6—7 l. Lat. 2—3½ l.

This species is not very closely allied to any other known to me. It is notable for the entire absence of tubercles (except the three or four near the apex of each elytron) and costæ, the third and fifth interstices however being slightly (in some examples scarcely) convex for a short distance at about the middle of their length. The punctures of the elytra are large and coarse, separated from each other by narrow interstices, which are as distinctly marked transversely as longitudinally; the seventh longitudinal interstice forms a marked ridge, owing to the part of the elytra beyond it being suddenly declivous. The joints of the funiculus are all transverse and subequal in length, the first, however, a trifle longer than the others. All the examples before me are much abraded, and to a casual glance appear as somewhat nitid, entirely black insects; but the presence of a few small patches of white scales on some of them (in variable positions) suggests the probability that a perfectly fresh specimen is much clothed with white scales. The patch of acuminate conical tubercles near the apex of each elytron varies in development; in some examples there are only three *distinct* tubercles, the postero-external one being so obsolete as to need looking for, while in others there are

four very conspicuous tubercles and even some indication of a fifth still nearer to the apex.

Tempe Downs.

L. palmensis, sp. nov. (2). Ovalis; minus nitidus; piceo-niger, squamis griseis et cervinis intermixtis vestitus; rostro supra in medio longitudinaliter carinato et utrinque leviter sulcato, inter oculos obsolete impresso, scrobibus (fere ut *L. tribuli*, Fab.) sinuatis bene determinatis; prothorace transversim subquadrato, antice minus angustato, crebre punctulato et sparsim inæquali, canaliculato (canali antice vix abbreviato, ut fovea elongata terminato), lateribus leviter arcuatis mox ante basin sinuatis (latitudine majori ad medium posita) angulis posticis (superne visis) rectis subdentiformibus; elytris striatis (striis crasse punctulatis), interstitiis alternis distincte elevatis et tuberculatis (tuberculis subobsoletis, tribus subapicalibus exceptis, horum uno in interstitio suturali uno in interstitio 3^o uno in interstitio 5^o positis), angulis humeralibus subrectis; metasterno postice haud tuberculato. Long. 6 l. Lat. $2\frac{4}{5}$ l.

An inconspicuous-looking species with no very strongly-marked characters. I should judge that a perfectly fresh specimen would be rather densely clothed with grey scales, some light brown ones intermingled. The alternate elytral interstices are only gently elevated and are obscurely knobby rather than distinctly tuberculate, except in having three well-defined conical but not large (that on the third interstice the largest) tubercles towards the apex. The tubercles of the third and fifth interstice are at the summit of the posterior declivity, that of the sutural interstice further back and close to its fellow of the other elytron. The antennæ are stout, the joints of the funiculus transverse and not differing much in length *inter se*.

Palm Creek.

L. Horni, sp. nov. (3). Sat breviter ovalis; minus nitidus; piceo-niger, squamis albidis vestitus; rostro ut *L. palmensis* sed capite inter oculos profunde foveolato; prothorace sat transverso, antice fortiter angustato, crassissime vermiculato-ruguloso, late minus distincte canaliculato (canali antice ut fovea dilatato), lateribus sat fortiter rotundatis mox ante basin sinuatis (latitudine majori vix ante medium posita), angulis posticis (superne visis) rectis subdentiformibus; elytris sat crasse punctulato-striatis, interstitiis alternis obsolete alternis magis distincte tuberculatis, tuberculis a basi retrorsum in magnitudine crescentibus, angulis humeralibus subacutis antrorsum vix prominentibus; metasterno postice haud tuberculato. Long. $5\frac{1}{2}$ l. Lat. $2\frac{2}{3}$ l.

Another species of inconspicuous appearance, but which is evidently distinct from any *Leptops* previously described. Its general aspect is very uneven and rough, but none of the tubercles on its elytra are very large. All the elytral interstices are furnished with tubercles, which in the front part of the elytra are close-set knobby inequalities rather than defined tubercles. The tubercles of the seventh interstice (the insect being viewed from above) seem to project laterally, forming a wavy edge to the elytra, and of these the third from the base is a little more prominent than the rest. The conical tubercles are as follows:—The sutural interstice has a conspicuous one at the summit of the posterior declivity and a very small one close in front of it; the third interstice has two conspicuous ones in front of the posterior declivity, and two very small ones on the face of the declivity; and the fifth interstice has two conspicuous ones in front of the posterior declivity (the hindmost of these two close to the summit of the declivity). The antennæ are more slender than those of the preceding species, the basal two joints of the funiculus almost equal to each other in length and evidently longer than the rest.

Storm Creek, Stevenson Creek.

CATASARCUS.

C. farinosus, sp. nov. (2). Sat breviter ovalis (minus breviter quam *C. transversalis*, Germ.); niger, antennis pedibusque piceo-rufescentibus; squamis albis vestitus; rostro carina mediana nitida instructo; fronte inter oculos impressa; funiculi articulo basali quam 2^{us} breviori; prothorace brevi crasse vermiculato-ruguloso; scutello vix manifesto; elytris seriatim foveato-punctulatis, interstitiis (præsertim 4^o 7^o 8^o 9^o 10^o que) anguste convexis et interrupte rugulosis (fere subtuberculatis). Long. (rostr. incl.) 5—6 l. Lat. 2½—3½ l.

This species belongs to the section of *Catasarcus*, having elytra devoid of spines or well-marked tubercles. Even the posthumeral tubercle is scarcely marked. In one example it is apparently absent, being so slight as to be concealed by the scales; in the other (which is more abraded) the lateral edging of the elytra ceases a little below the shoulder abruptly, thus forming a feeble tooth. Probably a perfectly fresh specimen is densely covered with white scales; both the specimens before me are abraded and their scales are irregularly patchy. The rostral carina runs back to the level of the front of the eyes, and the rostrum is somewhat slender and elongate for a *Catasarcus*. The scrobes are sinuous and well-defined, being less deflexed than in most *Catasarci* and more like those of a *Leptops*, to which genus I should be disposed to refer this insect were it not that its claws are those

of a *Catasarcus*. The second joint of the funicle considerably longer than the first is a well-marked character. I cannot say confidently where this species would fall in Mr. Pascoe's table of *Catasarci* (Tr.E.S., 1870), for I am unable to arrange the species of the genus in Mr. Pascoe's groups, where a main distinction consists in the species being (*a*) moderately or (*b*) strongly "convex above." If this species is regarded as "moderately" convex above it must be near *opimus*; if "strongly," it is probably near *effloratus*. I am not sure that I know either of those species, but the present insect is clearly distinct from both.

Palm Creek, Storm Creek.

TALaurINUS.

T. inequalis, sp. nov., Mas. ? (1). Ovalis; sat opacus; piceo-niger, pube brunnea setis minus brevibus nigris intermixtis vestitus, pedibus vix rufescentibus; capite vix manifeste punctulato; rostro brevi quam caput angustiori, ad apicem emarginato, carinis externis antrorsum parum divergentibus internis vix determinatis; antennis crassis sat brevibus, funiculi articulis (1^o subquadrato excepto) transversis; prothorace vix transverso, minus confertim tuberculato, antice quam trans basin vix angustiori, lateribus minus arcuatis ante medium vix dilatatis, latitudine majori vix ante medium posita; elytris sat convexis, leviter 3-costatis, costis et sutura (hac nullo modo costiformi) granulis nitidis seriatis crebre instructis, intervallis inter suturam costamque 1^{am} et inter costas 1^{am} 2^{am} que sat latis seriatim leviter bifoveolatis (inter fovearum series intervallo granulis majoribus sparsis instructo), intervallo inter costas 2^{am} 3^{am} que sat angusto vix biseriatim foveolato (granulis minutis sat crebre seriatis instructo), angulis humeralibus sat acutis vix tuberculiformibus, apice suturali vix acuta; tarsis sat brevibus; abdomine medio longitudinaliter hirsuto, segmento apicali vix transversim depresso. Long. 6 l. Lat. 2 $\frac{3}{5}$ l.

I am unable to specify any previously-described *Talaurinus* with which this species can be usefully compared on account of its elytra being (when carefully observed) distinctly (and from a certain point of view very noticeably) 3-costate, and yet very differently so from any of the species known to me of those which Sir W. Macleay places in his group of *Talaurini costati*, for the suture is not costate and the three costæ are all very much feebler than in (*e.g.*) *hisipennis*, Macl., and *Mastersi*, Macl. It may be recognised by its very stout antennæ (resembling those of *T. typicus*, Macl.) and the black colour and unusual length of the setæ of its upper surface. The sculpture of its elytra also is decidedly characteristic in the absence of any protuberances large enough to be called

tubercles. The suture and each of the costæ bear a close-set row (partially doubled on the first costa) of small granules, while the wide space between the suture and first costa and between the first and second costæ bears a row of distantly-placed and manifestly larger granules. The brownish pubescence is denser and more conspicuous on the head than elsewhere, and a feebly-defined longitudinal vitta of paler brown pubescence runs down the forehead. I may add that Mr. T. G. Sloane, who has made a special study of the *Amycterides*, has done me the favour of inspecting this insect, and is of opinion that Sir W. Macleay would have placed it among the *T. granulati* near *T. nodulosus*.

Palm Creek.

T. rufipes, sp. nov. (10). Niger, pedibus rufis, genibus tarsisque piceis; capite postice squamis piliformibus silaceis dense vestito, tuberculis in toto corpore setas breves rufas singulas ferentibus; capite sparsim distincte punctulato; rostro perbrevis quam caput paullo angustiori, ad apicem emarginato, carinis externis antrorsum leviter divergentibus internis bene determinatis; prothorace quam longiori parum latiori, confertim (fere ut *T. rugicipitis*, Macl., sed tuberculis paullo minoribus) tuberculato, antice quam trans basin vix angustiori, latitudine majori ante medium posita, lateribus pone medium vix subsinuatis; elytris modice convexis, seriatim crebre æqualiter tuberculatis, interstitiis seriatim granulatis, angulis humeralibus fortiter tuberculiformibus, apice suturali plus minusve spiniformi; tarsis sat elongatis.

Maris segmento ventrali ultimo fovea magna leviter impresso, in hac fovea versus apicem fovea altera parva profunda posita; tibiis intermediis ante apicem intus late profunde emarginatis.

Feminae segmento ventrali ultimo haud impresso; tibiis integris. Long. 9—10 l. Lat. $3\frac{4}{5}$ —4 l.

This is a distinct species, notable for its red legs and the very peculiar structure of the intermediate tibiæ in the male. The sculpture of its upper surface resembles that of *T. rugiceps*, Macl., but the tubercles are smaller on both prothorax and elytra; consequently the rows of tubercles on the elytra are a little more widely separated one from another, leaving room for a distinct intermediate row of granules.

Palm Creek, Finke Gorge, Paisley Bluff.

T. imitator, sp. nov. (12). Niger, pedibus plus minusve rufescentibus; capite cum rostro vix manifeste punctulato setis piceis brevibus sparsim vestitus; illo

postice subtiliter granulato-rugato ; rostro brevi cum capite continuo et quam hoc vix angustiori, ad apicem emarginato, carinis externis et internis obliquis parum elevatis ; prothorace quam longiori haud (maris) vel vix (feminæ) latiori, confertim (quam *T. rufipedis* paullo minus grosse minus crebre) tuberculato, antice quam trans basin paullo latiori, latitudine maxima fere ad marginem anticum posita, lateribus parum arcuatis ; elytris sat convexis, confuse subseriatim crebre granulis vel tuberculis parvis instructis, angulis humeralibus tuberculiformibus, apice haud spiniformi ; tarsis sat elongatis.

Maris segmento ventrali ultimo latissime impresso, parte depressa ad latera carinata ; tibiis intermediis ante apicem intus late emarginatis ; femoribus anticis dilatatis.

Feminæ segmento ventrali ultimo ad apicem tuberculo parvo armato ; pedibus simplicibus. Long. 6—7½ l. Lat. 2½—3½ l.

It is noteworthy that two species from one locality and so widely distinct *inter se* as are this and the preceding nevertheless possess in common two characters so unusual in the long series of *Talaurini* as legs of red colour and a remarkable sexual structure of the intermediate tibiæ. The most conspicuous superficial distinctions of this species from the preceding (*T. rufipes*) are its much smaller size and the much finer, closer, and more confused sculpture of its elytra. I have no other *Talaurinus* in my collection in which the tubercles and granules (of various sizes but none of them large) are so numerous and confusedly intermingled. The present insect may also be at once distinguished from *T. rufipes* by the different structure of the apical ventral segment in the male, which bears (instead of a feebly limited almost square impression, with a small deep fovea near its apex) only a deep and strongly transverse impression, with its lateral edges very sharply defined by a kind of carina.

Crown Point.

SCLERORHINUS.

S. (Talaurinus) convexus, Sloane (5). Mr. Sloane has been so generous as to send me his unique type of this species for inspection. It appears to be a somewhat narrower and more parallel insect than the specimens in the Horn collection of the same sex, but I cannot see any sufficient character for regarding it as a distinct species. Although Mr. Sloane described it as a *Talaurinus* I am unable to follow him in that assignment, concerning which he felt doubtful himself. The sexual characters are certainly those of a *Sclerorhinus*.

Deering Creek, Tempe Downs, Hermannsburg.

ACANTHOLOPHUS.

A. Tatei, sp. nov., fem. (1). Sat late ovalis ; fuscus, squamis albidis et silaceis intermixtis vestitus, illis capitis partem anticam prothoracis latera pedesque tegentibus et prothoracis partem mediam elytrorumque latera vittatim ornantibus ; rostro utrinque supra oculum crista valida apicem versus in ramis 2 divisa instructo ; antennarum funiculi articulis basalibus 2 inter se sat æqualibus ; prothorace spinis acutis 4-seriatim armato ; elytris ad apicem mucronatis, seriatim foveolatis et granulatis ; granulorum serie 2^a spinam sat magnam serie 3^a spinas 3 postice armatis, serie 5^a tota spiniformi (spinis retrorsum gradatim majoribus), serie 7^a prope basin spinis 2 armatis. Long. 8 l. Lat. 3½ l.

This species differs from most of its congeners in the shape of the crests over its eyes. These rise from the surface in the form of a single stem which branches into two spines, the hinder and larger one curved hindward, the anterior one appearing to branch off from it and being curved forward and upward ; the whole crest somewhat resembles a deer's antler. The median series of spines on the prothorax each consist of six spines ; the lateral series each consist of a large bifid spine near the front and a small bifid one behind it (both directed outward). The whole surface of the elytra is occupied by rows of small shining granules, interspersed with spines of diverse size as described above, the spines on the hinder part (none of them, however, continuing to the apex) of the second, third, and fifth rows of granules, and those at the base of the seventh series being the largest. Those near the base of the fifth series are very small (not much larger than the ordinary granules), and the two or three granules next after the basal 2 spines of the seventh series might almost be called small spines, being distinctly larger and more pointed than the ordinary granules. In Sir W. Macleay's classification of the *Acantholophi* (Tr. E.S. N.S.W., Vol. I.) this species would fall, I think, in the first division of Section 2 (distinguished by elytra with three rows of tubercles, the external one containing less than four tubercles or spines). The peculiar form of the crest over the eye distinguishes this from the others of that division.

Charlotte Waters.

A. simplex, sp. nov. (4). Sat angustus, elongato-ovalis (mas.) vel elytris late ovalibus (fem.) ; piceus, opacus, tuberculis granulisque magis nitidis ; squamis umbrinis plus minusve (exemplorum typicorum sparsim) vestitus ; tuberculis omnibus setas pallidas singulas ferentibus ; rostro sat brevi concavo, carinis lateralibus sat elevatis antice sat abrupte declivibus ; capite longitudinaliter oblique rugato, cristis modicis obtusis bilobis (exempli fem. vix bilobis), lobo postico quam

anticus paullo altiori; prothorace quam longiori, vix latiori, antice quam postice sublatori, supra planato, canaliculato, pone marginem anticum et ante basin transversim profunde sulcato, disco minus crebre tuberculis obtusis instructo, parte ante sulcum anticum tuberculis majoribus transversim positis ornata, laterum parte mediana tuberculis conicis extrorsum directis 3 vel 4 armata; elytris tuberculis parvis conicis (in seriebus circiter 9 confertim dispositis) instructis, his inter se fere æqualibus sed nonnullis apicem versus et in humeris quam ceteri paullo majoribus, apice suturali tuberculiformi.

· Maris segmento ventrali basali concavo, 2^o in medio planato, apicali grosse granulato-punctulato et setis suberectis vestito.

Feminae abdomine convexo; segmento ventrali apicali multo minus grosse punctulato et setis adpressis vestito. Long. $7\frac{1}{3}$ l. Lat. $3-3\frac{1}{3}$ l.

This species is very distinct from any other known to me by the even sculpture of its elytra, which consists of rows of closely-placed small tubercles of almost equal size and shape, those about the shoulder and the upper part of the hind declivity being, however, a little stronger than the rest, the intervals between these rows being gently concave and traversed by numerous transverse wrinkles. The elytra are thus much more like those of a *Cubicorhynchus* than of most *Acantholophi*. The head and prothorax are much like those of *A. planicollis*, Waterh., from which they differ, however, in the lateral ridges of the rostrum being continuous, the head not tuberculate between the eyes and the prothorax more elongate with stronger lateral tubercles. It may be distinguished from *A. granulatus*, Sloane, which it resembles, by (*inter alia*) the granules on its elytra running in single (not double) rows.

Illamurta, Palm Creek.

CUBICORHYNCHUS.

C. dilaticeps, sp. nov. Mas. ? (1). Ovalis; piceo-niger, pube brunnea setis brevibus pallidis intermixtis sparsim vestitus; capite sparsim granulato, supra oculos utrinque cristato, crista rostri planum oblique retrorsum et extrorsum continuanti; rostro perbrevis latissimo, quam longiori fere duplo latiori supra subplanato vel potius leviter concavo, ad latera sparsim punctulato, antice profunde emarginato; prothorace quam longiori plus quam dimidio latiori, fortiter æqualiter tuberculato (tuberculis fere ut *Sclerorhini biordinati*, Mael., sed magis æqualiter dispositis), lateribus sat fortiter dilatato-rotundatis; elytris crebre seriatim tuberculatis, seriebus alternis e tuberculis sat magnis (nihilominus quam prothoracis sat

minoribus) alternis e tuberculis parvis constantibus, humeris vix productis; segmentis ventralibus basalibus 2 longitudinaliter concavis. Long. 6 l. Lat. $2\frac{1}{2}$ l.

I do not think this species can be confused with any other described *Cubicorhynchus*; its very short rostrum flattened above (or rather having its entire upper surface gently and evenly concave), transversely quadrate, and as wide as the head is behind the eyes—with the crests appearing as prolongations of the rostrum and directed obliquely hindward and outward, and looking like set-back ears of some animal—furnishes very unmistakable characters. The strong, even tuberculation of the prothorax is also highly characteristic.

Charlotte Waters.

ATYCHORIA.

A. rudis, sp. nov. (4). Ovalis (fem. quam mas magis late); parum nitida; nigra, squamis pallidis plus minusve vestita (exemplis typicis fere glabris) et tuberculis omnibus setas obscuras ferentibus; rostro brevi supra ruguloso, quam caput paullo angustiori, in medio longitudinaliter anguste profunde canaliculato, dorso utrinque extra sulcum in parte posteriori a sulco brevi profundo in lobis 2 divisa; capite obsolete tuberculato, convexo; prothorace quam longiori parum latiori, tuberculis obtusis sat grossis crebre instructo, antice quam postice vix angustiori, lateribus rotundatis, latitudine majori ante medium posita; elytris tuberculis obtusis crebris valde rugulosis, his plus minusve seriatim positus, interstitiis obscure foveatis, humeris et tuberculorum serie tertia antrorsum fortiter tuberculiformibus, apice suturali minute acute producto.

Maris segmentis ventralibus setis erectis sat brevibus minus crebre vix vittatim vestitis, segmento basali late leviter concavo.

Feminae abdomine glabro æquali. Long. $4-5\frac{1}{2}$ l. Lat. $1\frac{3}{5}-2\frac{2}{5}$ l.

I have some hesitation in referring this insect to *Atychoria*, because the genus is known to me only by description; but I do not think there is much doubt about it. *Atychoria* is notable among the characterised genera of *Amycterides* through its occupying an intermediate position between the groups with antennæ having short and long antennal scape, its scape reaching back just beyond the front margin of the eye.

Storm Creek, Tempe Downs.

OPHRYOTA.

O. rapax, sp. nov. (8). Ovato-ampliata; picea, squamis cinereis umbrinisque diverse intermixtis vestita; capite inter oculos concavo utrinque super oculos crista erecta (hac in rostrum haud continuata) insigni; rostro quam caput multo longiori, in medio longitudinaliter leviter concavo, utrinque mox intra marginem lateralem leviter carinato; prothorace sat transverso, antice angustato, pone marginem anticum fovea sat magna leviter impresso, confuse sat grosse nec crebre ruguloso; elytris quam prothorax multo latioribus (maris quam feminae magis angustis magis parallelis), punctulato striatis, interstitiis convexis, 3^o 5^o que in parte posteriori tuberculis 2 vel 3 ornatis, humeris extrorsum tuberculiformibus; tibiis ad apicem externum processu spiniformi (hoc ad apicem minute bifido) armatis. Long. (rostr. incl.) $3\frac{1}{2}$ —4 l. Lat. $1\frac{3}{5}$ —2 l.

Very like *O. squamibunda*, Pasc., but at once distinguishable by the peculiar spine-like external process at the apex of the tibiae, also by its evidently longer rostrum, frontal crests ending abruptly in front instead of gradually merging into the rostrum, evidently shorter prothorax, etc. The less I say about the arrangement of the squamosity the better, as all the examples before me seem more or less abraded. Judging, however, by the least abraded, I should expect that the pattern on a fresh specimen bears much resemblance to that of *O. squamibunda*.

Crown Point.

DYSOSTINES.

A single example (female) of this genus was taken at Crown Point. The specific characters of the previously-described species depend so much on the sexual differences of the males that it seems to me scarcely justifiable to describe a *Dysostines* of which the male is unknown.

OXYOPS.

O. sicca, sp. nov. (2). Modice angusta; squamis albidis vestita, squamis hic illic interruptis sic ut notationes sat determinatae nonnullae formantur; antennis tibiis tarsisque obscure testaceis vel piceo-testaceis; oculis prominulis; rostro sat elongato; prothorace trans basin quam longiori paullo latiori, a basi antrorsum arcuatim angustato, subtilius sat crebre ruguloso, subobsolete tricarinato; scutello modico; elytris inaequaliter punctulato-striatis, interstitiis leviter convexis inter se aequalibus, humeris vix prominulis, striis suturalibus in parte mediana grosse foveatis; mesosterno antrorsum sat prominulo. Long. (rostr. incl.) 4— $5\frac{1}{2}$ l. Lat. 2— $2\frac{3}{4}$ l.

This species resembles *O. concreta*, Pasc., and *O. Mastersi*, Pasc., but differs from both by the interstices of its elytra being evenly and only slightly convex. Compared with *O. Mastersi* its antennæ are notably shorter and the front tibiæ (I have both sexes before me) scarcely arched. The whitish scales are disposed as in *O. Mastersi*, so that the apical half of the elytra appears whiter than the front half and there are two narrow dark fasciæ, one in front of the middle and the other immediately in front of the posterior pallid space.

Illamurta, Palm Creek.

O. Spenceri. sp. nov. (1). Minus angusta; squamis favosis dense vestita, his nonnullis dilutioribus intermixtis (sc. 3-vittatim in prothorace in scutello toto et maculatim vix perspicue in elytris); oculis minus prominulis; rostro modico; prothorace vix transverso, a basi antrorsum arcuatim angustato, minute vix crebre granulato, vix manifeste 3-carinato; elytris seriatim punctulatis, puncturis sat magnis quadratis sed in parte elytrorum antica sub squamas omnino abditis, humeris subprominulis; mesosterno antrorsum sat prominulo; tibiis brevibus fortiter compressis; tarsorum articulo ultimo ex articuli 3ⁱ lobis vix productis; antennis brevibus, funiculi articulis 3-7 transversis. Long. $3\frac{1}{2}$ l. Lat. $1\frac{1}{5}$ l.

Densely clothed with pale fawn-coloured scales, which are indistinctly paler in forming three vittæ on the prothorax, in clothing the scutellum, and in forming some scarcely-discernible spots on the elytra. The short antennæ (not nearly reaching the base of the prothorax), the very short and very strongly-compressed tibiæ, and the claw-joint of the tarsi scarcely passing the lobes of the preceding joint are very distinctive characters, which would perhaps justify the creation of a new genus, but as the insect has entirely the fascies of *Oxyops* I prefer to place it in that genus.

Idracowra, on Cassia.

BRYACHUS.

B. squamicollis, Pasc. (1), Camp 16.

HYPHÆRIA.

H. parallela, Blackb. (1), Alice Springs.

DESIANTHIA.

D. maculata, Blackb. (5), Stevenson River. [These examples are larger than any others that I have seen (Long. 4 l.), but I do not find any other distinctive character about them.]

EMPLESIS.

E. ænigmatica, sp. nov. (17). Ferruginea; squamis griseis et ferrugineis vel fuscis inconstanter vestita; antennis sat validis, funiculi articulo 1^o quam 2^{us} vix (hoc quam 3^{us} magis quam) dimidia parte longiori; prothorace antice rotundato-producto, apicem versus sat subito constricto, lateribus leviter rotundatis; elytris punctulato-striatis; prosterno antice longitudinaliter concavo.

Maris rostro leviter areuato, minus valido, quam prothorax dimidia parte longiori; antennis sat longe ante rostri medium insertis.

Feminae rostro gracili, sat arcuato, quam prothorax fere duplo longiori; antennis vix ante medium rostri insertis. Long. 2 l. Lat. $\frac{3}{5}$ l.

In general appearance this species is extremely like *E. munda*, Blackb., and *assimilis*, Blackb., but is at once distinguished from both by its longer rostrum. Its rostrum is so much longer than that of *E. assimilis* that there can be no confusion between the two species. Besides a very decided difference in this respect it may be noted that the present insect differs from *E. munda* by the second joint of its antennal funiculus being longer in proportion to the third joint, by its prothorax less rounded on the sides with its greatest width nearer the front, and by a difference in the squamosity of its prothorax—the scales on the prothorax of *E. munda* being larger, more crowded, and less flatly adpressed, so that the segment has a somewhat shaggy appearance, whereas in *E. ænigmatica* the scales are small, distinct from each other, and quite flat to the surface, so that they seem to be smoothly laid on.

Reedy Hole, Illamurta.

CYDMÆA.

C. fumosa, sp. nov. (3). Sat late ovalis; picea vel rufo-picea, rostro, antennis (funiculi articulis 2–7 exceptis), pedibusque (tarsis exceptis) rufis; squamis albidis fumosisque intermixtis dense vestita; rostro quam prothorax vix longiori, parum compressa, minus robusto; funiculi articulo 1^o quam 2^{us} multo longiori; prothorace vix transverso; elytris punctulato-striatis, interstitiis leviter convexis. Long. (rostr. incl.) $1\frac{2}{3}$ l. Lat. $\frac{3}{5}$ l (vix).

This minute *Curculionid* is scarcely at home in *Cydmæa* on account of its rostrum being less robust and compressed than in the typical members of the genus (e.g., *C. luctuosa*, Pasc.) and the ocular lobes being very feeble, but it is certainly so close to *Cydmæa* in all essential characters that it seems unnecessary

to found a new genus for it. It is so densely covered with closely adpressed small scales that the derm is invisible except by abrasion. Regarding the whitish scales as forming the ground colour, the smoky blackish scales form three vittæ and some minute spots on the prothorax, and on the elytra a pattern of irregular zig-zag transverse lines consisting of small mostly confluent spots, the scutellum and hinder half of the suture being also clothed with smoky blackish scales. The scales of the head, legs, and under surface are almost entirely whitish, with a tendency to a greenish tone in places.

Storm Creek, Finke River.

BELUS.

B. anguineus, Pasc.? (1), Camp 4. I take this insect to be a variety of a species I have myself taken in southern Central Australia and which I have, not without some uncertainty, referred to *anguineus*.

TENTEGIA.

T. Spenceri, sp. nov. (6). Breviter ovata; sat opaca; picea, antennis ferrugineis; squamositate ferruginea in partibus depressis vestita; capite (hoc æquali) rostroque grosse punctulato-ruguloso, hoc fortiter 5-carinato; prothorace ut caput punctulato-ruguloso, fortiter transverso, antice (superne viso) subtubulato, lateribus ante medium dilatato-rotundatis, postice rectis convergentibus; elytris ad basin quam prothoracis basis paullo latioribus, seriatim (vix profunde) foveatis, interstitiis convexis (his tuberculis parvis obtusis et granulis nitidis instructis), pone humeros rotundatim dilatatis, humeris antrorsum sat prominulis; femoribus ut caput punctulato-rugulosis, subtus ante apicem dente minuto instructis; tarsorum articulo 3^o quam 2^{us} vix latiori sed ad apicem sat profunde inciso; metasterno et abdominis segmentis basalibus 2 crassissime foveatis, segmentis 3^o 4^o que brevissimis lævibus, segmento apicali minus grosse punctulato. Long. (rostr. incl.) 4 l. Lat. $2\frac{1}{3}$ l.

The small but distinct tooth on the underside of the femora seems to be little more than the angle formed by the presence of a deep and abrupt emargination on the lower face of the segment immediately before its apex. It is most conspicuous when the front face of the femur is looked at from such a position as to display the *outline* of the lower surface. The presence of this tooth distinguishes *T. Spenceri* from *T. favosa*, Pasc., and *T. sana*, Faust, while the absence from the forehead of a longitudinal sulcus and from the rostrum of a fovea between the bases

of the antennæ distinguishes it from *T. basalis*, Faust, and *T. ingrata*, Faust, respectively (the other two previously-described species).

Illamurta, Rudall's Creek.

T. parva, sp. nov. (1). Subglobosa; nigro-picea, pedibus obscure rufescentibus, antennis rufis ad apicem dilutionibus; setis pallidis brevibus vestita; capite (hoc æquali) rostro prothoraceque grosse punctulato-ruguloso; rostro vix perspicue 2-vel 3-carinato; prothorace fortiter transverso, margine antico super caput sat producto, lateribus modice sat æqualiter arcuatis; elytris (superne visis) fere æqualiter subcircularibus, seriatim foveolatis, interstitiis convexis tuberculato-rugulosis, humeris parum prominulis; femoribus punctulato-rugulosis, subtus ante apicem dente acuto bene determinato (hoc in femoribus posticis minus perspicuo) armatis; tarsorum articulo 3^o quam 2^{us} laud latiori, fere integro; abdomine ut præcedentis (*T. Spenceri*). Long. (rostr. incl.) 3 l. Lat 2 l (vix).

The following characters in combination distinguish this species from all the *Tentegia* previously described:—Underside of femora with a well-defined sharp tooth, elytra not or scarcely callose below the humeral angle.

Palm Creek.

ELÆAGNA (?)

The collection contains an example (from Reedy Hole) probably referable to this genus but abraded to such a degree that it is impossible to determine it specifically.

LONGICORNES.

EURYNASSA.

E. (Mallodon) australis, Boisd. (7). I think the examples of this fine *Prionid* taken by the Horn Expedition may certainly be attributed to Boisduval's species, which (as Mr. Gahan points out, Tr.E.S., 1893) is no doubt the species subsequently described by Pascoe as *Mallodon figuratum*. The present series is interesting as showing that the insect is a very variable one, varying even in respect of characters that might easily be regarded as specific. Among the males I notice the following divergences:—In the antennæ the basal joint is longer or shorter (in one example scarcely longer than in *E. Odewahni*, Pasc.) ; the prothorax is quadrate or narrower in front or narrower behind, and is more or less transverse and more or less convex, also in some specimens the nitid spaces coalesce and almost

entirely cover the disc, and in others are almost wanting, also the lateral crenulations are not alike in any two specimens; the colour of the elytra varies from dark piceous to ferruginous, in some examples the elytra are more nitid than in others, and in some the sutural apex is more evidently spiniform than in others; the close granulation of the abdomen in some examples entirely covers each segment, while in other examples a small space in front of the apex of each segment (independent of the connecting membrane) is nitid; and some of the examples are more depressed in form and smaller than others. The female is interesting on account of its great divergence from the male. It is unnecessary here to recapitulate the points of difference as they have been described (in respect of an allied species, *E. Servillei*, Thoms.) by M. Thomson in his "Syst. Ceramb.," p. 304. They are so marked as to have led M. Lacordaire (Gen. Col., VIII., p. 110) to assert that M. Thomson must have been mistaken. I was already satisfied from examples in my own collection that M. Thomson was right, and these Central Australian specimens seem to place the matter beyond doubt.

The extreme variability of this insect suggests the question whether it is possible that any of the other described species may have been founded on it. As regards *E. Servillei*, Thoms., it is probably distinct, but as I have not to my knowledge seen it I cannot give a decided opinion. *E. (Mullodon) stigmosa*, Newm., is unrecognisable from the description, but Mr. Gahan has published a note on it specifying characters none of which seem to me clearly specific. *E. Odewahni* is, I think, distinct from the present species, although I can specify no constant reliable character except the presence of larger and nitid granules among the fine opaque granulosity on the sides of its prothorax, which seem to be never present in *australis*. Moreover, I find that it is in general smaller than *australis* (the largest specimen I have of it being scarcely so large as the smallest *australis*), and that no example I have seen of *australis* is so depressed in form as my examples of *E. Odewahni*.

PHORACANTHA.

P. recurva, Newm. (1), Bagot's Creek.

P. quinaria, Newm.? (1), Possum Creek. This example seems to pertain to a common species, which I presume is *quinaria*, although the description is insufficient for confident identification.

MICROTRAGUS.

M. maculatus, Blackb. (2), Alice Springs, Palm Creek. This species is very near *M. sticticus*, Pasc., but differs from it by the external elytral carina not

running parallel to the inner carina, but being strongly bent into a curve (with its convexity towards the lateral margin) at its apex.

Gen. nov. (?) (*Mecynopo affinis*).

The collection contains a single example—a female so far as I can judge—of a minute *Longicorn* (Long. $1\frac{1}{2}$ l.) apparently near *Mecynopus*. It is evidently a very interesting insect, but as it is considerably broken and it would not be possible to examine its characters satisfactorily without damaging it still more I am reluctantly compelled to pass it over with this brief notice. It was taken at Illamurta.

SYMPHYLETES.

S. fumatus, Pasc. (2), Illamurta.

S. deserti, sp. nov., fem. (1). Nigro-piceus, pube subtili grisea vestitus et pube albida (hic illic fulvescenti) condensata notulas plurimas efficienti ornatus [sc. in capite supra lineis insignibus, in prothorace lineis transversis anticis posticisque et in parte intermedia maculis indeterminatis nonnullis, in elytris maculis parvis insignibus (his prope basin fulvescentibus sat numerosis, postice sparsis magis albidis) et ad latera macula magna supra serrata ab elytrorum medio fere ad basin extensa (hac late argenteo-nivea), in corpore subtus maculis parvis numerosis et in abdomine segmentorum margine apicali]; antennis quam corpus paullo longioribus subtus dense ciliatis, articulo ultimo ad apicem minute curvato; prothorace leviter transverso, irregulariter minus perspicue punctulato-ruguloso, antice sulco 1 postice sulcis 2 transversim fortius impresso, antice leviter angustato, in disco medio tuberculis distinctis 2 transversim posticis instructo, lateribus haud tuberculatis; elytris minus elongatis, ad basin trisinuatis, ad apicem oblique rotundato-truncatis, subfortiter vix crebre punctulatis, in parte antica granulis sat magnis nitidis in seriebus 5 dispositis ornatis [sc. in serie suturali granulis 3, in serie 2^a 4, in serie 3^a 4, in serie 4^a 6 vel 7, in serie 5^a 5 (his in macula laterali argentea dispositis), seriei 2^{ae} granulis in gibba obsoleta positis]; tibiis posterioribus 4 extus dense albo-ciliatis, intermediis quam tarsi sat brevioribus. Long. 7 l. Lat. $2\frac{1}{5}$ l.

Among the smaller species of *Symphyletes* this insect is distinguished by its generally grey appearance, none of the pubescence being noticeably fulvous except a few of the small patches near the scutellum, and the lateral patch of dense silvery pubescence being on the lateral declivity of the elytra and invisible from above. The vertical front of the head is shaggy with long whitish hairs, the upper portion being prettily outlined with whitish (slightly fulvous) pubescence

which forms conspicuous lines round the eyes, a line (narrowly black down the middle of its posterior part) running longitudinally along the centre, and a sinuous line along the base; the front of the prothorax also is outlined with similar pubescence. The spots of dense whitish pubescence on the elytra are largest and most numerous near the base, and are almost wanting thence almost to the apex; close to the apex, however, they are numerous but very small and with an evident fulvous tone. The general surface is thinly and evenly covered with fine (almost dust-like) whitish pubescence which, only partially concealing the blackish derm, gives a general effect of the colour being grey. The five rows of large granules on the basal part of each elytron are very characteristic; besides the granules enumerated there are one or two very minute ones behind the hinder end of each row. I do not know any *Sympyhetes* with which this one can very advantageously be compared, its nearest ally in my collection being an undescribed species from Western Australia. I think, however, that its place in the genus will be not far from *Bathursti*, Pasc., which it resembles in its short, non-parallel form—indeed in structural characters generally—differing, however, *inter alia* in the manifestly larger granules on the base of its elytra and in its entirely different colour and markings, especially in its nearly black derm and in the lateral patch of pubescence on its elytra commencing considerably behind the shoulder and ending abruptly at a point very little behind the middle of the elytra.

Alice Springs.

PHYTOPHAGA.

DITROPIDUS.

D. baccaeformis, Chp.? (1), Illamurta. The description of this species is too brief for satisfactory identification; at any rate the present insect must be extremely close to it.

CHALCOLAMPRA.

C. eremita, Blackb. (6), Palm Creek, Illamurta, Finke River.

CALOMELA.

C. geniculata, Baly (3), Paisley Bluff, Glen Helen.

C. imperialis, Blackb. (1), Palm Creek.

C. lauta, sp. nov. (1). Oblonga; parallela; fulva, supra obsolete aureo-micans, anguste viridi-marginata, puncturarum fundo viridi-micanti, antennis

apicem versus paullo infuscatis ; capite lato æquali, sat crebre sat fortiter (fere ut *C. vittatæ*, Baly) punctulato ; prothorace quam longiori plus quam duplo latiori, antice leviter angustato, crebre sat fortiter (latera versus paullo magis grosse) punctulato (quam *C. coloratæ*, Germ. paullo magis crebre minus fortiter), lateribus parum arcuatis ; elytris crebre vix seriatim (fere ut prothoracis discus) punctulatis ; unguiculis ad basin minus distincte dentatis. Long. 3 l. Lat. $1\frac{1}{2}$ l.

The tooth at the base of the claws is extremely feeble and obtuse. This species is an exceptionally parallel and elongate one, not very closely allied to any previously-described member of the genus. Perhaps its nearest ally is *C. Waterhousei*, Baly, which seems from the description to resemble it in shape and coloration, but is described as having five or six obscurely-elevated vittæ on the elytra ; of these I find no trace in the present insect.

Palm Creek.

PAROPSIS.

P. deserti, sp. nov., fem. (2). Sat late ovalis ; sat convexa ; sat nitida ; pallide testacea, elytris (præsertim margines versus) nonnihil aurantiacis, et in punctis plus minusve infuscatis ; capite prothoraceque sat crebre minus subtiliter punctulatis, puncturis subtilissimis intermixtis ; hoc ad latera sat erasse ruguloso, quam longiori paullo plus quam duplo latiori, antice sinuatim sat fortiter emarginato, postice bisinuato, lateribus sat arcuatis sat fortiter bisinuatis, angulis anticis mucronatis posticis ferenullis ; elytris quam longioribus paullo latioribus, subtilius crebre (fere ut *P. glaucæ*, Blackb.) punctulatis, interstitiis lævibus leviter rugulosis (præsertim apicem versus), angulis humeralibus (a latere visis) deorsum sat fortiter angulatim productis ; prosterni parte mediana minus lata, longitudinaliter sulcata. Long. 4 l. Lat. $3\frac{1}{5}$ l.

This species appertains to Dr. Chapuis' Groupe I. of *Paropsis*, which I revised in Trans. Roy. Soc. S.A., 1894, pp. 220, etc. In the tabulation furnished in that memoir its place is along with *roseola*, Baly, *glaucæ*, Blackb., and *yilgarnensis*, Blackb., on account of its presenting the following characters in combination : prothorax with sides bisinuate and front angles mucronate, prosternum longitudinally concave, elytra devoid of a pattern consisting of raised coloured blotches and devoid of longitudinal series of wart-like inequalities, underside testaceous, elytra not strongly verrucose nor strongly ovate nor having dark transverse markings, puncturation of elytra close (as compared with that of *P. obsoleta*, Oliv.). From *roseola* it differs *inter alia* by the surface of its elytra except near the apex being almost smooth, the intervals between the punctures being scarcely at all raised

into pustules, even near the apex the pustules being very much smaller and closer than in *roseola*. Its very much narrower prothorax will at once distinguish it from *glauca*, as well as the much less convexity of its form. From *yilgarnensis* its different colour and the much more strongly produced (in a downward direction) humeral angles of its elytra render it very distinct. The width of its elytra is difficult to calculate exactly, because in both the specimens those organs are partly displaced (as though for flight); as nearly as I can measure, however, their width is just about equal to the distance from their apex to a point slightly in front of the middle of the prosternum. This species is not easy to place exactly in the tabulation referred to above, because in distinguishing in the table *roseola*, *glauca* and *yilgarnensis* I have availed myself of the fact that the first of those species has its elytral punctures exceptionally darkly coloured, while in the other two those punctures show scarcely any colouring; the present species, however, is intermediate in this respect, one of the specimens having its elytral punctures evidently infuscate, the other scarcely so.

Storm Creek, Idracowra.

P. conjungens, sp. nov. (26). Sat late ovalis; minus convexa; sat nitida; picea, partibus nonnullis (sc. capitis macula interoculari, antennarum basi, palpis, prothorace, elytrorum limbo, pedibus, metasterno lateribus, coxis, et segmenti ventralis apicalis lateribus) plus minusve rufis; capite antice crebre sat crasse, postice magis subtiliter magis sparsim, punctulato; prothorace quam longiori plus quam duplo latiori, in disco sparsim subtiliter (ad latera crasse, puncturis subtilibus intermixtis) punctulato, antice sinuatim sat fortiter emarginato, postice vix bisinuato, lateribus sat arcuatis, latitudine majori trans basin posita, angulis anticis obtusis modice productis posticis fere nullis; elytris quam latioribus paullo longioribus, sat fortiter minus crebre (fere ut *P. Waterhousei*, Baly, sed apicem versus quam antice haud magis crebre) punctulato, puncturis confuse dispositis sed sic ut apparent vittæ vix perspicuæ puncturis carentes nonnullæ, interstitiis sparsim subtiliter punctulatis, angulis humeralibus (a latere visis) deorsum nullo modo prominentibus; prosterni parte mediana modice angusta, leviter planata, ad latera nullo modo carinata. Long. $4\frac{1}{2}$ — $6\frac{1}{4}$ l. Lat. $3\frac{1}{5}$ — $4\frac{1}{2}$ l.

I do not find any difference between the male and female apart from the ordinary differences in the tarsi, etc., and in the male being somewhat smaller and proportionately shorter than the female. This species should be placed, in my opinion, near the beginning of Dr. Chapuis' "Groupe II.," having the sides of its prothorax evenly arched and the front angles of the same not mucronate, and its elytral punctures not running in lines and showing a slight tendency to leave

longitudinal intervals devoid of punctures here and there, these intervals, however, in some examples scarcely traceable, and not well marked in any example that I have seen. It is, however, a much less convex species than most of those in Groupe II. It is a very arbitrary division which places this insect and *P. Waterhousei* in different groups; but still it is highly convenient to break *Paropsis* up into groups, and if this is to be done an artificial line must be drawn somewhere, and I think it is best drawn by regarding *Waterhousei* as near the end of the first group and the present species as near the beginning of the second.

Paisley Bluff, Palm Creek, Goyder River.

P. palmensis, sp. nov. (6). Breviter ovata; convexa; nitida; supra brunnea (nonnullorum exemplorum capite postice prothorace postice et sutura nonnullorum elytris totis, picescentibus); subtus obscure brunnea vel nigro-picea, antennis palpis pedibusque rufo-brunneis; capite prothoraceque sparsim minus fortiter punctulatis; hoc (ad latera puncturis sat crassis sat crebre intermixtis) quam longiori plus quam duplo latiori, antice sinuatim sat fortiter emarginato, postice vix bisinuato, lateribus æqualiter sat arcuatis, angulis anticis obtusis posticis rotundatis; elytris quam longioribus paullo latioribus, sparsim subtilius (puncturis subtilissimis sparsim intermixtis) punctulatis, vittis nonnullis lævibus vix manifestis ornatis, humeris late rotundatis, angulis humeralibus (a latere visis) deorsum nullo modo productis, margine laterali summo sat late incrassato; prosterni parte mediana minus lata, antice convexa, postice sulcata (fere ut *P. porosa*, Er. sed minus lata). Long. $4\frac{2}{5}$ — $4\frac{4}{5}$ l. Lat. $3\frac{3}{5}$ — $3\frac{4}{5}$ l.

This species is a member of Dr. Chapuis' "Groupe II." In form it is shorter and wider than *P. semipunctata*, Chp., but not nearly so globular as *P. hemisphærica*, Chp. A well-marked character consists in the comparatively broadly thickened margin of its elytra, which is even a trifle more defined than in *P. semipunctata*. The form of its prosternum is also characteristic but less reliably, as in some specimens the sulcus of its posterior portion is continued nearer to the front of the prosternum than in others. In this species as compared with *P. hemisphærica*, Chp., the puncturation of the prothorax is much less close, while on the elytra the larger punctures are very similar and very similarly distributed, but the small punctures are very much more sparse. The longitudinal non-punctulate spaces are scarcely discernible. The width of the elytra (measured on the underside) is almost equal to the distance from their apex to the front of the prosternum. The sexual characters (apart from those common to all its congeners) seem very slight, the female, however, being a trifle narrower and generally a little larger than the male.

Palm Creek.

P. conferta, Chp. (2), Palm Creek. These specimens seem to be identical with an example in my possession received through M. Severin from Dr. Chapuis' collection. The principal character distinguishing this species from its immediate allies in the extremely difficult section of Dr. Chapuis' "Groupe III." to which it pertains appears to be the confusion and irregularity of the crowded punctures of its elytral striæ.

P. posticalis, sp. nov. (3). Ovalis; parum convexa; nitida; flavo-testacea, capite rufescenti, elytris apicem versus fascia maculari nigra insignibus; capite subtiliter suberebre punctulato; prothorace quam longiori paullo plus quam duplo latiori, subtilissime sat crebre (latera versus confertim subcrasse) punctulato, antice sinuatim minus profunde emarginato, postice leviter bisinuato, lateribus parum arcuatis, angulis anticis obtusis posticis (superne visis) fere rectis; elytris quam latioribus sat longioribus subtiliter regulariter striatis, striis subtiliter confertim regulariter (apicem versus magis fortiter) punctulatis, interstitiis planis (apicem versus vix convexis) crebre subtilius (quam striis magis subtiliter) punctulatis, humeris (superne visis) fere rectis, angulis humeralibus (a latere visis) deorsum nullo modo productis, margine laterali subtiliter incrassato; prosterno ante coxas æqualiter convexo, inter coxas angusto, pone coxas dilatato. Long. $2\frac{1}{5}$ l. Lat. $1\frac{3}{10}$ l.

This species resembles *P. Hera*, Stål., but is a considerably narrower species (approaching *P. turbata*, Chp., in build) with its prothorax very much less transverse, its puncturation throughout very much finer, and the sub-apical black fascia on its elytra differently shaped, the said fascia running straight across the suture (instead of being curved with its convexity directed hindward).

Crown Point.

P. sp. nov. ? (4), Stevenson R. This very minute (Long. 1 l) species appertains to a section of Dr. Chapuis' "Groupe III.," containing numerous species, very few of which have been described, and I do not think it is desirable to describe isolated members of it. I hope at no distant date to attempt dealing with the section collectively, when it may be possible by comparing one species with another to indicate the characters so that they can be identified; but I do not see how to do this without describing a number of new forms. *P. chlorotica*, Boisd., is a member of this section.

P. funerea, sp. nov. (5). Sat late ovata; sat convexa; sat nitida; rufo-castanea, nigro multo notata (sc. margine laterali toto, prothoracis parte antica et macula utrinque prope marginem lateralem, elytrorum sutura callohumerali pustulis

numerosis et epipleura, capite subtus, corpore subtus parte majori, et femoribus 4 posterioribus); capite prothoraceque crebre sat fortiter punctulatis; hoc quam longiori plus quam duplo latiori, antice sinuatim sat profunde emarginato, postice bisinuato, lateribus sat arcuatis, angulis omnibus obtusis; elytris quam latioribus vix longioribus, ad basin quam prothoracis basis sat latioribus, crebre fortiter subseriatim punctulatis, interstitiis sparsim subtilius punctulatis et pustulis nigris numerosis ornatiss, humeris (superne visis) fere rectis, angulis humeralibus (a latere visis) deorsum nullo modo productis, margine laterali subtiliter incrassato; prosterni parte mediana lata planata vix concava rugulosa. Long. $4\frac{1}{2}$ l. Lat. $3\frac{1}{2}$ l.

This species is a member of Dr. Chapuis' "Groupe IV." It is a dingy-looking insect, having the unusual character of the lateral margin and elytral epipleura being (apparently constantly) black. It is also remarkable for the middle flattened part of its prosternum being rugulose and exceptionally wide. It bears much resemblance to *P. picola*, Chp., of which I have an example from Dr. Chapuis' collection, but is readily distinguishable from it by the characters just mentioned, and also by the somewhat less coarse and rugulose sculpture of the surface of its elytra. The superficial sexual characters seem almost limited to the tarsi, where they are of the kind usual in the genus.

Bagot's Creek, Palm Creek, Reedy Hole.

P. convexicollis, Chp.? (1), Palm Creek. It is impossible to identify with certainty from the descriptions Dr. Chapuis' species, unless they happen to be distinguished by very marked characters. *P. convexicollis* seems to have been taken in Central Australia, and the insect to which I have ventured to apply the name agrees with the description, such as it is.

RUPILIA.

R. brevipennis, sp. nov. (Mas.). Ovalis; rufa, elytris aeneo-piceis, capite antennis pedibusque (femoribus ad basin rufescentibus) piceis; supra elytris exceptis laevis; his sat crebre rugulose punctulatis, quam abdomen dimidio brevioribus; antennis robustis; capite linea longitudinali impresso; prothorace transverso utrinque late impresso, lateribus mediis angulatim dilatatis; scutello transverso, convexo; segmento ventrali apicali profunde rotundatim emarginato. Long. 4 l. Lat. $1\frac{4}{5}$ l.

At once distinguishable from its described congeners by the absence of puncturation on the upper surface (except the elytra). *R. impressa*, Blackb.,

comes nearest to it, but in that species (besides the presence of distinct punctation especially on the head and abdomen) the clytra are considerably longer and the scutellum is narrower and concave.

Bagot's Creek, on *Erianthus fulvus*.

COCCINELLIDÆ.

COCCINELLA.

C. repanda, Thunb. (2), Storm Creek, Alice Well.

ARANEIDÆ.

By H. R. HOGG, M.A.

(PLATE 24).

Up to the present time very few specimens of this group from the desert and sandy country of Central Australia have been seen by zoologists, and its characteristics are almost entirely unknown.

The Horn Expedition has now brought down some 150 specimens collected throughout the whole route traversed north of the railway terminus at Oodnadatta. These it will be seen are well distributed over the various tribes of the order, and comprise 57 species, representative of 36 genera.

While nearly one-third of the species are hitherto undescribed, they present a general analogy to those from the coastal districts of New South Wales and Queensland, exhibiting here and there interesting variations in what are clearly co-ordinate types.

The differences in shape and measurement are such as might be expected to be developed during an isolation extending over a comparatively long period, isolation no doubt caused by intervening tracts of country, which even if no less barren than their present habitat, by change of vegetation and consequent insect life and food have proved an efficient barrier to migration. They consist chiefly of such points as longer or shorter legs, relative distances and sizes of eyes, bespining, absence of pattern, and shapes of genital organs, rather than differences in colouring which might naturally be looked for among differently coloured soils.

The preponderance in number, judged by the specimens brought down, would appear to lie with a small ring-legged *Lycosa* (*L. pulveresparsa*, L. Koch) and the large orb-weaving *Nephilæ*, while *Phrictus crassipes*, L. Koch, the giant of the Territelariæ or hole dwellers, seems to have been frequently secured at Alice Springs; the last-named spider being notable as found by Professor Spencer to be provided with stridulating organs similar to those discovered by Professor James Wood Mason* in his *Mygale stridulans* from Assam.

* Proc. As. Soc. Bengal, 1876, and Trans. Ent. Soc. of London, 1877, p. 281.

The numbers of the two latter may be affected by their large size attracting attention to them, but they seem at any rate to have constituted a prominent feature in the district passed over by the Expedition.

Many of the species are described from single specimens only, and the shortness of the time at the disposal of the collectors makes it doubtful how far what has come down can be taken as truly representative of the fauna. In addition to this Professor Spencer informs me that it was often very difficult to prevent the spiders captured from being broken up during the rough carriage on camel-back before they could be safely packed up and thus many were lost.

Had I been classifying afresh the spiders of Australia I should have followed more closely the later sub-divisions of Dr. Thorell, whose keen perception of the value of systematic differences cannot, in my opinion, be too closely followed. However, the labours of Dr. L. Koch and Graf E. von Keyserling* have constituted their important work beyond question the authority on spiders of this continent, and as it must continue to be for many years the main standard of reference, I feel that I might be only creating confusion among students of our fauna by translating their classification into the more recently elaborated systems so ably collated by Dr. Thorell in his latest work just issued from the press.†

It was at first intended that the collection now described should have been dealt with by myself in conjunction with Mr. C. Frost, but owing to pressure of other work Mr. Frost unfortunately felt himself unable to undertake the work. He has, however, been kind enough to devote a considerable amount of time to my assistance. I am much indebted to him for valuable suggestions, and his knowledge and experience of the order upon the study of which he has been engaged for many years have been a great assistance to me in identifying many of the specimens. My best thanks are also due to Professor Spencer for his ever ready guidance and advice, as well as for the opportunity afforded me of studying this important collection, which, in addition to those secured during the Expedition, includes others obtained by Professor Spencer during a subsequent visit to Charlotte Waters.

* Die Arachniden Australiens, part i, 1871. Appendix, 1884-1889.

† Descriptive Catalogue of the Spiders of Burmah preserved in the British Museum, London, 1895.

Of the species enumerated,

7	belong to tribus or sub-order	...	...	Orbitelariæ.
3	„ „ „	...	...	Retitelariæ.
11	„ „ „	...	...	Tubitelariæ.
3	„ „ „	...	...	Territelariæ.
13	„ „ „	...	...	Laterigradæ.
14	„ „ „	...	...	Citigradæ.
6	„ „ „	...	...	Saltigradæ.

The following is a list of the forms recorded, the various species being dealt with separately :—

Sub-order ORBITELARIÆ.

Family EPEIROIDÆ.

Sub-family Epeirinae.

Argiope, Sav. and Aud.

Argiope lugubris, L. Koch.

Epeira, Walck.

Epeira extuberata, L. Koch.

Epeira frosti, sp. n.

Epeira gracilis, sp. n.

Nephila, Leach.

Nephila eremiana, sp. n.

Tetragnatha, Latr.

Tetragnatha demissa, L. Koch.

Meta, C. Koch.

Meta ærea, sp. n.

Sub-order RETITELARIÆ.

Latrodectus, Walck.

Latrodectus scelio, Thorell.

Family ENYOIDÆ.

Habronestes, L. Koch.

Habronestes scintillans, L. Koch.

Habronestes formosus, Thorell.

Sub-order TUBITELARIÆ.

Family AGALENOIDÆ.

Sub-family Amaurobiinæ.

Amaurobius, C. Koch.*Amaurobius bimetallicus*, sp. n.*Amaurobius scalaris*, L. Koch.

Sub-family AGALENINÆ.

Mithurga, Thorell.*Mithurga lineata*, Thorell.

Family DRASSOIDÆ.

Zora, C. Koch.*Zora ferruginea*, L. Koch.*Zora marmorea*, sp. n.**Liocranum**, L. Koch.*Liocranum albopunctatum*, sp. n.**Clubiona**, Latr.*Clubiona achilles*, sp. n.**Micaria**, Westr.*Micaria inornata*, L. Koch.**Drassus**, Walck.*Drassus griseus*, L. Koch.**Gnaphosoides**, gen. nov.*Gnaphosoides albopunctata*, sp. n.

Sub-order TERRITELARIÆ.

Family THERAPHOSOIDÆ

Sub-family Theraphosinæ

Migas, L. Koch.*Migas paradoxus*, L. Koch.**Idiactis**, L. Koch.*Idiactis helva*, L. Koch.

Phrictus, L. Koch.*Phrictus crassipes*, L. Koch.

Sub-order LATERIGRADÆ.

Family THOMISOIDÆ.

Hedana, L. Koch.*Hedana maculosa*, sp. n.

Family PHILODROMIDÆ.

Hemiclœa, Thorell.*Hemiclœa longipes*, sp. n.**Voconia**, Thorell.*Voconia dolosa*, L. Koch.**Delena**, Walck.*Delena cancerides*, Walck.**Sarotes**, Sundevall.*Sarotes longipes*, L. Koch.**Isopeda**.*Isopeda horni*, sp. n.*Isopeda pessléri*, Thorell.*Isopeda villosa*, Thorell.*Isopeda flavibarbis*, Thorell.**Heteropoda**.*Heteropoda pallida*, L. Koch.*Heteropoda punctata*, L. Koch.*Heteropoda calligaster*, L. Koch.*Heteropoda inframaculata*, sp. n.

Sub-order CITIGRADÆ.

Family LYCOSIDÆ.

Dolomedes.*Dolomedes instabilis*, L. Koch.*Dolomedes australianus*, L. Koch.

Lycosa.

- Lycosa aurea*, sp. n.
Lycosa topaziopsis, sp. n.
Lycosa cowlei, sp. n.
Lycosa pulvere-sparsa, L. Koch.
Lycosa crispipes, L. Koch.
Lycosa læta, L. Koch.
Lycosa leucophœa, L. Koch.
Lycosa albosparsa, L. Koch.

Family OXYOPOIDÆ.

Peucetia, Thorell.

- Peucetia albescens*, L. Koch.

Oxyopes, Latr.

- Oxyopes attenuatus*, L. Koch.
Oxyopes gratus, L. Koch.
Oxyopes variabilis, L. Koch.

Sub-order SALTIGRADÆ.

Family ATTOIDÆ.

Leptorchestes, Thorell.

- Leptorchestes cupereus*, sp. n.

Sobara, von Keys.

- Sobara biteniata*, von Keys.

Selaophora, von Keys.

- Selaophora rubra*, von Keys.

Sandalodes, von Keys.

- Sandalodes albobarbatus*, von Keys.

Prostheclina.

- Prostheclina insecta*, sp. n.

Margaromma.

- Margaromma funesta*, von Keys.

Argiope, Sav. and Aud.*Argiope lugubris*, L. Koeh.

Two females, one young and the body of the other much broken.

Locality.—Tempe Downs. Previously recorded from Bowen (Queensland).

Epeira, Walek.*Epeira extuberata*, L. Koeh.

Locality.—Mereenie Bluff, McDonnell Range. Previously recorded from New Zealand.

Epeira frosti, sp. n. (Fig. 1).

Cephalothorax dark reddish-brown, darkest on head part, with long, coarse white hair; the mandibles bright darkish red, smooth and polished, with white hairs at upper end; the fangs reddish-brown; maxillæ and lip bright yellow-brown (with orange fringe), front edges yellowish white; sternum reddish-brown, with thick upstanding white hairs; abdomen black-brown above, mottled with pale yellow spots, in deep transverse wrinkles, longitudinal at sides, rather sparsely covered with white hair, yellow lines under the shoulder corners; underside deep brown in wrinkled folds, with a transverse yellow streak near the front; legs, femoral joints red-brown; patella, tibia, metatarsus and tarsus almost black at edges, but redder in middle and covered with red and white long hairs intermixed; palpi reddish-brown, with rough white hairs and yellow spines; spinnerets dark brown.

Cephalothorax shorter than patella and tibia IV. One-fourth longer than broad (broadest between second and third pairs of legs). In front 3 mm. narrower than in middle, rounded at the side, bright coloured and shiny. Head part arched longitudinally and transversely. Long thick hair covering sides. Sloping to the front and round on top.

Eyes.—The four middle eyes form a trapezium, narrowest at the rear and stand on a large hump protruding beyond the margin of the elypeus. The rear middle eyes a diameter apart. Front middle eyes are twice the diameter of the rear middle eyes, and are their diameter distant from the rear and three-quarters of their diameter apart from one another. The side eyes: each pair almost touching on a common protuberance distant from front middle eyes by twice the breadth of the front of the trapezium.

Mandibles shorter than patella I., thick and broad, somewhat thinner in front, arched at base, clothed with coarse white hair. Four teeth on outer side of falx head.

Sternum cordate, shiny, thickly covered with white bristly hair.

Maxillæ broad as high; rounded exteriorly; base narrowed.

Lip broad, triangular, arched, less than half length of maxillæ.

Palpi shorter than cephalothorax; all joints covered with long hair and spines of pale brownish-yellow.

Abdomen square-shaped, ovate, rather rounded in front, with square shoulder humps; behind running to a point beyond the spinnerets, the whole body thickly wrinkled.

Legs stout and powerful, the shanks thickened at the front end.

This fine spider seems allied to *E. producta* and *E. capitalis*, but has legs much longer in proportion than the latter, and the body is rounder and flatter than in the former (L. K., Group I.). Its front middle eyes are larger than instead of equal in size to the hinder middle eyes. Body rougher and darker; legs rather longer; no metallic-blue silver colour on the cephalothorax; sternum rather longer than epigyne process, which is however very unusually long.

DIMENSIONS.

Cephalothorax, length	-	-	-	10 mm.
„ breadth	-	-	-	8 „ (5 in front).
Abdomen, length	-	-	-	16½ „
„ breadth	-	-	-	14½ „

	Coxa.	Troch. and Femur.	Patella and Tibia.	Metat. and Tarsus.	
1. Leg	- 3 mm.	- 11 mm.	- 12½ mm.	- 12 mm.	= 38½ mm.
2. Leg	- 3 „	- 11 „	- 12½ „	- 11 „	= 37½ „
3. Leg	- 2½ „	- 8 „	- 7 „	- 6 „	= 23½ „
4. Leg	- 3 „	- 11 „	- 11½ „	- 10 „	= 35½ „

Relative length of legs: 1, 2, 4, 3.

Locality.—Stevenson River. A single female specimen.

Epeira (Singa) gracilis, sp. n. (Fig. 2).

Cephalothorax, legs, palpi, mandibles, maxillæ a pale straw colour, slightly darker longitudinal stripe down the middle of the cephalothorax from behind the second row of eyes through head part to the centre of the breast part. Lip and sternum yellowish-brown. Abdomen above striped longitudinally, with alternate grey and pale pink lines. Underneath yellow, mottled with darkish grey. Very fine, small upstanding white hairs sparsely scattered over the limbs and abdomen.

Cephalothorax twice as long as broad, narrow in front and gradually widening to the fourth pair of legs, rounded at the forehead and at the rear. Cephalic part rather indistinctly marked by faint side depressions. A round depression about the middle of the breast part, from whence the cephalothorax slopes off gradually to the rear and sides. Whole of cephalothorax arched transversely, smooth and shiny.

Abdomen rounded in front, nearly cylindrical as far as spinnerets, whence a conical tail slopes off to a point one-half the length of the portion of the abdomen from the front end to the spinnerets. Upper surface bare of hair, but under-surface, sides and front end sparsely covered with fine white hairs.

Eyes.—Four middle eyes form a trapezium narrowest at the rear; the two hinder a diameter apart, the two front one-and-a-half diameter of the rear; two of their diameters apart, and the same distance from the rear eyes. Side eyes small, almost touching; front side eyes as far from the front middle eyes as the latter are from the rear middle eyes. Seen from above the side eyes are in longitudinal line and the hind row straight; from in front the front row slightly curved down.

Mandibles conical, large at base, as long as patella I.; fangs small and weak, of pale red colour, smooth and shiny.

Maxillæ arched, triangular, truncate in front and pointed at the hinder end; twice as broad in front as high.

Lip slightly darker in colour, free, triangular; one half the height of the maxillæ; a few long hairs on top.

Palpi slender, with large (not fully developed) clavicle; a few white hairs on the lower joints and clavicle.

Sternum flat, long, cordate, truncate in front, pointed at the hinder end, twice as long as broad, rather rough and bare, darkish yellow-brown all round, but with a paler stripe in the centre.

Legs very fine and slender, pale yellow, with dark spots here and there at the base of the spines. Extremities very fine, thin white hairs rather sparse, short fine spines.

DIMENSIONS.

Cephalothorax, length	-	-	-	$2\frac{1}{2}$ mm.
„ breadth	-	-	-	$1\frac{1}{4}$ „
Abdomen length	-	-	-	$4\frac{1}{2}$ „
„ breadth	-	-	-	2 „

	Coxa.	Troch. and Femur.	Patella and Tibia.	Metat. and Tarsus.	
1. Leg	- 1 mm.	- 3 mm.	- $3\frac{1}{2}$ mm.	- $3\frac{1}{4}$ mm.	= $10\frac{3}{4}$ mm.
2. Leg	- 1 „	- $2\frac{3}{4}$ „	- 3 „	- 3 „	= $9\frac{3}{4}$ „
3. Leg	- 1 „	- 2 „	- $1\frac{1}{2}$ „	- $1\frac{1}{2}$ „	= 6 „
4. Leg	- 1 „	- 3 „	- 3 „	- 3 „	= 10 „

Relative length of legs : 1, 4, 2, 3.

Locality.—Valley of Stevenson River. A single male specimen.

Nephila, Leach.*Nephila eremiana*, sp. n. (Fig. 3).

Female.—The cephalothorax has a polished black-brown skin thickly covered with silvery-white hair; on the thoracic part are six bare spots arranged in a horseshoe, with a pair of shiny black tubercles near the middle.

Mandibles black; sternum, lip and maxillæ red-brown with darker transverse band across the former. Abdomen pale yellowish-brown on back, darkest in the middle and paler at the front edge. Sides and under surface covered with a network pattern of darker-coloured patches bordered by paler brown lines. At epigyne a dark and behind the same a broad, pale, transverse band; a transverse triangular patch in front of the spinnerets.

Femur, patella and tibia of all legs bright red-brown; on the femur patches of short white hair; a scopula of fine black hair from the fore end two-thirds of its length along the tibia. Tarsus and metatarsus black, with black spines and hair.

The *Cephalothorax* in front is square, and there one-fourth narrower than at broadest part. Cephalic part distinct and well raised up; the thoracic part

rounded at the sides is flat, and low at the rear; the clypeus and side edges are perpendicular, so as not to be visible from above.

Eyes.—Of the four middle, the rear are two-thirds the diameter of the front; they form a trapezium narrowest behind and slightly longer than broad, situated on a slight elevation. Front eyes their diameter distant from margin of the clypeus. The front side eyes, of equal size and on a common protuberance with the rear ones, are one-half the diameter of the middle, from which they are distant twice as far as the latter from one another and are the same distance from rear as are the front and rear middle eyes. The hind row is straight and longer than the front, which is likewise straight though slightly recurved when seen from above.

The *Mandibles* (4 mm. long) are conical truncate, smooth but with long fine hairs on the inner margin, claws short and strong, with openings on each side of the point. Three powerful teeth on each side of falx sheath.

Maxillæ arched, widening from the base to the anterior margin, which is truncate.

Lip longer than the base is broad, arched transversely and curved to a point in front; half the length of the maxillæ.

Sternum cordate, the two front corners projecting forward; low protuberances of equal height round the sides, front and rear.

The *Abdomen* is ovate, strongly arched, rounded in front and at the rear, one-half longer than broad; younger specimens more cylindrical and twice as long as broad. In two longitudinal rows down the back are three pairs of round depressions. The epigyne is a transverse oval opening, partially divided into two divisions by a V-shaped projection from the middle of the upper margin.

The palpi shorter than the cephalothorax, are covered with a thick growth of hair except on the cubital and radial joints.

The legs are slim, smooth and shiny, armed with long spines; the metatarsal and tarsal joints are only one-half the thickness of the tibial.

Cephalothorax, 10 mm. long, 6 mm. broad in front, 8 mm. in widest part.

Abdomen, $19\frac{1}{2}$ mm. long, 13 mm. broad in front.

	Coxæ.	Troch. and Femur.	Patella and Tibia.	Metat. and Tarsus.	Total length.
Legs—1st pair	- 3 mm.	- 16 mm.	- 12 mm.	- 19	= 50 mm.
Legs—2nd pair	- 3 „	- 14 „	- 11 „	- 17	= 45 „
Legs—3rd pair	- 2 „	- 8 „	- $5\frac{1}{2}$ „	- 9	= $24\frac{1}{2}$ „
Legs—4th pair	- $2\frac{1}{2}$ „	- 13 „	- 9 „	- 13	= $37\frac{1}{2}$ „

Relative length of legs : 1, 2, 4, 3.

A large number of specimens of this species—all females, and without any males—were brought from Oodnadatta and the Goyder River, where their large orb webs, hung on powerful lines and stretching twelve to fifteen feet across the scrub are reported by Professor Spencer to be a prominent feature of the landscape in the months of June and July.

This species would appear to be closely allied to all the following:—*N. victorialis*, L. Koch, *N. nigratarsis*, L. Koch, *L. imperatrix*, L. Koch, and *L. imperialis*, Dol. From the two former, however, it is distinguished by the shape of the epigyne and the evenness of colouring of its femur, patella, and tibia. Like *imperatrix* and *imperialis* in shape, and having a network pattern on the under side of abdomen; the legs are finer and smoother; the elevation on sternum behind lip is as low as those round the sides; the side eyes are wider apart and hinder row not recurved. The network pattern also differs in detail, and there is no bright yellow transverse band across front of abdomen.

Tetragnatha, Latr.

Tetragnatha demissa, L. Koch.

Locality.—Illamurta, James Range. Previously described from Bowen, Queensland.

Meta, C. Koch.

Meta area, sp. n. (Figs. 4, 5).

Cephalothorax pale golden yellow deepening into brown on the sides of the breast part. Abdomen, legs, palpi and maxillæ yellow and brown; digital joint of palpi yellow above, black-brown underneath, with black points.

Cephalothorax ovate, contracted in front but squarish and rounded at corners; breast part rounded at sides, smooth, shiny, without hairs; moderately raised all along middle ridge and sloping off to side margins.

Abdomen ovate, pointed at the posterior end, smooth and shiny; both upper and under sides rather flat, and of no great thickness; bare of hair.

Eyes.—The hinder row straight, equidistant, and about equal in size. The middle eyes round, the side eyes oval; the two middle eyes one diameter apart;

the side eyes one-and-a-half of longer diameter from the middle eyes; the front row recurved; the side eyes the same size as the near side eyes, one-half diameter distant; the middle eyes one-and-a-half diameters only from the side eyes, two diameters of the hinder middle eyes distant from the hinder middle eyes, all of a bright yellow colour.

Mandibles conical, smooth, fangs small, reddish brown.

Maxillæ parallel, dilated at the anterior portion, truncated, square at the top on a narrower cylindrical base.

Lip free, triangular, arched at the sides, two-thirds the length of the maxillæ; yellowish fringe; thin white hairs on lip and maxillæ.

Sternum ovate, truncated anteriorly, pointed posteriorly, smooth, with thin white hairs at the margins.

Legs long and slender, a few thin white hairs on the upper joints, thickening on the tarsus and metatarsus; fine brown spines on the upper side of the femur, tarsus and metatarsus, about five pectinations on the two upper claws extending two-thirds of the distance from the base to the point.

Male palpi of large size, furnished with very long pointed process, from a bulb underlying a hairy covering or sheath; bulb shiny and black; process long and leathery, pointed like a fang or tongue; white hairs on sheath.

DIMENSIONS.

Cephalothorax, length	-	-	-	1½ mm.
„ breadth	-	-	-	1¼ „
Abdomen, length	-	-	-	2 „
„ breadth	-	-	-	1¼ „
	Coxa.	Troch. and Femur.	Patella and Tibia.	Metat. and Tarsus.
1. Leg	- ¾ mm.	- 3 mm.	- 2¼ mm.	- 3¾ mm. = 9¾ mm.
2. Leg	- ½ „	- 2½ „	- 2 „	- 3 „ = 8 „
3. Leg	- ½ „	- 1½ „	- 1 „	- 1½ „ = 4½ „
4. Leg	- ½ „	- 2 „	- 1½ „	- 2½ „ = 6½ „

Relative length of legs: 1, 2, 4, 3.

Locality.—Tempe Downs. One male specimen.

Latrodectus, Walck.*Latrodectus scelio*, Thorell.

Two females of this species were collected. The streak on one of them is white (as in the male). This spider, popularly known as the red-streaked spider, is found all over Victoria and New South Wales, and is recorded from Rockhampton and Bowen on the Queensland coast and from the North Island of New Zealand, where it is known by the Maoris as the Katipo.

Locality.—Crown Point, Finke River and Bagot's Creek, George Gill Range.

ENYOIDÆ.

Habronestes, L. Koch.*(Storena, Walck.)**Habronestes scintillans*, Cambr.

Two female specimens were brought down, which well illustrate the great beauty of this interesting little spider.

Locality.—Palm Creek. Previously described from Swan River, W.A.

Habronestes formosus, Thorell.

Locality.—Charlotte Waters and Goyder River. Previously recorded from "New Holland." Two female specimens, one young, were brought down.

AGALENOIDÆ.

Amaurobius.*Amaurobius bimetallicus*, sp. n. (Figs. 6, 7.)

Cephalothorax pale golden yellow, tinged with brown on pars cephalica and mandibles. Legs and palpi similar yellow colour, the coxæ a darker orange. Palpi thickly legs sparsely clothed with long fine brown hairs. Lip and maxillæ brownish yellow. Sternum brownish-orange, covered with upstanding brown hair. Abdomen pale silver-grey, upper surface covered with rather long pale golden hairs.

Cephalothorax oblong, sides nearly straight, but convex towards the rear, rounded behind, only slightly narrower in front. Pars cephalica separated by

lateral impressions from the thoracic part, elevated, convex, a deep, narrow longitudinal fovea behind the pars cephalica, smooth and shiny, almost transparent.

Mandibles protruding forwards, divergent, long, conical, truncate ; five teeth on the front edge of the falx, three on the inner ; fangs rather stout, long and well curved.

Palpi long and rather fine, digital joint covered with long fine hairs ; a palpal claw.

Eyes.—Front row straight, the middle eyes round, the side eyes oval, about equal in size, equidistant, the diameter of the middle eyes apart ; their diameter from the margin of the clypeus. Hinder row curved forward, the same size. The middle eyes a diameter apart, the same distance from the front middle eyes, and two diameters distant from their side eyes. The front and rear side eyes on a common protuberance.

Maxillæ parallel, not quite twice the length of the lip, rounded on the outer edge, cut off slopingly on the inner side.

Lip truncated at the top, with an indentation in the centre, constricted at the base, narrowing from above the constriction towards the front edge.

Sternum oval, truncate in front, one and a half times as long as broad.

Abdomen contour oval, four pairs of depressions forming at a little distance, two rows of spots reaching from the front to the rear of the back ; sides straight and deep ; mamillæ, two jointed, the second joint very short, the inferior much stouter and larger, but only a little longer than the superior ; an inframamillary organ.

Legs fine and slender, tapering to the extremity. Long brown spines, tarsal claws three ; a tuft of long hairs on the end of the tarsal joint, calanistrum on metatarsus IV.

DIMENSIONS.

Cephalothorax, length	-	-	-	4	mm.
„ breadth	-	-	-	2½	„
Abdomen, length	-	-	-	5	„
„ breadth	-	-	-	3	„

	Coxa.	Troch. and Femur.	Patella and Tibia.	Metat. and Tarsus.	
1. Leg -	- $1\frac{1}{2}$ mm.	- $4\frac{1}{4}$ mm.	- $4\frac{1}{4}$ mm.	- $4\frac{1}{4}$ mm.	= $14\frac{1}{4}$ mm.
2. Leg -	- $1\frac{1}{2}$ „	- $4\frac{1}{4}$ „	- $3\frac{3}{4}$ „	- $3\frac{3}{4}$ „	= $13\frac{1}{4}$ „
3. Leg -	- 1 „	- 3 „	- 3 „	- 3 „	= 10 „
4. Leg -	- $1\frac{1}{4}$ „	- 4 „	- 4 „	- 4 „	= $13\frac{1}{4}$ „

Relative length of legs: 1, $\overbrace{2, 4, 3}$.

Allied to *A. senilis* (L. Koch, Division B), but differs in the shape of the epigyne, the number of teeth on the falx edge (*senilis* having four and two); also the legs are longer in proportion to the size of the body, and the abdomen is smaller.

Locality.—Reedy Hole. A single female specimen.

Amaurobius scalaris, L. Koch.

A number of specimens, both male and female.

Professor Spencer informs me that this spider was very frequently seen on buildings. At Crown Point station its webs were constructed in a funnel shape with the mouth opening to the outside of the thick thatch covering a verandah. The funnel narrows rapidly as the web passes into the thatch. At Tempe Downs and other places the web was built so as to pass in between sheets of corrugated iron and the horizontal wooden beam on which the ends rested. The open end of the funnel was from two to several inches in diameter, and the web was usually heavily laden with fine sand particles which had adhered to it. Numerous small insects such as flies are caught in the webs, and the spider lies in wait close to the opening, retreating down the funnel immediately it is disturbed. It was never seen away from buildings.

Locality.—Charlotte Waters, Crown Point, Tempe Downs, Glen Helen. Previously recorded from Bowen, Queensland.

Mithurga, Thor.

Mithurga lineata,* Thor., var.

Two males and two females from Oodnadatta, Alice Springs, and unlabelled combine the distinguishing characteristics of both *M. lineata*, Thor., and *M. gilva*, L. Koch.

* *Araneæ nonnullæ*, Novæ Hollandiæ. Oversight af Kongl. Svenska Vetenskaps Acad. Forhandlingar, vol. 27, 1870, pp. 367-389.

In the eyes of the front row the middle are slightly larger than the side; the proportionate lengths of cephalothorax and abdomen and the markings underneath the latter correspond with *M. lineata* and not *M. gilva*. The hinder row of eyes is recurved like the latter; the male palp is more like the latter, while both it and the epigyne differ from *M. lineata*. The legs are longer in proportion than either of them.

Cephalothorax, 10 mm. long, 4 to 6 mm. broad.

Abdomen, 11 mm. long to 6 mm. broad.

	Coxæ.	Troch. and Femur.	Patella and Tibia.	Tarsus and Metat.	Total.
Legs (of males)—1st pair	- 3½ mm.	- 10½ mm.	- 12 mm.	- 12 mm.	= 38 mm.
„ „ 2nd pair	- 3 „	- 9½ „	- 11 „	- 11 „	= 34½ „
„ „ 3rd pair	- 3 „	- 9 „	- 10 „	- 10 „	= 32 „
„ „ 4th pair	- 3½ „	- 12 „	- 13 „	- 14 „	= 42½ „

Relative length of legs, 4, 1, 2, 3.

All four specimens agree in general contour and colouring, shape of legs, scopulæ, bespining, eyes and spinnerets with a slight difference in the respective lengths of legs 1st and 2nd between male and female, as in both *M. lineata* and *M. gilva*. All the specimens are larger than either species as given by L. Koch and Thorell.

However, if these specimens had been found first I do not think that either of the above-named species would have differed from them more than to be varieties, as genital organs appear to me to vary very easily with isolation; and I therefore prefer to consider them a variety of *M. lineata*—the first described—rather than a new species.

DRASSOIDÆ.

Zora, C. Koch.

Zora ferruginea, L. Koch.

One female from Charlotte Waters.

Locality.—Charlotte Waters. One female specimen. Previously described from "Australia" (Thorell).

Zora marmorea, sp. n.

Two males and six females from McDonnell Ranges, Palm Creek, and elsewhere (unlabelled).

Cephalothorax yellowish-brown, a band of pale, bristly hair round the side edges, giving the appearance of scallops; a darker streak of colour in depressions separating the head and breast parts, making it look more separated than it really is. Mandibles, maxillæ and lip yellowish-red shaded with dark brown. Sternum and haunches brownish-yellow with paler yellow hair. Palpi and legs yellowish-brown, bright coloured, metatarsi and tarsi rather darker. Hair bright whitish-yellow where thickest and darker brown in the thinner hair on the cephalothorax.

Abdomen bright pale yellow, both upper and under side, mottled with rather large dark brown or black spots disposed somewhat irregularly in lines following the contour of the sides. Epigyne brown. Spinnerets pale yellow to brown.

Cephalothorax short, high, steep at the sides and the rear, shorter than the patella and tibia IV., 1 to $1\frac{1}{2}$ mm. longer than broad, rounded at the sides, considerably narrower but rather square in front; shiny, with down-lying single hairs thinly spread, except round the edge of the breast part, where they form a thick band. Median sulcus rather long, reaching to the rear slope. Cephalic part distinguished from the breast part by slight side depressions.

Abdomen ovate, square in front, sloping to a point at the rear, sides slightly rounded.

Eyes.—Front row straight, eyes round. Side eyes = $1\frac{1}{3}$ diameter of the middle eyes. The latter $\frac{1}{2}$ diameter apart and $\frac{1}{4}$ of their own diameter from the side eyes. The front middle eyes 2 diameters from the margin of the clypeus and $1\frac{1}{2}$ from the hinder middle eyes. The rear row recurved, broader than the front row by $\frac{1}{2}$ diameter each side, about equal in diameter to the front side eyes; middle eyes $\frac{1}{2}$ diameter apart, rather more than a diameter from the side eyes, the latter on an elevation looking backwards and sideways.

Mandibles knee-formed from the forehead, thence straight, as long as the front patella, rather thickly covered with long thin hairs, which are rubbed off in some specimens. Claws short and curved, with a thick yellowish fringe on the outer edge, which prevents a view of any falx edge teeth.

Maxillæ convex, not impressed, rounded on the outer side, upright, rather pointing outwards, fringe on the inner margin reaching down to the lip.

Lip less than half the length of the maxillæ, slightly constricted at the base, narrowing from above the base to the front edge, which is straight, slightly notched in the middle.

Spinnerets six. Inferior pair conical, one-jointed, truncated at the top. Four superior on a recurved transverse line, cylindrical, one-jointed, slightly narrower and shorter than the inferior.

Sternum oval, slightly arched, thickly covered with rather long hair.

Legs clothed with both down-lying and upstanding hair and short bristles. Tarsal claws two, fine, small, parallel, close together, over thick claw-tufts. Scopulæ on tarsus and metatarsus of all legs.

Bespining of legs as follows:—

	Above.	In front.	Behind.
Femur I. and II.	- 1.1	- 1.1	- none
„ III. and IV.	- 1.1	- 1.1.1	- „
Tibia III. and IV.	- 1.1		

On tibia and metatarsus I., two rows of long spines.

DIMENSIONS.

(a) Of male specimen from Palm Creek.

Cephalothorax, length	-	-	-	4 mm.
„ breadth	-	-	-	2½ „
Abdomen, length	-	-	-	5½ „
„ breadth	-	-	-	3¼ „

	Coxa.	Troch. and Femur.	Patella and Tibia.	Meta. and Tarsus.	
1. Leg	- 1 mm.	- 3½ mm.	- 3½ mm.	- 3½ mm.	= 11½ mm.
2. Leg	- 1 „	- 3½ „	- 3½ „	- 3½ „	= 11½ „
3. Leg	- 1 „	- 3¼ „	- 3½ „	- 3½ „	= 11¼ „
4. Leg	- 1½ „	- 4½ „	- 5 „	- 5 „	= 16 „

Relative length of legs: 4, 1, 2, 3.

(b) Of female specimen from McDonnell Range.

Cephalothorax, length	-	-	-	3½ mm.
„ breadth	-	-	-	{ 1½ „ 2½ „
Abdomen, length	-	-	-	5 „
„ breadth	-	-	-	3 „

	Coxa.	Troch and Femur.	Patella and Tibia.	Metat. and Tarsus.	
1. Leg - -	3 mm.	3 mm.	$3\frac{1}{2}$ mm.	3 mm.	= $10\frac{3}{4}$ mm.
2. Leg - -	3 „	3 „	$3\frac{1}{2}$ „	3 „	= $10\frac{3}{4}$ „
3. Leg - -	$2\frac{3}{4}$ „	$2\frac{3}{4}$ „	3 „	$2\frac{3}{4}$ „	= $9\frac{3}{4}$ „
4. Leg - -	4 „	4 „	4 „	4 „	= $13\frac{1}{2}$ „

Relative length of legs : 4, $\overbrace{1, 2, 3}$.

Locality.—Palm Creek, McDonnell Ranges.

Liocranum, L. Koch.

Liocranum albopunctatum, sp. n. (Fig. 8).

Cephalothorax deep jet black. Skin bare, rough, and covered with pimples. Cephalic part smooth and shiny. A line of white pinnated scales or feathers extending longitudinally from between the hinder middle eyes to the beginning of the hinder slope. Similar white scaly feathers round the hinder margin of the breast part and on each side round the margin of the cephalic part. Abdomen deep black above, a blotchy, pale, curved streak round the anterior margin; a few long black bristles on the clypeus below the eyes. Skin shagreeny, two white patches about the middle of the back and two more half-way between the middle and the anterior margin, composed of similar feathery flakes as those on the cephalothorax; under surface black-brown, with thin down-lying black hairs. Legs and palpi deep to paler chocolate-brown, smooth and shiny; tarsi and metatarsi paler still, the whole of these and of the under surface of other joints more or less thickly covered with long erect brown hairs. Sternum black-brown, with thin erect pale brown hairs. Mandibles black-brown, smooth and shiny, inner front edge much paler, with a few upstanding black hairs on the upper part. Lip and maxillæ black-brown, the upper portion of the former and the inner slope of the latter pale colour; hair fringe pale orange. Epigyne bright reddish-brown; mammillæ black-brown.

Cephalothorax longer than the patella and tibia of the first pair, $1\frac{1}{2}$ mm. longer than broad; strongly arched transversely, breast part sloping steeply from the middle point to the posterior margin; in front square and not much narrower than the broadest part between pairs two and three. A few upstanding thin black hairs on the upper surface and the hind slope of the breast part, but most remarkable for the down-lying white feathery scales.

Eyes nearly equal in size; hinder row strongly procurved, middle eyes a diameter apart. The side eyes one-and-a-half diameter from the middle eyes. Front row straight, side eyes almost touching the middle eyes, the latter three-quarters of a diameter apart. Front middle eyes two diameters from the margin of the clypeus, and slightly more from the hinder middle eyes.

Mandibles knee-formed at the base, much arched transversely, widening from the base to one-third of the distance down, thence narrowing to the front edge, which is adorned with thick pale orange fringe.

Fangs short, rather broad at the base, of deep brown colour. Inner front edge of the falx bright red-brown.

Maxillæ divergent, arched transversely, rounded at the base and a long outer margin, truncated at the top and slopingly on inner edge.

Lip less than one-half the height of the maxillæ, rounded anteriorly, with a broad, pale coloured, inwardly-sloping margin, thence gradually narrowing to the base.

Sternum a short ovate, rather wide in front, pointed at the rear, slightly arched from the edges to the centre, and clothed all round the margin with thick, erect, pale yellowish-brown hairs or bristles. The centre smooth and shiny, black-brown.

Abdomen oval, slightly smaller at the rear end than in front; sides and back arched from a flat under surface; lightly clothed with erect thin long hairs and thick flat feathery scales, but bare in most parts.

Legs.—Femoral joints arched and thickened in the middle, smooth and shiny, with few thin erect hairs. Tarsi and metatarsi clothed with thick, erect short yellow hairs. Two claws and thick claw-tuft at the end of the tarsus. Long black spines. Radial and digital joints of *palpi* thickly clothed with short erect yellowish hair, with three or four long spines at the base of the digital joint.

DIMENSIONS.

Cephalothorax, length	-	-	-	4	mm.
„ breadth	-	-	-	2½	„
Abdomen, length	-	-	-	6	„
„ breadth	-	-	-	4	„

	Coxa.	Troch. and Femur.	Patella and Tibia.	Metat. and Tarsus.	
1. Leg - -	$1\frac{1}{2}$ mm.	- 3 mm.	- 3 mm.	- 3 mm.	= $10\frac{1}{2}$ mm.
2. Leg - -	$1\frac{1}{2}$ „	- $2\frac{3}{4}$ „	- $2\frac{3}{4}$ „	- $2\frac{3}{4}$ „	= $9\frac{3}{4}$ „
3. Leg - -	1 „	- 3 „	- 3 „	- $3\frac{1}{2}$ „	= $10\frac{1}{2}$ „
4. Leg - -	$1\frac{3}{4}$ „	- $3\frac{3}{4}$ „	- 4 „	- 5 „	= $14\frac{1}{2}$ „

Relative length of legs : 4, $\overbrace{1, 3, 2}$.

Locality.—Illamurta. A single female specimen.

Clubiona, Latr.

Clubiona achilles, sp. n. (Fig. 9).

Cephalothorax bright chesnut-brown, smooth and shiny, with a few brown down-lying hairs on the hinder slope. Legs similar colour, with upstanding pale brown or white hairs at the intersection of the joints; on tarsus and underneath side of femur brown spines on tibia IV. Palpi similar in colour, also mandibles, lip, and maxillæ, with only a few scattered whity-brown hairs. Sternum mottled with deep golden splashes, brilliant and shining; white and whity-brown hairs round the edge. Abdomen silver grey on upper and under sides; pale yellow breathing gill coverings; epigyne brown; spinnerets pale brown; grey down-lying thick hair on the back and sides and white similar on the under side.

Cephalothorax pear-shaped, cephalic part contracted almost to a point in front and sloping away to the rear, where it is broadest between fourth pair of legs, arched, and moderately high at the centre of the breast part, sloping to the margin all round except towards the eyes, where it runs out in a semi-cylindrical ridge.

Eyes.—The front row straight; the two middle eyes round; side eyes oval, middle and side close together; the middle eyes one-half diameter apart. Hinder row similar in size and straight likewise. The side eyes one diameter from the middle, directed sideways. Front and rear middle eyes two diameters apart.

Mandibles kneed at the base and thence perpendicular, conical; fangs quite small; upstanding brown hairs on the inner side, long as patella I.; no spines at the base.

Maxillæ thick, long and narrow, curved in towards and round the lip above and below, arched transversely, rounded on the outer side, slopingly truncated at the top, a thin pale hair fringe.

Lip long, oval, two-thirds the length of the maxilla, flat and smooth.

Sternum ovate, smaller in front than at the rear, brightly burnished, thick greyish hairs round the margin, flat and bare in the middle.

Abdomen 1 mm. longer than broad, oval, two large yellow patches on the under side on each side of the epigyne, which is deep brown in contrast to ground colour of abdomen. No abdominal fold behind the genital fold.

Mammillæ six in number, cylindrical, truncated at the top, single-jointed, three or four long hairs round the edge of the superior ones; inferior and superior of equal length, intermediate shorter.

Legs short, glossy; femoral joint thickened in middle; metatarsus and tibia IV. armed with lying-down brown spines; femur, tarsus and metatarsus pale brown hairs; patella and tibia smooth; two pectinated claws (four teeth on outer, three on inner), and rather thick hairs at the point of the tarsus. Tarsus and metatarsus particularly short; fourth pair of legs longest.

Note.—The cephalic part is by no means distinctly separated and no *rima media*, otherwise the cephalothorax is of the *centrothele* type. The hind row also of eyes are straight instead of curved forward, therefore it must be assigned to *Clubiona*, though on the borders of the two genera.

DIMENSIONS.

Cephalothorax, length	-	-	-	2½ mm.
„ breadth	-	-	-	2 „
Abdomen, length	-	-	-	4 „
„ breadth	-	-	-	3 „
				Coxa.
1. Leg	-	-	-	4½ mm.
2. Leg	-	-	-	— „
3. Leg	-	-	-	4 „
4. Leg	-	-	-	6 „

Locality.—A single female specimen (broken). Finke River.

Micaria, Westr.

Micaria inornata? L. Koch.

Locality.—Palm Creek. One female specimen too much broken to be absolutely certain as to the identification. Previously recorded from “New Holland.”

Drassus, Walek.*Drassus griseus*, L. Koch.

One female and one male from Palm Creek and Storm Creek.

The six spinnerets are remarkable, the inferior pair being very long and conical, broadening from base to apex, which is then truncate. The superior invertly half as long, intermediate narrowest and shortest.

The tarsal claws, and claw tufts of short flat hairs, spring out of a hollow at the end of the foot.

The middle eyes of the rear row are long, narrow and flat, of a dull grey colour, and are possibly rudimentary only.

Locality.—Palm Creek, Storm Creek. Previously described from "New Holland."

Gnaphosoides, nov. gen.

Cephalothorax inversely cordate, back and sides moderately convex, faint side depressions barely distinguishing the cephalic from the thoracic part, a short median depression leading to hinder slope.

Eyes eight (or six) arranged in two rows. Front and rear side eyes, about equal in size, are farther apart than the two intermediate pairs, and much larger than the latter. Middle eyes of front row small and closer to the side eyes than to one another, the upper margins of the four being in a straight line. The lower margins of side eyes are close to margin of elypeus.

The rear row broader and recurved, the middle eyes quite small, flat, and (apparently) rudimentary.

Maxillæ impressed in the middle, inclined towards the lip, their upper margins forming a straight line.

The lip is triangular, and more than half the length of the maxilla.

The abdomen is oval; spinnerets six, the superior and inferior pairs nearly equal in size.

Legs in proportion of 4, 3, 2, 1, furnished with spines and two tarsal claws.

This genus differs from *Gnaphosa*, Latr., in having the side eyes much larger than the middle, and is perhaps allied to *Thysa*.

Gnaphosoides, nov. gen.

Gnaphosoides albopunctata, sp. n. (Fig. 10).

Cephalothorax black-brown, with paler brown along the median area. Sternum, mandibles, lip and maxillæ reddish-brown to orange. Abdomen on the upper and under side jet black, with blue metallic sheen down the middle of the back and over the under surface. Four white spots at the shoulders and the rear corners of the back. Femoral joint of legs black-brown, other joints paler brown. Hairs on the legs pale brown.

Cephalothorax inversely cordate, truncate, narrowed anteriorly. Pars cephalica not distinct, slightly rounded above. A round depression in the middle of the cephalothorax, with a deep thin short fovea behind it.

Eyes all round. Four lateral ones form a trapezium, broadest at the rear, equal in size, two diameters between the front side eyes and the same between the front and rear side eyes, three diameters between the rear side eyes. The four median eyes equal in size, half the diameter of the side eyes, and forming a rectangle; the two front ones touch the front side eyes, with the upper edges of all four touching a straight line; the four posterior recurved; the two small middle eyes of the hinder row are a dull grey colour and flat, and give the impression of being blind.

Sternum oval, smooth, slightly arched, with a few thin hairs at the edges.

Maxillæ inclined inwards, meeting in front above the lip, the top ends forming a straight line, swelling and rounded at the basal end, flatter and thinner at the anterior, slightly impressed in the middle.

Lip two-thirds length of maxillæ, arched to a point.

Mandibles conical, fangs short and weak.

Legs moderately slim, femoral joint thickest at the base and narrowing to the front end; rather thickly covered with stiff hairs and a few upstanding bristles or thin spines; two fine short curved tarsal claws, with five or six pectinations, over fine hair tufts; a double row of black bristles on the under side of the tarsus and metatarsus.

Abdomen oblong, square in front and straight at the sides, also rather square at the posterior end; two longitudinal depressions on the under surface.

Spinnerets six, one-jointed, cylindrical, truncate at top, anterior largest in diameter and one-and-a-half times as long as the posterior.

DIMENSIONS.

Cephalothorax, length	-	-	-	2	mm.	
,, breadth	-	-	-	$\left\{ \begin{array}{l} 1 \\ 1\frac{1}{2} \end{array} \right.$,,	
Abdomen, length	-	-	-	$2\frac{1}{2}$,,	
,, breadth	-	-	-	$1\frac{1}{2}$,,	
	Coxa.	Troch. and Femur.	Patella and Tibia.	Metat. and Tarsus.		
1. Leg	- $\frac{1}{2}$ mm.	- $1\frac{3}{4}$ mm.	- 2 mm.	- 2 mm.	= $6\frac{1}{4}$ mm.	
2. Leg	- $\frac{1}{2}$,,	- $1\frac{3}{4}$,,	- 2 ,,	- 2 ,,	= $6\frac{1}{4}$,,	
3. Leg	- $\frac{1}{2}$,,	- 2 ,,	- 2 ,,	- $2\frac{1}{2}$,,	= 7 ,,	
4. Leg	- $\frac{3}{4}$,,	- $2\frac{1}{2}$,,	- $2\frac{1}{2}$,,	- $2\frac{3}{4}$,,	= $8\frac{1}{2}$,,	

Relative length of legs : 4, 3, $\overbrace{2, 1}$.

Locality.—Storm Creek. Two male specimens.

In many respects this specimen would satisfy the European genus *Gnaphosa* Latr., (*Pythonissa* C. Koch, 1837). The shape of the claws agree very well. However, the eyes of *Gnaphosa* (not hitherto found in Australia) are equal in size, whereas here they are of very different sizes, and, provisionally at any rate, I think a new genus must be formed for it. *Thysa* has the two intermediate front eyes wanting, otherwise it resembles *Gnaphosa*.

THERAPHOSOIDÆ.

Migas, L. Koch.*Migas paradoxus*, L. Koch.

A mutilated specimen (consisting of a cephalothorax and three pairs of legs) appears to agree with the description given of this species. The legs, however, are longer than in the New Zealand specimens. The row of large spines described as on metatarsus IV. is absent, and there are short, thick, rough hairs on the tarsus and metatarsus very like a scopula, which the New Zealand specimen does not possess. The falx is protrudent below the claw instead of having a sulcus.

Locality.—Palm Creek. Previously described from Auckland, New Zealand.

Idioctis, L. Koch.*Idioctis helva*, L. Koch.

In seven female specimens the third pair of legs is longer in proportion, the lips are shorter and the body larger than in those described by L. Koch.

Locality.—Palm Creek. Previously described from Ovalau (Fiji).

THOMISIDÆ.

Hedana, L. Koch.*Hedana maculosa*, sp. n. (Fig. 11).

Cephalothorax black-brown above, yellow round the front and side edges; with thick dark bristles here and there over both surfaces; two brown indentations in the centre of the back, one on each side. Legs yellow, with black-brown patches blotched irregularly over them; thickly set with pale to dark brown bristly hairs. Abdomen yellow ground colour with broad ring of black-brown blotches round the upper surface (spots in younger specimen converging into continuous ring in older); under side yellowish-grey, with concentric rings of darker spots all round the outer margin concurrent with the contour; longer dark hairs round the margin, but the inner portion of the under surface covered with short fine dark hair all erect. Sternum dark brown, with upstanding pale hairs intertwined with black, and pale yellow margin. Lip and maxillæ yellow and brown mixed.

Cephalothorax rather thick, raised up perpendicularly all round the margin, above flat all over; as broad as long, shorter than patella and tibia I.; narrower but square in front, rounded at the sides. Skin warty and rough, but the colours deep and decided and altogether effective in appearance. No separate pars cephalica. Clypeus descending perpendicularly; nearly as wide from the front eyes to the margin as between the front and rear middle eyes. Hinder slope of breast part smooth and shiny and steep, with black markings.

Eyes.—Front row slightly, hinder strongly, recurved. Front eyes, on yellow colouring, black ringed with yellow; hind row, on brown colouring, black. Four side eyes twice the diameter of the front middle eyes and set so as to be looking from the four corners of quadrangle outwards. Hinder middle eyes (black) the size of inner black pupils of front middle eyes. Front middle eyes a diameter apart and two-and-a-half diameters from the side eyes, two diameters from the

hinder middle eyes, which are four of their own diameters apart and distant from the hinder side eyes twice as far as in front.

Mandibles sub-conical, joined at the base, yellowish light brown ground colour, set over with thick, erect, brown bristles in front.

Fangs very small.

Maxillæ inclined towards the lip, convex at the base, outer margin sinuous.

Lip free, more than half as long as the maxillæ, narrowing to the front edge, which is straight; very slightly rounded; short black hairs on lip and maxillæ, grey hair fringe.

Sternum cordate, flat and shiny; hairs erect.

Abdomen broadly ovate, narrower and truncated in front, running to a point at the rear from the broadest part, two-thirds down; rounded at sides; mottled with dark brown patches on a yellow ground; flat underneath.

Spinnerets four; two-jointed, even in length; second joint short and pointed; yellow, covered with short brown hairs.

Legs and *palpi* thickly covered with down-lying, brown, bristly hairs.

Metatarsus armed with long brown spines and a bunch at the anterior end.

Tarsal claws two, rather strong, straight from the base and curved at the point; five pectinations.

DIMENSIONS.

Cephalothorax, length	-	-	-	3 mm.
„ breadth	-	-	-	3 „
Abdomen, length	-	-	-	4½ „
„ breadth	-	-	-	4 „

	Coxa.	Troch. and Femur.	Patella and Tibia.	Metat. and Tarsus.	
1. Leg	- - ¾ mm.	- 3½ mm.	- 3½ mm.	- 3 mm.	= 10¾ mm.
2. Leg	- - ¾ „	- 3½ „	- 4 „	- 3½ „	= 11¾ „
3. Leg	- - ½ „	- 3 „	- 2¾ „	- 2¾ „	= 9 „
4. Leg	- - ½ „	- 2½ „	- 2½ „	- 2½ „	= 8 „

Relative length of legs: 2, 1, 3, 4.

Cephalothorax, length	-	-	-	2 mm.
„ breadth	-	-	-	2 „
Abdomen, length	-	-	-	4 „
„ breadth	-	-	-	3½ „

	Coxa.	Troch. and Femur.	Patella and Tibia.	Metat. and Tarsus.	
1. Leg	- ½ mm.	- 3 mm.	- 3 mm.	- 2¾ mm.	= 9¼ mm.
2. Leg	- ½ „	- 3 „	- 3 „	- 2¾ „	= 9¼ „
3. Leg	- ½ „	- 2½ „	- 2 „	- 2 „	= 7 „
4. Leg	- ½ „	- 2 „	- 2 „	- 2 „	= 6 „

Relative length of legs : $\overbrace{2, 1, 3, 4.}$

Localities.—Finke River, Stevenson River.

PHILODROMIDÆ.

Hemiclœa, Thorell.

Hemiclœa longipes, sp. n.

Cephalothorax reddish-brown above, with short white hairs here and there. Sternum, legs and palpi reddish-golden yellow. Mandibles pale red, with deeper red-brown fangs. Abdomen ashy-grey above, with darker and lighter short grey hairs; five broad depressions in a ring above, with darker colouring; under surface paler grey, thickly covered with short, erect, pale hairs.

Cephalothorax inversely cordate, with the point truncated, so as to be square in front; cephalic part flat behind the eyes; slightly raised longitudinally and gradually sloping to the margin; slight side depressions distinguishing the cephalic part. Longitudinal dorsal fovea from behind the cephalic part to the beginning of the rear slope; shining and smooth, sparsely covered with down-lying white hairs.

Mandibles protrudent, only slightly darker than the cephalothorax; rather thickly covered with erect, brown, bristly hair.

Fangs long and curved, deeper red; two teeth on the inner edge of the falc sheath, three on the outer.

Eyes.—In two straight rows; the front row one-and-a-half diameters distant from the margin of the clypeus; equal in size and one-and-a-half diameters distant

from one another. The posterior row longer. The middle eyes the same diameter as the front middle eyes; two-and-a-half diameters apart; one-and-a-half-diameters from the front middle eyes; two-and-a-half diameters from the hinder side eyes, which are twice the diameter of the others and raised on a small protuberance and look sideways and backwards.

Maxille nearly parallel at the base and for half their length, but suddenly bent backwards, having an impression in the outer margin; rounded at the upper margin, with a thick, grey hair fringe. Lower portion of maxillæ bright golden, upper margin pale.

Lip contracted at base, broadest just above the contraction, thence narrowing towards the anterior margin; truncated and straight at the upper edge, and less than one-half the length of the maxillæ. Golden-brown below and through golden to pale at the upper margin.

Sternum broad, oval, bright and glossy golden colour with long, thin, brown hairs round the margin; no projecting cover at the front end.

Abdomen flattened on upper and under surface, ovate, truncated in front, covered with darker and lighter, rather rough, erect, grey hairs. Short black hairs on the hinder part of the under surface.

Mammille four, of equal length, two-jointed, second joint short, the superior thinner than the inferior.

Legs long, smooth and slender. Coxæ (especially coxa IV.) unusually prolonged, sparsely covered with short fine hairs, brown and pale. Long spines on the femur and metatarsus of all legs; first and second pairs of legs equal, fourth pair longest; tarsal claws two, fine divided claw-tuft.

Palpi covered with short brown and pale hairs. Male palp largely developed, white hairs on the upper sheath. White bladder raised and covered by dark brown muscles, a protuberance on radial joint.

DIMENSIONS.

Cephalothorax, length	-	-	-	5	mm.
„	breadth	-	-	{ 3	„
				{ 4½	„
Abdomen, length	-	-	-	4¾	„
„	breadth	-	-	3	„

	Coxa.	Troch. and Femur.	Patella and Tibia.	Metat. and Tarsus.	
1. Leg - -	2 mm.	- 6 mm.	- 6 mm.	- $5\frac{1}{2}$ mm.	= $19\frac{1}{2}$ mm.
2. Leg - -	2 „	- 6 „	- 6 „	- $5\frac{1}{2}$ „	= $19\frac{1}{2}$ „
3. Leg - -	2 „	- 5 „	- 5 „	- $5\frac{1}{2}$ „	= $17\frac{1}{2}$ „
4. Leg - -	$2\frac{1}{2}$ „	- 7 „	- 7 „	- 7 „	= $23\frac{1}{2}$ „

Relative length of legs : 4, $\overbrace{1, 2, 3}$.

Locality.—Illamurta.

Much like *H. diversa*, but the legs are longer in proportion. The fourth pair is the longest instead of the second. The abdomen is shorter; also the front eyes are equidistant, and the hinder side eyes are larger than the others instead of the same size as the front eyes.

Voconia, Thorell.

Voconia dolosa, L. Koch.

Three male and two female specimens were brought down. They were captured under bark. The animals are larger than those described by L. Koch; the black markings on the back are not clear, no longitudinal stripes being noticeable, and the legs are certainly longer in proportion than in the typical form.

Locality.—Alice Springs. Previously described from "New Holland."

Delena, Walck.

Delena cancerides, Walck.

The legs of these specimens are about one-fourth longer than L. Koch's specimen of *D. cancerides*, and agree with a specimen of my own found at Macedon (Vict.). The colouring and marking are substantially the same.

Locality.—Central Australia (? exact locality). Previously recorded from Nepean River (New South Wales), Peak Downs, Bowen and Rockhampton (Queensland); occurs also at Macedon (Victoria).

Sarotes, Sundevall.

Sarotes longipes, L. Koch.

Locality.—Alice Springs. Previously recorded from Sydney.

Isopeda.

Isopeda horni, sp. n. (Fig. 12).

Cephalothorax dark reddish-brown to black-brown, sparsely covered with grey, yellowish-brown, and black hairs intermixed; between the two rows of eyes a transverse stripe of white hair. Mandibles dark reddish-brown, with long thin hairs coloured as on the cephalothorax. Muscles at the base of the fang bright white. Hair fringe on the falcis; lip and maxillæ bright orange. Sternum black-brown, with reddish-brown and paler hairs round the margin. Lip and maxillæ dark red-brown, with paler edge. Abdomen yellowish-grey, with short down-lying brown and grey hairs intermixed. Behind the epigyne, which is bright brown, is a dark transverse stripe. Palpi bright red-brown, with long black-brown and grey hairs intermixed. Haunches red-brown, blacker on the front side; femur reddish, with patches of white hairs giving a spotted appearance. Patella, tibia, metatarsus and tarsus clothed with yellow and white hairs. Long brown spines. Thick grey scapula on metatarsus and tarsus. Skin between the joints bright white, forming a contrast to the general brown colour of the legs.

Cephalothorax equal in length to patella and tibia IV.; 1 mm. longer than broad, rotund, square in front. Cephalic part well marked by side impressions, moderately convex and slightly arched, but flat on the top, rising rather steeply at the rear and round the margin of the sides. A few long hairs, brown and grey, stand out from the margin of the elypeus.

Eyes.—The front row straight, equal in size, half diameter apart and the same distance from the margin of the elypeus. Hinder row broader, likewise straight. The side eyes looking sideways and backwards, one-and-a-half diameters distant from front side eyes, all equal in size, one-and-a-half diameters apart, but rather smaller than the front eyes. Hind middle eyes two diameters from front middle eyes; the two side eyes on a common protuberance.

Mandibles.—Knee-formed at the base, thence perpendicular, divergent, conical; fangs curved and long.

Maxillæ parallel, broad and powerful, rounded at the top and on the outer margin, brown and shiny, with pale inner margin, sloping from the highest point inwards, thence perpendicular; a thick coarse fringe.

Lip broader than long, half the length of the maxillæ, slightly rounded at the top, with a broad margin paler in colour and sloping towards the upper edge,

rather narrower at the base. Long dark hairs coming from the sternum, over the base of the lip and the maxillæ, also similar long and thin hairs on the outer margin of the maxillæ.

Sternum cordate, flat, coriaceous, covered round the sides with down-lying whitish-brown hairs, bare in the middle.

Palpi slightly longer than the cephalothorax, the femoral joint bent outwards to conform to the margin of the clypeus; thick pale hair on the cubital, digital, and radial joints.

Legs powerful and long, shiny, femoral joints thickened in the middle. Scopula on all metatarsi and tarsi, divided at the foot pad into two. Thick matted hair, white on the haunches; two long powerful pectinated claws, straight from the base and then strongly curved at the point; about ten short pectinations along the straight part; thick hard claw-tuft divided into two and pointed at the end.

Abdomen one-and-a-half times as long as broad, ovate, truncated in front and tapering at the rear, acorn-shaped; a loose white skin over darker inside coloured matter, covered with yellow and grey short down-lying hair; across the anterior portion of the sides and below the epigyne on the under side a dark stripe is transversely stretched, broad and indistinct at the posterior margin.

Epigyne a horseshoe-shaped ridge of shiny brown cuticle, disconnected at the apex and base, enclosing a white fatty sheet.

Mammillæ four, conical, single-jointed, rounded or flat at the top, brown, with dark-brown hairs on the upper part.

The skin wrinkles on the abdomen form five transverse depressions, with a median ridge along the posterior half of the upper surface. A median depression reaches on the under side from the epigyne to the spinnerets, and all are filled with short matted grey hair. On tibia III. and IV. there is one spine on the upper side.

This powerful spider by the setting of its legs appears to border on the Citigrades. In the shape of the cephalothorax, sternum, lip, maxillæ, mandibles, epigyne, and in the arrangement of the eyes, it resembles a large dark *Isopeda pessleri*, but may be readily distinguished by its comparatively much longer abdomen, shorter palpi, even length of pairs I. and II., and shorter pair III.

DIMENSIONS.

Cephalothorax, length	-	-	-	11 mm.
„ breadth	-	-	-	$\left\{ \begin{array}{l} 6 \\ 10 \end{array} \right.$ „
Abdomen, length	-	-	-	21 „
„ breadth	-	-	-	13 „

	Coxa.	Troch. and Femur.	Patella and Tibia.	Metat. and Tarsus.	
1. Leg	- 4 mm.	- 11 mm.	- $13\frac{1}{2}$ mm.	- 11 mm.	= $39\frac{1}{2}$ mm.
2. Leg	- 4 „	- 11 „	- $13\frac{1}{2}$ „	- 11 „	= $39\frac{1}{2}$ „
3. Leg	- 3 „	- $8\frac{1}{2}$ „	- 8 „	- 7 „	= $26\frac{1}{2}$ „
4. Leg	- 4 „	- 11 „	- 11 „	- 11 „	= 37 „

Relative length of legs : $\overbrace{1, 2, 4, 3.}$

Locality.—Oodnadatta. Two female specimens.

Isopeda pessleri, Thorell.

Locality.—Oodnadatta, Stevenson River, Alice Springs, Rudall's Creek. Previously recorded from Sydney, Bowen and Port Mackay (Queensland).

Isopeda villosa, L. Koch.

Locality.—Dalhousie, Palm Creek, Alice Springs. Previously recorded from Sydney. Occurs also at Macedon (Victoria).

Isopeda flavibarbis, L. Koch.

Locality.—Oodnadatta. Previously recorded from Sydney.

Heteropoda, Latr.

Heteropoda pallida, L. Koch.

Locality.—Bagot's Creek, George Gill Range. Previously recorded from Peak Downs (Queensland).

Heteropoda punctata, L. Koch.

Locality.—Palm Creek. Previously recorded from Sydney, Woollongong (New South Wales), Bowen, Peak Downs, Port Mackay, Rockhampton (Queensland).

Heteropoda calligaster, Thorell.

Locality.—Oodnadatta. Previously recorded from Sydney and Peak Downs (Queensland).

Heteropoda inframaculata, sp. n.

Cephalothorax bright canary-yellow, with whitish-yellow hair on breast part; cephalic part bare and shiny; mandibles pale straw colour, rather thickly covered with short, yellowish-grey hair and long, yellow bristles; the hair fringe on the mandibles and maxillæ a bright pale brownish-pink, the latter and lip pale straw colour, brownish-yellow bristles on the front edge; sternum golden yellow, all with pale yellow hairs. Abdomen pale yellow with short yellow and white and long brownish hair, a longitudinal brown median stripe broad anteriorly and tapering towards the rear from a third of way down back to just above the spinnerets. Underneath irregular, small dark brown spots scattered over the space between the genital aperture and the spinnerets. The palpi pale yellow, the tarsal joint covered with thick grey hair. Legs pale straw colour, all the joints thinly besprinkled with pale yellow hair; spines brown. A thick grey scopula on all the tarsi and metatarsi.

Cephalothorax rather highly arched, highest in front, steeply sloping at the rear; broad in front, slightly rounded at the sides; shorter than patella and tibia IV.; 2 mm. longer than broad, and 2 mm. narrower in the front than in the middle. Cephalic part arched, bare and shiny and standing up from the breast part.

Eyes.—Front row straight along the upper edge; middle eyes one-and-a-half diameter of the side eyes and half diameter apart; the middle eyes from the side eyes half diameter of the side eyes. Rear row straight, equal in size, half the diameter of the front middle eyes and two of their own diameters apart. Front middle eyes from the rear middle eyes the diameter of the front middle eyes, and the same distance from the margin of the clypeus.

Mandibles long, perpendicular, arched, slightly divergent, with thick rough hair on their inner margins. A thick pink fringe along the falx edge. Fangs small and slightly curved.

Maxillæ upright, parallel, rounded on the outer and front margins, sloping off to the inside, and thickly fringed with long stiff hair.

Lip straight in front, half the length of the maxillæ, constricted at the base, and narrowing again from above the constriction to the front.

Sternum heart-shaped, flat, shiny, with thick upstanding hair round the margin.

Abdomen rather long, slightly rounded at the sides, straight in front, and running to a point at the rear, covered with a thick mat of stiffish hair, longest on the upper surface and shorter on the under.

Legs long and slender, lightly covered with hair and bespined with short stout and long fine spines. No spines on the upper surface of the tibiæ. A thick scopula on all the tarsi and metatarsi; claws two; at first springing out straight, then deeply bent; five pectinations, the longest towards the point of the claw some little distance back.

DIMENSIONS.

Cephalothorax, length	-	-	-	7 mm.
„ breadth	-	-	-	5 „
Abdomen, length	-	-	-	9 „
„ breadth	-	-	-	6 „

	Coxa.	Troch. and Femur.	Patella and Tibia.	Metat. and Tarsus.	
1. Leg	- 2 mm.	- 8 mm.	- $9\frac{1}{4}$ mm.	- $9\frac{1}{4}$ mm.	= $28\frac{1}{2}$ mm.
2. Leg	- 2 „	- 9 „	- 10 „	- $9\frac{1}{2}$ „	= $30\frac{1}{2}$ „
3. Leg	- 2 „	- 7 „	- $6\frac{1}{2}$ „	- $6\frac{1}{2}$ „	= 22 „
4. Leg	- 2 „	- $8\frac{1}{2}$ „	- $8\frac{1}{2}$ „	- $8\frac{1}{2}$ „	= $27\frac{1}{2}$ „

Relative length of legs: 2, 1, 4, 3.

Locality.—Illamurta. One female specimen (young).

This species is not far from *H. regina*, L. Koch,* but differs in colouring and pattern, especially on the underside of the abdomen, and has no spine on the upper side of the tibia; and the front middle eyes are largest instead of equal in size to the side eyes.

Sub-order CITIGRADÆ.

LYCOSIDÆ.

Dolomedes, Latr.

Dolomedes instabilis, L. Koch.

This specimen has longer legs in proportion to the body, the third pair is also rather longer as compared with the first and second than in L. Koch's specimens, the specimen being larger also. Sternum, lip, maxillæ and shanks rather lighter.

* Die Arach. Aust., p. 716.

Locality.—Reedy Creek, George Gill Range. Previously recorded from Mudgee (New South Wales), Herbert Town (Queensland).

Dolomedes australianus, L. Koch.

This is an extremely small specimen to have an epigyne apparently fully developed; but L. Koch mentions that his specimens vary remarkably in size and marking, and it seems to agree well with his description except in much smaller size and side stripes on the cephalothorax not so well marked. His were accustomed to live in and about water, which may account for the difference.

Locality.—Reedy Creek, George Gill Range. Previously recorded from Woollongong, Sydney, Nepean River (New South Wales).

Lycosa, Latr.

Lycosa aurea, sp. n. (Fig. 13).

Cephalothorax dark orange-yellow with yellowish-white hair; eye-space black with white hair; maxillæ and lips dull, rather dark, brown; sternum bright orange with white hair; mandibles black-brown with yellowish hair and brown bristles, a grey fringe on the outer falx edge; abdomen, upper side golden yellow sprinkled with little black spots, white hair; in front a blackish longitudinal stripe, sides paler yellow, hair white. Underneath yellow with transverse rows of stiff white hairs pointing backwards. Palpi bright yellow with white hair. Tarsal joint, grey hair and brown spines. Legs bright orange-yellow with white hair and grey spines.

Cephalothorax $1\frac{1}{2}$ mm. longer than broad, as long as the patella and tibia IV., as broad as tibia IV., slightly rounded at the sides, shiny, and clothed with down-lying hairs, which are rather stout; the middle ridge is prominent and the hind slope rather steep.

Eyes.—The front row is slightly procurved; the middle eyes being one-and-a-third times the diameter of the side eyes, all are equidistant, one-half the diameter of the side eyes apart and not so wide as the second row, from which the side eyes are rather farther apart than they are from the middle front. The eyes of the second row are large, three-fourths of their diameter apart and one-and-a-quarter of their diameter from the eyes of the third row. The third row of eyes is two-thirds the diameter of the second row and two of their diameters from one another.

Mandibles, long and powerful, longer than patella I.; short down-lying hair and a few long bristles.

Maxillæ rounded on the front and outer edge, narrowing to base, sloping off to the inside and there thickly fringed, rather protruding on the inside above the lip.

Lip half as long as the maxillæ, straight in front with a rather deep, sloping edge, only slightly narrower in front than at the base.

Sternum oval, flat, shiny, rather thickly clothed with hair round the edges.

Abdomen longish, slightly rounded at the sides, rounded bluntly both at the front and rear; rather bare above but with thick, stout hairs pointing backwards in transverse rows underneath.

Epigyne.—A semi-elliptical plate lying transversely with two round apertures on the basal line.

Palpi longer than the cephalothorax, slim; femoral joint slightly curved and widened at the anterior end. Tarsal joint well-haired underneath and a rather large female palp claw.

Legs rather bare of hair; three short, stout spines at the end of the metatarsus, and at the end of each shank a pair of spines. The patellæ of the two front pairs without spines. On tibia III. and IV. above two spines I., I. A thin scopula on each tarsal joint.

DIMENSIONS.

Cephalothorax, length	-	-	-	$5\frac{1}{2}$ mm.
„ breadth	-	-	-	4 „
Abdomen, length	-	-	-	$6\frac{1}{2}$ „
„ breadth	-	-	-	4 „

	Coxa.	Troch. and Femur.	Patella and Tibia.	Metat. and Tarsus.	
1. Leg -	- 2 mm.	- $4\frac{3}{4}$ mm.	- $4\frac{3}{4}$ mm.	- $4\frac{3}{4}$ mm.	= $16\frac{1}{4}$ mm.
2. Leg -	- $1\frac{1}{2}$ „	- $4\frac{3}{4}$ „	- $4\frac{3}{4}$ „	- $4\frac{3}{4}$ „	= $15\frac{3}{4}$ „
3. Leg -	- $1\frac{1}{2}$ „	- 4 „	- 4 „	- 4 „	= $13\frac{1}{2}$ „
4. Leg -	- 2 „	- $5\frac{1}{2}$ „	- $5\frac{1}{2}$ „	- 7 „	= 20 „

Relative length of legs: 4, 1, 2, 3.

Locality.—Ellery Creek. One female specimen.

This species, while agreeing in synoptical points with *L. egeria*,* L. Koch, differs from it in its lighter colouring, the pattern and blunter shape of the abdomen, the proportion of its legs (much shorter third pair) shape of epigyne, straighter front row of eyes, and the front row of eyes nearer together; no scopula on the tarsal joint.

Lycosa.

Lycosa topaziopsis, sp. n. (Fig. 14).

Cephalothorax rich ochre-brown on the sides, forehead, and middle ridge; two darker brown stripes from behind the hinder row of eyes to the hind slope of the cephalothorax, thickly covered with smooth close hair; lighter brown at the sides and in the middle, darker along the stripes. A few pale, almost white, erect hairs along the margin of the clypeus and round the side edge of the cephalic part. Long upstanding black bristles sparsely scattered over the pars cephalica. Legs and palpi pale brown, with short close similar-coloured hair, paler and more upstanding on the palpi, interspersed with long black erect hairs, longer and blacker still on the tarsus and metatarsus. Scopula on the under side of the tarsus and metatarsus ashy-grey. Eyes most brilliant topaz colour, with black pupils. Mandibles dark brown, rather thickly covered with smooth short yellow hair, mixed with long erect black hair; fangs red. Lip, maxillæ, and sternum dark grey, with black hair. The coxæ are dirty dark yellowish-brown; a dark grey fringe is present on the lip and maxillæ. Abdomen underneath brownish-grey in front of the epigyne. From the latter half-way to the spinnerets is a black transverse band, the rear part of which is pale brown in colour. On the upper surface is a thick mat of black, brown, and grey bristly hair.

Cephalothorax as long as the patella and tibia IV.; between the second and third pairs of legs as broad as patella and tibia III. Square in front, slightly rounded at the sides. At the hinder end a steep slope with medial indentation in the margin; at the head part arched transversely, more sloping and rounded off at the front corners.

Eyes.—The front row straight; the two middle eyes half a diameter apart, and not half of their diameter from the margin of the clypeus; front side eyes half of their diameter from the middle eyes, and in size two-thirds of the diameter of the middle eyes. Front row slightly narrower than the second row. Second or middle row three times the diameter of the front middle eyes, two-thirds of their

* Die Arach. Aust., pp. 895 and 935.

diameter apart, and distant from the front middle eyes the diameter of the front side eyes. The eyes of the hinder row (third) twice the diameter of the front middle eyes, three diameters apart. Eye space as long as broad, face high, the yellow part of the eyes surrounded by a white transparent rim.

Mandibles only slightly divergent, rather arched in front, but not knee-formed, perpendicular, longer than tibia I. At the upper end and down the outer side thickly covered with brown hair, and with long erect bristles on the inner lower bare portion.

Maxillæ arched, rather straight at the top and sloping to the inside, upright and parallel, a thick dark-grey fringe and long upstanding hair (black); no pale edge part; rather narrowed towards the base.

Lip less than half as long as the maxillæ, truncated, slightly rounded towards the front corners, and notched in front.

Sternum flat, truncate, heart-shaped, shiny, thickly covered with dark upright hair and paler down-lying ones.

Abdomen a broad oval, smaller than the cephalothorax; spinnerets about equal in length. (Inferior much stouter and more truncate at the top than the superior). Abdomen thickly covered with a mat of short thick upright hair arranged in transverse rows on both the upper and under surface.

Palpi shorter than the cephalothorax; the femoral joint curved towards the head and gradually thickened to the front end; thickly covered with pale stiff-pointed hair; tarsal joint more thickly haired and darker in colour.

Legs moderately stout, covered with smooth, nearly white, hair. Long erect dark-brown bristles and black spines. Scopula on metatarsi and tarsi.

This is near *L. semicincta* (L. Koch), but in the latter the lip is more than half the length of the maxillæ. The eyes of the second row not quite a diameter from the third and first row, as broad as the second, and the eyes equally distant. In this they are one-and-a-third the diameter, and the front row is not quite so broad as the second. The lip is less than half as long as the maxillæ. The abdomen is shorter in proportion and the legs longer compared with the cephalothorax. The front middle eyes are further apart than from the side eyes. In other points the two species agree.

DIMENSIONS.

Cephalothorax, length	-	-	-	5½ mm.
„ breadth	-	-	-	4 „
Abdomen, length	-	-	-	4 „
„ breadth	-	-	-	3 „

	Coxa.	Troch. and Femur.	Patella and Tibia.	Metat. and Tarsus.	
1. Leg -	- 2 mm.	- 5 mm.	- 4½ mm.	- 4½ mm.	= 16 mm.
2. Leg -	- 2 „	- 4½ „	- 4½ „	- 4½ „	= 15½ „
3. Leg -	- 2 „	- 4½ „	- 4 „	- 4½ „	= 15 „
4. Leg -	- 2 „	- 5 „	- 5½ „	- 7 „	= 19½ „

Relative length of legs : 4, 1, 2, 3.

Locality.—Stevenson River. One female specimen.

(42) *Lycosa cowlei*, sp. n. (Fig. 15).

Cephalothorax black-brown, shiny all over; short smooth white hairs in patches (possibly rubbed off from remainder). Mandibles dark brown, with long white hairs on the inner side, reddish at the lower end of the falx. Fangs reddish-brown, white at the base; a fringe of long brown hair on the falx edge. Palpi golden yellow; legs pale golden yellow, with grey rings on the femur, patella and tibia. Maxillæ and lip yellowish-brown; sternum yellow, mottled with brown spots, brown, with long thin brown and palish brown hairs. Abdomen darker grey above, yellowish and whitish hairs on darker and lighter patches respectively, yellowish-brown on the sides and grey again underneath, with yellowish and whitish hairs as before.

Cephalothorax as long as patella and tibia IV. or I., and 2 mm. longer than broad, straight in front, rounded at the sides, a curved indentation in middle of the rear edge. Cephalic part a good deal raised up, flat on the top, the corners and sides being well rounded; the clypeus bare, very smooth and shiny, as is the whole of the upper side of the cephalothorax.

Eyes very much raised and prominent, high above the surface from which they spring. Front row curved forward and not so wide as the second; the middle eyes larger than the side eyes; diameters as 3 : 2; eyes equidistant, the diameter of the side eyes; about the same distance from the eyes of the second row. Eyes of the second row their diameter apart = 3 diameters of the front middle eyes.

Eyes of the third row = the same distance from second = $2\frac{1}{2}$ diameters of the front middle eyes, and three of their own diameters apart.

Mandibles longer than patella IV. ; arched, shiny, with thin long pendent hair on their inner and lower edges ; a rake of powerful teeth, five on the inner falx ridge, three on the outer edge. Fangs long and powerful.

Maxille arched, rounded in front and outer edge, upright, parallel, narrowing to the base, covered with long thin erect hair ; thin dark brown fringe.

Lip free, half as long as the maxillæ, somewhat narrower in front, with a straight fore edge.

Sternum cordate, flat, shiny, with long thin erect hairs.

Abdomen oval, rounded in front and at the rear and sides ; steep at the sides and arched transversely, smooth, with short down-lying hair here and there in patches.

Legs long and moderately powerful ; femur arched and thickest in the middle, and with three dark rings all round ; a dark ring at the extremity of the tibia ; three claws on the tarsus, two upper long and thin, with small pectinations for about one-third of the length from the base. Legs quite smooth and bare, with long brown spines, a thin black scopula on the tarsus only.

Epigyne a semi-elliptical shield, with long angular openings at the base, the small ends meeting in the middle.

Superficially this *Lycosa* is not unlike *L. crispipes*, but the epigyne is quite different. It may also be distinguished by the different hairing of the shanks, maxilla, and sternum, which latter is in *crispipes* short thick and yellow, instead of smooth and mottled with brown. The tarsal claws are not pectinated far from the base. Legs I. longer than II. and III., instead of equal to II. and longer than III. It agrees in nearly all respects with L. Koch's *L. berenice*, but the body is twice as long and the legs three times. It is also generally of a darker colour, and has no pattern on the back ; the eyes of front row are nearer together and the epigyne are different.

DIMENSIONS.

Cephalothorax, length	-	-	-	7 mm.
„ breadth	-	-	-	5 „
Abdomen, length	-	-	-	8 „
„ breadth	-	-	-	6 „

	Coxa.	Troch. and Femur.	Patella and Tibia.	Metat. and Tarsus.	
1. Leg - -	3 mm.	- 7 mm.	- 7 mm.	- 8 mm.	= 25 mm.
2. Leg - -	2½ „	- 6 „	- 6 „	- 7 „	= 21½ „
3. Leg - -	2½ „	- 6 „	- 6 „	- 7 „	= 21½ „
4. Leg - -	3 „	- 7 „	- 7 „	- 10 „	= 27 „

Relative length of legs : 4, 1, $\overbrace{2, 3}$.

Locality.—Ayer's Rock. One female specimen. The species is associated with the name of Mr. E. C. Cowle, under whose guidance a party visited Ayer's Rock, which lies in the desert sandhill country to the south of Lake Amadeus.

Lycosa, Latr.

Lycosa pulvere-sparsa, L. Koch.

Locality.—Three males, fifteen females, and six young specimens brought from Camps 7 and 25, McDonnell Ranges, Palm Creek, Bagot's Creek, and Paisley Bluff show this species to be about the most numerous and widely-spread of the spiders of this district. Previously recorded from Bowen and Rockhampton Queensland.

Lycosa crispipes, L. Koch.

Locality.—Palm Creek. Previously recorded from Rockhampton, Queensland.

Lycosa læta, L. Koch.

Locality.—Palm Creek. Previously recorded from Rockhampton, Queensland.

Lycosa leucophœa, L. Koch.

Locality.—Palm Creek. Previously recorded from Rockhampton, Queensland.

Lycosa albosparsa.

Locality.—Storm Creek. Previously recorded from Rockhampton, Queensland.

OXYPOIDÆ.

Peucetia, Thorell.

Peucetia albescens, L. Koch.

Locality.—Central Australia (? exact locality). Previously recorded from Bowen and Peak Downs, Queensland.

Oxyopes, Latr.*Oxyopes attenuatus*, L. Koch.

Locality.—Central Australia (? exact locality). Previously recorded from Peak Downs, Queensland.

Oxyopes gratus, L. Koch.

One young male (unlabelled).

Locality.—Central Australia (? exact locality). Previously recorded from Rockhampton and Gayndah, Queensland.

Oxyopes variabilis, L. Koch.

Locality.—Ellery Creek. Previously recorded from Gayndah, Queensland.

Sub-order SALTIGRADÆ.

ATTOIDÆ.

Leptorchestes.*Leptorchestes cupereus*, sp. n. (Figs. 16 and 17).

Cephalothorax coppery-brown, smooth and shiny from the third row of eyes to the rear; white and red recumbent hairs intermingled on the rear and side slopes. Eye space deep black, opaque, red and white recumbent hair, black up-standing hair. Palpi pale straw colour with long thick straw-coloured hair interspersed with a few long thin black hairs; a bunch of grey hair at the point. Mandibles yellowish-grey, fangs pink. Lip and maxillæ bright amber, somewhat paler yellow at their inner edges. Legs bright amber with thin white hairs on the upper joints; black spines on the tarsus, metatarsus and tibia; grey claw-tufts. Sternum olive-brown. Abdomen pale yellow on the sides and under surface, with a few pale thin hairs scattered at intervals. Epigyne amber. Upper surface brownish-grey, with red, white and black hairs intermingled, mottled with small yellow spots.

Cephalothorax oblong, square in front, slightly rounded at the sides of the breast part, only slightly incurved at the rear of the same. The petiole joining the cephalothorax and abdomen long and visible from above; the breast part arched from the middle, sloping rather steeply to the side and rear margins, flat on

the eye space and straight at the sides of the same; on the same level as (or if anything, lower than) the breast part.

Eyes.—The middle eyes of the front row twice the diameter of the side eyes; all touching one another; one-third of their diameter from the margin of the clypeus. Hinder eyes equal in size to the front side eyes; eyes square, narrower behind. The middle row half way between the front side eyes and the rear eyes, quite small.

Legs rather stout, the fourth pair longest; femora thickened in the middle. Spines on the tibia, tarsus and metatarsus. Coxa IV. rather long. Coxæ all bare and shiny; femur and patella bare, smooth and shiny.

Lip free, short; less than half the length of the maxillæ; constricted at the base and from the widest part one-third up, again narrowing to the apex, which is finally truncate and straight.

Maxillæ spatulate, broad and straight in front; upright, parallel, flat, slightly narrowing to the base.

Sternum oval, smooth and shiny, flat, pale hairs thickest at the margin.

Abdomen oblong, straight at the sides, rounded in front and at the rear; flat on the back, more rounded on the under surface.

Spinnerets six; rather long thin and pointed, even in length, single-jointed.

DIMENSIONS.

Cephalothorax, length	-	-	-	2 mm.
„ breadth	-	-	-	$1\frac{1}{4}$ „
Abdomen, length	-	-	-	3 „
„ breadth	-	-	-	2 „

	Coxa.	Troch. and Femur.	Patella and Tibia.	Metat. and Tarsus.	
1. Leg	-	-	-	$\frac{1}{4}$ mm.	- 1 mm. - $1\frac{1}{4}$ mm. - $\frac{1}{2}$ mm. = 3 mm.
2. Leg	-	-	-	$\frac{1}{4}$ „	- 1 „ - $1\frac{1}{4}$ „ - $\frac{3}{4}$ „ = $3\frac{1}{4}$ „
3. Leg	-	-	-	$\frac{1}{3}$ „	- $1\frac{1}{8}$ „ - $1\frac{1}{3}$ „ - $1\frac{1}{3}$ „ = $4\frac{1}{8}$ „
4. Leg	-	-	-	$\frac{1}{2}$ „	- $1\frac{1}{4}$ „ - $1\frac{1}{2}$ „ - $1\frac{1}{2}$ „ = $4\frac{3}{4}$ „

Relative length of legs: 4, 3, 2, 1.

Locality.—Stevenson River. A single female specimen.

Sobara, E. von Keys.*Sobara biteniata*, E. von Keys.*Locality*.—Opossum Creek. Previously recorded from Sydney.**Selaophora**, E. von Keys.*Selaophora rubra*, E. von Keys.*Locality*.—Opossum Creek. Previously recorded from Cape York, Queensland.**Sandalodes**, E. von Keys.*Sandalodes albobarbatus*, E. von Keys.

One female from Illamurta.

Locality.—Illamurta, James Range. Previously recorded from Peak Downs, Queensland.**Prostheclina**, E. von Keys.*Prostheclina insecta*, nov. sp. (Fig. 18).

Cephalothorax bright orange-brown, with darker brown longitudinal streaks towards each edge, and a narrower streak in the middle; down-lying short red and white hairs; eye space black, with similar bright red and white hairs. Mandibles dark brown, paler at the lower edge, with yellow-brown fangs. Lip and maxillæ yellow. Sternum pale olive-brown, with thick pale yellow hairs round the margin. Palpi and legs golden yellow, with transverse rings of black, three on the femur, two on the tibia, one each at the base of the tarsus and metatarsus; none on the coxa, which is deeper yellow. Petiole pale straw colour, with dark longitudinal streaks one on each side of the middle band. Abdomen pale yellow, mottled with brown spots on the upper surface, three larger spots in a transverse band across the middle of the back; similar at the rear end, and brought together into a curved line. The under surface rather paler yellow, mottled with brown spots, all about the same size. Epigyne deep orange on a paler orange plate, with pale orange breathing gill covers, one on each side of the same.

Cephalothorax square in front, with straight sides, longer than patella and tibia IV., and one-fourth longer than broad. Slightly bulged and rounded at the rear corners, with deep indentation in the middle of the posterior margin; highly

arched longitudinally, sloping steeply to the sides and rear. Eye space flat and rectangular, wider than long.

Eyes.—The front middle eyes touching one another, twice the diameter of the side eyes, one-fourth their diameter distant from the margin of the clypeus, the row straight at the rear edge. Hinder (third) row the same size as the front side eyes. The middle row of eyes very small, slightly nearer to the rear row than to the front, and situated on a line joining the outer margins of the front and rear side eyes. Quadrangle of eyes slightly narrower behind than in front, and its breadth less than that of the whole cephalothorax.

Mandibles cylindrical, parallel, with small thin fangs, smooth and shiny, and without hair.

Maxille upright, parallel, truncate at the anterior margin, flat, and not tapering to either extremity.

Lip free, triangular, barely one-half the length of the maxillæ.

Sternum ovate, broad and truncate at the anterior margin; thick upstanding hairs round the margin, flat and shiny.

Petiole joining the cephalothorax and abdomen, very unusually long, broad and flat, above half the length of the cephalothorax; prominently visible from above.

Legs.—Coxa of fourth pair of legs wholly attached to the petiole, and that of the third pair partially so. Legs short and strong, the third and fourth pair nearly equal in length and longer than the front pairs; in regular order of length from behind. All limbs well armed with long brown spines and long bristles, especially on the tarsal and metatarsal joints. Grey claw-tuft covering up the two claws.

Abdomen ovate, broad, rounded at the anterior end, broadest one-third down and rather pointed at the rear; rather sparsely haired, with short down-lying hairs. Skin hard and slightly rough and harsh (like drawing paper).

Epigyne.—Pair of circular depressions side by side in elliptical shell.

Spinnerets four, conical, truncate at the top, the inferior pair rather longest and largest round; single-jointed, springing from a common elevation. This species is not far removed from *P. lignata*, but differs in the epigyne and in the colouring and marking of the abdomen.

DIMENSIONS.

Cephalothorax, length	-	-	-	$2\frac{1}{2}$ mm.
„ breadth	-	-	-	2 „
Abdomen, length	-	-	-	$3\frac{1}{4}$ „
„ breadth	-	-	-	3 „

	Coxa.	Troch. and Femur.	Patella and Tibia.	Metat. and Tarsus.	
1. Leg	- $\frac{1}{2}$ mm.	- $1\frac{1}{2}$ mm.	- $1\frac{1}{4}$ mm.	- $1\frac{1}{2}$ mm.	= $4\frac{1}{2}$ mm.
2. Leg	- $\frac{1}{2}$ „	- $1\frac{1}{2}$ „	- $1\frac{1}{4}$ „	- $1\frac{1}{2}$ „	= $4\frac{3}{4}$ „
3. Leg	- $\frac{1}{2}$ „	- $1\frac{3}{4}$ „	- $1\frac{3}{4}$ „	- $1\frac{3}{4}$ „	= $5\frac{3}{4}$ „
4. Leg	- $\frac{3}{4}$ „	- $1\frac{1}{2}$ „	- $1\frac{3}{4}$ „	- 2 „	= 6 „

Relative length of legs : 4, 3, 2, 1.

Locality.—Rudall's Creek. One female specimen.

Margaromma, E. von Keys.

Margaromma funesta, E. von Keys.

Locality.—Mereenie Bluff. Previously recorded from Sydney and Cape York, Queensland.

PLATE XXIV.

Fig.

1. *Epeira frosti*. Eyes, from above.
2. *Epeira gracilis*. Eyes, from front.
3. *Nephila eremiana*. Epigyne.
4. *Meta œrea*. Eyes, from above.
5. *Meta œrea*. Male palp.
6. *Amaurobius bimetallicus*. Falx, to show teeth.
7. *Amaurobius bimetallicus*. Epigyne.
8. *Liocranum albopunctatum*. Eyes, seen from above.
9. *Clubiona achilles*. Epigyne.
10. *Gnaphosoides albopunctata*. Eyes, seen from above.

Fig.

11. *Hedana maculosa*. Eyes, seen from above.
12. *Isopeda horni*. Epigyne.
13. *Lycosa aurea*. Eyes, seen from above.
14. *Lycosa topaziopsis*. Eyes, seen from above.
15. *Lycosa cowlei*. Eyes, seen from above.
16. *Leptorchestes cupereus*. Eyes, seen from above.
17. *Leptorchestes cupereus*. Epigyne.
18. *Prostheclina insecta*. × 3.

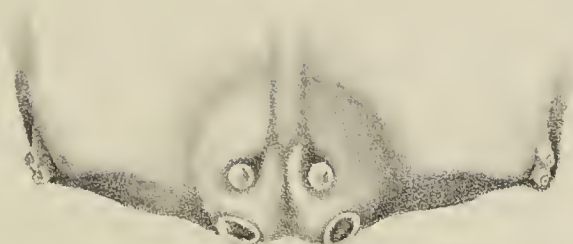


Fig 1 x 12

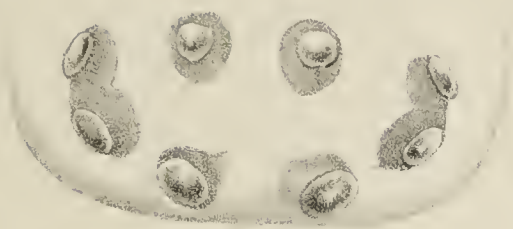


Fig 4



Fig 7 x 30



Fig 2 x 18



Fig 3 x 10



Fig 8 x 20



Fig 6 x 20

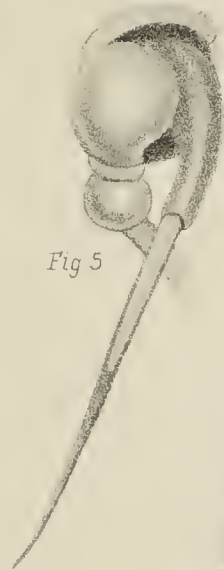


Fig 5



Fig 9 x 25



Fig 10 x 20

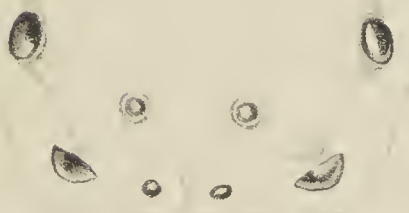


Fig 11 x 25

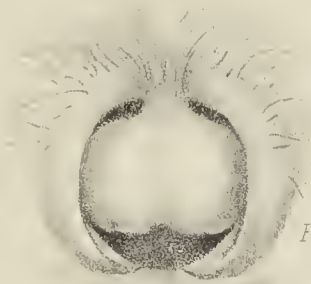


Fig 12 x 9



Fig 13 x 10

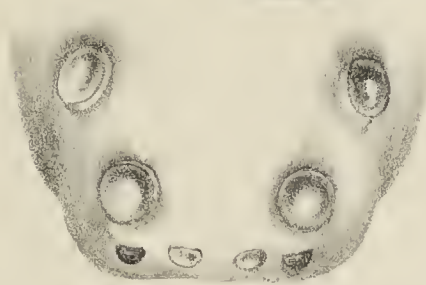


Fig 15 x 8

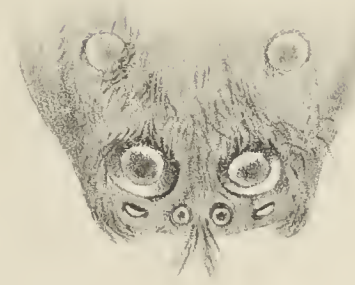


Fig 14 x 10



Fig 17 x 30

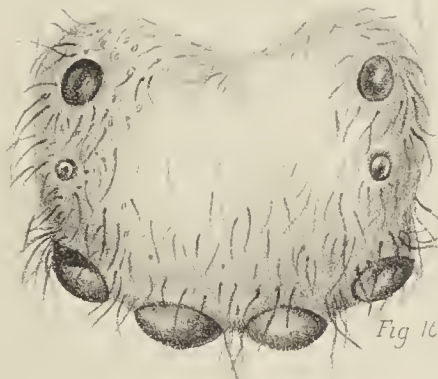


Fig 16 x 20



Fig 18 x 3

ORTHOPTERA.

By J. G. O. TEPPER, F.L.S.

The Orthoptera are at present separated into seven sections, sometimes called families, which term, however, appears to be more suitable for the smaller divisions of each of these. These sections are (1) *Forficulariæ* or Earwigs; (2) *Blattodea* or Cockroaches; (3) *Mantodea* or Mantids; (4) *Phasmodea* or Spectre (Walking-stick) Insects; (5) *Acridiodea* or Short-horned Locusts; (6) *Locustodea* or Long-horned Locusts; and (7) *Gryllodea* or Crickets. Representatives of all these were collected, forming a total of slightly more than 200 specimens. As they had been preserved in alcohol, the colour of many of them has been more or less destroyed, and the bodies of some contracted and contorted by drying.

Although in most directions, so far as this order is concerned, comparatively few novelties have been brought back by the Expedition, such as are new are the more interesting, while the knowledge gained in respect of the distribution of the remainder is highly valuable. That no more new species have been found is due chiefly to the fact that previous expeditions and private collectors had contributed some of those rarer forms endemic to the regions explored, while the others are distributed over a very large portion of the interior, or even extend to the southern districts.

Section I.—FORFICULARIÆ.

Labidura, sp. There are two specimens, one male and one female, which do not appear to differ from the commonest species of southern Australia. The species is closely allied to *Labidura riparia*, Pallas (*Forficula gigantea*, F.), but differs from it in the forceps of the male being bidentate, besides other differences.

Locality.—Stevenson River.

Section II.—BLATTODEA.

PHYLLODROMIDÆ.

Loboptera tricolor, sp. n. Piceous, very shining, elongate, oval, larva paler. Head black, ocelliform spots, clypeus, antennæ with basal area and palpi

(except the last apical whitish joint) black. Circumferential margin, above and beneath, narrow, whitish. Pronotum elliptical, nearly black; disk slightly impressed rugulose; hind margin straight, narrowly red. Mesonotum transverse, colour similar, lobes of elytra white, very narrow, not exceeding the hind margin. Metanotum black near pale margin, median area broadly reddish, hind margin concave. Legs pale, coxæ with a black spot. Abdomen inter-marginally black, disk broadly red; nuder side similar. Supra-anal lamina triangular, apex subspinose, black, finely transversely impressed striate, tip reddish. Cerci black. One adult male and a male larva.

	Adult Male.	Male Larva.
Length of body - - -	6 mm.	4.5 mm.
„ pronotum - - -	2 „	1.5 „
Width of pronotum - - -	2.5 „	1.75 „

Locality.—Ayer's Rock and Palm Creek.

The larva (from the latter locality) is much paler than the adult, and the margins of the yellow meso- and metanotum narrowly black, while the submarginal dark stripe of the abdomen is almost obsolete. These differences, however, I consider as due to immaturity.

Loboptera, sp. There is a single male nymph from Finke Gorge, which resembles *L. circumcincta*, Tepp. (Trans. Roy. Soc. S.A., 1893, p. 37), in size and colouring, but differs in the pronotum being marked by a large circular testaceous patch in the disk, the hind margins of meso- and metanotum being narrowly piceous in the middle, widening out gradually, the lateral lobes very much produced posteriorly, and the cerci dark instead of pale. Owing to the immaturity of the specimen no name can be attached.

Paratemnopteryx australis, Saussure (Mel. Orth., i., p. 93).

Locality.—Alice Springs. One female.

Apolyta testacea, sp. n. Female. Pale testaceous. Vertex and a narrow band between the eyes pale brown. Pronotum with a few dark dots. Membrane of elytra brownish; crowdedly reticulating veins and veinlets pale. Wings pellucid; legs pale, edges of coxæ and femora, also the spines, blackish. Abdominal segments with hind margins narrowly dark, especially next to lateral margin, and with a few blackish dots in the disk.

Length of body (female)	-	-	-	-	7 mm.
„ elytra	-	-	-	-	8 „
„ pronotum	-	-	-	-	2 „
Width „	-	-	-	-	2.5 „

Locality.—Reedy Hole, George Gill Range.

There is a male larva besides from Palm Creek, which I am inclined to associate with the above on account of similar size and apparently characteristic streaking of the legs, and notwithstanding the otherwise very different colouration, as the latter is the rule for immature stages in the genus. The following is a detailed description:—

Testaceous, shining. Vertex of head brownish, face pale. Antennæ, except base, blackish. Pronotum black, margins all round broadly testaceous, laterally bordered very narrowly with blackish; disk with an anterior arch, with about five streak-like spots and a posterior broader bar with five tubercles in front. Mesonotum blackish all round the pale disk, lateral margins whitish, slightly bordered with black laterally. Metanotum similar, not bordered with black laterally. Legs pale, *coxæ and broad femora with narrow black lines*; tibiæ black. Abdomen pale, segments with narrowly black bases, posterior margins narrowly white, remainder finely dotted with brownish; under side pale. Cerci black at the basal half, red at apical, acuminate; styles pale.

Length of body (male larva)	-	-	-	-	7.3 mm.
„ pronotum	-	-	-	-	2 „
Width „	-	-	-	-	2.7 „

Apolyta litura, sp. n. Minute, testaceous. Head brownish, face pale, a white band below the eyes. Antennæ blackish. Pronotum pale, disk with brownish spots like oriental letters. Elytra blackish, veins and veinlets pale. Wings with anterior veins and veinlets brown. Legs pale, *coxæ whitish*. Abdomen black, disk varied with yellowish above and below, and with small pale round dots near the pale margin. Cerci pale, apex black.

	♀	Larvæ.
Length of body	- - - 5 mm.	- 3—4.5 mm.
„ elytra	- - - 5 „	- ———
„ pronotum	- - - 1.5 „	- 1—1.3 „
Width „	- - - 1.6 „	- 1—1.3 „

The above two species are the smallest known to me.

Locality.—Not recorded.

EPILAMPRIDÆ.

Epilampra gracilis, Brunner (Syst. Bl., 170, Trans. Roy. Soc. S.A., 1893, p. 57). There is a very small male (12 mm. long), a young male larva, and two adult females from Reedy Hole, one female from Painta Springs, and one larger larva from Palm Creek. Although the form and colouring is the same as those of specimens from the southern parts of Australia, yet the average size is much less.

Locality.—Three very young larva, 4 mm. in length—from Reedy Creek (2) and Finke Gorge (1)—appear to belong also to this species.

Epilampra notabilis, Walk. (Brit. Mus. Cat., 202; Roy. Soc. Trans. S.A., 1893, p. 58). One adult female from Illamurta appears to belong to this widely-distributed species, and also a half-grown larva from Palmer River. They are distinguished from the preceding species by the body being distinctly dilated posteriorly, and also rather different detail of colouring.

Epilampra fraserensis, Tepp. (Trans. Roy. Soc. S.A., 1893, p. 59).

The specimens consist of two adult females and a young larva from the above localities and in the same order. As the species was originally established on some males only, there is a slight doubt whether the two sets really represent the same kind.

The following description will supplement the original one :—

Female.—Testaceous, varied with blackish streaks. Body elongate oval, *not dilated behind*. Head concealed, pale, a brown to chestnut band between the eyes, more or less interrupted in the middle; clypeus with a chestnut patch; palpi with last joint partially dark. Pronotum with margin pale, bordered narrowly reddish-brown externally, and dotted distantly with dark points and small spots internally; disk varied much with black, a distinct swelling anteriorly on each side of median line, with round, intensely-black spot near the margin; hind margin nearly straight and without vittæ. Meso- and metanotum similar, hind margin slightly produced in the middle, vittæ more or less indistinct. Elytra lobiform, exceeding the hind margin of the metanotum considerably, a black streak in the middle, discal part obscurely dotted, apex subacute. Legs testaceous; anterior femora with 3—4 small brown spines towards apex. Dorsal abdominal segments each alternately pale and dark, pale band dotted with brownish, dark band with raised black vittæ; median line dark, more or less distinct; it and two larger black spots on each side, joined by a pale patch, divide the upper surface of the abdomen into six subequal stripes; ventral side

pale, with piceous to black lateral border and a small round pale spot within the dark on each segment except the last; disk reddish. Supra-anal lamina pale, transverse; hind margin rounded, slightly emarginate. Cerci short, broad, pale. Subgenital lamina large, rotundate, entire; margin rugulose.

Length of body (female)	-	-	-	-	24 mm.
„ pronotum	-	-	-	-	5 „
Width „	-	-	-	-	11 „

Locality.—Finke Gorge, Palm Creek, Reedy Hole.

Epilampra aspera, Tepp. (Trans. Roy. Soc. S.A., xvii., p. 62).

Locality.—Oodnadatta. A single specimen of a female larva.

PERIPLANETIDÆ.

Polyzosteria impressa, sp. n. Metallic blackish glaucous; fore and hind margin of pronotum and the hind margins of all other segments narrowly yellow. Face, antennæ, legs (except the ochreous coxæ) and ventral segments of abdomen brownish-red. Vertex of the head dull metallic green, punctate; fore margin of clypeus whitish. Pronotum hooded, lateral margin broad, reflexed, impressed cribriform rugulose, hind angles moderately rounded; discal area limited by a semicircular interrupted impression, in front a low elevation succeeded by an inversely-curved depression, and on each side of the middle an elongated pit; hind margin concave. Meso- and metanotum with similar sculpture and transverse impressions; hind angles of former distinctly produced, hind margin straight; of latter, hind angles not produced, hind margin very sinuous. Abdomen short, very slightly rugulose, margin of last two segments finely crenulate and hind angles produced; first ventral segment and coxæ bordered pale. Supra-anal lamina very flat and short, rotundate, entire, rugulose. Cerci very short, acuminate, pale yellow. One adult (?) female.

Length of body	-	-	-	-	28 mm.
„ pronotum	-	-	-	-	8 „
Width „	-	-	-	-	18 „

Locality.—Illamurta, James Range.

This remarkable species is distinguished from all others by the peculiar sculpture of the thoracic segments, the curves of the segmental hind margins, and the general colouring. In form it resembles *P. limbata*, but is otherwise quite different.

Polyzosteria zebra, sp. n. Yellow, banded with piceous, stout. Head scarcely concealed; vertex, a band between and below the antennæ, base of clypeus, and a longitudinal stripe, both reddish piceous. Antennæ and palpi reddish. Pronotum scarcely hooded, not much reflexed laterally, almost smooth, shining, disk indistinctly impressed with very faint dark spots; hind angles subacute; hind margin concave. Mesonotum and metanotum similar, each side with small shallow pits, a dark band rather broad in the middle and convex behind, short; hind margin of metanotum slightly and angularly produced in the middle. Abdomen almost smooth, except a few scattered pits, dark basal band narrow, not extending to lateral margin, posterior angles rectangular or shortly produced as a small tooth. Legs bicolorous; coxæ pale testaceous, anterior border, base, and a short stripe in the middle from the base reddish-brown; femora with inner side pale testaceous, remainder reddish; tibiæ and tarsi reddish-piceous; arolia large. Abdomen ventrally pale yellowish, each segment with a narrow dark basal band extending to lateral margin. Valvules reddish. Cerci as long as the lamina, slender, pale yellow, terminating in a short spine at inner side. One specimen.

Length of body (female)	-	-	-	-	35 mm.
„ pronotum	-	-	-	-	9 „
Width „	-	-	-	-	19 „

This is a most remarkably coloured species and could not be mistaken for any other on account of the inversion of the predominating colours. In this respect it is only approached by the much smaller *Platyzosteria latizona* and *P. ardrossanensis*, M.

Locality.—Oodnadatta.

Pseudolampra punctata, Tepp. (*loc. cit.*, xvii., p. 97). There is one female larva in the collection, while two others were obtained by the Elder Expedition previously, also some adults from the Everard Range. The larvæ are much paler than the adults, the markings being indistinct and the legs only reddish on the upper side.

Locality.—Ayer's Roek.

Periplaneta invisa, Walker (Brit. Mus. Cat., p. 137). The single female agrees well with the description and is almost full grown, as the outlines of the elytra have become discernible. It measures 20 mm. in length of body, the pronotum being 5 mm. long and 8 mm. wide.

Locality.—Heavitree Gap, McDonnell Range.

Periplaneta obscura, Tepp. (*l.c.*, 107). There are two male larvæ of different ages from Palm Creek, and also a very young one, presumably belonging to the same species, from Reedy Creek. The specimens upon which the species was originally established came from the Northern Territory.

Periplaneta rufa, Tepp. (*l.c.*, 101). One adult male from Oodnadatta, two female nymphs (?) from Palm Creek, and a larva of each sex from Dalhousie.

PERISPHÆRIDÆ.

Lepidophora furcata, Tepper (*l.c.*, xviii., p. 20). Of this remarkable species a single male was captured at Oodnadatta, being the second known to me. The first specimen, upon which genus and species were established, was brought by A. Zietz, Esq., F.L.S., from Lake Collabonna and described in a paper read before the Roy. Soc. S.A., in Dec., 1894. The abdomen possesses the singular peculiarity that the upper angles of the tarsal segments overlap the ventral scale-like, a structure only existing among the Forficulariæ, among Orthoptera, so far as I am aware of.

HETEROGAMIDÆ.

(?) *Ataxigamia tatei*, Tepp. (*loc. cit.*, xvii., 123). Females, male nymph, and larvæ. The genus and species were originally established upon some adult males (winged) obtained from Fowler's Bay. The specimens brought back by the Expedition, on the contrary, consist all of wingless individuals, and, with one exception, of females, which are habitually apterous. There is therefore some doubt left whether the sexes are correctly mated, but as the general characters denote considerable affinity, I prefer to assign the specimens for the present as above. The following descriptions will therefore be supplementary to the previously-published ones :—

Male nymph et larvæ.—Reddish-brown above, testaceous beneath, also the legs and lateral margin ; larvæ paler. Head free, antennæ and palpi pale, vertex with a dark band absent in larvæ and females. Pronotum hooded, rotundate, disk scabrous, with raised tubercles, an impressed short furrow on each side of the indistinct median line anteriorly, and two round black impressed dots in the middle, besides some other less distinct shallow impressions ; hind margin slightly sinuate, angles acute. Mesonotum similar, a black impressed spot on each side near insertion of elytra ; hind margin tuberculate, very concave. Lobes of elytra distinctly discernible (not free), much produced, apex subrotundate. Metanotum similar, wing lobes very distinct, venation discernible. Abdominal segments with two

main transverse rows of tubercles, the one along hind margin regular, hind margin straight, angles narrowly produced as short triangular spines, lateral margin with subtriangular pale testaceous spots, and a row of impressed, small, round black spots submarginally (which are more or less obsolete in the females and the larvæ), margins of the last two segments finely serrate. Supra-anal lamina transverse, hind margins rotundate, serrate, depressed medially, slightly emarginate. Cerci lanceolate, flat, rather obtuse, scarcely exceeding lamina, brown. Penultimate ventral segment of abdomen much excavated. Subgenital lamina short, flat, margin rounded, finely tuberculate, deeply emarginate. Styles very short, scarcely visible from above.

	Male Nymph.	Larvæ.
Length of body - - - -	26 mm.	26 mm.
„ pronotum - - - -	5.5 „	5 „
Width „ - - - -	13 „	12 „

The under side is pubescent, but not nearly so much as in the typical adult male specimens. The anterior femora are similarly spined as the latter, but the intermediary and posterior ones possess besides 2—3 small spines each, which are absent in the adult males and (supposed) females, otherwise they are quite similar in structure, armature of tibiæ, the form of tarsi, etc.

Female.—Similar to above, excepting being less scabrous, in addition to the points noted above. Angles of meso- and metanotum much less produced, lobes of elytra and wings absent. Fore femora spinose, tibiæ unarmed. Supra-anal lamina similar to that of male nymph, but larger and flatter, less scabrous, scarcely serrate. Cerci shorter; subgenital lamina broad, sub-semicircular, entire, margin smooth.

Length of body - - - -	25—28 mm.
„ pronotum - - - -	6 „
Width „ - - - -	13—14 „

Locality.—Palm Creek, McDonnell Range (two immature males, one adult female), Bagot's Creek and Illamurta (one female each). One of the smaller larvæ, presumably belong to the same species, from Alice Springs is almost glabrous; the other, still younger, is quite villous, and from Palmer River.

Section III.—MANTODEA.

Micromantis (?) sp. Fawn coloured. Head transverse, flat; eyes prominent, subconical. Antennæ filiform, very slender, about as long as the prothorax.

Pronotum tectiform, in front nearly as wide as the head, slightly narrower behind; fore margin subrotundate, slightly emarginate; lateral margins straight, finely and evenly serrulate; humeral sinus deeply excised; hind margin produced, rotundate. Fore coxæ nearly as long as the pronotum, stout, both edges serrate, inner side deep orange. Fore femora stout, as long as pronotum, when folded back with four spines external of tibiæ, and three beyond. Fore tibiæ curved, about half the length and diameter of the femora, both inner carinæ densely spinose. Tarsi longer than the tibiæ. Middle and hind legs slender, unarmed. Elytra of body colour, opaque. Wings pellucid, slightly greenish-yellow, abdomen spindle-shaped, stout; ovipositor produced; cerci longer than ovipositor, gradually accuncate.

Length of body (female) -	-	-	30	—	32	mm.
„ elytra -	-	-	25	—	28	„
„ pronotum -	-	-	9	—	9·5	„
Width „ -	-	-	3·5	—	4·3	„

Locality.—Reedy Creek; Stevenson River. One female from each. The insects which I have referred to this genus resemble others occurring in the more southern parts of South Australia, and of which some five different varieties (?) can be distinguished, but differ in several structural though inconspicuous details, and may be new (the cerci are comparatively shorter in this than with some of the others).

Archimantis brunneriana, Sauss. (Mel. Orth., i., 401).

Locality.—Alice Springs, one adult male; Palm Creek, Crown Spring (a half-grown larvæ each); Bagot's Creek (a very young larvæ). The adult differs in nothing from specimen about Adelaide.

Haania kraussii, Sauss. (Mel. Orth., ii., 75). One male, two females and two larvæ of different ages. These seem to agree well with the published descriptions. Head and pronotum are provided with strong spines, the colour is tawny-grey, densely dotted with black; the elytra of the male have a black humeral stripe, and the legs are banded with black.

		♂		♀
Length of body	-	17 mm.	-	20 mm.
„ elytra	-	18 „	-	7 „
„ pronotum	-	4 „	-	4 „
Width „	-	1·5 „	-	3 „

Locality.—Storm Creek (♂), Stevenson River (♀), Mount Tate (larger larva), Palm Creek (smaller larva).

Haania conspersa, Sauss. (*loc. cit.*, p. 75). There is one male, which I doubtfully refer to this species, but may be new. Head and pronotum are rugose, not spined. Length of body, 18 mm.; of elytra, 20 mm.

Locality.—Illamurta.

Haania, sp. Size very small, brownish-tawny. Head and pronotum not spinose, scarcely rugulose. Elytra almost pellucid, apex slightly smoky. Transverse veinlets few, distant, pale.

Length of body (male)	-	-	.	-	11	mm.
„ elytra	-	-	-	-	12	„
„ pronotum	-	-	-	-	2	„
Width „	-	-	-	-	1.2	„

Locality.—Finke Gorge. The material is too scanty to warrant the application of a specific name, but the description may serve as a guide for future identification.

Section IV.—PHASMODEA.

Cyphocrania pasimachus, Westward. A small sized female with the wings much damaged. Although applying the name to the specimen, I have to note that the fore tibiæ are not lobed as described, and that there are some other differential characters that may entitle the present form to a varietal rank when better known. The species is widely distributed in Central and Northern Australia, but few individuals appear to be seen. Length of body (♀) 170 mm., of elytra 25 mm., of wings 36-38 mm.

Locality.—Oodnadatta.

Bacteria, sp. Probably new. There are four apparently immature specimens, which are remarkable for slenderness, and a very fine black dorsal median line for the whole length. Length of body 56-63 mm., width of body 1.3 mm., legs very long and slender, antennæ 44 jointed.

Locality.—Ayer's Rock (2), Bagot's Creek and Crown Point (1 each).

Section V.—ACRIDIODEA.

To this section belongs the bulk of the collection, and includes a considerable number of large and moderate-sized species, besides a few small ones. Many of these have been previously collected, though scientifically they may be new or hitherto unrecognised. The literature of this section at my command is too incomplete to allow me to deal thoroughly with the collection. In addition to those described below, the collection includes specimens belonging to the family Tryxalidæ (one species) and to the genera *Pezotettix* (one species), *Brachytettix* (two species), *Caloptenus* (two species), and to the group *Eremoboides* (seven species).

MESOPES.

Cervidia (?), sp. Pale grey varied with intricate blackish markings. Eyes finely banded. Hind tibiæ with seventeen external spines (*C. lobipes*, Stol., has seventeen). One larva, perhaps full grown (probably new), and three much younger.

Locality.—Idracowra, Palm Creek and Glen Edith.

CHORYPHISTÆ.

Choryphistes. The genus comprises rather large and sluggish insects inhabiting woody situations, and are endemic in Australia. The specimens in the present collection comprise two (or possibly three) species or varieties, of which the larger one is also known from the Adelaide district, but not the smaller. Neither appears to have been described.

Choryphistes obscuro-brunneus, sp. n. Dull tawny grey. Prothorax with a very distinct broad dark stripe on each side and along the hind femora; indistinct with the other varieties. Wings colourless. Three females, two males and a very young larva.

Locality.—Oodnadatta (♀), Darwent Creek (♀), Tempe Downs (♀), Storm Creek (♂), Adminga Creek (♂ and larva). Length of body, ♂ 25—27 mm., ♀ 42—45 mm.

Choryphistes obscuro-brunneus, var. Reddish-fawn. Abdomen banded black. One female and a female nymph. Length of body, ♀ 27—37 mm.

Locality.—Oodnadatta, Storm Creek.

Choryphistes interioris, sp. n. Pale grey, darker marks indistinct, lobes of pronotum indistinctly striped; hind femora not striped, with two indistinct dark transverse bands exteriorly; abdomen laterally spotted black mostly.

	♂	♀
Length of body - -	21 —24 mm.	30 —34 mm.
„ elytra - -	22 —24 „	30 —32 „
„ pronotum - -	6·5—7 „	9·5—10 „
Width „ - -	3·7—4 „	5 —6 „

Locality.—Storm Creek (three males, two females), Opossum Creek (one female), Stevenson River (a young larva).

Goniæa (*Tropinotus*, Serv.) **arcuata**, sp. n. Size moderate to large, pale fawn. Pronotum with medial ridge high, much compressed and arched, hind margin acutely produced. Elytra with remote, very indistinct annular spots. Wings with basal part broadly brownish-yellow. Three females.

Length of body - - - -	31—47 mm.
„ elytra - - - -	29—46 „
„ pronotum - - - -	11—16 „

Locality.—Dalhousie (2), Crown Point (1). There are also two young larvæ from Storm Creek, two from Illamurta, one from Adminga Creek, and one from Bagot's Creek, which are referred to this species. It may be remarked that there are specimens of the above species from Innaminka in the Adelaide Museum.

Goniæa fusca, sp. n. Much darker than the preceding. Thorax, elytra and hind femora thickly covered with small blackish spots and minute dots. Pronotum with crest less elevated, hind margin angularly and acutely produced. Wings with basal area deep reddish-brown. One female and one larva.

Length of body, ♀ - - - -	35 mm.
„ elytra - - - -	38 „
„ pronotum - - - -	13 „

Locality.—Idracowra (♀), Palm Creek (larva).

Goniæa flava, sp. n. Pale tawny. Elytra only remotely and indistinctly spotted beyond the middle. Crest of pronotum low, not much curved; disk with posterior part less produced, dull brown, hind margin bordered narrowly pale, apex obtuse. Wings pale brownish-yellow. Abdomen slightly crested. Femora

and tibiae wholly pale. One female and a young nymph. Length of body 43 mm., of pronotum 13 mm., of elytra 47 mm.

Locality.—Alice Springs.

STROPES.

Stropis ocellatus (?). Size large, greenish-tawny to pale brownish. Antennæ ensiform, longer than pronotum, apical part blackish. Fastigium sulcate, very prominent, much depressed below summit of vertex, horizontal. Vertex arcuate. Eyes oval, varied with crowded cerebriform markings. Face much declined. Pronotum rotundate, medial carina faintly developed, interrupted; fore margin distinctly reflexed, first sulcus not continued downwards, second and third extending to interior margin of lobes; hind margin not much produced, subrotundate on each side, before last sulcus two shallow bluish-white depressions. Head and pronotum ornamented with distant, round, but minute granulations, apparently translucent and resembling ocelli. Margins of lobes broadly pale tawny, colour extending to pleura of mesonotum. Elytra very pale tawny, slightly spotted darker. Wings translucent, veins black. Hind femora whitish with regular, angulated, brown, transverse bars laterally and above. Tarsi with first two joints shorter than third; arolia very large. Two females.

Length of body	-	-	-	-	-	50 mm.
„ elytra	-	-	-	-	-	42 „
„ pronotum	-	-	-	-	-	12 „
Width „	-	-	-	-	-	8 „

Locality.—Stevenson River, Alice Springs.

The colour of the specimen has been much altered, probably by the spirits in which it was preserved. A young nymph from Alice Springs appears to belong to it, but is only 24 mm. in length and much discoloured.

(?) **Cratippus dispar**, sp. n. Tawny to yellowish-brown. Male rather slender. Head declined; fastigium produced, concave at apex; antennæ narrowly ensiform, longer than head and pronotum together; vertex convex. Pronotum slightly rugulose, lateral ridges indistinctly denoted by a few tubercles, medial ridge low, interrupted, lateral lobes with inferior margin broadly whitish, above which a broad brown stripe, much wider behind and in front extending around the face. Elytra slightly exceeding the abdomen, tawny, unmarked. Abdomen with the first six segments banded black above, except the pale space along the middle; first two segments with a small oval whitish spot on each side.

	♂	♀
Length of body - - -	33 mm.	35—47 mm.
„ pronotum - - -	8 „	10—12 „
„ elytra - - -	27 „	13—18 „
Width of pronotum - - -	5 „	7—9 „

Female darker, much larger than the male; elytra and wings abbreviate. Head and fastigium similar, antennæ broadly ensiform. Pronotum tubercular rugose, laterally tumid; carina scarcely perceptible, hind margin subrotundate, emarginate, lateral pale band more distinct, darker stripe much less distinct than of male. Elytra broad, extending to the middle of fourth abdominal segment, radial and ulnar areas much spotted, remainder almost concolorous. Wings short, though perfect, pale brownish, pellucid. Coxæ and hind femora externally whitish, transverse lines dark, inner side black at base, as long as abdomen. Metanotum with fore margin white, on each side a kidney-shaped, sharply-defined, bluish-white spot close to medial line; abdomen with first three segments similarly marked, sides banded black below spots, middle of dorsum, etc., concolorous. Twelve specimens of both sexes.

Locality.—Oodnadatta (two pairs), Storm Creek (one pair), Stevenson River (one pair), Illamurta, Storm Creek (each one female), Alberga Creek (two males), Alice Springs (one young larva).

The above species may probably require a genus for its reception, on account of the disparity in size and the organs of flight in the two sexes, which are not mentioned in the original description of the genus, otherwise they appear to agree well with it.

MESAMBRIÆ.

Tritropis vittatus, sp. n. Size moderate. Greyish-tawny, sides of body and the elytra and hind femora mottled with blackish. Pronotum tricarinate, ridges slightly elevated, interrupted, black, disk laterally with a broad band on each side, extending in front to the lateral margins of the fastigium, behind along the anal margin of the elytra; medial space dark brown. Elytra with anterior margin greyish-tawny, discal area a little darker. Hind femora internally pale tawny. Two females.

Length of body - - -	- - -	25—27 mm.
„ elytra . - - -	- - -	25 „
„ pronotum - - -	- - -	7 „
Width „ - - -	- - -	4 „

Locality.—Crown Point, Finke River. There are several specimens in the S.A. Museum from elsewhere, but possibly of another species, being much smaller. It may be mentioned of the above that the fore margin of the pronotum exhibits a few small raised vittæ laterally, the hind margin of the lobes four longer vittæ, and that of the disk one raised streaklet on each side of the medial ridge. The wings of this and the following species are pellucid, veins black.

Tritropis striatus, sp. n. Brownish; head and hind femora cinereous, all over mottled with blackish; pronotum darker than other parts, dorsally not pale striped, rugose, fore and hind margins with numerous raised striæ, lateral ridges not distinct; hind femora with two black bars above, inner side red near base.

Length of body	-	-	-	-	-	28 mm.
„ elytra	-	-	-	-	-	23 „
„ pronotum	-	-	-	-	-	6 „
Width „	-	-	-	-	-	5 „

Locality.—Mereenie Bluff (one female).

Tritropis, sp. Resembling last, reddish-brown. Pronotum with lateral ridges obsolete, disk with a few raised elongated tubercles behind and in the middle; margins *not vittate*. Elytra with several interrupted indistinct dark bands. Hind femora pale, black near base.

Length of body	-	-	-	-	-	27 mm.
„ elytra	-	-	-	-	-	23 „
„ pronotum	-	-	-	-	-	7 „
Width „	-	-	-	-	-	5 „

Locality.—Oodnadatta (one female).

Trigoniza sulcatus, sp. n. Pale tawny, scabrous. Face almost vertical, rugulose, occiput and cheeks almost smooth; fastigium of vertex not distinct from frontal, but separated from vertex by a semi-lunar depression; foveoles on ridge; frontal ocellus obsolete, only denoted by a tumour; costa very short, suddenly much dilated, not extending to labrum. Pronotum broadly truncate, scabrous in front, impressed punctate behind, with a few remote tubercles along the hind margin, anteriorly narrower than the head, much dilated and angular behind, disk without raised medial line, distinctly depressed, slightly convex in the middle near last sulcus, latter very convex; fore margin subcrenulate, emarginate; lateral lobes not very scabrous, broad behind, depressed in the middle, with a longitudinal furrow joining the last two transverse sulci, and a conical elevation above;

hind margin of lobes oblique, nearly straight, of disk slightly convex, subsinuuous. Elytra lobiform, oval, fore margin straight, hind margin rounded, and extend to the middle of first abdominal segment; membrane dark, veins very crowdedly reticulate, pale. Metanotum wholly exposed between the elytra, scabrous. Legs remotely pilose, anterior pair short, tibiæ with six external and four internal spinelets (besides the spurs), middle pair longer, tibiæ with seven external and three internal spinelets; hind femora longer than abdomen, gradually attenuate to the incrassated knees; upper and lower carina laminate, former equally wide throughout, latter much wider in the middle; kneec lobes broadly oval, shorter than apex, narrowly emarginate; hind tibiæ subtrigonal, with six external (ex-apical spine absent) and eight internal spines, base pinkish, apex black. Tarsi with first joint as long or shorter as the others together; claws very spreading, arolia elongate, truncate behind. Abdomen very short, conical, first three segments slightly scabrous. One female.

Length of body	-	-	-	-	-	30 mm.
„ elytra	-	-	-	-	-	6 „
„ pronotum	-	-	-	-	-	12 „
Width „	-	-	-	-	-	13 „
Length of hind femora	-	-	-	-	-	16 „
Width „	-	-	-	-	-	6 „

Locality.—Idracowra. The prosternal tubercle is very broad, acuminate and very low. Habit of *Brachytettix*.

Trigoniza maculatus, sp. n. The insects placed here provisionally resemble the European *Pamphagus* and North American *Brachyepplus* to a certain extent, but differ from the former by having a promiscuously produced fastigium and uncrested pronotum, from the other by their terete pronotum and elongate tibiæ, etc., while separated from the American *Dactylotum* by the horizontal or scarcely suberect fastigium and multispinose hind tibiæ. With *Trigoniza* it appears united by a similar prosternal tubercle, labiform elytra and general habit, but differs in the pronotum being without a keel. The following description will serve for identification:—

Body brownish or blackish with *numerous round elevated yellowish or white dots and spots over the whole surface*, except beneath. The male very much smaller than the female, else similar. Head small, pale, smooth, except vertex; fastigium much produced, horizontal (♂) or raised (♀), disk excavated; face much declined; antennæ slender, longer than pronotum, flattened, 16 (♀) to 18 (♂) jointed,

blackish; cheeks without ridges, but with a short furrow from the mouth toward the eyes; latter oval, black, with some white streaks or ramifying white lines. Pronotum terete, short, thick, conical, with four transverse sulci; fore margin straight, smooth; lobes broad, inferior margin slightly oblique, subsinuate; hind margin slightly and oblique concave, of disk not produced, truncate; lower margin of lobes broadly whitish, this band extending in a straight line to the inferior extremity of the eyes. Elytra lobiform, base narrow, apex broadly rotundate (♀) or oblique (♂), veins crowded, thick, pale spaces between, small, black. Wings rudimentary, pale pinkish. Meso- and metanotum black and pink, or wholly blackish or brown (but always with the raised yellow spots). Abdomen long, terete or subcompressed, very gradually attenuated to apex. Legs spotted. Hind femora rather slender; ridges thick, edges rounded; inner side pale. Hind tibiæ terete, slender, straight, with 8–12 internal, and 5–8 external spines (♂), or 12 internal and 8 external spines (♀); *apical external spine always present*. Supra-anal lamina of male triangular. Cerci acutely conical; subgenital lamina cucullate, much incurved (ventro-apically), with a rounded tubercle in the middle which forms the apex of the body. Female with supra-anal lamina oval, valves of ovipositor very stout, superior pair with lateral ridges obtusely dentate, pale, apex black; subgenital lamina bilobæ.

	♂	♀
Length of body	22 — 24 mm.	35—40 mm.
„ elytra	3 — 5·5 „	5— 7 „
„ pronotum	5·5— 6 „	8—11 „
Width „	4 — 5·5 „	8— 9 „
Length of hind femora	13 — 14 „	14—18 „
Width „ „	2 — 2·5 „	3— 4 „

Locality.—Pale var., Storm Creek (♂ ♀), Crown Point (♂), Oodnadatta (♀). Dark var., Darwent Creek (♂ ♀), Oodnadatta (one ♂, four ♀), Deering Creek (♀).

The pale and dark varieties differ also in some other details, but scarcely sufficient to separate them. A remarkable habit is that usually a male and a female only are found together and feeding in company without quitting each other's company. When alarmed the small male bestrides the much stronger partner, and is carried by her out of harm's reach; the movements are, however, slow and comparatively feeble. The genus and species is widely distributed in South Australia, but nowhere numerously, and may have to be removed to another section.

TERATODES.

Ecphantus cristatus, sp. n. Pale tawny (green?), pilose, punctate rugulose, slightly varied with indistinct darker spots. Face vertical; eyes finely dark punctate; fastigium rounded, vertex raised behind in a line with the crest. Pronotum highly and interruptedly cristate, arched, produced behind, hind angle obtuse, angular. Elytra much longer than the abdomen. Hind femora much incrassated at base, exceeding the abdomen, latter purplish-red above. Hind tibiae slender, with small spines.

Length of body (female)	-	-	-	-	26 mm.
„ elytra	-	-	-	-	30 „
„ pronotum	-	-	-	-	7 „
Width „	-	-	-	-	4.5 „

Locality.—Stevenson River, Palmer River. One female from each, that from the latter place without hind legs. This species is not represented in South Australia Museum and is different from any described by Stal. (Syst. Acrid., p. 71).

Ecphantus ayersii, sp. n. Larger and darker than the last, striately rugose. Eyes ovate, vertically lineate, fastigium horizontal, vertex arcuate, separated from fastigium by a depression, transversely carinate. Pronotum sellæ-form, carina distinct, first and second sulci apparently confluent in the middle, crest of anterior part rather high, arcuate, low behind, middle part conical, posterior part of pronotum flat, fore and hind margin of lobes with raised black vittæ, disk with a short and broad dark band bordered pale externally. Elytra with fore and hind margins dark spotted, medial and apical almost concolorous. Wings pellucid, colourless. Hind femora shorter than abdomen, with a few indistinct dark spots externally, inner side pale. Hind tibiae slender, spines long. One female.

Length of body	-	-	-	-	41 mm.
„ elytra	-	-	-	-	48 „
„ pronotum	-	-	-	-	9 „
Width „	-	-	-	-	6 „

Locality.—Ayer's Rock. There are specimens of similar appearance in the South Australian Museum, but the wings are sky-blue at the base.

GERENIÆ.

Gerenia dilatata, sp. n. Reddish, with indistinct darker spots on the elytra. Head and fastigium carinate; antennæ slender, *dilated and flat towards apex*,

latter acutely acuminate, black; frontal costa not sulcate, straight. Pronotum dull, tricarinate, fore margin straight, much raised, disk slightly tuftiform, hind margin obtusely triangular. Elytra slightly longer than the abdomen, narrow, with a large ill-defined black spot near base. Hind legs missing. Abdomen slender, whitish; supra-anal lamina elliptic. Cerci conical, terete, apex obtuse. Subgenital lamina small, cordiform, suberect. One male only.

Length of body	-	-	-	-	-	17·5 mm.
„ elytra	-	-	-	-	-	13·5 „
„ pronotum	-	-	-	-	-	4 „
Width „	-	-	-	-	-	2·7 „

Locality.—Alice Springs.

The form of the antennæ is a remarkable feature.

Section VI.—LOCUSTODEA.

DECTICIDÆ.

Chlorobalius, gen. nov. (green and spotted). Hind tibiæ with two apical spines below. Pronotum not carinate (*medial line depressed*), sellæform, hind margin subtruncate, *slightly convex*. Subgenital lamina flat; styles rather long, *flat, very obliquely truncate*; apex of ovipositor smooth. Front flat, *base broader than the truncated apex*, moderately declined. Elytra and wings perfectly explicate, *very long*. Pectus narrow. Meso- and metasternum bispinose. Hind tarsi with free plantula, much shorter than first joint (differt *Metaballus*, affinis *Rachidorus*). Vertex acuminate, *acute*; very much narrower than first joint of antennæ (aff. *Metaballus*, diff. *Rachidorus*). Anal segment *short, broadly, but not deeply emarginate*. Ovipositor slightly and gradually curved. Styles with a short recurved tooth.

Chlorobalius leucoviridis, sp. n. Green, elytra banded and spotted with white. Fastigium of vertex very narrow, about one-third of the width of the first joint of the antennæ, acuminate from the middle, apical part spine-like, widely separated from the apex of frontal costa, which is acutely triangular, including the shallow ocellar spot, remainder very indistinctly discernible, flat; vertex with a pale medial and several lateral lines; eyes globose, very prominent; antennæ with basal joint very large, subcompressed, second joint half as long and thick, third much longer and thinner, remainder very slender, subequal. Pronotum terete, hind part flat, fore margin raised, disk wrinkled. Elytra very long, narrowest in

the middle, hind margin subundulate, anal area beyond speculum extremely attenuated, finally obsolete toward apex, latter rotundate. Costal area pellucid, with 14—15 opaque, green, transverse bars, remainder green with numerous, subpellucid, whitish spots and transverse bars; anal area of both sides broad at base, with quadrilateral speculum almost veinless. Wings pellucid, veins pale, nearly as long as elytra, width about one-third of the length, apex subacute. Legs long, rugose above and spotted with white, fore femora purplish, below with six external and seven internal spines (besides spurs), terminal ones very small; middle femora similar; hind femora with eight internal and nine external spines, basal ones small, rather close, remainder larger, very remote towards apex. Fore tibiæ subsulcate, foramina conchate, opening cleft-like, with six external and seven internal (long) spines. Hind tibiæ quadrangular, all margins spinulose, the spinelets below near base very minute and remote, larger and more crowded near apex, above larger and very numerous (about 20—21 each side). Abdomen spotted white above.

Length of body (♂)	-	-	-	-	-	26	mm.
„ elytra	-	-	-	-	-	55	„
„ pronotum	-	-	-	-	-	7	„
Width „	-	-	-	-	-	5	„
Length of hind femora	-	-	-	-	-	28	„
Width „ „	-	-	-	-	-	2.5	„

Locality.—Alice Springs. The single specimen brought back by the Expedition has become much discoloured by alcohol, the green having changed to a tawny brown. The species occurs, however, in the mallee scrubs of southern Australia, but is always more or less rare. Having been unable to fit it into any of the genera characterised in the Keys of Hermann and Brunner, a new genus has been formed for the reception of the species, which may possibly be Walker's *Ephippigera irrorata*. The italicised parts of the description denote its differences from other and especially from the Australian genera *Metaballus* and *Rachidorus*, occupying a somewhat intermediate position.

GRYLLACRIDÆ.

Gryllacris straminea, Tepper (Trans. Roy. Soc. S.A., 1892, p. 150). One female. The specimen is considerably smaller than the type from North-western Victoria, and the organs of flight proportionally longer, otherwise it resembles it as much as individuals of the same species usually do. If correctly diagnosed, the distribution is a very wide one. The male is still unknown to me. Rare.

Length of body	-	-	-	-	-	16	mm.
„ elytra	-	-	-	-	-	33	„
„ pronotum	-	-	-	-	-	3·3	„
„ hind femora	-	-	-	-	-	11	„
„ ovipositor	-	-	-	-	-	14	„

Locality.—Storm Creek.

Gryllacris lutescens, Tepper (Trans. Roy. Soc. S.A., 1892, p. 148). Two females.

Locality.—Alice Springs and Stevenson River. Common in Central Australia.

Eonius atrofrons, Tepper (Trans Roy. Soc. S.A., 1892, p. 164). A nearly full-grown female and a half-grown male nymph. As the male sex has been unknown to me hitherto, a short description is appended.

Male (young).—Similar to female; dark bands of body wider and more intense in colour; knee joints reddish-piceous. Spines of hind femora small. Supra-anal lamina cucullate, smooth, slightly incised in the middle, a small tubercle on each side of incision. Cerci lanceolate, acute, villous. Subgenital lamina narrow, slightly tapering, apex rounded, incised; lateral appendages present as small rotundate scales. (Elytra and wings rudimentary).

Length of body	-	-	-	-	-	27·5	mm.
„ pronotum	-	-	-	-	-	4	„
„ hind femora	-	-	-	-	-	10	„

Locality.—Oodnadatta (♀), Finke Gorge (♂). One male and female.

STENOPELMATIDÆ.

Penthoplophora driffieldi, Tepper (*loc. cit.*, p. 176). One male and female from different localities. The former having been unknown to me hitherto, a description is added.

Male.—Similar, but much smaller than female. Fastigium with a short dark medial line in front, joined to a sinuate transverse one, with a vertical prolongation at a right angle, beneath which a faint triangular dark spot; antennæ more than twice the length of the body; palpi (in both sexes) flat, apex shortly dilated. Femora long, ciliate. Hind tibiæ with 6—9 long internal and 2—4 very small external spines (in addition to the terminal ones noted and accidentally omitted),

ciliate. Cerci similar to female, ciliate, apex acute, blackish. Subgenital lamina transverse, hind margin almost straight. Styles rudimentary.

		♂		♀
Length of body	-	25	mm.	- 28 mm.
„ pronotum	-	5.5	„	- 6.5 „
„ ovipositor	-	—		- 40 „

Locality.—Crown Point (♂), Idracowra (♀). The measurements given are not very reliable; having been taken from spirit specimens, the bodies may have become considerably contracted in drying.

Section VII.—GRYLLODEA.

ŒCANTHIDÆ.

Œcanthus (*minutus*, Sauss. ?). Creamy white; eyes brown; elytra and wings pellucid, large, rotundate; hind femora shorter than hind tibiæ, latter with four slender spines remote from apex internally, and numerous minute spinelets externally. Abdomen slender. Cerci of male very long, pilose, gradually acuminate. Subgenital lamina large, crest-shaped, apex rounded. A single defective specimen.

Length of body (♂)	-	-	-	-	-	10 mm.
„ elytra	-	-	-	-	-	12 „
„ pronotum	-	-	-	-	-	3 „
„ hind femora	-	-	-	-	-	7 „
„ hind tibiæ	-	-	-	-	-	9 „

Locality.—Storm Creek. The single male specimen received is without antennæ and has lost four of its legs; hence no name could be attached with certainty. The genus appears to be very rare in most parts of Australia, for this is the first I have seen, and it is not represented in the S.A. Museum.

GRYLLIDÆ.

Nemobius larapintæ, sp. n. Dark brown. Body stout, with long remote hairs. Elytra smoky, with four longitudinal veins but without transverse veinlets, nearly as long as abdomen; apex subtruncate. Wings none. Ovipositor slightly recurved, apex acute. Cerci rather thick, densely long pilose, slightly exceeding the ovipositor. Hind femora very thick, twice as long as abdomen (hind tibiæ with five very long spines on each side, the apical longest). Two females.

Length of body	-	-	-	-	-	7.3	mm.
„ pronotum	-	-	-	-	-	1.75	„
„ elytra	-	-	-	-	-	3.5	„
„ hind femora	-	-	-	-	-	4.5	„

Locality.—Finke Gorge, Reedy Hole.

Endacustes, sp. Only one male, probably a young larva, the adults attaining usually a much larger size. Pale tawny, spotted with brown. Legs banded black and spotted with brown. Antennæ as long as body, banded dark. Cerci as long as body, densely long pilose. Hind femora incrassated, exceeding abdomen more than twice its length. Hind tibiae as long as femora, with four pairs of spinelets near apex, ciliate above.

Length of body	-	-	-	-	-	7.5	mm.
„ pronotum	-	-	-	-	-	1.7	„
„ hind femora	-	-	-	-	-	6.3	„

Locality.—Paisley Bluff. The genus is entirely apterous, and the various known species inhabit preferentially the burrows of animals. The genus is widely distributed in Australia.

GRYLLOTALPIDÆ.

Gryllotalpa coarctata, Walk. (Sauss.) (Mel. Orth., ii., 200). The specimens obtained appear to belong all to the same species, and consist of adults, nymphs, and larva of various stages, and apparently belong to our commonest species.

Locality.—Palm Creek (7), Bagot's Creek (2), Darwent Creek, Rudall's Creek, and Illamurta, one specimen each.

CARABIDÆ.

By THOMAS G. SLOANE.

Tachys spenceri, n. sp.

Elongate-oval, convex; prothorax transverse (not short); elytra bistriate on each side of suture, recurved stria of apex well marked, disc lævigata, quadripunctate.

Shining, polished; head and prothorax reddish-brown or piceous; elytra yellowish-brown near base, clouding to black across middle and near apex, a large spot behind middle on each elytron of paler colour than the base; antennæ and legs (excepting coxæ and trochanters) pale yellow, coxæ and under surface as far back as first ventral segment piceous-red, apex of abdomen reddish-testaceous. Head convex, smooth; two short impressions diverging backwards between eyes, these impressions not extending to clypeus; eyes prominent. Prothorax wider than head, transverse, widest at anterior marginal puncture, lightly narrowed to base, truncate on base and apex, convex, lævigata, not declivous to middle of base, not transversely impressed near base; sides rounded, not sinuate before posterior angles, these forming a short acute triangular projection just before the base; lateral border reflexed (widely and decidedly so at anterior marginal puncture); median line wanting; a wide impression on each side of base near posterior angles. Elytra much wider than prothorax, oval, subtruncate at base, rather narrowly rounded at apex, convex—a little depressed on disc—declivous to base; striæ simple, first entire, second very lightly impressed, extending backwards from level with anterior discoidal puncture to posterior margin of light-coloured discoidal spot; a deep lateral stria besides the lateral channel on each elytron, interstice between these striæ convex; lateral margin slightly interrupted just behind shoulders, causing the margin of the humeral angles to project a little. Anterior tibiæ cut shortly and obliquely to apex on external edge, a short projecting spur above the obliquity. Penultimate joint of maxillary palpi large, pyriform, hirsute; apical joint very small. Length, 2·7 mm.; breadth, 1·2 mm.

Habitat.—Ellery Creek, Missionary Plains, Palm Creek, Rudall's Creek, Paisley Bluff, McDonnell Ranges. Twenty-two specimens.

I know of no described species that closely resembles this.

Prosopognmus insperatus, n. sp.

Winged, elliptic-oval; prothorax subquadrate; elytra striate, interstices a little convex, a short striole at base of second interstice, basal border forming a slight prominence at humeral angles; prosternum bordered on base. Piceous, elytra piceous-brown, legs, antennæ and palpi ferruginous.

♂. Head rather small, lightly and widely transversely impressed behind vertex; front bi-impressed; eyes not prominent; orbits abruptly constricted behind eyes. Prothorax transverse (1.4 x 1.8 mm.) widest just behind anterior marginal puncture, decidedly narrowed to base, a little wider across base (1.6 mm.) than apex (1.5 mm.), convex, lightly and roundly declivous to sides; anterior margin very lightly emarginate; base subtruncate (lightly emarginate across peduncle); anterior angles not marked; basal angles subrectangular (a little obtuse); lateral border narrow; median line feebly impressed; a deep narrow linear impression on each side of base; posterior marginal seta placed at basal angle. Elytra wider than prothorax, ovate (4 x 2.5 mm.); shortly but decidedly narrowed to shoulders; sides lightly rounded; base truncate; apical curve very lightly sinuate on each side; striæ strongly impressed; striole at base of second interstice short, linear; interstices lightly convex, fifth and seventh enclosing sixth—though not confluent—at apex, third tripunctate (anterior puncture on course of third stria, two hinder ones on course of second stria), ninth punctate; lateral border narrowly reflexed; lateral channel narrow; basal border projecting a little (but not dentate) above the lateral border at humeral angles. Sides of metasternum and metasternal episterna punctulate; anterior ventral segments punctulate laterally. Length, 6.5 mm.; breadth, 2.5 mm.

Habitat.—Palm Creek. One specimen.

This species would have been placed by Baron Chaudoir in his genus *Ophryosternus*, which I have merged with *Prosopognmus*.* Comparing it with *P. (Argutor) oodiformis*, Mael. (= *Ophryosternus sulcatulus*, Chaud.) a species that is widely distributed in the coastal districts of Eastern Australia, the following differences may be noted:—(a), its much smaller size; (b), its narrower and more convex prothorax more strongly rounded on the anterior part of the sides and more narrowed behind. From *P. (Simodontus) occidentalis*, Mael., it may be distinguished by the same differences as from *P. oodiformis*, and by the interstices of the elytra being much less convex.

* P.L.S.N.S.W., 1894, ix. (2), p. 428.

Note.—It is possible that the specimen on which this species is founded is slightly immature, and that the normal colour (especially of the clytra) will be found to be darker; and it may be noted that the prothorax has but one impunctate basal impression on each side, the usual second shorter one, which is a feature of high importance in the genus, being wanting.

Oodes parviceps, n. sp.

Oval, slightly convex; upper surface minutely shagreened; prothorax decidedly bi-impressed towards base; elytra convex, finely dentate at humeral angles, strongly striate, interstices not elevated; ♂ with three basal joints of anterior tarsi moderately dilatate (as in *O. modestus*, Casteln.); prosternum margined between coxæ.

Black, shining; under surface picceous; legs, mandibles and inflexed margin of elytra reddish; antennæ and palpi ferruginous. Head small, narrow; vertex minutely shagreened; front obsoletely impressed on each side behind clypeus; eyes (with orbits) reniform, deeply enclosed in orbits at base. Prothorax short, transverse (2.5 mm. x 4.3 mm.), widest about posterior fourth, depressed across base, hardly the least declivous to basal angles; sides lightly rounded on posterior half, strongly narrowed to apex; anterior margin deeply emarginate, the emargination becoming much deeper and subtruncate behind the occiput; base sinuate as usual in genus; anterior angles less rounded off than usual in genus; basal angles subrectangular; median line very lightly impressed; basal impressions deep, narrow, short, not extending to base; inflexed margin not wide or concave anteriorly. Elytra widely oval (5.3 mm. x 7.5 mm.), decidedly wider than prothorax, convex; sides rounded; base of same width as base of prothorax; basal border forming a short dentiform projection at humeral angles; striæ well marked, simple; first, sixth and seventh most strongly impressed, fourth and fifth curved inwards at base, sixth and seventh not attaining base; striae at base of first interstice strongly impressed; interstices finely shagreened, third bi-impressed. Sides of metasternum and metasternal episterna smooth (the puncturation shallow and almost quite obsolete); lateral parts of ventral segments obsoletely punctate. Length, 11 mm.; breadth, 5.3 mm.

Habitat.—Paisley Bluff.

This species has the eyes much less prominent than in most other Australian *Oodes*. It seems allied to *O. latus*, Casteln., which is said by Baron Chaudoir (Ann. Soc. Ent. Fr., 1882 (6), p. 345) to be from Roebuck Bay, but Chaudoir

describes *O. latus* as having the shoulders edentate, and the striae of the elytra finely punctulate.

Phorticosomus horni, n. sp.

♂ Oblong, robust, lightly convex; prothorax transversely subcordate, wider across apex (5.8 mm.) than base (5.1 mm.), anterior and posterior angles obtuse; elytra strongly striate, interstices flat, third unipunctate just above apical declivity, humeral angles obtuse.

Dark piceous. Head large (4 mm. x 4.8 mm.), convex, swollen below eyes, minutely and sparsely punctulate; clypeal suture distinct; front widely impressed on each side, the centre of each impression punctiform just behind the end of clypeal suture; eyes small, not prominent. Prothorax smooth, transverse (4.7 mm. x 7.5 mm.), lightly narrowed to base, convex, declivous to base; sides lightly rounded anteriorly, roundly and obliquely narrowed to base; anterior margin lightly and widely emarginate; base truncate; anterior angles widely rounded, hardly advanced; basal angles rounded; lateral margins wide, explanate, punctulate near basal angles; border thick, reflexed on sides, entire on base, but hardly reflexed across peduncle; median line lightly impressed. Elytra broader than prothorax (12 mm. x 8.2 mm.), strongly declivous on sides and apex, lightly declivous on base; sides subparallel; base widely truncate; apical curve widely but decidedly sinuate on each side before apex; striae at base of second interstice distinct, elongate; border reflexed, most strongly so round humeral angles; basal border curving forward from fourth stria to humeral angle; ninth interstice with a row of large punctures, and a number of minute punctures interspersed among the larger ones, margin and apex of eighth interstice also minutely punctulate. Prosternum setose on base. Metasternum strongly punctate on each side near intermediate coxæ. Ventral segments 3, 4, 5 setigero-punctate along anterior margin. Anterior coxæ closely punctate on anterior side; anterior tibiæ wide at apex; anterior tarsi narrow, not squamulose beneath; posterior femora long, not dilatate, a closely-set row of strong punctures extending for whole length of joint along lower margin of anterior side; posterior trochanters with lower edge straight, and closely punctate for whole length, apex very widely and roundly subtruncate. Length, 20 mm.; breadth, 8.2 mm.

Habitat.—Palm Creek. One specimen.

The only described species to which I can compare *Ph. horni* is *Ph. grandis*. Casteln., a species which differs greatly in having the anterior angles of the

prothorax forming a short, obtuse, but decided projection, the posterior angles rectangular, and the elytra weakly striate.

Besides the four new species described above the following species of *Carabidæ* were obtained by the Expedition, making a total of thirty-two species :—

Calosoma schayeri, Erich., Alice Springs, Finke River.

Euryscaphus waterhousei, Macl., Ilpilla Gorge.

Carenum tibiale, Sl., Opossum Creek.

Carenum distinctum, Macl., Charlotte Waters.

Neocarenum blackburni, Sl., Ayers Rock.

Clivina, sp. ?

Clivina, sp. ?, Goyder River.

Bembidium jacksoniense, Guer., Goyder River, Ellery Creek, Missionary Plains, Rudall's Creek, McDonnell Ranges.

Tachys flindersi, Blackb., near Gosse Range.

Catadromus lacordairi, Boisd., Palm Creek.

Chlænioidius herbaceus, Chaud. (common).

Chlænioidius prolixa, Er., Illamurta.

Loxandrus, sp. ? (Very closely allied to *L. (Pœcilus) atronitens*, Macl.), Palm Creek, Paisley Bluff.

Rhytisternus, sp. ?, Bagot's Creek.

Abacetus macleayi, Blackb., Palm Creek.

Platynus marginicollis, Macl., near Glen Helen.

Dicrochile goryi, Boisd., Ellery Creek, Missionary Plains.

Eudalia waterhousei, Casteln., Ellery Creek, Palm Creek.

Ectroma benefica, Newm., Opossum Creek.

Philophlæus planus, Newm., Tempe Downs.

Pheropsophus verticalis, Dej., Palm Creek, Bagot's Creek.

Chlænius australis, Dej., Hugh River, Ellery Creek, Finke River.

Chlænius læteviridis, Chaud., Palm Creek, Goyder River, Ellery Creek, Idracowra, near Glen Helen, Illamurta.

Oodes waterhousei, Casteln. ? (var. ? or n. sp. ?)

Gnathaphanus adalaidæ, Casteln., Storm Creek.

Hypharpax krefftii, Casteln., Stevenson River.

Hypharpax vilis, Blackb., Alice Springs.

Adelotopus obscurus, Casteln.

HONEY ANTS.

By *WALTER W. FROGGATT.*

(PLATE 27).

Among the many interesting habits of the Formicidæ there is perhaps none so peculiar as that which certain species have adopted of turning some of their fellows into animated honey-pots. At certain seasons of the year many honeydew-producing insects infest the Eucalyptus, such as the larvæ of the lerp insects, *Psyllidæ*, and several kinds of Coccidæ (*Eriococcus coriaceus*), the latter often covering the foliage with a thin coating of sticky matter, so plentifully does the honeydew drop from the female Coccus. Many different species of ants frequent the bushes for this sweet food, and some of these species have the forethought to store up the surplus supplies; but instead of forming a comb, as the instinct of the honey-bees teaches them, the ants select a certain number of their workers, and after their return to the nest from foraging, disgorge the honey they have obtained down the throats of these chosen individuals, which soon causes the stomach to increase to such an extent that the intersegmental membrane becomes so distended that the chitinous plates of the segments simply become dark bands across the semi-transparent globular abdomen.

These ants are in all respects similar to their fellow workers, except in this enormously swollen body, and in this state are compelled to remain in the nest with only a limited power of progression, and constitute a reserve stock of honey in times of scarcity.

Three different species have up to the present been recorded which possess this remarkable habit. The first that were known were collected by Mr. W. Wesmael in Mexico, and described by him* under the name *Myrmecocystus mexicanus*. They were called by the natives "*hormiger mieleras*," or "*mochileras*," honey or pouched ants. They have since then been found by Mr. H. C. M'Cook in Colorado, and he has published a very interesting account of them† in his book on honey ants, and a short summary of this work upon their habits is given in the Proceedings of the Academy of Natural Science.‡

* Bulletin de l' Acad. des Science de Bruxelles, 1838, p. 770.

† The Honey Ants of the Garden of the Gods, Phil., 1881.

‡ P.A.N.S. Phil., 1882, p. 303.

Though belonging to a different genus from ours their habits are not unlike, and as they are confined to a similar dry and drought-stricken country, probably the same surroundings have led to like habits. Mr. M'Cook says:—"Their nests are found in ridgy country with small truncated cones protecting the entrances, which lead into a vertical shaft from three to six inches in depth leading into galleries and chambers, cutting through gravel and sandstone to nearly eight feet in distance, and from two to four feet beneath the surface. The honey-bag ants were found hanging in clusters to the roof of the chambers by the feet, their large globular bodies looking like bunches of grapes, and each nest contained from eight to ten chambers, each containing about thirty honey ants, which as soon as the nest was broken into were dragged below by the workers. They are nocturnal in their habits, the workers obtaining their supplies of honey from a sweet exudation from the galls of a kind of cynips which grew plentifully upon the oaks in that district."

The second species of honey ant belongs to the genus *Crematogaster*, the members of which construct their nests on the branches of trees, not unlike wasp nests, but the interior consists of many irregular galleries and chambers. Their abdomen is generally heart-shaped, and the peduncle by which it is attached to the thorax, being inserted at the top of the basal segment instead of beneath, gives them a very comical appearance when running about, as they carry their abdomen curved over the thorax.

Crematogaster inflatus, Smith,* is found at Singapore and Sarawak, but instead of having the abdomen formed into a honey-bag, Smith says:—"It has a swollen bladder-like formation on the metathorax furnished with a small circular orifice at the posterior lateral angles, from which the saccharine fluid doubtless exudes; portions of crystallised particles are visible within the orifices, and frequently scattered all over the surface of the inflation, and we may therefore reasonably conclude that this insect elaborates a suitable and necessary aliment for the nourishment of the young brood."

Our Australian honey ants belong to the genus *Camponotus*, members of which are found in all parts of the world, and are popularly known as "sugar ants" from their fondness for all kinds of sweets. Over thirty species are described from Australia, which generally construct their nests under stones or logs, and are nocturnal in their habits. *Camponotus inflatus* was described by Sir John Lubbock† from specimens received from Adelaide.

* B.M. Cat. Hym., pt. vi., 1858, p. 136, pl. ix., fig. 1.

† Jour. Linn. Soc. Zool., xv., 1880, p. 167.

During and subsequent to the visit of the Horn Expedition to Central Australia Professor Baldwin Spencer obtained, mainly through the kindness of Mr. E. C. Cowle, of Illamurta, a very fine series of this species, together with other honey ants, upon which he has sent me the following notes, together with the specimens to describe.

Professor Spencer says :—“The black honey ant (*Camponotus inflatus*, Lub.) is called “Yarumpa” by the natives, by whom it is esteemed a great luxury ; it is, *par excellence*, the honey ant of the central country, and ranges across to the Murchison in Western Australia. We found them plentiful in certain districts on the hard sandy plains, and also often very abundant in patches among the Mulga scrub. The ground all round Ayers Rock, to the south of Lake Amadeus, was strewn with heaps of sand where the natives had been digging them out. They construct no mound over their nests ; the entrance, which is an inch in length by a quarter of an inch in width, leads down into a vertical shaft or burrow from five to six feet in depth. About a foot below the surface horizontal passages about a foot in length lead off from the main shaft, at the end of which were three or four of the honey ants, while the bottom of the main shaft, which is excavated into a larger cavity, contained a considerable number. The ‘honey ants’ are quite incapable of movement and must be fed by the workers. Unlike all the other ants noticed in this country, these did not appear to collect twigs, leaves or grass to carry into their burrows.”

The red honey ant (*Camponotus cowlei*, n. sp.) is a much rarer species. Professor Spencer says :—“I only came across a single nest of the golden yellow species, which was a small one, consisting of branching passages close to the surface, under a little block of quartzite in one of the gorges amongst the McDonnell Ranges. In this nest the honey ants, though considerably swollen out, seemed to be able to move about slowly. Perhaps it was a young colony and they were not fully developed.” The natives call this species “Ittootoonee,” and we are indebted to the energy of Mr. Cowle who afterward secured a very fine series of this honey ant in all stages of its growth.

Camponotus cowlei, n. sp. Figs. 1, 2, 3, 4, 5.

♂ Black, wings fuscus, cinereous hairs about the jaws and head, legs and antennæ dark chocolate-brown ; length four lines. Head longer than broad, ocelli small, close together, forming a triangle on summit behind the eyes, the latter circular, brown and not very prominent ; antennæ inserted below the eyes in deep clefts, scape long and slender, the flagellum about half as long again as the scape,

clypeus raised in centre, mandibles stout at base, hollowed in centre, swelling out at tip, terminating in a large tooth and four small teeth along inner edge; prothorax almost as wide as head at apical edge, with a slight ridge down the centre, mesothorax forming a boss in the centre, metathorax tapering towards the apex. Legs medium, slender, with stout spines at apex of tibiae, and the tarsi thickly spined. Wings fuscus, nervures dark brown, subcostal cell and stigma small. Abdomen node small, rounded on sides, and produced in small angular points on the lower margin, the first segment broad at base, tapering towards the apex, lightly covered with reddish-brown hairs thickest upon the under side; the genitalia very distinct; the side lobes covered with stout cinereous hairs at the tip and inner edge.

♀ Dark reddish-brown, wings fuscus, length seven lines. Head large, quadrate, ocelli very small; eyes small, black oval, antennae long, scape nearly as long as the flagellum, fovea in centre below the antennae, clypeus thickly fringed with long stout ferruginous hairs covering the jaws; mandibles stout, forming a sharp curved tooth at the tip, with a row of four angular teeth below; thorax broad, rounded in front, scutellum large, arcuate in front and slightly angular on the sides; legs stout and thick, tibiae and tarsi very thickly covered with spiny ferruginous hairs; wings large, fuscus, nervures brown. Abdomen large, elongate, oval, smooth and shining, the whole of the upper surface finely coriaceous, but more in the pattern of fine striae than in that of *C. inflatus*.

♂ Honey-worker dark reddish-brown, except the segmental membrane of the abdomen, which is pale yellow, head quadrate, ocelli in depression on summit of head above the eyes; eyes small, black, slightly oval, antennae twelve-jointed, scape not quite as long as flagellum, a few short spines at the apex of the segment, but not bifurcated at the tip as in *C. inflatus*, covered with a fine silvery pubescence towards the apical joints, clypeus depressed in centre, thickly fringed with stout reddish hairs along the apical edge; mandibles large, hollowed out in centre, broadest toward the tip, which forms a stout curved fang with a row of four angular teeth below, the intermediate ones the smallest; thorax rounded in front, arched, and broadest at apex of prothorax, meso- and metathorax narrow, truncate at apex; legs long, slender, the tibiae spined along either side, spines at apex of tibiae, long and slender mid and hind legs, tarsi very spiny. Scale rounded, ridged in front and produced into an angular tip on the apical margin; abdominal segments swollen out so that the chitinous plates of the segments are widely separated from each other, but the abdomen is much more corrugated and constricted about the middle than in *C. inflatus*.

Besides the colour and shape this species differs from *C. inflatus* in several important particulars, the surface very closely covered with fine striae, the body and head nothing like so hairy, the mandibles with two less teeth, and the genitalia of the males are very different in structure. The honey contained in the abdomen is of a slightly sour taste, not unlike that in the nests of our little native bees (*Trigona carbonarius*). I have much pleasure in naming this fine species after Mr. Cowle, who obtained this complete series of this new honey ant at no little trouble and inconvenience, digging them out under a semi-tropical sun. In another tube are several very slender golden yellow-coloured neuters, together with a lot of pupæ, which may belong to another species, but I think they are probably a minor form of neuter of this species.

Locality.—Illamurta in the James Range, Spencer Gorge in the McDonnell Range.

Camponotus inflatus, Lubbock. Figs. 10, 11, 12, 13.

Journ. Linn. Soc., xv., Zool., p. 167, 1880; Nature, xxiii., p. 258, 1881; Bees, Ants and Wasps, London, 1883, p. 428, pl. iv., fig. 1; Forel. Ann. Soc. Ent. Belg. xxx., p. 167, 1886.

♂ Black, clothed with cinereous pubescence, wings fuscus; length, three-and-a-half lines. Head thickly covered with long, stout hairs, broader than long; ocelli large, not very close together on summit of head. Eyes prominent, circular, antennæ scape not quite as long as flagellum, the latter covered with light brown pubescence. Mandibles slender at base, club-shaped at apex, with short, curved fang at tip, and flat, untoothed inner margin. Thorax rather oval in front, lightly clothed with long hairs, with short, impressed median line in front; mesonotum rounded and arched behind. Legs long, tarsi and spurs on tibiæ ferruginous; wings slightly fuscus, the nervures brown, stigma slender. Abdomen, node as in worker, the segments rounded in front, tapering to apex, the apical margin of each very lightly edged with pale brown. Genitalia light yellow, out-appendages very hairy on both sides, central appendage slightly lobed on the sides at tip.

♀ Black, with legs piceous and antennæ and mandibles dark reddish-brown; length, five lines. Head broadest behind, as broad as the thorax, sloping down to the mandibles; ocelli vitreous, forming a triangle, the lower one situated at the summit of furrow running down between the antennæ, carinate on either side, with the antennal tubercles in a depressed oval cleft. Eyes slightly oval, antennæ scape lightly spined at apex, about half the length of flagellum, the joints of which

are thickly covered with greyish pubescence. Clypeus elevated in the centre, rather truncate in front and covered with stout cinero-testaceous hairs, which lightly clothe the whole of the head. Jaws stout, with row of six short, regular teeth along the upper edge, covered with golden yellow hairs. Thorax broad, mesonotum raised above the pronotum and lightly impressed in centre, with short, parallel line; scutellum rounded and swelling up at apex, metanotum short. The legs moderate, the hind ones much the longest, covered with short, silvery hairs, with those on the tarsi golden. Wings large, testaceous, with nervures ferruginous and stigma dark brown. Abdomen, node seen from above heart-shaped; the rest large and rounded oval, with the apical margins of each segment edged with a narrow band of pale golden-yellow, and fringed with fine hairs of the same colour.

Locality.—Ayers Rock, Illamurta in the James Range. A considerable number of specimens were obtained during the Expedition, but we are indebted to Mr. Cowle for a large series since received, which included the various forms.

Camponotus midas, n. sp. Figs. 6, 7, 8, 9.

♀ Head, thorax, legs and antennæ dark reddish-brown, lighter on the sides, abdominal segment black as the base, with narrow transverse band of deep orange-yellow, followed by a broader, bright golden-yellow band, anal tip reddish-chestnut, only a few scattered hairs over clypeus and tip of abdomen; length, seven lines. Head broad, slightly round behind, tapering round to the mandibles, which are stout and curved, with six small, regular teeth; the two upper ocelli very small, lower one much larger, situated in base of cleft running down the centre of head. The antennal foveæ deep and elongate, the carina on either side forming a leaf-like projection, round at the tip. Eyes slightly oval toward the summit of the head, clypeus rugose, rather rounded and ridged in the centre. Antennæ scape not as long as flagellum, twelve-jointed, the first three joints of the flagellum are the longest, with fine spines at apex of scape and the following joints, the apical one clothed with fine ochreous pubescence. Thorax, pronotum narrow, slightly transversely ridged towards apex; mesonotum almost flat on summit, with impressed parallel line crossing it through the middle; scutellum small, rather truncate in front and rounded behind; metanotum short. Legs stout, the tarsi thickly spined, the tibial spur of fore legs large, inner edge of tibiæ lightly spined, the spines at apex of tibiæ upon the other legs fine and slender. Wings large, stigma long and slender, with the radial and second and third submarginal cells thickly clouded with fuscus, the rest of fore wing slightly clouded, hind wings much lighter. Node broad, rounded, with slight projection on either side in front and an angulated edge along the apex. Abdomen broad, rounded, slightly rounded towards tip.

♂ Worker major, similar in colour and sculpture, about the same length, seven lines. Head twice as broad as thorax, arcuate behind, swelling out on the sides and longer than broad; two distinct foveolets, the upper one including the lower ocellus and the lower between the antennæ, and not one extended cleft as in the female; the apical tooth on the mandibles largest and curved inwards. Pronotum ridged transversely and more swollen out on the sides; meso- and metanotum more elongated, rest as in previously-described female.

♂ Minor worker, four lines, very slender in form, head antennæ, the femur and tarsi of the mid and hind legs, metathorax and node reddish-brown, the rest of the legs, thorax, and first segment (except apical margin), and the base of the others underneath black; the rest of the abdomen brilliant golden yellow, with a few golden hairs at tip. Head elongated, rather broader than the thorax, rounded behind and rather straight on the sides; jaws large, with the two teeth at tip much longer than female; clypeus distinctly ridged in centre, mandibles covered with longish hairs; pronotum long, slender, mesonotum rounded on summit, metanotum very small. Node long, rather cylindrical, swollen out towards the apex, but contracted at junction with abdomen, elongate oval.

Locality.—Illamurta, in the James Range. A fine series of this species was obtained by Mr. Cowle subsequently to the return of the Expedition.

EXPLANATION OF PLATE XXVII.

Figures 1—5. *Camponotus cowlei*.

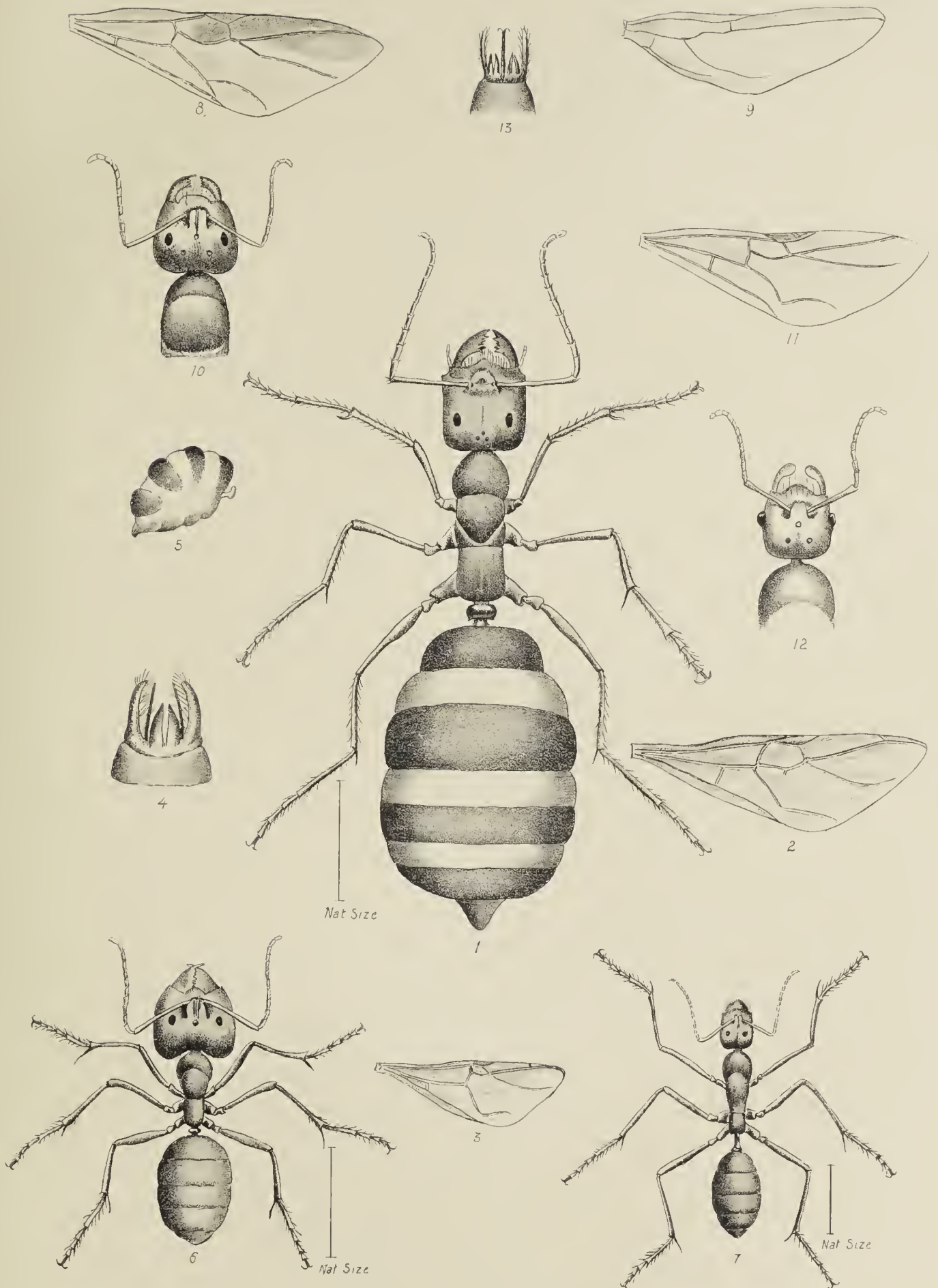
- Fig. 1.—Honey ant worker.
 „ 2.—Wing of female.
 „ 3.—Wing of male.
 „ 4.—Genitalia of male.
 „ 5.—Side view of abdomen of honey ant.

Figures 6—9. *Camponotus midas*.

- Fig. 6.—Major worker.
 „ 7.—Minor worker.
 „ 8.—Fore-wing of female.
 „ 9.—Hind-wing of female.

Figures 10—13. *Camponotus inflatus*.

- Fig. 10.—Head of worker.
„ 11.—Fore-wing of female.
„ 12.—Head of male.
„ 13.—Genitalia of male.
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MURIDÆ.

By EDGAR R. WAITE, F.L.S., Zoologist, Australian Museum,
Sydney.

(PLATES 25 AND 26.)

The mice referred to in the present article were not, for the most part, obtained at the time the Expedition visited the McDonnell Ranges, but Professor Spencer, who has since worked over the same ground, collected quite a large number. These, together with sundry specimens since forwarded to him from the same districts, he kindly sent to me for the purpose of having some notice of them prepared for publication in this volume.

Occasion may first be taken to remark on the impossibility of satisfactorily determining the *Muridæ* of Australia from such meagre descriptions as at present do duty for many of the earlier-described species. Those furnished by Gould are of the very barest nature, and deal only with external characters. Such characters are in some cases quite insufficient for the determination of species, and may even be useless in the case of genera. Mr. Oldfield Thomas has remarked of his *Mastacomys fuscus* that externally it is almost exactly similar to *Mus velutinus*, both Tasmanian species, so that an examination of the skull is needed to distinguish the two forms.*

Even a cursory study shows that very little satisfactory work can be done at the *Muridæ* until many of the types, of which nearly all of Gould's are in London, have been adequately re-described and their osteological characters figured. Then again, with the exception of a very few types, there are here no authentic specimens available for comparison. Under these circumstances the writer has, very reluctantly, been compelled to give names to some of the species examined, at the possible risk of adding to the synonymy. He trusts, however, that the descriptions and figures given will be found sufficient to enable anyone undertaking a much-needed revision of the Australian *Muridæ* to recognise the species described. Should the majority of them ultimately prove to be valid it will scarcely be remarkable, inasmuch as they are from an almost unknown zoological region ;

* Ann. Mag. Nat. Hist. (5), ix., 1882, p. 414.

witness the number of new species discovered by Professor Spencer in the comparatively well-worked order of the *Marsupialia*.

“Most of the specimens were collected in districts having similar features—hard sandy ground covered with sparse scrub of Mallee gum, Cassias, Eremophilas, and Mulga. The mice construct burrows, usually close to the base of a shrub. The burrow is simply a small hole in the ground just large enough to admit the mouse; it goes slanting steeply downwards for two, three, or even four feet. In each instance there appeared to be more than one pair inhabiting the same burrow.” My informant says that he “once counted nine specimens of the rather larger species, with a whitish belly (*Mus gouldi*), of which five were adult, and four young of fair size, together with other smaller young ones being suckled by two females. A rough nest is made of bits of grass lying on the floor of the burrow where it was slightly hollowed out, on which the females with young were lying. On smelling this grass in a burrow the blackfellow will at once say whether the animal is ‘at home’ or not. The smaller and darker-coloured mouse (*Mus musculus*) is very common on the hard sandy and stony plains about Charlotte Waters, but is not found in the looser sandy districts near the creek beds.”

Professor Spencer, who has kindly furnished the foregoing valuable and interesting information, tells me that he did not himself obtain the larger species (*Conilurus pedunculatus*), and has no particulars of it beyond the locality and the peculiarities below mentioned.

One of the interesting features of the collection is the finding of *Mastacomys* living in Australia, and although this is what one would naturally expect, seeing that it at present exists in Tasmania, the genus was previously known only as fossil on the continent.

The examples of *Mus musculus* received furnishes another instance of how the species will accompany man wherever he goes, turning up and successfully colonising in the most unexpected places. Setting aside this species, and also *Mus greyi*, of which only males were collected, all the specimens sent are characterised by the possession of four inguinal mammæ only, there being none in the pectoral region. Pectoral mammæ, when present, are apt to be overlooked; but several females of each species sent were suckling, which not only settles this point, but also proves them to be adult. The specimens of *Mastacomys* below-mentioned were too young for the number of mammæ to be definitely ascertained, but Mr. Thomas has shown that four only are present in the type.

This author has remarked on the occasional difficulty of determining whether one of the Australian *Muridæ* should be placed in the genus *Conilurus* (*Hapalotis*) or *Mus*, and writes* :—"It seems indeed probable that the characters of these two genera will be found so to blend together in the different species as to necessitate their ultimate union, notwithstanding the very striking characters presented by the more typical species of *Hapalotis*." Such a question may be raised by the following species.

Conilurus pedunculatus,† n. sp. Fig. 1, *a—f*.

Fur long, thick and harsh, more so on the back. General color yellowish-brown; the basal three-fourths of the hairs are grey, succeeded some by yellow, some by brown, many slightly longer ones tipped with black. Muzzle and face grey; the hairs on the sides of the body are not brown-tipped, so that the color is yellowish, fading into white below, which color extends along the whole of the under surface; the hairs on the median line are not bicolored, but the bases of the yellow hairs and of the lateral white ones are pale grey. Ears large, clothed with short gold-colored hairs within and without; laid forward, they reach the centre of the eye. Limbs paler than the back; fore and especially the hind feet large, ochraceous. Toes white; a dark line passes from the heel along the outer side, and advancing upwards along the median line of the foot, disappears before reaching the base of the toes; a similar line is traceable on the fore feet. Tail slightly longer than the head and body. At and for a centimetre from its insertion it is of normal thickness, about four millimetres, whence it suddenly swells to twice that diameter, its lateral slightly more than its vertical thickness; continuing of this size for some distance, it gradually diminishes in diameter. The hairs are long and quite conceal the scales, very coarse and stiff near the root, but becoming finer and longer, and pencilled at the end. Color above yellow, with some black hairs interposed; they become more numerous distally, and eventually displace the yellow ones; no black hairs on the sides, under hairs white; twelve scales to the centimetre. Mammæ 0·2 = 4.

Skull of rather delicate proportions, supraorbital region angular but without prominent ridges. A very large preorbital process. Nasals long, projecting considerably beyond the line of the premaxillary. The anterior zygoma root is rounded above, but the front edge is markedly concave.

* Ann. Mag. Nat. Hist. (6) iii., 1889. p.

† *Conilurus*, Ogilby = *Hapalotis*, Lichtenstein, pre-occupied by Hübner in the Lepidoptera Heterocera.

Teeth.—The incisors are short but strong and much curved. The molars are considerably worn. In m^1 there is no anterior cusp and no outer cusps, with the exception of a small unworn one on the first lamina; the inner cusps on the contrary are remarkably developed. m^2 , an antereo-internal cusp as in *Mus*. An outer cusp may have been developed on the first lamina, but the teeth are worn below the point where it would have been possible to be certain. The position of the first lamina in m^3 seems to indicate that an outer cusp has been developed at the expense of the inner one.

DIMENSIONS.

—						Var. <i>brachyotis</i> .	
	A. ♂	B. ♂	C. ♂	D. ♂	E. ♀	F. ♂	G. ♀
Head and body - -	133·0	117·0	121·0	117·5	127·8	110·0	112·0
Tail - - - -	138·0	?	?	?	?	?	108·2
Length of head - -	42·3	41·4	42·1	40·0	39·2	38·1	39·0
Muzzle to ear - -	33·5	33·1	33·3	31·3	31·0	30·6	30·8
Ear - - - -	18·5	18·2	18·0	17·5	17·5	15·2	15·0
Forearm and hand - -	35·5	34·0	34·5	31·3	32·0	31·2	31·1
Hind foot - - - -	28·5	27·7	28·3	26·7	25·2	26·1	26·2
Heel to front of last foot-pad	12·5	12·4	13·0	12·3	11·5	11·7	12·0
Last foot-pad - -	3·8	3·3	3·5	3·1	3·5	3·2	3·2

SKULL.

—	Var. <i>brachyotis</i> .	
	B. ♂	F. ♂
Greatest length - - -	37·4	35·3
Basal length - - - -	31·4	29·2
Greatest breadth - - -	18·0	17·4

SKULL (*continued*).

—	Var. <i>brachyotis</i> .	
	B. ♂	F. ♂
Nasals, length - - -	13·8	12·8
Nasals, greatest breadth -	3·8	3·7
Interorbital breadth - -	5·3	5·1
Interparietal length - -	5·5	5·8
Interparietal breadth - -	9·2	9·0
Brain-case, breadth - -	15·8	15·6
Anterior zygoma root - -	3·5	3·1
Diastema - - -	9·3	8·7
Palate, length - - -	19·0	17·8
Anterior palatina foramina -	7·0	6·6
Upper molars, length - -	6·6	6·6
Lower molars, length - -	6·8	6·7
Condyle to incisor tip - -	24·0	22·3
Coronoid tip to angle - -	9·4	8·2

Habitat.—Alice Springs and (variety) Illamurta, Central Australia.

Of seven examples two, marked F and G, differ from the others in being slightly smaller, in having the ears proportionately smaller, reaching only to the posterior margin of the eye, and in the tail being shorter than the head and body. The tail is similar to the typical examples, but is less incrassated, and is destitute of yellow hairs, being black above and white below throughout; basally the hairs are scanty and do not hide the scales, but are longer distally. The scales are also much smaller, averaging seventeen to the centimetre. It may be that these several points are of specific value, but as the two skulls examined do not differ materially, the writer, for the present, prefers to regard this form as a well-marked variety, which may be known as var. *brachyotis*, characterised as above. One of the two specimens was collected by Mr. E. C. Cowle at Illamurta, James' Range. The other was in the parcel received from Mr. J. Field at Alice Springs.

The remarkable thickening of the tail of this species above referred to was conjectured to be due to a layer of fat stored for the purpose of food supply. On

opening one to ascertain the fact, however, the vertebræ were found to be quite normal, and the increased diameter was caused wholly by an enormous thickening of the skin, for which no reason could be assigned. It is evident that the thinner pedicle would allow the appendage a greater degree of motion than would be otherwise possible. Apart from its peculiar form the tail appears to be very fragile, and out of seven specimens was perfect in two only. In the others it had been broken off, and in one instance a second partial fracture had occurred, but the portion broken, not having been detached, had rejoined with the dark dorsal surface to one side. This fragility was remarked by Mr. Field, of Alice Springs, who caught the animals, and said that "the tail very easily broke off whilst they were catching them; it seemed to be brittle." It is not easy to understand the advantage of this peculiarity, unless indeed it is analagous to what occurs in the lizards, many of which detach their tails to escape capture; but it is not conceivable that a similar power of reproduction can exist. It has been previously hinted that this species has affinities both with *Mus* and *Conilurus*, with the former by the presence of a coronoid process in the lower jaw, and with the latter by having among other features a well-clothed tail. To propose a new genus for *Conilurus pedunculatus*, a species whose tail renders it peculiar, would only add to the difficulty of defining the genera, and the jerboa-like character of the species sufficiently proclaims its affinities to the more typical examples of *Conilurus*.

Mus musculus, Linn.

A number of specimens from Charlotte Waters were in all particulars indistinguishable from the common house mouse. Although common enough in most parts of the continent, it was recognised with some surprise from Central Australia. On mentioning its occurrence to Professor Spencer he wrote—"All along the central telegraph line there is a constant carriage of goods to the various outlying stations, and an odd pair may by this means have been conveyed to the central districts. Once established, the beast would presumably be able to spread widely." He adds the interesting, if not altogether welcome fact, that even the rabbit has now made its appearance at Charlotte Waters.

Mus gouldi? Fig. 2, *a—f*.

Waterhouse, Voy. "Beagle," I., p. 67, pl. xxxiv., fig. 18 (molars); Gould, Mamm. Austr., III., pl. xix.; Ogilby, Cat. Austr. Mamm., p. 107.

Several specimens are provisionally referred to this species, but as they are much smaller than those measured by Waterhouse they may eventually prove to be distinct. In most other respects the original description applies to these examples. The following points are, however, not mentioned:—The ears when

laid forward do not quite reach the eye; the hairs of the tail are long and almost conceal the scales, which average twenty to the centimetre; mammae, $0\cdot2 = 4$. The palate ridges are three premental undivided and five interrupted interdental, the fourth reduced to two tubercles.

Skull.—Moderately stout, ridges low but discernible. The posterior wall of the orbit is deflected outwards, giving a squarish appearance to the brain case; the anterior zygoma root projects slightly above, but the front edge is not markedly concave.

Teeth.—The molar teeth are somewhat worn, the second and third lamina of the upper m^1 having united on the inner side into a C-like figure; otherwise they agree very well with Waterhouse's illustration. The upper molars may be briefly described as follows, but as in other cases the figures are mainly relied upon, explaining what the best possible description would fail to convey:— m^1 , the anterior cusp is doubled, partaking almost of the character of a lamina. In the first lamina proper the inner cusp is remarkably large, while the outer one is equally small. The condition of the second and third laminae has been referred to. m^2 , the antereo-internal cusp is large; the remaining cusps are united in a similar manner to the second and third laminae of m^1 . m^3 quite worn down; markings show that it possessed three cusps.

In the first column of the following table will be found the measurements of the type specimen so far as given, reduced to millimetres for the sake of comparison:—

DIMENSIONS.

—	Type.	A. ♂	B. ♂	C. ♀	D. ♀
Head and body - - -	110·0	83·0	84·3	91·0	88·5
Tail - - - -	89·0	60·0	?	67·0	77·2
Length of head - - -	—	26·5	27·6	27·0	27·0
Muzzle to ear - - -	25·5	21·8	21·6	21·8	21·6
Ear - - - -	14·5	10·5	11·8	11·2	12·0
Forearm and hand - - -	—	19·0	20·3	22·0	21·1
Hind foot - - - -	25·5 (and claw)	16·0	16·0	17·8	17·7
Heel to front of last foot-pad -	—	8·1	8·3	8·4	8·5
Last foot-pad - - -	—	·75	1·0	1·0	1·0

SKULL.

—	B. ♂	C. ♀
Greatest length - - -	24·8	24·5
Basal length - - -	22·1	22·2
Greatest breadth - - -	13·3	14·0
Nasals, length - - -	8·5	9·0
Nasals, greatest breadth - -	2·4	2·3
Interorbital breadth - - -	3·8	3·7
Interparietal length - - -	3·5	3·0
Interparietal breadth - - -	8·3	9·0
Brain-case, breadth - - -	11·8	11·8
Anterior zygoma root - - -	2·6	2·4
Diastema - - -	6·6	6·9
Palate, length - - -	13·0	13·8
Anterior palatina foramina -	4·3	4·8
Upper molars, length - - -	5·0	4·6
Lower molars, length - - -	3·5	4·3
Condyle to incisor tip - - -	16·3	16·7
Coronoid tip to angle - - -	5·2	5·4

Habitat.—Alice Springs, Central Australia.

It has been previously mentioned that these specimens agree with the type of *Mus gouldi*, as described, in nearly all particulars excepting that of size. One other point of difference may be mentioned. The fur of the under parts is uniform white throughout, whereas in the type it is "deep grey at the base;" this is qualified in "var. B," in which the basal fur is "indistinctly tinted with very pale grey at the roots." There would therefore be a greater difference in this respect between these two forms than between an example with wholly white fur and the variety described.

Although the specimens examined agree closely with the published description of *Mus gouldi*, I believe that if the two forms were placed side by side they would be found to be quite distinct. Gould, doubtless from a comparison of external characters alone, gives *Mus greyi*, Gray, as a synonym of *Mus gouldi*. If, however, the skull of this species at all agrees with that of the former, as described by Collett,* there can be no doubt of the specific distinctness of the Central Australian examples.

Observations.—In Ogilby's Catalogue, *loc. cit.*, the "References" to *Mus gouldi* are printed under *Mus greyi*, on page 108.

Mus greyi. Fig. 3, *a—f*.

Gray : Grey's Trav. Austr., App. II., p. 410.

Collett : Zool. Jahrb., II., 1886-7, p. 837.

Ogilby : Cat. Austr. Mamm., p. 108.

The following remarks are based on three specimens received from Alice Springs. I am scarcely satisfied of the identification, and their affinities would hardly have been suspected had not Collett published his description of skulls of *Mus greyi*, identified by Thomas. He has compared them with the skull of *Mus rattus*, of which I have unfortunately no representative.

In color the specimens are not of that intense reddish-brown ascribed to the species, and the feet are white instead of "reddish-grey." As the cranial characters appear to be similar, I am inclined to waive the slight differences of color, which may be the result of environment. Under the circumstances a detailed description will be advisable, more especially as many of the usual measurements have not previously been recorded.

Fur of moderate length and texture. General color dark warmish-brown above, but such a small portion of each hair is tipped with this color that the under fur, which is dark grey, shows through, sombring the whole. Sides and under surfaces yellowish-white ; this fur is uniform in color.

* Zool. Jahrb., ii., 1886-7, p. 837.

Ears small and almost naked within ; laid forward, they do not reach the eye by a diameter. Feet and toes white. Tail shorter than the head and body, scantily clothed with stiff hairs, black above, white beneath, everywhere fully exposing the scales, which average twelve to the centimetre.

Skull.—Stout and angular ; nasal region short and thick ; the nasals project very little beyond the line of the premaxillary, and are narrow when compared with the width of the combined maxillaries ; supraorbital ridge prominent, continued as a temporal ridge, thence less defined along the outer suture of the interparietal to the prominent occipital crest ; crest for attachment of the temporal muscle also largely developed. The anterior palatina foramina narrow, extending backwards almost to between the centre of the anterior molars ; the anterior zygoma root is rounded and does not project above ; the front edge is slightly concave.

Teeth.— m^1 no anterior cusp. The first and second lamina have each three cusps, the inner ones very large ; the last lamina has no inner cusp. m^2 , antereo-internal cusp large ; first lamina with three cusps, the second with two, no outer one. m^3 , an antereo-internal cusp ; the laminae have each two cusps.

DIMENSIONS.

	A ♂	B ♂	C juv. ♂
Head and body - - - -	146.5	140.0	116.0
Tail - - - -	121.0	116.0	111.5
Length of head - - - -	45.0	40.4	36.5
Muzzle to ear - - - -	36.1	31.5	29.8
Ear - - - -	16.0	15.2	13.2
Forearm and hand - - - -	37.5	33.3	32.0
Hind foot - - - -	29.6	27.2	26.5
Heel to front of last foot-pad - -	15.2	14.6	13.4
Last foot-pad - - - -	4.7	3.5	3.4

SKULL.

—	B ♂
Greatest length - - - -	34·5
Basal length - - - -	31·0
Greatest breadth - - - -	19·6
Nasals, length - - - -	11·8
Nasals, greatest breadth - - - -	3·3
Interorbital breadth - - - -	4·7
Interparietal length - - - -	5·1
Interparietal breadth - - - -	10·4
Brain-case breadth - - - -	15·0
Anterior-zygoma root - - - -	4·4
Diastema - - - -	9·0
Palate, length - - - -	18·4
Anterior palatina foramina - - - -	7·2
Upper molars length - - - -	7·1
Lower molars length - - - -	6·8
Condyle to incisor tip - - - -	23·5
Coronoid tip to angle - - - -	10·0

Habitat.—Alice Springs, Central Australia, June, 1895.

It will be noticed that the dimensions are almost identical with Collett's example "A." The only apparent discrepancy lies in the fact that the interparietal length above given is the anterior-posterior dimension, whereas Collett gives the greatest measurement as the length. My measurement of the interparietal breadth is therefore across the skull. The greatest length of the bulla is 8·7 mm., or about 4 in the length of the skull.

Mus fieldi,* sp. nov. Fig. 4, *d—j*.

Size medium, fur of moderate length, remarkably fine and fluffy; general color warm sandy-brown; head a little darker; the hairs are dark grey at the

* At the request of Prof. Spencer I have pleasure in associating with this animal the name of Mr. J. Field, in recognition of his valuable services in the collection of certain of the material dealt with in this article.

base; cheeks and sides brighter in color; the whole under surfaces pure white; the bases of these hairs pale grey. Ears large, almost naked within, laid forward they reach the centre of the eye. Limbs pale sandy color, hands and feet white. Tail thin and very long, considerably more so than the head and body; a few short sandy hairs above, becoming darker distally, white below, hairs on the tip black and somewhat longer, hiding the scales, which are elsewhere visible; fourteen to the centimetre; mammae, $0\cdot2 = 4$.

Skull.—The skull of this, the only example of the species, was so utterly crushed that not a single measurement of the bones could be made; the molar teeth remain intact, and are very similar to those of the species next described, excepting that in *m*¹ the first cusp is extremely small.

DIMENSIONS.

Head and Body	-	-	-	-	103·5
Tail	-	-	-	-	122·0
Length of head	-	-	-	-	32·8
Muzzle to ear	-	-	-	-	26·7
Ear	-	-	-	-	18·5
Forearm and hand	-	-	-	-	26·8
Hind foot	-	-	-	-	23·5
Heel to front of last foot-pad	-	-	-	-	10·5
Last foot-pad	-	-	-	-	1·1

SKULL.

Upper molars, length	-	-	-	5·0
Lower molars, length	-	-	-	4·7

Habitat.—Alice Springs, Central Australia, June, 1895.

This specimen is an adult female, and was suckling at the time of capture. The great length of the tail, the size of the ears, and the small hind foot-pads are points which should assist in identifying the species. It is to be hoped that further examples will be obtained when the cranial characters can be recorded and the foregoing description amplified if necessary.

Mus hermannsburgensis, sp. nov. Fig. 5, a—f.

Size a little smaller than *Mus musculus*; fur soft, with longer hairs; general color warm brown, darker on the back, becoming lighter on the sides where it merges into yellow; the hairs dark grey at the base; color below the eye and ear somewhat paler than the body; under parts white, the bases of the hairs pale grey. Ears large, grey within, well clothed with whitish hairs, laid forward they reach the posterior third or centre of the eye; front of fore and hind limbs yellow; feet pale yellow. Tail longer than the head and body; uniform brownish-grey above, sides and below white; the hairs short, leaving the scales well exposed, averaging eighteen to the centimetre; mammae, $0.2 = 4$.

Skull of the usual proportions, supraorbital area smooth. The anterior zygoma root does not project forward above, and the front edge is but slightly concave.

Teeth.—The molar series diverge but little posteriorly, running almost parallel, and are noticeably worn in the two skulls examined. m^1 , there is a well-marked anterior cusp; both the inner and outer cusps of the first and second laminae are large, more especially the former ones. m^2 , the antereo-internal cusp is very large; the second and third laminae are united into an S-like figure, the former having three large cusps.

Palate ridges.—Three premental undivided, five interdental, all interrupted.

DIMENSIONS.

—	A ♂	B ♀	C ♀	D ♀	E ♀
Head and body - - -	69.5	79.0	78.0	78.0	76.0
Tail - - - - -	80.0	85.0	81.5	83.0	80.0
Length of head - - -	23.5	23.0	24.5	24.5	23.5
Muzzle to ear - - -	19.0	19.0	19.0	19.7	19.0
Ear - - - - -	11.0	11.5	11.5	12.5	11.0
Forearm and hand - - -	18.8	18.5	18.0	19.5	19.0
Hind foot - - - - -	17.0	17.0	17.5	17.0	17.5
Heel to front of last foot-pad -	8.3	8.9	9.0	8.3	8.6

SKULL.

	B ♀	C ♀
Greatest length - - -	23·0	22·6
Basal length - - -	19·3	19·5
Greatest breadth - - -	12·5	12·0
Nasals, length - - -	7·4	7·2
Nasals, greatest breadth - -	2·3	2·5
Interorbital breadth - - -	3·5	3·4
Interparietal length - - -	3·2	3·2
Interparietal breadth - - -	8·1	8·2
Brain-case, breadth - - -	11·2	11·0
Anterior zygoma root - - -	2·4	2·4
Diastema - - - -	5·7	5·8
Palate, length - - - -	13·0	13·0
Anterior palatina foramina -	4·5	4·2
Upper molars, length - - -	3·2	3·8
Lower molars, length - - -	3·1	3·5
Condyle to incisor tip - - -	14·0	14·2
Coronoid tip to angle - - -	5·4	5·3

Habitat.—George Gill Range, Hermannsburg, and Charlotte Waters, Central Australia, February, 1895.

Mastacomys, sp. Fig. 6, *d—f*.

Four immature examples are referred to this genus, and are of interest as being the first living representatives obtained on the Australian continent. In 1882* Mr. Oldfield Thomas formed the genus to receive a mouse from Tasmania which he named *Mastacomys fuscus*, and fossil fragments obtained in the Wellington Caves, New South Wales, have been referred to this species.† The specimens

* Ann. Mag. Nat. Hist. (5), ix., p. 413, 1882.

† Brit. Mus. Cat., Fossil Mammalia, i., p. 227, 1885.

herein mentioned are too young to enable one to judge of the identity or otherwise of the species, but the peculiarity of the greatly broadened molars leaves little doubt as to the correctness of assigning them to the genus. There are differences, such as the colour of the ventral surface, the comparative length of the ears and tail and the form of the anterior zygoma root, which seem to be too wide to be accounted for by immaturity. The following description may therefore be useful when adult specimens are obtained.

Habit, vole-like. Fur exceedingly long and thick; general color rich reddish-brown above, yellowish beneath. All the hairs grey at the base. Ears of medium size, greatly hidden in the fur, clothed with longish brown hairs; laid forward, they do not reach the eye by a diameter. Limbs and toes brown. Tail shorter than the head and body, dark brown above, yellow beneath; hairs long, hiding the scales, which average twenty-three to the centimetre.

Skull rather stout; the anterior zygoma root does not project above, the angle being rounded and the front edge slightly concave. The anterior palatina foramina extend backwards to just within the front margin of m^1 .

Teeth.—As far as can be ascertained, the teeth are as in *Mastacomys fuscus*, but the anterior molars appear to be slightly more separated. m^1 , all the cusps excepting the posterior one are worn so as to expose the enamel ridges. m^2 , the anterior cusps only have had the summits removed, while m^3 has not emerged to the level permitting abrasion.

Palate ridges.—Three pre dental undivided, five interdental interrupted.

DIMENSIONS.

	A. ♂	B. ♂	C. ♀	D. ♀
Head and body	64.5	64.0	63.0	58.0
Tail	63.5	61.8	61.5	56.8
Length of head	24.5	24.4	23.7	23.8
Muzzle to ear	17.4	20.8	17.0	18.1
Ear	7.9	8.5	9.1	7.6
Forearm and hand	19.0	17.2	20.0	17.2
Hind foot	17.0	19.5	18.5	18.5
Heel to front of last foot-pad	7.5	9.0	8.5	8.4

SKULL.

—	C ♀
Greatest length - - - -	23·2
Basal length - - - -	18·2
Greatest breadth - - - -	12·0
Nasals, length - - - -	7·0
Nasals, greatest breadth - - - -	2·1
Interorbital breadth - - - -	3·7
Interparietal length - - - -	3·8
Interparietal breadth - - - -	8·3
Brain-case, breadth - - - -	11·0 ?
Anterior zygoma root - - - -	2·5
Diastema - - - -	4·1
Palate, length - - - -	12·5
Anterior palatina foramina - - - -	3·0
Upper molars, length - - - -	4·4
Lower molars, length - - - -	5·0
Condyle to incisor tip - - - -	14·8
Coronoid tip to angle - - - -	?

Habitat.—Alice Springs, Central Australia, June, 1895.



$1^a \times 1\frac{1}{2}$



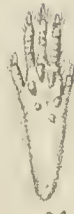
1^d



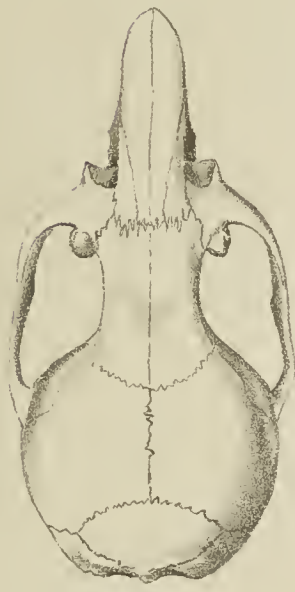
1^f



1^e



2^e



$1^b \times 1\frac{1}{2}$



$1^c \times 1\frac{1}{2}$



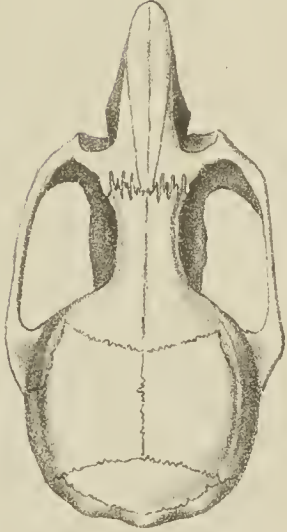
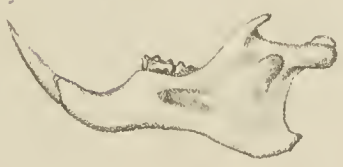
2^f



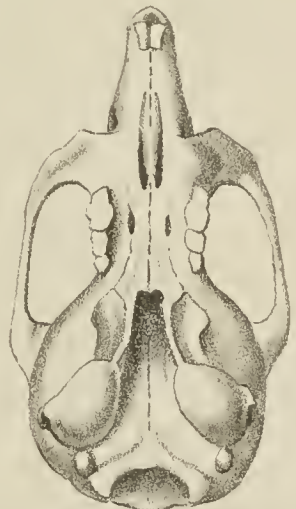
2^d



$2^a \times 2$



$2^b \times 2$



$2^c \times 2$



$3^a \times 1\frac{1}{2}$



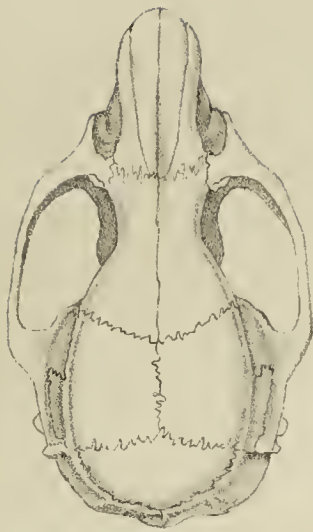


Fig. 3^b x 1 1/2

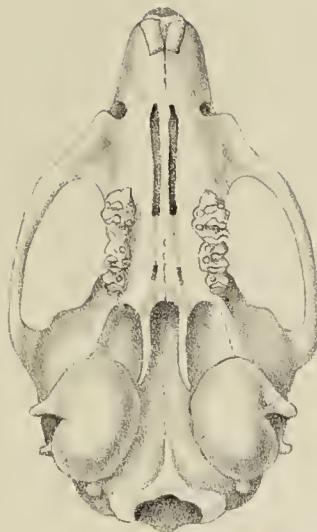


Fig 3^c x 1 1/2



Fig. 3^d



Fig 3^e

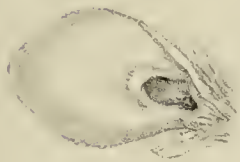


Fig 4^f



Fig 5^f



Fig 4^e



Fig 5^e

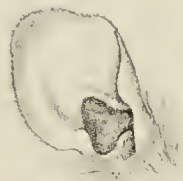


Fig 3^f



Fig. 4^a

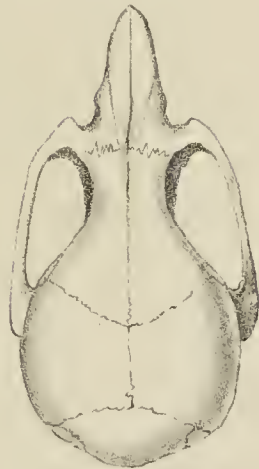


Fig 5^b x 2



Fig 5^a x 2

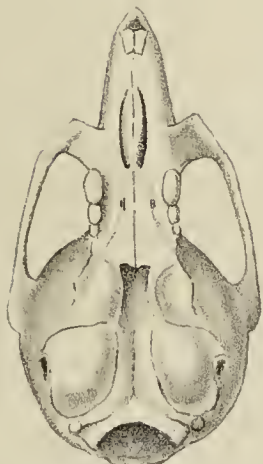


Fig. 5^c x 2

Edgar R. Waite del



Fig 5^d

Troedel & C^o Print



Fig 6^d



Fig. 6^f



Fig 6^e

R. Wendel Lith Melbourne

EXPLANATION OF PLATES.

a, skull in profile; *b*, ditto from above; *c*, ditto from below, and *d*, right upper molars, all enlarged; *e*, hind foot, and *f*, ear, both natural size.

PLATE XXV.

- Fig. 1.—*Conilurus pedunculatus*, sp. nov.
 „ 2.—*Mus gouldi*?, Waterhouse.
 „ 3.—*Mus greyi*, Gray.

PLATE XXVI.

- Fig. 3.—*Mus greyi*, Gray
 „ 4.—*Mus fieldi*, sp. nov.
 „ 5.—*Mus hermannsburgensis*, sp. nov.
 „ 6.—*Mastacomys*, sp.
-

APPENDIX.

Description of an additional New Species of Fish from the Finke and Barcoo Rivers.

By A. ZIETZ, F.L.S.,

Assistant Director of the South Australian Museum, Adelaide.

(FIG. 7, PLATE 16).

Plotosus argenteus, n. sp.

D. 1/4. C. + A. about 120. P. 1/7. V. 11.

Body very compressed; its height, which is equal to the length of the head, is contained a little more than five times in the total length; the diameter of the eye is contained six times in the length of the head. Head convex above, width of interorbital space equal to the distance measured from the tip of the snout to the posterior margin of the eye. Eight barbels, the upper pair more than half the length of the head; the next pair, which are situated one on each side of the mouth, are of about the same length. Of those situated on the lower jaw the outer pair are the longest, and nearly equal in length to the head. Body scaleless.

Teeth in the upper jaw pointed; the outer series of teeth in lower jaw are likewise pointed, but the inner series are molar-like, like those on the vomer, which form a triangular disk. A short dorsal with a simple spine and four rays is situated at the first quarter of the total length; the spine of the dorsal and those of the pectorals are of about equal length. The ventrals are only about half the length of the pectorals, and have twelve rays. The caudal is united with the anal fin, and terminates in an acute point. I counted about 120 fin-rays, of which the first are very minute. The lateral line is well marked and continuous. The colour of this specimen is yellowish, with a silvery tinge on the sides of the body. The whole fish, excepting the under surface, is minutely pitted with black.

This description has been compiled from a well-preserved specimen of $5\frac{3}{4}$ inch total length, caught in the Barcoo, near Innamincka. A larger specimen, of about eight inches total length, from the Finke River, Hermannsburg, is of a darkish colour ; but this is most likely caused by having been dried formerly. I unite this species with some doubt with Gunther's Group B, *Plotosina*, of his first sub-family Siluridæ Homaloptera. It differs from Gunther's Group *Plotosina* only through not possessing a long posterior dorsal fin, which is in this species almost rudimentary. I thought it not advisable to separate it, for this one reason, from the genus *Plotosus*, as this would interfere with the present classification of this group.

Locality.—Barcoo River, Finke River at Hermannsburg and Idracowra, and in Palm Creek and Ilpilla Creek.

On the Presence and Structure of a Stridulating Organ in
Phlogius (Phrictus) crassipes.

By BALDWIN SPENCER, M.A.,

Professor of Biology in the University of Melbourne.

(PLATE 28).

During the Expedition we were frequently told of the existence of a spider which made a booming or barking noise at night time. The white settlers, as well as many of the aborigines, firmly believed that such a spider actually existed, in fact it goes by the name of the Barking Spider. At Alice Springs for the first time we secured specimens of it. It turned out to be *Phlogius (Phrictus) crassipes*, a large form belonging to the tribe Territelariæ. It lives in burrows in hard ground; on the surface is a hole perhaps an inch in diameter leading into the burrow, which goes down in a slightly slanting direction to the depth of a foot and a half or even more, where it ends in a more or less spherical space about two inches in diameter, in which during the daytime the spider lies. In this chamber were remains of beetles and small portions of web. All the specimens secured, both here and elsewhere, as at Charlotte Waters, were females.

Whilst staying at Alice Springs I had the opportunity of watching the animal alive, and kept several in this state for nearly two weeks to try and find out if it really made the noise attributed to it, and if so how it was made. Thinking it possible that the noise might be intensified by the form of the burrow, supposing, what was scarcely likely, that it produced the sound underground, I put one or two into tubular structures with a hollow space containing sand at the bottom. At night we used to go and sit not far away from where the animals were actually living in their burrows, but there was no sound of any kind to be heard. This was attributed to the fact that the sound is usually made during and after the wet season, which is in itself significant, as that is the time when birds of all kinds are about.

The evidence in favour of the barking or booming being produced by the spiders consisted apparently in the fact that it had been heard at night, and that on going to the spot from which the sound proceeded next day spider burrows containing the live animal had been found. I spent a night out in the scrub with a friend, and we heard the noise attributed to the spider; but in this case, as we

approached it, it kept sounding away in the distance, and was very evidently made by some bird. We came to the conclusion, which I think is the correct one, that the sound usually attributed to the spider is in reality made by birds, and most probably by quails. The latter frequent the very parts—grassy flats amongst the hills—where the sound is heard and the spiders live, and they are most abundant just after rainfalls, when also the sound is heard most frequently. Not only this, but they actually produce a noise which is apparently identical with that attributed to the spider. The time spent in observing the animals was not, however, altogether thrown away, as one day, whilst teasing a large female which had been kept in a tin box for ten days, with a piece of straw, it raised its body and, rubbing its palps against the mandibles, made a distinctly audible whistling noise. The attitude assumed by the spider was much the same as that figured first by Professor Wood Mason,* and later still by Mr. Pocock.†

On examining the animal I found that there was a very well-developed stridulating organ, consisting of modified surfaces on the inner face of the first joint of the palp and the outer face of the mandible. A short account of this was communicated in a letter to "Nature." Meanwhile, Mr. Pocock's‡ interesting article already referred to had appeared in "Natural Science," copies of which had not then reached Australia. Before this time Westring had described a stridulating organ, consisting of small teeth on the abdomen which scraped against ridges on the carapace, in spiders referred to the genus *Theridium*; and Campbell§, many years subsequently, described an organ in *Lepthyphantes* formed from modified parts on the palp and mandible. Within the past few months further accounts of similar organs have been published by Mr. Pocock|| and by Mr. Pickard Cambridge.¶

References to previous descriptions is given in these papers. All that need be said here is that so far two distinct sets of structures have been described. In the one, the best example of which is that given by Mr. Pocock in the male of *Cambridgea antipodiana*, there is an excavation in the abdomen with longitudinal ridges, which are rubbed against by a scraper which has the form of a strong tooth placed on the pedicel. In the other set, what Mr. Pickard Cambridge speaks of as spines and keys, are developed on the palp and mandible, where they are in contact with one another. In some instances the keys are on the mandible and the spines on the palp (as in *Phormingochilus*); in others the position is reversed

* Trans. Entom. Soc., 1877.

† Nat. Sci., vol. vi., Jan., 1895, p. 48.

‡ Nature, March, 1895.

§ Journal Linn. Soc., 1881.

|| A.M.N.H., vol. xvi., No. 93, p. 230.

¶ A.M.N.H., vol. xvi., No. 95, p. 371.

(as in *Musagetes*). In the genus *Scytodes*, as recently described by Mr. Pickard Cambridge, there is a single large blunt spine on the basal point of the palp, which rubs over a series of ridges on the mandible.

In *Phlogius crassipes*, a spider which is evidently widely distributed over the hotter parts of Australia, being found in Queensland and Central Australia, the organ appears to be very similar to that figured by Mr. Pocock in *Musagetes*.* The keys or rods are on the basal joint of the palp, and the opposing spines are on the mandible. The spines form a prominent dark patch (Figs. 2 and 5) on the outer face of the mandible, and are arranged in somewhat vertical lines, each line containing some nine spines, which gradually decrease in size from above downwards. The spinous area is bounded below by a distinct rounded ridge, and the arrangement of the spines can easily be seen by reference to the figures. Figure 6 represents a sectional view of the organ, which has been cut across at right angles to the length of the basal joint of the mandible, and shows the spines, which form a single row. The two sets of long thin hairs on the margin are separated by a space into which the strong claw folds down.

The keys or rods form a still more distinct patch right in the middle of the face of the basal joint of the palp, and when both palp and mandible are at rest the spines and keys are in apposition. The size of the area and spines may be gathered from reference to Fig. 1, in which (drawn under the camera) they are magnified eight times.

The lower edge of the area is convex, formed by the protruding ends of the longer keys, which gradually diminish in size and at the upper end pass gradually into a series of close-set stiff hairs. These keys have a very definite structure. Each consists of two parts—a distal and a proximal—and the two parts are flattened out in planes at right angles to one another.

Seen from above the distal part looks thin, whilst from the side (Fig. 4) the proximal part resembles a rod and the distal a flattened-out plate, with a distinctly pointed extremity. As they are rubbed across at right angles to their length this peculiar double flattening must give considerable rigidity. Their structure will be understood from reference to Fig. 3, in which four are drawn as seen from above and slightly to the side. There are, as shown in Fig. 4, some six series of keys ranged one above the other.

With regard to the function of this organ there is no doubt as to its sound-producing capacity. My attention was drawn to it, as previously noted, by

* Nat. Sci., Jan., 1895, p. 46.



Fig 1 x 8



Fig 2 x 2



Fig 3

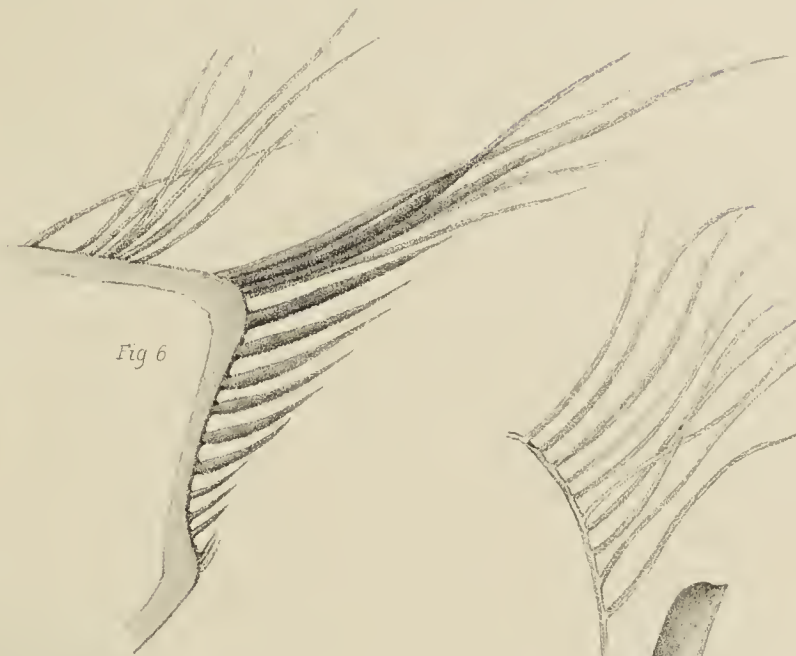


Fig 6



Fig 4



Fig 5 x 8

actually hearing the whistling sound produced when the animal was irritated, and could be watched—as it subsequently often was by several of us—rubbing the palps alternately up and down on the mandibles, both parts moving at the same time. Whilst the palp of one side was elevated, that of the other was depressed. The sound resembled a whistling noise, and could be heard at night in a room when all was quiet at a distance of eight or ten feet.

Unfortunately, no male specimen was secured; but seeing that it is so well developed in the female, and judging by the size and powerful claws of the animal, the probabilities are strongly in favour of the idea that the organ is used as a signal to warn off would-be aggressors.

DESCRIPTION OF PLATES.

All the figures refer to *Phlogius (Phrictus) crassipes*, and, except in the case of Fig. 2, the outlines have been drawn under the camera lucida.

- Fig. 1.—Inner surface of the basal joint of the palp. $\times 8$.
 „ 2.—Mandible seen from the outer side. $\times 2$.
 „ 3.—Four of the longest keys *in situ*. Zeiss A, oc. 2.
 „ 4.—Section across the length of the inner face of the palp to show the series of keys in position. Zeiss A,* oc. 4.
 „ 5.—Upper part of the outer face of the mandible showing the spines. $\times 8$.
 „ 6.—Section across the upper part of the mandible to show the series of spines in position. Zeiss A,* oc. 4.
-

Acanthodrilus eremius, a New Species of Earthworm.

By BALDWIN SPENCER, M.A.,

Professor of Biology in the University of Melbourne.

(PLATE 29).

The arid nature of the country and the fact that only very rarely is black soil met with in Central Australia made it very unlikely that many earthworms would be found. I had, however, no idea that the earthworm fauna would be of such a meagre description, as previous experience in Victoria, Tasmania and Queensland had shown me that earthworms were to be found in the most unlikely spots, and as a constant search was made I do not think it likely that available forms were overlooked. At the same time it is quite possible that more than the single species which we found does exist, but to secure them you probably need to be on the spot immediately after the fall of rain.

During the course of our Expedition it was only on three occasions that very limited patches of damp black earth were met with, once by the side of a water-hole in the James Range, at Illamurta, once in the George Gill Range, and once in the McDonnell Range on the Finke River.

Though these spots are separated by wide tracts of country quite impassable to earthworms, yet in each one there is found only the single species which is referable to the genus *Acanthodrilus*.

It has already been pointed out by myself in the case of mammals, and by Professor Tate in the case of molluscs, what a vast influence the change from a pluvial to a desiccating climate has had upon the early fauna of the central area. The majority of the forms became extinct, whilst a certain number were preserved in sheltered and favourable spots.

Now there can be little doubt but that the earthworm is not a recent introduction: not even the widespreading *Allolobophora* introduced from Europe has yet made its way into the interior, nor is there any trace of any of the dominant Australian genera, such as *Megascolides* or *Cryptodrilus*. If such abundant forms have not been introduced, it is scarcely likely that the rarest genus in Australia should have been carried to three spots separated from one

another and from the rest of the continent by tracts now absolutely impassable to an earthworm.

We are bound therefore to regard this species as a survivor of the old earthworm fauna, which almost entirely disappeared when, in Post-Pliocene times, the climate changed and the country gradually dried up, preventing a migration of earthworms, and gradually driving back those which did persist into their present isolated and sheltered homes amongst the Mountain Ranges.

Though it would be rash, on evidence as yet so slender, to speak with anything but considerable hesitancy upon the matter, still it is perhaps worth while suggesting an interesting point brought out with regard to the early earthworm fauna of the continent, supposing, what really seems likely, that the genus *Acanthodrilus* is the only one found in the central area.

It shows, at all events, the antiquity of the genus (for I feel sure that it is not an introduced form), and it *tends* to show, inasmuch as it has been found in three isolated spots far distant from one another and in conjunction with no other form, that at an early period the genus *Acanthodrilus* must have been the dominant one in that part of Australia from which the central area derived its earthworm fauna. It is of course possible that other genera existed but were unable to accommodate themselves to change of environment; even were this the case, it would still tend to show the dominancy of the genus *Acanthodrilus*.

Now, if we take the distribution of *Acanthodrilus*, we find that it is represented by one species in North-west Australia,* two in Queensland (I have a third as yet undescribed species from the Mary River district), numerous species in New Zealand, where it is now the dominant genus; and species scattered over New Caledonia, Falkland Islands, Kerguelen, etc., South America, and the Cape of Good Hope.

As Mr. Beddard has already indicated, the genus is probably to be regarded as a southern or Antarctic one, owing its present distribution to a former more genial climate and greater extent of land surface in Antarctic regions.

So far as Australia is concerned, it seems to show (1) that members of the genus entered towards the north, coming up from the south by way of a land connection to the east of the present continent, and so not apparently touching Tasmania or the south-eastern part of Australia, where the genus is not represented; and (2) that they formed the more important element of the earth-

* Fletcher, Proc. Linn. Soc. N.S.W. (iv.), 1893, p. 999.

worm fauna at the time, which may perhaps go as far back as the Lower Cretaceous age, when such animals could pass across into the central area of the continent. At the present time the now characteristic genera—*Megascolides* and *Cryptodrilus*—have the centre of their distribution in the south-eastern part of the continent, and are probably to be regarded as being indigenous to this portion, from which they have spread in various directions around the coastal area. Other genera, the systematic position of which is not at present at all clear, but which have as yet been described by Mr. Fletcher and myself under the general name of *Perichaeta*,* and which form in point of number the greater part of the present Australian earthworm fauna, are partly to be regarded as developed within the limits of the continent, and partly as probable immigrants from the oriental region. It is certainly curious, supposing them to have existed side by side with *Acanthodrilus* in Pre-Tertiary or early Tertiary times, that none seem to have made their way across into the centre of the continent.

Whilst the evidence is admittedly slender, still it points in the direction of *Acanthodrilus* being an ancient genus, and as forming the dominant one in the north-eastern part of the continent at the time when favourable conditions allowed of the migration of such soft-bodied and moisture-loving creatures as earthworms.

It is interesting also in this connection to note amongst the Molluscs the presence of *Microphyura hemiclausa*, belonging to a genus which Mr. Hedley regards "from its distribution and anatomy to be of high antiquity and of Antarctic origin," and as perhaps one of the most primitive of Australian snails.

Like *Acanthodrilus*, *Microphyura* is found on the continent only in Queensland, but is also recorded from New Caledonia and the Loyalty Islands.

Probably *Microphyura* and *Acanthodrilus* entered Australia at the same time, and the relics of both genera left stranded in the centre are to be regarded as representatives of genera which once had a wide distribution over the north and north-eastern part of the continent.

The following is a description of the species :—

Acanthodrilus eremius, sp. n. Length of spirit specimen 85 mm., breadth about 2 mm. Number of segments about 130.

Prostomium not completely dovetailed into the peristomium (about one-half).

* These forms have been placed in various genera by Mr. Beddard in his recent invaluable monograph on the Oligochaeta, but as a re-arrangement of these will be ultimately necessary, I have here spoken of them as *Perichaeta*, under which name they were described.

Clitellum well marked, extending over segments 13-17, and including the anterior half of 18. Incomplete in the median ventral line in segments 17 and 18.

Setæ very small and inconspicuous. The two of each pair very close together. Regularly arranged.

Male pores on segment 18, slightly ventral to the level of the inner pair of setæ of each side. The ventral pair of setæ on each side absent on the 18th segment.

Openings of prostate glands on segments 17 and 19, at the same level as the male pores. Penial setæ present. Long, thin, and without ornament.

Oviduct pores on segment 14, just in front of and external to the level of the inner pair of setæ of each side.

Spermathecal pores. Two pairs between segments 7 and 8, 8 and 9 at the level of the inner pair of setæ of each side.

Accessory copulatory structures. Not usually well developed. Elliptical tumid patches may be present at the level of the inner pair of setæ of each side, between some or all of segments 17 and 18, 18 and 19, 19 and 20, 21 and 22.

Dorsal pores. Present behind the clitellum.

Alimentary canal. Gizzard in segment 5. No calciferous glands or even swollen vascular pouches on the œsophagus. Large intestine commencing in segment 17.

Circulatory system. Single dorsal blood vessel. Hearts in segments 5-13 inclusive. A well-marked lateral blood vessel on each side of the gizzard.

Excretory system meganephoric. Regularly arranged. Nephridiopores just in front of the inner pairs of setæ on each side. Peptonephridia present.

Reproductive system. Two pairs of testes, one each in segments 10 and 11, into which also the rosettes open.

Prostates tubular, the anterior being larger than the posterior, and extending through segments 17-20; the posterior lying in segments 19 and 20. Each is supported by a double muscle slip, extending backwards and upwards into segment 22.

Sperm sacs, two pairs, racemose, one attached to the posterior wall of segment 9, the other to the anterior wall of segment 12.

Ovaries in segment 13, into which the oviducts open.

Spermatheca, two pairs; one each in segments 8 and 9. Each consists of a sac with two diverticula (1) a small knob-like process close to the opening, and (2) a long, tubular, and at times somewhat coiled process, which may be as long as or longer than the sac.

Habitat.—Soil by the sides of waterholes at Illamurta in the James Range, Bagot's Creek in the George Gill Range, and the Finke Gorge in the McDonnell Range.

EXPLANATION OF PLATE XXIX.

Acanthrodrilus eremius.

- Fig. 1.—Diagram representing the external anatomy.
- „ 2.—Diagram representing the alimentary canal, circulatory system, and disposition of the nephridia.
- „ 3.—Diagram representing the reproductive system.
- „ 4.—Pair of setæ, drawn under the camera lucida, much enlarged.
- „ 5.—Spermatheca, drawn under the camera lucida, much enlarged.
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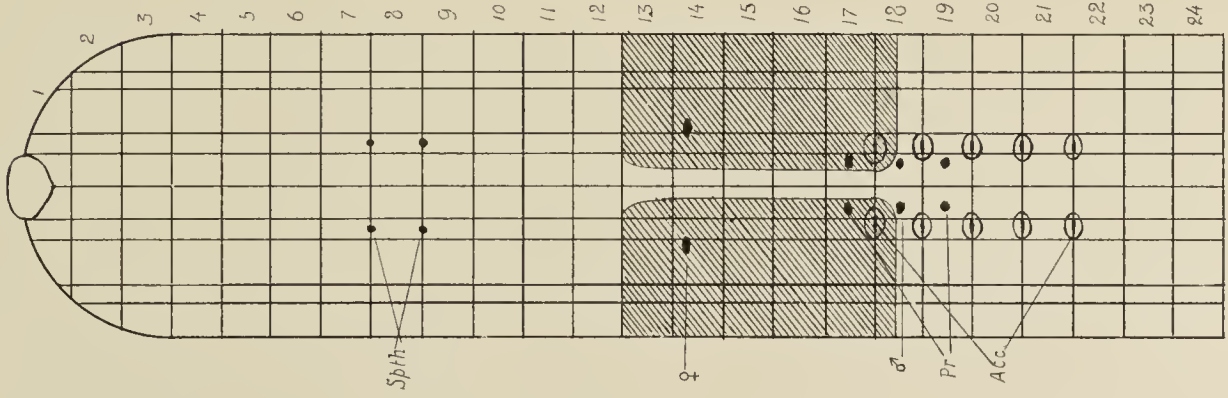


Fig. 1.

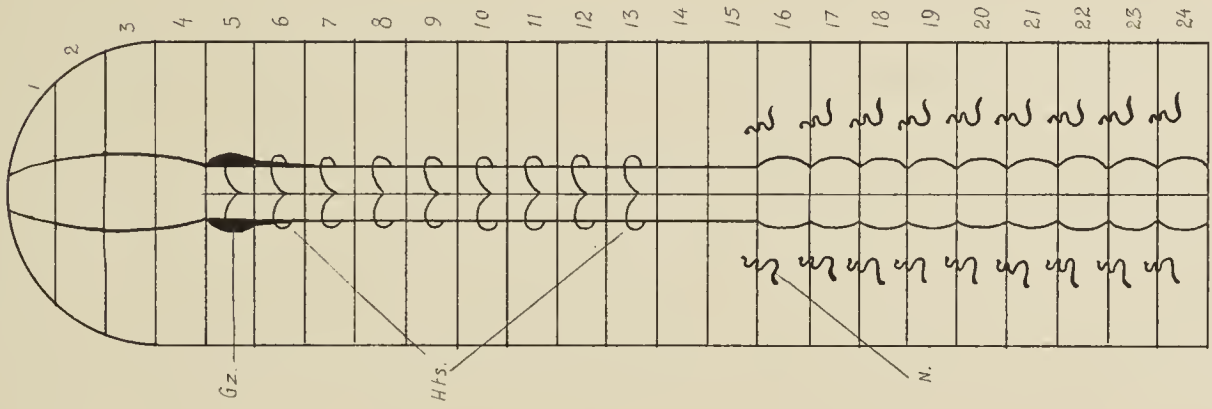


Fig. 2



Fig. 3.

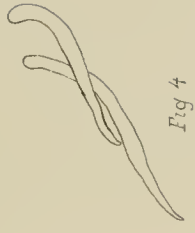


Fig. 4

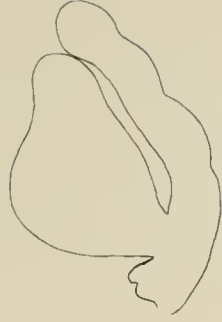


Fig. 5

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