THE

PROCEEDINGS

OF THE

LINNEAN SOCIETY

OF

NEW SOUTH WALES,

VOL. VII.,

[WITH ~~FOURTEEN~~ 12 PLATES.]

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PROCEEDINGS

OF THE

LINNEAN SOCIETY

OF NEW SOUTH WALES.

WEDNESDAY, 25TH JANUARY, 1882.

The President Dr. James C. Cox, F.L.S., in the Chair.

MEMBERS ELECTED.

W. Davidson, Esq., Stanthorpe, Queensland.

Rev. W. Walsh, Townsville.

W. C. Hume, Esq., Toowoomba.

DONATIONS.

From the Chief Secretary, Victoria: "Fragmenta Phytographiæ Australiæ," by Baron von Mueller, Vols. 8 and 9; "Introduction to Botanic Teachings at the Schools of Victoria," by Baron Ferd. von Mueller.

From the Hon. William Macleay, M.L.C.: "Catalogue of the described Coleoptera of Australia," by George Masters, Parts 1 to 5, complete: "Catalogue of the described Diurnal Lepidoptera of Australia, by George Masters."

PAPERS READ.

On the Structure of the Paired Fins of *Ceratodus*, with remarks on the general theory of the Vertebrate Limb.

By William A. Haswell, M.A., B.Sc.

[Plate I.]

In his description of *Ceratodus Forsteri*,* Dr. Günther says respecting the fins:

"The limbs consist of two pairs of paddles similar in appearance to the termination of the tail; viz., a longitudinal axis, formed by the endoskeleton and muscles and covered with scales is surrounded by a broad rayed fringe. These paddles are structurally identical with the fins of *Lepidosiren :* only the axis and also the fringe are much dilated.

"The paddle is joined to the scapular arch by an elongate flattish, slightly curved cartilage; its proximal end has a glenoid cavity fitting into the humeral condyle; the joint is simple, free, allowing of a considerable amount of motion, its parts being held together by a ligament fastened around its circumference. This is the only true joint in the limb, all the other parts being fixed to one another by connective tissue. I consider this cartilage to be the forearm; a horizontal section along its longitudinal axis does not shew any primary division. The next following cartilage forms the base of the paddle; although externally it appears as a single flat broad short piece, unevennesses of its surface indicate that several primary pieces are coalesced in it."

"I am confirmed in this view by a horizontal section, in which the lines of the former divisions are preserved in the shape of tracts of a white connective tissue. Three such divisions may be distinguished corresponding to the three carpals of most Plagiostomes. If this determination is correct, then the antibrachial

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* Phil. Trans. 1871.

cartilage just described is not represented in that order. The remaining framework of the paddle shews an arrangement unique among the Vertebrata. From the middle of the basal cartilage a series of about twenty-six quadrangular pieces takes its origin, forming a longitudinal axis along the middle of the paddle to its extremity. The pieces gradually become smaller and are scarcely distinguishable towards the end of the paddle. On the two posterior corners of each piece a branch is inserted running obliquely backwards towards the margin of the fin; the branches of the first eight or twelve pieces are three-jointed, the remainder two-jointed, the last having no branch at all. Slight irregularities, such as the origin of two branches from one side of a central piece occur, as also several four-jointed branches immediately on the basal cartilage."

On this description Huxley* makes the following comments:—

"In general, this description suits the pectoral fins of the specimen I have described very well. Mine, however, has only twenty median cartilages. All but the very last bear lateral rays; but towards the distal end of the fin these become minute, and consist of a single piece. Moreover the distal joints are much more slender, especially the last. A more important point is that the second shews no trace of such divisions as those described by Dr. Günther. To make sure of this I made a thin microscopic section of this cartilage on the right side, and thereby satisfied myself of the homogeneity of the cartilage of which it is composed."

"I find no true joint between the proximal median piece and the scapular arch, the connection between the two being effected by a solid fibrous mass."

Fig. 2 is copied from Huxley's figure of the pectoral fin of *Ceratodus*.

* P.Z.S., 1876, p. 46.

It will thus be seen that both Günther and Huxley, while their descriptions differ in various minor points connected with the arrangement of the cartilages, agree in regarding the fin of *Ceratodus* as essentially uniaxial, *i. e.* consisting of a single jointed axis, with the preaxial and postaxial sides of which a series of jointed cartilaginous rays are connected.

A similar, though simpler, arrangement had already been described as characterising the fin of *Lepidosiren*, and before the discovery of *Ceratodus*, Gegenbaur had come to the conclusion from theoretical considerations that the fundamental type of the Vertebrate limb very much resembled the fin of *Lepidosiren*. This primitive limb he designated the *archipterygium*, and in connection with it he remarks in the second edition of his "Grundriss der Vergleichenden Anatomie" (F. Jeffrey Bell's Transl. 1878, p. 473)—"When simplest this (the skeleton of the free part of the limb), is made up of cartilaginous rods (rays), which differ in their size, segmentation and relation to one another. One of these rays is larger than the rest and has a number of other rays attached to its sides. I have given the name of Archipterygium to the ground form of the skeleton which extends from the limb-bearing girdle into the free appendage. The primary ray is the stem of this archipterygium, the character of which enables us to follow out the lines of development of the skeleton of the appendage. Cartilaginous arches beset with rays form the branchial skeleton. The form of skeleton of the appendages may be compared with them; and we are led to the conclusion that it is possible that they may have been derived from such forms. In the branchial skeleton of the *Selachii* the cartilaginous bars are beset with simple rays. In many, a median one is developed to a greater size. As the surrounding rays become smaller, and approach the larger one, we get an intermediate step towards that arrangement in which the larger median ray carries a few smaller ones. This differentiation of one ray, which is thereby raised to a higher grade, may be connected with the primitive form of the appendicular skeleton; and, as we compare the girdle with a branchial arch, so we may compare the median ray and its secondary investment of rays with the skeleton of the free appendage."

"All the varied forms which the skeleton of the free appendages exhibits may be derived from a ground-form which persists in a few cases only, and which represents the first, and consequently the lowest, stages of the skeleton of the fin—the Archipterygium. This is made up of a stem which consists of jointed pieces of cartilage, which is articulated to the shoulder-girdle, and is beset on either side with rays which are likewise jointed. In addition to the rays on the stem there are others which are directly attached to the limb-girdle."

"*Ceratodus* has a fin-skeleton of this form; in it there is a stem beset with two rows of rays. But there are no rays on the shoulder girdle. This biserial investment of rays on the stem of the fin may also undergo various kinds of modifications. Among the *Dipnoi*, *Protopterus* retains the medial row of rays only which have the form of fine rods of cartilage; in the *Selachii*, on the other hand, the lateral rays are considerably developed."

Thus both Gegenbaur and Huxley regard the fin of *Ceratodus* as representing or nearly representing a primitive type from which the limbs of the *Ganoids*, the *Holocephali*, and the *Selachii* have been derived. Reasons have already been adduced by Balfour,* Thacker and others, for dissenting from this conclusion, and these, together with the facts which I am about to bring forward, seem to me to place it beyond a doubt that the limb of *Ceratodus*, so far from representing a primitive and generalised type, is, as indeed we should expect from various other points in the organisation of the animal, in reality highly specialised, and

* Comparative Embryology, Vol. ii., p. 506; "On the Development of the Paired Fins of the Elasmobranchii," etc., P.Z.S., 1881, p. 656.

is to be regarded as *derivable from* such simpler limb-skeletons as those of the *Selachii.*

In his work on the "Development of Elasmobranch Fishes" and in his "Comparative Embryology" F. M. Balfour gives an account of the development of the fins of Scyllium, which is important as throwing considerable light upon this question. Externally each fin first shews itself as a ridge of epiblast, subsequently enclosing mesoblast; the front and hind fins of each side are connected at first in some *Elasmobranchs* by a very low ridge of epiblast cells; but this connecting ridge soon disappears. Its existence, however, at this early stage would seem to render it probable, as pointed out by Balfour, that the pectoral and pelvic fins of each side had originally the form of a continuous fold similar in nature to the unpaired fins. The first rudiment of the skeleton of the fin consists of a bar of cartilage attached in front to the limb-arch and running backwards parallel with the long axis of the body; and a plate which extends into the fin and very soon becomes divided into a series of cartilaginous rods placed at right angles to the longitudinal bar. By a series of changes which are greater in the pectoral than in the pelvic fins, and include in the former the rotation outwards of the basal bar or *basipterygium* which becomes converted into the *metapterygium*, and the introduction of additional basal elements, the primitive longitudinal bar and segmented plate become converted into the skeleton of the adult fin.

The most important result of these researches, as regards the present question, was the proof that the paired fins are developed from structures which are essentially very similar to the unpaired fins. More recently Mivart* in a memoir entitled "On the Fins of Elasmobranchs, with Considerations on the Nature and Homologues of Vertebrate Limbs" (Trans. Zool. Soc., vol. x.) has endeavoured to shew that this fundamental identity of the

* And independently J. K. Thacker in a memoir on the Median and Paired Fins in the Transactions of the Connecticut Academy

paired and unpaired fins might have been inferred from their adult structure as well as from their mode of development.

Both Günther and Huxley, as already noted, found both the pectoral and pelvic fins to be uniaxial. I was surprised, therefore, to find that the skeleton of the pectoral fin of the first of two specimens very kindly placed at my disposal by Mr. Ramsay, presented the arrangement shewn in fig. 1.

There is first an elongate basal joint attached to the shoulder-girdle; upon this follows a short transversely oblong joint and to the distal border of this in turn are connected (1) a series of five post-axial rays, (2) the main axis of the paddle consisting of a series of cartilaginous joints to most of which are attached a pair of jointed cartilaginous rays, and (3) a supplementary axis (pre-axial fin-ray of Huxley) consisting only of four joints, and having only two rudimentary rays, one attached to the anterior and distal angle of the first joint, and the other to the same point on the second. The fin of the opposite side presented the same arrangement of the cartilaginous elements, except that the anterior axis had only one rudimentary ray in place of two. On examining the pectoral fins of a second specimen of *Ceratodus* I found that the anterior axis of neither of them had any rudiments of rays.

When the left pelvic fin of the first specimen was examined, a still greater divergence from the archipterygial type of structure presented itself. Articulating with the basal joint are (1) in front two small cartilages of irregular shape, the anterior of which supports a short ray, and (2) a broad, somewhat oblong plate. This plate is seen on a closer inspection to present traces of longitudinal division into two parts and is formed apparently by the partial coalescence of the bases (1) of a short bifurcated ray, (2) of a short branching anterior axis supporting five rays, (3) of the basal undivided portion of the main axis, and (4) of a short posterior axis giving off one simple and two bifurcated branches. Of the rays attached to the distal portion of the axis several are bifurcated. The pelvic fin of the opposite side of the same specimen (fig. 4) has a totally different structure and very closely resembles the pectoral fins. There is a broad second joint divided distally by a fissure, the posterior division being connected distally with the main axis of the fin and supporting posteriorly three short rays, while the anterior forms the base of stout anterior ray or unbranched anterior axis. None of the rays in this fin are branched and the arrangement approaches very closely to that figured and described by Günther (fig. 3.). The pectoral fins of the second specimen are very similar to those of the first, except that the anterior axis gives off no branches. The left pelvic fin of this specimen (fig. 6) somewhat resembles that of the first, but there are important differences in detail. Thus the anterior axis is much longer and more complexly branched, and the main axis itself subdivides into two, only one of which, however, is continued to the extremity of the fin. The right fin (fig. 7), is very similar to the left fin of the first specimen with some slight points of difference which hardly require description.

As Günther and Huxley each examined two specimens, this branching of the cartilaginous skeleton of the fin of *Ceratodus* would appear to be an exceptional arrangement; and it is reasonable to regard it as an instance of atavism, and as pointing back to a pre-existing condition in which the fin-skeleton consisted of branching jointed cartilaginous elements supporting a cutaneous expansion considerably broader than that of the fin of the living *Ceratodus Forsteri.* The second joint seems to be formed by the coalescence of the bases of several of the main ribs or axes of the fin, and the first joint is to be regarded as derived from the equivalent of the *basipterygium* of the embryonic *Scyllium.* In the absence, however, of any data on the development of *Ceratodus* the homologies of these cartilages cannot be determined with any certainty, but the varieties of arrangement which I have described seem to point to the above conclusion.

If these cases of plurality of axes in the limb are cases of atavism, then they may perhaps point back to a common form of fin-skeleton whence the normal specialised fin of *Ceratodus* and the *cheiropterygium* of the higher vertebrates may have been derived. The speculations of Prof. Huxley (*l. c.*, p. 56) would however, require little modification to adapt them to such a biaxial or multi-axial type of limb, and it would be idle, in view of the variations which I have shewn the fin-skeleton to present, to offer any further more detailed suggestions in this direction.

If we were to speculate as to the nature of the earliest fin-skeleton, we should most probably, in view of the structure of the embryonic fin in the Elasmobranchii, come to the conclusion that at first it consisted of a series of detached nodules of cartilage; that, as muscular action became more definite in direction, these nodules came to be arranged in rows so as to assume the form of numerous parallel, jointed rods of cartilage, which might coalesce in some cases so as to form a continuous plate; the coalescence of the bases of these jointed rays as the two pairs of fins became differentiated from one another and the proximal part of each fin became narrowed, and the inward growth of this, probably, as Thacker has suggested, formed the *basipterygium*. As the breadth of the whole fin became decreased to form the narrow, pointed paddle of *Ceratodus*, the jointed rods became approximated not only at their bases but throughout a considerable portion of their length, and their partial coalescence resulted in the formation of a branching structure, the branches of which, as centralisation went on further, came to be arranged on each side of a single stem—the axis of the so-called *archipterygium*.

A study of the soft parts of the fin in *Ceratodus* points to the same conclusion as the consideration of the skeleton. The pectoral fin of *Ceratodus* as observed by Mr. E. P. Ramsay, is capable of somewhat complex movements, and to accomplish those the muscles, though simply arranged, are somewhat more highly specialised than in even the adult Dog Fish or Ray. In these the muscles which move the fin are flat plates made up of coarse fasciculi radiating from the limb arch to the bases of the fin rays.

In *Ceratodus* there is a strong extensor muscle arising from the shoulder-girdle and inserted along the dorsal surface of the basal joint, the next joint, and the first two joints of the central axis; and a flexor muscle with a similar arrangement but interrupted opposite the distal end of the basal joint, the distal portion of its fibres chiefly having their proximal attachment with the tubercle at the distal end of the ventral surface of the basal cartilage. Along the axis of the fin both on the dorsal and the ventral surfaces run a series of interrupted muscular fasciculi which pass between adjacent joints of the axis and the basal joints of the rays, and passing obliquely outward from those are series of fibres connected externally with the bases of the fin-rays. The front portion of the extensor turns round the anterior margin so that it acts to some extent as an abductor. Beneath it are two muscles, one arising from the shoulder girdle and inserted wholly into the basal cartilage; and the other arising from a prominent tubercle near the distal end of that cartilage, its fibres passing in a radiating manner to be inserted into the next joint and the two basal joints of the anterior axis; this muscle must act as a rotator.

In *Ceratodus*, as in all limb-bearing vertebrates, the nerves which supply the limbs converge from an extent of the spinal cord which is great compared with the breadth of attachment of the limb. In *Ceratodus* the pectoral fin for example is supplied by a single nerve-trunk to which fibres from four spinal nerves contribute. After passing the axil of the limb this main trunk divides into two, one of which turns round the anterior border of the fin to the dorsal surface, while the other runs straight onwards along the middle of the ventral surface.

If the primordial limb consisted of a wide fold flanking a number of vertebral segments, as seems highly probable from

Balfour's researches, it would naturally be supplied by branches from most of the spinal nerves belonging to those segments; and, as the base of connection of the fin with the body became narrowed, these nerves would be brought into closer connection with one another, and would assume the appearance of converging towards the axil of the limb. The fact that the nerves which go to supply the limbs originate from a number of spinal nerves would thus seem to afford an additional argument in favour of this view of the origin of limbs, and against the theory put forward by Gegenbaur that the limbs are modified branchial arches.

Explanation of Plate I.

Fig. 1.—Left pectoral fin of specimen 1.
,, 2.—Pectoral fin of *Ceratodus*, after Huxley.
,, 3.—Pelvic fin, after Günther.
,, 4.—Right pelvic fin of specimen 1.
,, 5.—Left pelvic fin of specimen 1.
,, 6.—Left pelvic fin of specimen 2.
,, 7.—Right pelvic fin of specimen 2.

Notes on the Pleuronectidæ of Port Jackson, with descriptions of two hitherto unobserved species.

By William Macleay, F.L.S., &c.

Fishes of this family are rarely seen in the Sydney Market, and the species most frequently seen and generally known as the "Flounder," cannot, in point of quality as food, be compared with the Turbot, Sole, or other *Pleuronectidæ* of cooler seas. But it by no means follows that, because our fishermen do not catch them, they are really rare or of a quality inferior to the Flat Fish of other parts of the world, indeed I believe that in this Paper I shall be enabled to prove the contrary.

The *Pleuronectidæ* are all ground Fishes, and except in the spawning season, keep in deep water, they moreover seldom, except in the case of one species, ("The Flounder") take a bait, and the only way therefore that they can be captured in their deep haunts, is by the use of the Trawl Net.

Nets of this kind may be said to have been hitherto untried in these waters, for though one or two efforts in the way of experiment in this mode of fishing were made some years ago, they were far from successful, chiefly I believe from the imperfect description of net used.

Opportunities, I am glad to say, will now soon be given, of fairly testing the productiveness of our deep waters, and the suitableness of our coast for the use of the Trawl. The Government, acting upon the recommendation of the Commissioners of Fisheries for New South Wales, have lately imported a variety of Nets, Lines, and other implements of fishing of the latest and most improved kinds from England, Norway, and America. Among these are two descriptions of Trawl Nets—a large Grimby Beam Trawl, and an Otter Trawl of 42 feet width of net.

I was present at a trial of the last named net about a fortnight ago, and it is on the results of that trial, that my present paper is founded. The net was first put overboard off Middle Head, and was raised in North Harbour near Manly Beach, it was again lowered at the mouth of Middle Harbour, and raised opposite Clontarf. On both occasions the net was quite full when raised of a very miscellaneous mass of Ascidians, Sponges, Algæ, Crabs, Cephalopods and other Mollusks.

The Fishes consisted of Rays—*Urolophus testaceus*, in great number, *Rhinobatus tuberculatus* or Angel Ray, and *Hypnos subnigrum* or Numb Fish. Of Sharks there were a few young specimens of *Heterodontus Phillipii*, Bl., and *Rhina squatina* or Angel Shark. There were also specimens of *Callionymus* *calcaratus* mihi, and *Trigla Kumu*, and *polyommata*. Of *Pleuronectidæ* there were seven species taken :

1. *Pseudorhombus Russellii.*
2. " *multiradiatus.*
3. *Pardachirus pavoninus.*
4. *Plagusia unicolor*, mihi.
5. *Synaptura nigra*, mihi.
6. " *fasciata*, n. sp.
7. *Lophorhombus cristatus*, n. g and sp.

The first of these—*Pseudorhombus Russellii* was got in considerable number. It is the best known of our Flat Fish, taking the hook sometimes readily, and occasionally being captured in the ordinary Seine Net. It is a good fish for the table, though very inferior to the Sole. It is found in all seas from India to Port Jackson, and is generally called "The Flounder" by the Fishermen, and not unfrequently "The Sole" by the Fishmonger, who thereby effects a ready sale. In fact it is not entitled to either name, and of all the European Flat Fish it most approaches the Brill (*Rhombus lævis*).

The second species *Pseudorhombus multiradiatus*, Gunther, has not I believe, been ever got except in Port Jackson, and that only very rarely ; it may probably be found more abundant in deeper water. *Pardachirus pavoninus* the next on the list was represented by two rather small specimens. It is a species of wide range, but is chiefly met with in warmer seas than ours. Of the next species *Plagusia unicolor* mihi, sometimes called "The Lemon Sole," only two specimens were captured, one of them ten inches in length. The edible qualities of this Fish are unknown. Of the fifth species *Synaptura nigra* mihi, or "The Botany Bay Sole," one very large specimen and several small ones were obtained. This is the best of our Flat Fish, being I think, when properly cooked superior to the English Sole. In midsummer it visits in considerable numbers, for the purpose of spawning, the shallow flats in Botany Bay at the mouth of Cook's River, it is then easily speared in the early morning when the water is clear and unruffled by any breeze. That it is also to be found within the

Heads of Port Jackson is evidenced by the specimens taken on the occasion I am narrating. The remaining species met with are new and may be described as follows :—

SYNAPTURA FASCIATA.

D. + C. + A. 148.

Form rather elongate, the height being twice and a half in the total length ; the head is short ; the mouth small and much twisted to the blind side ; the teeth are minute and regular ; the eyes are in the same vertical plane, and about their vertical diameter apart ; the dorsal fin commences over the eye, the rays are short ; the caudal fin is rather pointed ; the ventrals are equal in size ; pectoral fins none ; the lateral line is straight ; the scales are strongly denticulated on the free margin. The colour is a pale brown, with about twenty dark brown vertical about equidistant bars over the head and body ; the fins are blackish. Length five inches.

One specimen only captured.

LOPHORHOMBUS, *new genus.*

Eyes on the left side and close together, the lower rather in advance of the upper. Mouth small, dentition rather feeble, equally developed on both sides. Vertical fins not continuous with the caudal. Anterior rays of dorsal fin elongate. Pectoral fins well developed. Scales large, smooth, finely ciliated, and rather deciduous. Lateral line much curved above the pectoral fin.

LOPHORHOMBUS CRISTATUS, *n. sp.*

D. 85. A. 72. C. 16. P. 12. V. 6.

Height of body one-half of the total length ; the eyes large, separated only by a narrow prominent ridge ; the dorsal fin commences near the snout, and in front of the upper eye ; the first three rays are elongate, more than twice the length of the others ; the middle rays of the caudal fin are somewhat elongated ; the left ventral fin commences in advance of the right one ; the pectoral fins are about, or nearly, as long as the head. The colour is of a lightish brown, with some indistinct darker markings. All the fins are minutely speckled.

One specimen about six inches in length.

The fact of the capture in the Trawl of these seven species of Flat Fish—two of them not previously known—in such a small space as was traversed by the net on the occasion I mention, seems to me to prove almost beyond a doubt that the *Pleuronectidæ* are sufficiently numerous on our sea bottoms, and that if we can only find patches along our Coasts free from rocks, Trawl fishing may become a most useful and profitable occupation.

The other species of Flat Fish which have been found in Port Jackson are *Teratorhombus excisiceps* mihi, described in the sixth volume of the Proceedings of this Society ; *Rhomboidichthys spiniceps* mihi, also described in the sixth volume ; *Ammotretis rostratus*, Gunther, and *Solea microcephala*, Gunther, *Solea Macleayana*, Ramsay, and *Synaptura quagga*, Kaup. The last named species is the only one I have not seen, and I give to it the habitat of Port Jackson upon the authority of Count Castelnau.

The apparently entire absence from Sydney waters of any species of the genus *Rhombosolea*, which is represented by several species in Victoria, Tasmania, and the Southern coast generally, is a peculiarity which I previously noticed in my Catalogue of Australian Fishes. I venture however to predict that a better acquaintance with the deep sea Fauna which I believe the Trawl net is destined to give us, will prove the existence, in the cool and deep currents, of species of *Rhombosolea* rivalling—like one New Zealand species *Rhombosolea monopus*—the size and excellence of the European Turbot.

Notes on the Zoology of the Solomon Islands.—Part IV.

By E. P. Ramsay, F.L.S., &c.

When I first wrote on the Ornithology of the Solomon Islands in 1879, only about thirty-five authentic species were known from that group, it may therefore not be out of place, to give here, a resumé of all that has been done up to the present time.

As far as I can ascertain the first notice of the Birds of the Solomon Islands is given by Hombron and Jacquinot in the "Voyage au Pôle Sud," where the following species are described:

Athene tæniata,
Pachycephala orioloides,
Lamprotornis fulvipennis,
Sturnoides gigas,
Dicæum æneum,
Myzomela lafargei,
Lorius cardinalis,
Pionias heteroclitus,
,, *cyaniceps*,
Cacatua ducorpsii,
Carpophaga rufigula,
Peristera stephani.

And *Myzomela solitaria*, which last being well known to come from the Figi group alone, must be omitted, reducing the number of the then known species to 11, or 10 if we take *Pionias cyaniceps* as the female of *P. heteroclitus*. The next notice I come to, is in Bonaparte's Conspectus Avium, from which may be added *Carpophaga pristinaria*, and *Nycticorax manillensis*. After this little seems to have been done, until the voyage of the "Rattlesnake," during which Mr. John Magillivray collected the following, described by Mr. Gould in the P.Z.S., 1856, pp. 136, 137:

Centropus milo,
Turacæna crassirostris,
Lorius chlorocercus,
Iotreron (Ptilonopus) eugeniæ.

In Gray's Catalogue of Birds of the Tropical Islands of the Pacific, I find five additional species mentioned:

Carpophaga rubracera,
Halcyon cinnamonia,
,, *sancta*,
Halcyon leucopygia,
Trichoglossus massenæ.

The next notice, I believe, is that of Dr. Sclater who in P.Z.S. 1865, p. 620, describes *Nasiterna pusio*, and again in 1869, after recapitulating what had already been written on the subject enumerates in all 34 species, (see P.Z.S., 1869, p. 124,) 21 of which were from a collection supposed to have been made in the Solomon Islands, but unfortunately the localities were very incorrect, and the following species must therefore be thrown out:

Centropus ateralbus, New Ireland.
Myzomela solitaria, Fiji Islands.
Dicrurus megarhynchus, New Ireland.
Carpophaga rubricera, New Ireland.
Philemon vulturinus, New Guinea.
Todiramphus chloris, New Guinea.
Lorius hypœnochrous, New Ireland.
Athene variegata, and *Nasiterna pusio*, both from New Ireland and the Duke of York Group.

Nevertheless in this important paper three new species were recorded:

Gracula krefftii, *Rallus intactus*,
Eurystomus crassirostris [This last requires confirmation.]

The species recorded as *Philemon vulturinus*, being a new species afterwards described by Mr. G. R. Gray, as *P. sclaterii* may be added, from the Ann. Mag. Nat. Hist. 1870, p. 327; in the same paper I find described also the following new species:

Accipiter albigularis, *Carpophaga brenchleyi*,
Ptilonopus solomonensis *Megapodius brenchleyi*,

And six more species added to the list—two of which *Eclectus linnæi*, and *E. intermedius*, I presume are synonyms of *E. polychorus*—bring the number up to 34. In the "Voyage of the Curaçoa," an account is given of the collections made by Julius Brenchley, Esq., and the above new species recorded.

In the proceedings of the Zoological Soc., 1876, p. 663, Mr. R. B. Sharpe described *Ninox solomonensis*, but I believe this bird is now considered to belong to a previously described species and not to have come from the Solomons; it must therefore be omitted.

I believe these are the most important, if not the whole of the notices of the Solomon Island birds previous to my paper on Cockerell's collection, which was read before the Linnean Society of N.S.W., January 29th, 1879; this contains a record of 45 species of which eight were described as new to science, and since six others there mentioned—

Graucalus elegans,	*Ptilopus lewisii*,
Baza gurneyii,	*Macropygia rufrocastanea*,
Astur pulchellus	*Halcyon tristrami*,

have proved to belong to undescribed species; one species, *Monarcha rufrocastanea* however is undoubtedly the *Pomarea castaneiventris* of *Verreaux*, and the *Dicæum erythrothorax*, there mentioned is *D. æneum, Homb. et Jacq.* Fifty one species were therefore recorded when the next notice appeared, in the Ibis of 1879, p. 437, where an important paper of the Rev. Canon Tristram's on a collection made by Lieutenant Richards, R.N., 33 species are enumerated from the Solomons and the New Hebrides; unfortunately those from the Solomons are not separated from those of the New Hebrides, and very few if any of the localities or habitats are given. Having had access to Lieutenant Richard's collections I feel much pleasure in acknowledging his courtesy in giving me the localities by recording them in the present paper (Part IV.)

Mr. Tristram describes 11 species as new from the Solomons, of which seven at least will stand, the others having been previously described.

These papers by Canon Tristram and myself were criticised by Count Salvadori in the Ibis of 1880, p. 126, but many of the new species, there considered doubtful, have since been proved by Canon Tristram (see Ibis 1880, p. 246) and myself elsewhere, to be good and distinct species, notwithstanding much valuable information may be gained by the perusal of the Count's criticisms; this brings the number of authentic species up to 58.

The next paper, one of my own, appeared in the P. L. S., of N.S.W., 1881—"Contributions to the Zoology of the Solomon Islands, pt. II."—where I described six new species from collections made by Lieutenant Richards, this was followed by another paper which I sent to the Linnean Society of London,* on new Birds from the Solomon Islands and the Duke of York Group, &c., in which I described from the Solomon Islands, *Pomarea ugiensis*, *Baza gurneyi*, *Astur pulchellus*, the two last I had previous mentioned in my first paper, (1879) under the names *Baza reinwardtii*, and *Astur soloensis*. The next contribution to the Zoology of these Islands appeared in the P. L. S. of N.S.W., 1881, (Aug. 31st) Vol VI., p. 718; in this paper are described six new species, and recently in the same publication Vol. VI., pp. 833 and 843, I have added three more—

Halcyon salamonis, *Rhipidura tenebrosa*, *Eurostopodus nigripennis*.

In the present paper I have endeavoured to give a complete list of all the authentic species known to inhabit the Islands of the Group which brings the number up to 99, and with a few exceptions the whole of these are represented in the Australian Museum. I may also add that I have discarded such as I have reason to believe have been wrongly recorded.

PICARLÆ.

1. EUROSTOPODUS NIGRIPENNIS, *Ramsay*.

P.L.S. of N.S.W., 1881, Vol. VI., p. 843.

The type of this species, the only specimen I have seen, was obtained by Lieutenant Farie, R.N., of H.M.S. "Miranda."

Hab. Hawthorn Sound, Rubiana *(Farie.)*

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* Jour. Linn. Soc. Lond., Zool., Dec. 1881.

2. Collocalia fuciphaga.

Recorded by Canon Tristram, Ibis, 1879, p. 438. Morton met with a species nesting under shelving rocks on the coast of St. Christoval, but failed to secure any specimens ; he describes it as being a very small species.

3. Dendrocheilidon mystacea, *Less.*

Common throughout the Group.

Hab. Ugi, Gaudalcanar, St. Christoval, (*Richards, Cockerell, Morton.*)

4. Merops ornatus, *Lath.*

Found througout the Group.

Hab. Ugi, St. Christoval, (*Richards, Morton*), Gaudalcanar (*Cockerell.*)

5. Eurystomus crassirostris, *Sclater.*

Common throughout the Group.

Hab. Ugi, St. Christoval, Savo, Gaudalcanar, (*Richards, Cockerell, Stephens, Morton.*)

6. Ceyx gentiana, *Tristram, Ibis,* 1879, *p.* 438, *pl.* xi.

Hab. Makira Harbour, (*Richards.*)

7. Halcyon leucopygia, *Verr.*

Ramsay, P.L.S. of N.S.W., IV., p. 67.

Hab. Gaudalcanar (*Cockerell.*)

8. Halcyon albicilla, *Cuv.*

Hab. Ugi (*Morton*), Makira Harbour, St. Christoval (*Richards.*)

9. Halcyon sanctus, *Vig. & Horsf.*

Common throughout the Group.

Hab. Ugi, (*Morton, Stephens*), Gaudalcanar, Savo, (*Cockerell*) St. Christoval, (*Stephens.*)

10. Halcyon tristrami, *Layard.*

? *H. chloris, var.*, Ramsay, *l. c.*, p. 67.

This is probably the species alluded to by me under the name of *H. chloris*, var., P. L. Soc. of N.S.W., IV., p. 67. Unfortunately the figure given in the "Ibis" 1880, pl. xv., does not agree with the description, which is so meagre, that it rather tends to confuse matters than throw any light on the subject.

11. Halcyon salamonis, *Ramsay.*

P. Linn. Soc., N.S.W., Vol. VI., p. 833, (*Nov.* 1881.)

This species is the representative of *Halcyon chloris*, in the Solomon Islands, it has no superciliary stripe, no white nape patch, the upper parts are of a much richer blue, of a rich cobalt blue on the wings and tail; and is a smaller bird.

Hab. Ugi, St. Christoval (*Morton, Stephens.*)

12. Rhytidoceros plicatus, (*Penn.*)

Hab. Gaudalcanar, Ysabel Islands, (*Cockerell, Morton.*)

13. Centropus milo, *Gould*, P.Z.S., 1856, p. 136.

Hab. Gaudalcanar, (*Cockerell*), Florida Island (*Morton.*)

14. Eudynamis cyanocephala, *Lath.*

Eudynamis taitiensis, (Sparm.,) Ramsay, P. L. S., N. S. W., Vol. IV., p. 70.

15. Chalcites, ? plagosus (*Temm.*)

Ramsay, P.L.S. of N.S.W., 1872, *p.* 70.

Hab. Savo, (*Cockerell.*)

16. Cuculus (? tymbonomus, *S. Müll.*)

Hab. Ugi, (*Stephens, Morton.*)

PASSERES.

17. Hirundo tahitica, *Gm.; Tristram, Ibis*, 1880, *p.* 246.

Canon Tristram records this species from Lieutenant Richards' collections. I have not met with any from the Solomons but I have seen specimens of *Hirundo jananica*, a closely allied species from the Louisades and South-east end of New Guinea.

18. Graucalus elegans, *Ramsay.*

Graucalus hypoleucus, Ramsay, P.L.S. of N.S.W., Vol. IV., p. 71.

The type of this species is from Gaudalcanar.

Hab. Ugi, (*Morton*, *Stephens*), Gaudalcanar, (*Cockerell.*)

19. Graucalus sublineatus, *Sclater.*

From Lieutenant Richards' collection.

Hab. Makira Harbour, St. Christoval, (*Richards.*)

20. Graucalus salomonensis, *Ramsay.*

Pro. Linn. Soc. N.S.W., IV., p. 314, (*June 25th*, 1879.)

Graucalus pusillus, Ramsay, *l. c.*, p. 71.

Hab. Gaudalcanar, (*Cockerell.*)

21. Graucalus monotonus, *Tristram*, l. c., p. 441, (1879.)

22. Edoliisoma tristrami, *Ramsay.*

E. salomonis, Tristram, *l. c.*, p. 440. *E. marescottii*, Ramsay, P.L.S. of N.S.W., IV., p. 71.

I have been obliged to alter the name as above, to prevent confusion with my *G. solomonensis*, (Proc. Linn. Soc. N.S.W., IV., p. 314.)

The young males resemble the females in having all the under surface chestnut; the adult male is of a deep bluish-slate colour, with the under wing-coverts chestnut.

The species of *Graucalus* and especially of *Edoliisoma* of the Solomons' and Duke of York Group require careful revision, and comparison of the various types of the species, but this can only be done where large series of each species have been brought together.

23. Symmorphus affinis, *Tristram*, l. c., p. 440.

I have received several specimens of this species, but it does not appear to be a common bird.

Hab. Ugi, (*Morton.*)

24. Rhipidura rubrofrontata, *Ramsay*, l. c., p. 82.

Rhipidura russata, Tristram.

Hab. Ugi, St. Christoval, (*Morton*, *Richards*), Gaudalcanar, (*Cockerell.*)

25. Rhipidura tenebrosa, *Ramsay*.

Proc. Linn. Soc., N.S.W., Vol. VI., p. 835, 1882.

Hab. "Wannu," St. Christoval, (*Stephens.*)

26. Sauloprocta cockerellii, *Ramsay*.

Proc. Linn. Soc., N.S.W., IV., p. 81, (1879.)

Hab. Ugi, (*Morton*), Gaudalcanar, (*Cockerell.*)

27. Sauloprocta tricolor, *Vieill.*

Hab. Throughout the group, Ugi, St. Christoval, Rubiana, Gaudalcanar, &c.

28. Piezorhynchus vidua, *Tristram*; Ibis, 1879, p. 439.

If this species is distinct from the next, then I have never seen it, but it appears to me to be only the young of *P. melanocephalus.*

29. Piezorhynchus melanocephalus, *Ramsay.*

Proc. Linn. Soc., N.S.W., IV., p. 468, (*Dec.* 1879.)

This is a common species, of which I have received many specimens in different stages of plumage, one of which I think may prove identical with the *P. vidua* of Mr. Tristram.

Hab. Ugi, (*Richards, Morton*), Makiri Harbour, (*Richards.*)

30. Piezorhynchus richardsii, *Ramsay,*

Proc. Linn. Soc., N.S.W., VI., p. 177.

Hab. Ugi, (*Richards, Morton.*)

31. Piezorhynchus brodiei, *Ramsay.*

Proc. Linn. Soc., N.S.W., IV., p. 80.

Hab. Gaudalcanar, (*Cockerell.*)

32. Myiagra pallida, *Ramsay.*

Proc. Linn. Soc., N.S.W., IV., p. 79.

Hab. Gaudalcanar, (*Cockerell.*)

33. Myiagra ferrocyanea, *Ramsay*, l. c., p. 78.

Hab. Gaudalcanar, (*Cockerell.*)

34. Myiagra cervinicauda, *Tristram*, Ibis, 1879, p. 439.

Ramsay, Proc. Linn. Soc., N.S.W., Vol. IV., p. 726, (1881.)

Mr. Tristram's description has evidently been taken from a female, or from a young male, which in this species resembles in plumage the female.

Hab. Ugi, (*Morton.*)

35. Pomarea castaneiventris, *Verr.*

Monarcha rufocastanea, Ramsay, P.L.S., N.S.W., IV., p. 79.

This species is rare on Ugi, but was found plentiful on Gaudalcanar.

Hab. Ugi, (*Richards*), Gaudalcanar, (*Cockerell*), Florida Island, (*Morton.*)

36. Pomarea ugiensis, *Ramsay.*

Journ. of Linn. Soc., Lond., Zool., 1881.

This is a glossy, jet black species, with large bluish-black bill, whitish at the base of lower mandible in some specimens. Sexes alike in plumage.

I believe this species is confined to the Island of Ugi, where it is not rare.

Hab. Ugi, (*Richards, Morton, Rev. George Brown*)

37. Pachycephala christophori, *Tristram*, l. c., p. 441.

This is apparently a common species, the female is like the male but has no black throat-band; all the under surface being yellow.

Hab. Ugi, (*Richards, Morton, Stephens.*)

38. Pachycephala orioloides (*Peale.*)

Ramsay, Proc. Linn. Soc., N.S.W., IV., p. 70.

I have received this fine species only from Cockerell's collection.

Hab. Gaudalcanar, (*Cockerell.*)

39. Gracula kreffti, *Sclater; Ramsay*, l. c., p. 70.

Hab. Ysabel Island, (*Morton*), Savo, Gaudalcanar, St. Christoval, (*Cockerell, Stephens.*)

It is probably common throughout the group.

40. Calornis metallica, *Temm.*

Ramsay, l. c., p. 77.

Common throughout the group.

Hab. Ugi, (*Morton*), St. Christoval, (*Richards, Stephens*), Gaudalcanar, (*Cockerell*), Florida, (*Lieut. Farie.*)

41. Calornis cantoroides, *G. R. Grag.*

Hab. Savo, (*Cockerell.*)

42. Sturnoides fulvipennis, *Homb. et Jacq.*

Hab. Gaudalcanar, (*Cockerell.*)

43. Sturnoides minor, *Ramsay.*

Proc. Linn. Soc., N.S.W., VI., p. 726, 1881.

This species may be easily distinguished by all the quills and tail-feathers being brown.

Hab. St. Christoval, (*Morton.*)

44. Philemon sclateri, *G. R. Gray.*

This species appears to be very plentiful throughout the group and is found feeding on the flowers of the Cocoanut Palm (*Cocos nucifera.*) It is known by the Traders and other residents as the "Cocoanut Bird." It is one of the most common birds in the group. The sexes are alike in plumage.

The following measurements are taken from carefully sexed specimens received in spirits, the bills vary considerably in length:

	Inches.		
Total length, about	9·4	9·5	10·2
Wing	4·55	4·55	4·8
Tail	4 in.	4·1	4·55
Tarsus	1·35	1·2	1·35
Bill from forehead	1·3	1·32	1·5
Bill from nostril	0·75	0·76	0·8
Sex	♀	♀	♂

Hab. Ugi, (*Richards, Morton*) St. Christoval, (*Stephens*).

45. Myzomela tristrami, *Ramsay.*

Journ. Linn. Soc., Lond., Zool., (1881.)

This species appears to be rare, no other specimens than the types having as yet come under my notice, the specimens obtained by Lieutenant Richards, R.N., and mentioned by Canon Tristram (Ibis, 1879, p. 439) may probably belong to the next mentioned species, which was obtained by Morton on Ugi; my reason for thinking them the same as the birds I named *M. tristrami*, was, that I believed we both obtained our specimens from exactly the same source, and that they were all shot at the same time and place.

By some oversight the measurement of the bill in my description of this species were omitted, they are as follows: bill from forehead, 0·85; from nostril, 0·54; width at base of nostril, 0·1 in.

46. Myzomela pammelæna, *Sclater*.

One specimen of a jet black Myzomela, adult male; the entire plumage black a little shining, the whole of the bill and the legs black, under wing-coverts along the ulna and on the edge of the shoulders black, the remainder brownish with some portions of the webs whitish, margins of the inner webs of the quills towards the base white. Length from the forehead 4·2 in.; bill from the forehead, 0·8, frcm nostril 0·55; wing 2·65; tail 1·9; tarsus 0·75.

This species was observed both on Ugi and St. Christoval, (*Morton.*)

47. Myzomela pulcherima, *Ramsay*.

Proc, Linn. Soc., N.S.W., VI., p. 179, (Feb. 1881.)

Numerous specimens, some having the *crimson of the belly and flanks* extending on to the *under tail-coverts*.

A young bird which probably belongs to this species may be thus described: "All the plumage of the body and head dull brown washed with brownish-red; on the forehead, sides of the head, throat, chest, back and upper tail-coverts the feathers are tipped with brighter red; tail and wings blackish-brown the outer webs of the feathers and of the scapulars margined with olive, wing-coverts above margined with brownish-red, under tail-coverts reddish-brown; under wing-coverts and inner margins of the quills towards the base white; bill blackish-brown, gape yellow, legs and feet lead-brown. Length from forehead 3·9 in., wing 2·4, tail 1·5, tarsus 0·7, bill from forehead 0·7.

Hab. Ugi, (*Richards, Morton, Stephens.*)

48. TEPHRAS (*Zosterops*) UGIENSIS, *Ramsay.*

Tephras olivacea, Ramsay, P. L. S., N.S.W., VI., p. 180, 1881.

I find in Gray's Handlist, Vol. I., p. 163, sp. 3153, that there is already a *Zosterops olivacea*, I have therefore to prevent any mistake changed the name as above.

49. DICÆUM ÆNEUM, *Homb. et Jacq.*

D. erythrothorax, Homb. et Jacq., Ramsay, Proc. Linn. Soc. of N.S.W., IV., p. 77, 78.

Hab. Gaudalcanar, (*Cockerell.*)

50. CINNYRIS FRENATA, *Mull.*

The following measurements of a male shot at Ugi by Morton may be useful. Length 4·2, wing 1·95, tail 1·5, tarsus 0·6, bill from forehead, 0·7.

Hab. Gaudalcanar, (*Cockerell*), Ugi, (*Morton, Richards.*)

51. CINNYRIS MELANOCEPHALUS, *Ramsay.*

C. dubia, Ramsay, Proc. Linn. Soc., N.S.W., IV., p. 83.

Hab. Savo, (*Cockerell.*)

ACCIPITRES.

52. PANDION LEUCOCEPHALUS, *Gould.*

Specimens attained at Mandeleana, common throughout the group.

Hab. Mandeleana, Florida Islands.

53. Haliaëtus leucogaster,

One specimen obtained in the brown mottled plumage of youth from the Island of Ugi, the small feathers along the margins of the ulna, are the first to show white markings; the feathers on the hind neck, interscapular region, and those from the chest downwards to the under tail-coverts, are tipped with very pale fawn colour.

Hab. Ugi, (*Morton.*)

54. Haliastur girrenera, *Vieill.*

Found throughout the group. For the sake of comparison, the following are the measurements of a pair obtained by Mr. Alex. Morton.

Sex..	♂		♀
Total length..	21 in.	..	21 in.
Wing	14·3	..	15·6
Tail	7·7	..	8·6
Tarsus	2·3	..	2·4
Mid toe (*s.u.*)	1·55	..	1·5
Hind toe (*s.u.*)	1 in.	..	1 in.
Bill from forehead	1·45	..	1·6
,, ,, nostril	0·9	..	1 in.
,, ,, gape	1·45	..	1·53
,, ,, culmen from posterior margin of the cere	1·55	..	1·8

55. Astur versicolor, *Ramsay.*

Proc. Linn. Soc., of N.S.W., VI., pp. 718 to 720, (1881.)

The types of the species were obtained by Morton on Ugi.

56. Astur albigularis, *Gray.*

Mr. John Stephens obtained a fine series of this species in various stages of plumage, the young show the same changes towards maturity as described in *A. versicolor.* A young bird as will be hereafter noticed, becoming white below. The specimen mentioned and figured by Mr. J. H. Gurney, Ibis, 1881, p. 259, is probably a female, but I have seen one specimen said to be a male, with white under surface and much smaller than the others.

A young bird (No. 10) is similar to the young of *A. versicolor* No. 3, but is very much smaller and is older than No. 2, having the crown, nape and a portion of the interscapular region already black, the throat is white and there are large patches of white on the breast, but the bars on the rufous feathers below are hastate or bracket-shaped, and narrower, much the same as those on the young *female* No. 3.; this bird is marked a male and if the determination is correct then there are two distinct species, and Nos. 1, 2, and 3, must retain the name of *A. versicolor.* Morton's notes state, that the eggs were well developed in No. 1, and Nos. 2, and 3; both females were shot together.

A. VERSICOLOR, *Ramsay*, Proc. Linn. Soc., N.S.W., p. 718, 1881.

	Total length (circa).	Wing.	Tail from oil-gland.	Tarsus.	Bill from tip to nostril.	Sex.
1. Adult slate-black, under surface of the wings and tail ashy-white at base, with remains of black bars.—"Ugi."	16·8	9·8	7·7	2·5	0·7	♀
2. Nearly adult, with broad bands across the under surface which is deep rufous, all the feathers margined with rufous above, tail with 15 bars, the last subterminal and broadest	15·65	9·2	7 in.	2·5	0·7	♀
3. A younger bird with hastate and sagittate black markings on the under surface, tail bars 16 to 18 narrower, and closer together	16 2	9·6	7·5	2·5	0·7	♀

A. ALBIGULARIS, *Gray*.	Total length (circa)	Wing.	Tail from oil-gland.	Tarsus.	Bill from tip to nostril.	Sex.
4. Adult, *black*, Ugi	16 in.	9·5	7·2	2·5	0·7	♂
5. Adult, *black*, ,, ...	15·3	9·5	7·4	2·55	0·7	♂
6. Adult, *black*, ,, ...	15·4	9·4	7·5	2·55	0·69	♂
7. Adult, *white below* ,, ...	15·3	9·6	7·5	2·65	0·7	♀
8. Adult, *white below* ,, ...	16 in.	9·6	7·5	2·55	0·7	♀
9. Adult, *white below* ,, ...	16 in.	9·7	7·4	2·5	0·7	♀
10. Young, with hastate bars on under surface, which is partly white and partly rufous, head and neck black above, chest and throat white, wings above and below like No. 3.	14 in.	8	6·3	2·2	0·6	♂ ?

57. ASTUR PULCHELLUS, *Ramsay*.

Journal of the Linnean Society, London, Zool., Dec., 1881.

This species so closely resembles the figure of *A. soloensis* in Sharpe's Catalogue, Vol. I., that at first I believed it to be identical. Professor Salvadori, however assures me that this cannot be the case, and Dr. Finsch who has examined the type believes it to be a good species. The bird is evidently very rare, only one other specimen having since been obtained, of which I give the following measurements :

Total length 15·5 ; wing 9·3 ; tail 8 in. ; tarsus 2·3 ; bill from forehead 1 in. ; from gape 1·05 ; the culmen from base of cere 1·2 "Sex female, bill and claws black, feet, legs, and cere, yellow." (*A.M.*) The *female* differs slightly from the male in plumage being darker on the head and throat, the thighs under tail- and under wing-coverts like the breast and abdomen. In the male these parts are almost white.

Hab. Cape Pitt, Gaudalcanar, (*Cockerell*), Florida Island, about ten miles inland, (*Morton.*)

58. Baza gurneyi, *Ramsay.*

Baza reinwardti, Ramsay, *l. c.*, p. 66.*

I have examined a large series of this fine hawk, but find no differences in the plumage among them. Morton has been fortunate enough to obtain several fine specimens from which I take the following measurements; in all the bill is black, cere lead color, legs brown:

Sex	♀	♀	?	♀	♂	♂
Total length	15 to 16	15 to 16	15	16	15·5	16·5
Wing	12·2	13	12·2	12·2	12	12
Tail	8·3	8·5	8	8	7·6	8
Tarsus..	1·45	1·45	1·4	1·45	1·45	1·5
Mid toe (*s.u.*)	1·5	1·5	1·5	1·5	1·5	1·5
Hind toe (*s.u.*)	0·9	0·85	0·85	0·33	0·85	0·9
Bill from forehead ..	1·3	1·25	1·2	1·2	1·2	1·2
Bill from nostril ..	0·9	0·85	0·83	1·8	0·8	0·9
Bill from gape	1·25	1·22	1·2	1·15	1·2	1·25
Bill along the culmen from base of cere ..	1·4	1·32	1·3	1·4	1·35	1·4

Hab. Ugi.

STRIGES.

59. Ninox punctulata, *Quoy et Gaim.*

With all due respect to so high an authority as Count Salvadori I cannot see why a Celebes bird should not be found on the Solomon Group, I have again compared my specimen with the description of *N. punctulata*, in Sharpe's Catalogue (Vol. I.) and it agrees better with that than any other. I have not met with other specimens since Cockerell brought his in 1879, from

* I regret to say that the specimen I first recorded from the Solomon Islands was a New Guinea bird, I did not discover the mistake until recently overhauling our Collections.

Gaudalcanar, but I have several specimens of *N. odiosa*, a near ally from New Britain.

Hab. Gaudalcanar, *Cockerell*).

60. Ninox tæniata, *Homb. et Jacq.*

Many of the species of this genus are so closely allied, that it requires very minute and careful descriptions to enable any one without actually seeing the types, to distinguish them.

One specimen of a small owl seen by Morton on Ugi may belong to this species.

PSITTACIDÆ.

61. Cacatua ducorpsii, *Homb. et Jacq.*

A very local species.

Hab. Savo. *(Cockerell).*

62. Cacatua goffini, *O. Finsch, die Papag. I., p.* 308.

Three specimens of a small white Cockatoo with a much larger crest than the preceding, appear to belong to this species.

Hab. Gaudalcanar, *(Morton).*

63. Eclectus polychlorus, *Scop.;* Ramsay, *l. c., p.* 69.

Common on most of the islands of the group.

Hab. Ugi, (*Morton*), Savo, (*Cockeacll*), St. Christoval, (*Stephens*)

64. Geoffroyus hecteroclitus, *Homb et Jacq.*
Ramsay, *l. c.*, p. 68.

Hab. Savo, (*Cockerell*), Ugi, *(Richards, Stephens)*, Malayta, *(Morton).*

65. Lorius chlorocercus, *Gould;* Ramsay, *l. c.* p. 68.

This species appears to be very plentiful on several of the Islands of the group.

Hab. Savo, (*Cockerell*), Ugi, St. Christoval, (*Stephens, Morton*).

C

66. Lorius cardinalis, *Homb. et Jacq.*; Ramsay, *l. c.*, p. 68.

Numerous specimens.

Hab. Savo, *(Cockerell)*, Ugi, St. Christoval, *(Richards, Stephens Morton).*

67. Trichoglossus massenæ, *Bp.*

Common throughout the group, it ranges from the S.E. coast of New Guinea throughout the South Pacific Islands to New Caledonia.

68. Charmosyna margarithæ, *Tristram, l. c., p.* 442, *pl.* xii., ♀.

Specimens of this beautiful species in Mr. Stephens' collection were obtained at "Wanna" on St. Christoval; the male differs from the female in having the sides of the rump crimson like the belly, in the female there is a patch of bright yellow on each side of the rump; the upper tail-coverts are green in both sexes. In all the specimens I have examined I find that the black of the occiput and narrow line bordering the yellow collar and chest band, has a *violet* tinge in certain lights. Across the breast, below the yellow band, is another of violet-black, much broader than the upper, and in some specimens joining the yellow breast band, in others it is separated by a narrow broken line of crimson. In immature birds the violet-black bands are very indistinct, and the under wing-coverts mixed with orange. The centre two tail feathers crimson tipped with orange-yellow, all the others are crimson in the centre, tipped with yellow, which increases in size towards the outermost, they have a broad margin of black on the inner webs extending to the base, and a narrow line of green on the outer webs reaching, on the outermost feather only to the base. Bill orange-red, legs and feet yellow.

Sex	♂	♀	
Total length ...	7·5	7·8	varying according to length of tail.
Wing...	4·2	4·15	

Sex	♂	♀	
Tail	3·4	3·6	varies from 3·4 to 4 in.
Tarsus	0·5	0·5	
Bill from nostril	0·6	3·53	
The culmen ...	0·65	0·61	

Hab. Makiri Harbour, St. Christoval, (*Richards, Stephens*).

69. Nasiterna finschii, *Ramsay.*

Proc. Linn. Soc., N.S.W., VI., p. 180.

The adult males have a line of blue feathers round the lower mandible and an orange-red stripe down the abdomen; the young, or what I believe to be the young of this species have a rosy tint round the lower mandible, each of the feathers having a rose spot on either side of the shaft. In the adults of both sexes, the blue round the lower mandible does not extend to the cheeks, but is confined to two or three rows of feathers only, but is more defined on the chin; the males alone as far as is at present known have the orange-red stripe on the abdomen.

It is not unlikely that the birds with the *rose tint* on the feathers *round the lower mandible* may belong to a *distinct species*, specimens lately received tend to prove this, in which case I propose to distinguish these birds under the name of *Nasiterna mortoni.*

COLUMBÆ.

70. Carpophaga brenchleyi, *Gray.*

Numerous at times, "found feeding in flocks on the fruit of a species of Ficus," (*Morton*).

The iris of a young one in confinement is of a rich red, almost blood red in certain lights; legs and feet *red.*

Hab. Ugi, (*Morton*), St. Christoval (*Stephens*).

71. Carpophaga pristinaria, *Bp.*

Ramsay, l. c., pp. 72, 73.

Equally plentiful with the last species, and found breeding during July, 1880.

Hab. Ugi, (*Morton*), Gaudalcanar, (*Cockerell*), St. Christoval (*Stephens*).

72. CARPOPHAGA (*Globicera*) RUFIGULA, *Salvadori.*

Ramsay, l. c., p. 72.

Apparently plentiful.

Hab. Ugi, (*Morton*), Savo, (*Cockerell*), Makiri Harbour, (*Richards*), St. Christoval, (*Stephens*).

73. TURACÆNA CRASSIROSTRIS, *Gould*, P.Z.S., 1856, p. 136-7.

Morton informs me that this fine species is not scarce on Ugi, and although it may readily be detected by its clear, rather mournful whistle-like note it is difficult to obtain ; it appears to be strictly a ground pigeon with habits resembling a Macropygia; it frequents the dense parts of the scrub, and when flushed takes to the low boughs of the nearest tree ; there is no difference in the plumage of the sexes, but the males have the crest a little more developed and frequently two or three of the longest feathers reach *three inches* in length, and are curved up at the ends, the feathers on the nape and hindpart of the head are more or less elongated, but on the whole the crest takes the form of that of *Ocyphaps lophotes.*

In the original description, no crest is mentioned and in the plate in the "Voyage of the Curaçoa" this ornament is not correctly figured. "The bare skin round the eye is of a rich carmine, the iris bright yellow, the bill reddish carmine, the legs deep flesh-red."—(*A.M.*)

Individuals vary in size, but a fully adult male of Morton's collecting reaches in total length 16 inches ; wing 8·1 in. ; tail 9 in. ; tarsus 1·05 ; mid toe (*s.u.*) 1·5, its nail 0·35 in. ; bill from forehead 1 in., from nostril 0·5, from gape 1·1; width of the tip in front 0·2.

Hab. Ugi and St. Christoval, (*Morton*).

74. MACROPYGIA RUFOCASTANEA, *Ramsay.*

Proc. Linn. Soc., of N.S.W., Vol. IV., p. 314, (*June*, 1879.)
Macropygia arossi, Tristram, *l. c.*, p. 443.
Macropygia sp. Ramsay, Proc. Linn. Soc., N.S.W., IV., p. 73.

I have met with this species in four collections, but it appears to be scarce or difficult to obtain.

Hab. Ugi, (*Morton*), Gaudalcanar, (*Cockerell*), St. Christoval, (*Stephens*, *Richards*).

75. CHALCOPHAPS MORTONI, *Ramsay.*

Proc. Linn. Soc. af N.S.W., VI., p. 725, (1881).
Chalcophaps chrysochlora, juv, Ramsay, *l. c.*, Vol. IV., p. 73.

I believe now, that certain young specimens which at different times I had determined as the young of *C. chrysochlora* of Gould were the immature birds of the present species, which may be distinguished by having no *white shoulder band;* when fully adult *C. mortoni* is a decidedly larger bird and has other differences as pointed out in my description. (*l. c.*)

I have only seen five adult specimens besides the type, one of which is in the Macleay Museum, and probably from Cockerell's collection.*

76. CHALCOPHAPS STEPHANI, *Homb. et Jacq.*

Hab. Gaudalcanar. ?

I am not quite sure as to the authenticity of this locality, having forgotten to give the authority in my note book.

* It is quite possible that the *Chalcophaps* I described as *C. chrysochlora* var *sandwichensis*, is the young of this species, and is not as some collectors have asserted it to be the young of *C. chrysochlora.*

77. CALLÆNAS NICOBARICA, *Linn.*

Hab. Ugi, (*Morton*).

78. IANTHÆNAS PHILIPPANÆ, *Ramsay.*

Proc. Linn. Soc., N.S.W., VI., p. 721, 1881.

Morton obtained this fine Pigeon on the Island of Ugi, and since I have observed several specimens in Mr. Stephen's collection, obtained both on Ugi and St. Christoval; in a recent letter from Mr. Stephens, he notes that some of his specimens have the throat alone white, and the legs of a dark red instead of yellow, these are doubtless the young of the present species.

Hab. Ugi, (*Morton, Stephens*).

79. PHLOGÆNAS JOHANNÆ, *Sclater.*

Tristram, l. c., p. 444.

Canon Tristram enumerates this bird in his "Notes on a collection of Birds from Solomon Islands and New Hebrides," but does not state from which of these Groups it came. In all probability it is not found in either, but was obtained at Blanche Bay, New Britain, from whence I saw several specimens in Lieutenant Richards' collection.

80. PTILOPUS SUPERBA, *Temm.*

Ramsay, l. c., p. 74.

Hab. Gaudalcanar, (*Cockerell*), Ugi, (*Morton*).

81. PTILOPUS EUGENÆ, *Gould.*

Ramsay, Journ. Linn. Soc., Lon., Zool., 1881, ♂; Proc. Linn. Soc., N.S.W., Vol. VI., p. 724.

Hab. Ugi, (*Richards, Morton, Stephens*).

82. PTILOPUS LEWISII, *Ramsay.*

Proc. Linn. Soc., N.S.W., VI., p. 724, (*Aug.* 1881.)

Ptilotis eugeniæ, ♀ Ramsay, Journ. Linn. Soc., Lon., Zool., 1881.
? *Ptilopus viridis* var., Ramsay, Proc. Linn. Soc., N.S.W., 1879, p. 73.

Hab. Ugi, Florida, and Malatta, (*Morton*), Ugi, (*Richards.*)

83. PTILOPUS RICHARDSII, *Ramsay.*

Proc. Linn. Soc., N.S.W., VI., p. 722, (*Aug.* 1881.)

Hab. Ugi, (*Morton, Richards.*)

84. PTILOPUS JOHANNIS, *Sclater.*

Ptilopus cerasseipectus, Tristram, *Ptilopus solomonensis*, Gray.

It is most probable that the *Ptilopus solomonensis* of Gray is the female of this species, the description certainly answers very well, but then it might equally well have been taken from the female of *P. rivolii*, or *P. strophium.*

Hab. Ugi, St. Christoval, (*Morton, Richards.*)

MEGAPODIDÆ.

85. MEGAPODIUS BRENCHLEYI, *G. R. Gray.*

Ramsay, l. c., p. 75 ; *Brazier*, Proc. Linn. Soc., N.S.W., Vol. VI. pt. 1, p. 150.

Hab. Savo, (*Cockerell*), Ugi, St. Christoval, (*Morton, Stephens.*)

RALLIDÆ.

86. HYPOTÆNIDIA AUSTRALIS,

Found throughout the group.

Hab. Ugi, St. Christoval, Florida, Gaudalcanar, (*Morton, Richards, Cockerell*)

HERODIONES.

87 NYCTICORAX MANILLENSIS, *Vigors.*

I have no doubt that this is the species referred to in Bonaparte's Conspectus Avium, II., p. 140, as a young of

Nycticorax manillensis, Vigors, (also see P.Z.S., Lond., 1831, p. 98, for the original description by Vigors), but I do not think it altogether agrees with *N. manillensis* of Mr. Vigors ; the black of the head and nape extends far down the neck almost on to the interscapular region in some specimens ; the white feathers from the occiput are tipped with black, and with rufous subterminally, these are preceded by a pair of elongated black feathers slightly decomposed at the ends, in form much the same as the rest of the occipital plumes but elongated beyond them, there is no superciliary stripe as is found in *N. caledonicus*, (Gm.) I have received the same species from New Britain and the Duke of York Islands, the young undergo the same changes in plumage as those of *N. caledonicus*, (Gmelin.)

An egg sent by Mr. Stephens from Ugi is of a pale bluish-green, and measures 2·1 in. x 1·45. The eggs of *N. caledonicus* taken at Port Stephens on Schnapper Island measure 2·1 x 1·55 and 2·1 x 1·47, and are of the same tint.

Hab. Ugi, St. Christoval, (*Morton*, *Stephens*.)

88. BUTOROIDES JAVANICA, *Horsf.*

One young specimen.

Hab. Savo, (*Cockerell.*)

89. BUTOROIDES STAGNATILIS, *Gould.*

One young specimen in Morton's collection.

Hab. Florida Island, (*Morton.*)

LIMICOLÆ.

90. ÆSACUS MAGNIROSTRIS, *Geoff.*

One specimen only.

Hab. Island of Mandeylana, (*Morton.*)

91. Actitis hypoleucos, *Linn.*

One specimen only, but the species is common on all the Islands of the Group and is found also on the S. E. Coast of New Guinea, the Louisades, Duke of York Group, and New Britain, &c.

Hab. Ugi, (*Stephens.*)

92. Totanus brevipes, *Cuv.*

Hab. St. Christoval, (*Stephens.*)

93. Limosa baueri, *Naum.*

Tristram, l. c., p. 444.

Canon Tristram records this species, of which I have no specimen before me, but examples from the Louisades which I examined some time ago, appeared to me to be the same as our Australian species, *Limosa uropygialis* of Gould.

ANATIDÆ.

94. Anas superciliosa.

Several specimens, but all much smaller than the Australian examples ; it is considered rare at the Solomon Islands, no other species was found there. Total length 18 inches ; wing, 8·3 ; tail 3·7 ; tarsus 1·4, mid toe (*s.u.*) 1·95 ; bill from forehead 1·9, width at tip 0·8, width at base above 0·6. length from the gape 0·8.

Hab. Ugi and St. Christoval, (*Richards*, *Morton*, *Stephens.)*

GAVIÆ.

95. Sterna gracilis, *Gould.*

Hab. Robinson Island, (*Morton.*)

96. Sterna burgeri, *Licht.*

Hab. Savo, (*Cockerell*).

97. Piletox flavirostris, *Brandt.*

Hab. Savo, (*Cockerell*).

98. Sula fusca, *Gould.*

Hab. Savo, (*Cockerell*).

99. Sula personata.

Hab. Savo (*Cockerell*).

100. Sula fiber, *Linn.*

Hab. Savo.

Since the foregoing was in print I have received an advance copy of a paper by Canon Tristram on a collection of Birds sent to England by Lieutenant Richards, nearly twelve months ago; from this collection Canon Tristram describes the following four species which may be added to our list, bringing the number of authentic species up to 104:

(101). Caprimulgus nobilis, *Tristram*, Ibis, pt. 1, p. 134, 1882.

Hab. Rendova Island, (*Richards*).

(102). Alcyone richardsii, Tristram, Ibis, 1882, p. 134.

Zosterops rendovæ, a name substituted for my *Tephras olivaceus* on the supposition that the genus will not hold good.

Piezorhynchus squamulatus, previously described by me as *P. melanocephalus*, see antea.

(103). Geoffroyus agrestis, *Tristram.*

This appears to be only the young of *G. cyaniceps.*

(104). Ardea sacra, *Gray.*

Hab. St. Christoval (*Richards*).

PTILOPUS RHODOSTICTUS, *Tristram.* Previously described by me under the name of *P. richardsi*, see antea.

Then follows a list of 98 species recorded from the Solomon Group, of these however the following 7 species must be thrown out : *Dicrurus megarhynchus, Centropus ater-albus, Nasiterna pusio, Lorius hypænochrous, Carpophaga finschii, Phlogænas johannæ, Chalcophaps chrysochlora.* All of which (except the last) are from New Ireland, New Britain, or the Duke of York Group. *Rallus intactus,* also, requires confirmation. Ornithologists may with advantage compare this paper with my list given in the foregoing pages where certain errors will be found corrected.

ON A NEW SPECIES OF *Mus* FROM THE ISLAND OF UGI, SOLOMON GROUP.

By E. P. RAMSAY, F.L.S., &c.

[Plate V.]

MUS SALAMONIS, *sp. nov.*

General colour of the fur, of a light ashy grey, somewhat grizzly, and pencilled with black, the base of the hair mouse colour, the tips almost white : long black hairs extending about half an inch beyond the fur, which is slightly harsh to the touch ; the tail bare, scaly ; the whiskers long, blackish ; the ears small, inside grey, on the outside covered with minute hairs.

Adult male, described from specimen preserved in alcohol.

Total length to tip of tail 17·3 ; length from snout to vent 8·5, from snout to centre of eye 1 in., from snout to base of ear 1·7 ; length of ear 0·5, breadth at base 0·3 ; from nostril to upper incisors 0·4 ; width of snout at point 0·2 : length of whiskers 2·5 reaching to the shoulders ; length of forearm and hand 2·3 ; width of hand 0·4, length 0 5 (without fingers) ; length of first finger 0·38, second 0·46, third 0·45, fourth 0·3 ; thumb (a horny tubercle) 0·05; hind foot and toes (*s.u.*) 1·75, breadth of foot between outer toes 0·55. Hallux 0·35; first toe (*s.u.*) 0·52, its nail 0·25; second toe 0·6, its nail 0·26; third toe 0·59, nail 0·25; fourth toe 0·5, nail 0·21.

Skull—Length 1·95, greatest breadth 0·7, the auditor bullæ are small, slightly rounded above, compressed laterally; the range of the three molars 0·4; the first 0·2, second 0·15, third 0·1; width of first molar 0·1, of the second 0·11; width of palate between the teeth 0·2; length of the anterior palatal foramina 0·2; width apart in the centre 0·11, from their hinder edge to the posterior palatal foramina 0·4, from the inner side of the incisors to tubercle in the angle of the posterior margin of the palate 0·9; there is a slight ridge extending down the palate between the foramina; length of zygoma 0·9, width of the arch 0·6; occipital foramen, height 0·31, width 0·3. Interorbital space flat, slightly elevated in a narrow ridge on the margin of the orbits.

Hab. Island of "Ugi," Solomon Group.

Explanation of Plate V.

Fig. 1.—Under surface of foot.
,, 2.—Upper surface of foot.
,, 3.—Skull from below.
,, 4.—Outside view of ramus of lower jaw.
,, 5.—Side view of skull.
,, 6.—Teeth of right lower jaw, (enlarged).
,, 7.—Teeth of right side of upper jaw, (enlarged).

The working surface of the teeth in the upper jaw shows a well defined central ridge fitting into a corresponding depression in the series of the lower jaw.

Contributions to Australian Oology.—Part I.

By E. P. Ramsay, F.L.S., &c.

[Plates II., III., IV.]

Finding, from numerous enquiries I have lately received from England and the Continent, respecting the Eggs of our Australian Birds, that *Oology* is becoming of greater interest among Ornithologists, I considered that descriptions of some of our Australian Birds' Eggs may prove of interest to Oologists at the antipodes. I have accordingly selected such as appear to me to be either altogether undescribed or imperfectly known, and beg to lay before the Society descriptions of 42 species ; many of these have been for years in the Dobroyde Collection, others are to be found in the Australian Museum and in the collections of the various gentlemen whose names are mentioned in connection therewith. I need scarcely state that no Eggs of doubtful authenticity have been described. Descriptions of some rare eggs of Australian Birds will be found in previous numbers of our Society's publications.

PICARIÆ.

1. Halcyon pyrrhopygia, *Gould*.

This species breeds in the Bourke and Cobar districts during October and November, it nests in hollow boughs of trees, but on one occasion Mr. James Ramsay took five eggs from the end of a tunnel in the bank of a recently made dam or tank ; these specimens, accompanied by a skin of the parent bird, were sent to me, and measure as follows ; 1·02 x 0·88 ; 1·02 x 0·88 ; 1·02 x 0·88 ; 1·02 x 0·78 ; 1·04 x 0·87 In. ; they are of a pure glossy white colour.—(*Mus. Dobr.*)

2. Dacelo Leachii.

Eggs four in number for a sitting, placed in a hollow bough or at the end of tunnels excavated in the nests of the Termites.

Colour of a pure pearly white. Length A. 1·72 x 1·3 in., *oval in shape;* B. 1·6 x 1·34 *rather round.*—(*Mus. Dobr.*)

3. Eurystomus pacificus, *Lath.*

I found this bird nesting in the hollow Eucalyptus boughs on the Richmond River in 1867; they make no nest but lay their eggs on the dust formed by decayed wood—not unfrequently they fight with, and dispossess the *Dacelo gigas*, and I have seen them take the young of this bird and throw them out of the nest. The eggs are two to three in number, of a dull white, rather glossy, and sometimes variable in form, some being oval and pointed, others almost round. Length (A.) 1·45 x 1·05, oblong; (B.) 1·34 x 1·1, roundish.—(*Mus. Dobr.*)

PASSERES.

4. Pomatostomus rubeculus, *Gould.*

Nest flask shaped, of thin sticks and twigs interwoven, lined with fine grasses, shreds of bark and sometimes a few feathers; it is placed at the end of some bushy branch, or among thick upright twigs; and is very similar to that of *P. temporalis*, as described by Mr. Gould (Handbk., I., p. 479). The eggs three to five in number, are of a yellowish brown tint, some with the ground colour of a somewhat saturnine hue, almost obscured by hair lines and veins of blackish sienna or of a blackish chocolate colour; they vary considerably in tint, some have fleecy cloud like markings and but few hair lines, some are pointed in form, others oblong with both ends almost equal. Length 1·05 x 0·75 inch, *oblong;* 1·07 x 0·74 inch, *pointed;* 1·02 x 0·7 inch, *rounded.* (*Mr. Barnard's Collection.*)

5. Pomatostomus ruficeps, *Gould.* Pl. 3, fig. 12.

Nest similar to the foregoing. Eggs a little smaller, five in number. In several the ground colour has a very faint tinge of green, the blackish hair lines are finer and closer together, in some nearly obscuring the ground colour, others have a pinkish chocolate tinge. Length 0·95 x 0·72.—(*Mus. Dobr.*, *J. R.*)

6. Pachycephala olivacea, *Vig. & Horsf.*

Eggs two or three in number, rather pointed at both ends, length 1·05 to 1·1 by 0·75 to 0·8 in breadth, colour white or very pale buff, with rather large spots of light brown, yellowish brown or blackish brown and roundish obsolete dots of pale lilac, sparingly scattered over the whole surface but closer together at the larger end.—(*From Mr. Campbell's Collection.*)

7. Pachycephala melanura, *Gould.*

The nest is a cup shaped, shallow, rather scanty structure of fine roots and twigs lined with rootlets and grass, &c., and through the bottom of which the eggs can be seen from below, it is about three to four inches in diameter by two deep. The eggs are three in number, of a pale buff, with irregular spots of dark umber sparingly scattered over the face, but forming a zone near the thicker end. Length, A. 0·85 x 0·64 in.; B. 0·84 x 0·62 in. (*Mr. Barnard's Coll.*)

8. Pteropodocys phasianella, *Gould.* Pl. 3, fig. 1.

The nest is very similar to that of *Graucalus melanops*, and placed in such like situations on horizontal boughs, it is composed of grasses and stalks of various herbs slightly interwoven and fastened together by spiders' webs, &c., and lined with finer grass &c., inside diameter four inches, the depth 1·4, the height of the rim above the branch on which it is placed is one inch. The eggs are three in number, oblong in form, the shell of a delicate thin texture, the ground colour pale asparagus green with a dull brownish patch of confluent markings at the thicker end, or with freckles of the same tint thinly distributed over the surface, and a few black irregular markings at the thick end. Length 1·3 x 0·95; 1·35 x 0·95; 1·33 x 0·92; 1·3 x 0·87; 1·35 x 0·88.

They are about the same size or a trifle smaller than the eggs of *Graucalus melanops* from the same district, but more elongated, of a brighter green and with fewer spots.—(*Mus. Dobr.*)

9. Myiagra concinna, *Gould.*

The nest is a neat cup-shaped structure of bark, and a few fine grasses neatly interwoven, and placed on a horizontal bough usually over a fork or junction of two branches, the whole is cemented together with cobweb and scales of lichens, &c. The eggs three in number, of a delicate bluish white when fresh, with a strongly defined band of spots, and dots of wood brown to sienna, or yellowish umber, here and there a dot of slaty blue appearing as if beneath the surface. Length A. 0·64 x 0·53 in. ; B. 0·65 x 0·52 in.—(*From Mr. Barnard's Collection.*)

10. Ephthianura tricolor, *Gould.*

The nest is of fine grass, lined with fine rootlets and a few hairs; it is cup-shaped, two inches in diameter inside and two inches deep, and was placed in a wind-bent tuft of coarse grass, the sides of the nest were hidden by the tops of grasses stuck in perpendicularly round the rim, hanging over it in some places, and forming a more secure frame work all round. The eggs were three in number of a pure white, with rich clear red dots sprinkled over the surface a little closer together at the thick end, but not forming a zone there. Length 0·63 x 0·5 ; 0·65 x 0·5 in. (*Mus. Dobr., J. R.*, 1880.)

11. Ephthianura aurifrons, *Gould.*

The nest similar to that of the last species; a round open cup-shaped structure made of fine twigs and grasses—the one before me has a feather of an Emu worked into the side, and is lined with fine grass—the inside diameter two inches, depth one inch, and was placed in a low bush. The Eggs white with small red dots, sometimes confined to the thicker end; length 0·7 x 0·52 in. ; 0·6 x 0·5.—(*From Bennett's Collection.*)

12. Malurus leuconotus, *Gould.*

The nest like that of all other members of the genus is a dome shaped, oblong structure of fine grass, ornamented and mixed with cobweb and wool, and lined inside with the cotton from the native "Cotton Bush," or the silky down from the seed pods of an *Asclepiad.* The length of the nest is 5·5 in. x 2·3, and was placed in a small tuft of coarse grass near the ground, others were found among the lower branches and grass at the base of "Cotton Bush" shrub. The eggs are three in number, pearly white with a zone of reddish spots on the thicker end, and a few dots of the same tint sprinkled over the rest of the surface. Length 0·6 x 0·45.

Hab. Bourke District (*Mus. Dobr., J. R.*)

13. Malurus leucopterus, *Quoy & Gaim.*

The nest is from the same district as the above mentioned and composed of the same materials and similarly placed; it is a little smaller and rather more loosely put together; the eggs are very similar, only a trifle smaller than those of *M. leuconotus*, and the zone of reddish spots not so distinct, they nevertheless vary considerably, some having the zone more defined, others which have no zone at all, are simply sprinkled all over the thicker end, with reddish brown or light red spots.—(*Mus. Dobr., J. R.*)

14. Pyrrholæmus brunneus, *Gould.* Pl. 3, fig. 8.

This is a remarkable species, and peculiar in the colour of its eggs, the nest is very similar to that of a *Malurus*, it is composed wholly of grasses loosely thrown together, without being interwoven more than is necessary to keep them in their place; the structure would hardly bear removal; the lining is of hair or fur of the "Rabbit-rat" *Lagorchestes*, it is five inches in diameter, by three and a quarter across outside, with no hood over the opening; the structure was placed on its side among the twigs of small shrub with grass growing through its branches near the ground and hidden by the grass. The eggs are of a dull olive brown, nearly of a uniform bronze tint, usually without markings, one specimen has an indistinct ring of minute dots on the larger end, where it forms a patch of a darker shade, the eggs are three to four in number; length 0·78 x 0·59 ; 0·78 x 0·58 ; 0·79 x 0·58.

Hab. Bourke District, Tyndarie—*(Mus. Dobr., J. R.)*

15. SPHENURA BRACHYPTERA, *Lath.* Pl. 3, fig. 13.

The nest is an oval dome-shaped structure, composed of grasses and debris, it is placed at the foot of some bushy shrub and concealed among the debris and grass which usually accumulates in such places. The eggs are three in number, the ground colour almost white, the whole surface thickly freckled with dots of blackish-brown and reddish-brown, with a few of a pale lilac tint here and there, some of the dots very minute others larger and roundish in shape, in one specimen they form a thick crowded patch on the thicker end, where some are confluent; the egg before me is oval, rather swollen, and the shell very thin; length 1·02 x 0·75, they breed during September to December.—(*Mus. Dobr.)*, (*from Mr. Ralph Hargrave's Collection*).

16. MENURA ALBERTI, *Gould.* Pl. 5, figs. 1 and 2.

I have lately seen a fine specimen of this rare egg in the Macleay Museum, and another in the Australian Museum Collection, are all I have met with during the last twenty years ; the egg is oval, almost equal at both ends, the ground colour is of a rich purple-brown, the thicker end of the egg is blotched with large irregular markings of purplish-brown, very dark and almost forming a zone, the remainder of the surface is marked with irregularly shaped spots of the same tint, a few of them inclining to linear, others almost rounded ; length 2·23 x 1·7 in.

The specimen in the Macleayan Museum is figured on Pl. 5, fig. 2, natural size. The ground colour was a purplish-stone colour, but has faded to light slate colour, the markings are irregular of a dark purplish-brown and sprinkled sparingly over the surface.

17. Menura victoriæ, *Gould.* Pl. 4, figs. 1 to 4.

For a description of the egg of *Menura superba* and notes of the species see P.Z.S., 1868, p. 49; [Pl. 5, fig. 3.]

The eggs of all three species bear a marked resemblance to one another, although they vary considerably *inter se.*

Menura victoriæ, var. A.—Ground colour olive brown, of a rather light tint, with spots of blackish brown and purple brown, some confluent, others solitary, rather crowded on the top of the thicker end, there are also a few obsolete spots of a lilac tint; length 2·37 x 1·65. (Fig. 1.)

Var. B.—Ground colour purplish stone-colour, or dark brownish-purple, with obsolete spots and irregular markings of a blackish tint, crowded towards the thick end, and forming a dark patch at the top where they overlap, some of the spots on the body of the egg, elongate and interspersed among freckles of the same blackish tint; length 2·41 x 1·73. (Fig. 2.)

18. Climacteris leucophæa, *Lath.*

This species of *Climacteris*, nests like all of the other members of the genus, in hollow limbs of trees often at a great distance from the ground, but occasionally low enough to admit of being taken. On two occasions only have I seen the egg of this bird during the last twenty years, once in 1860 when a single specimen was obtained after considerable difficulty by my friend Ralph Hargrave Esq., at Macquarie fields; and more recently a pair in the Collection of Dr. Lucas, taken July 10th, 1880, have been brought under my notice. The only nest, is a small bed of dry grass placed on the decayed wood found in the hollow trunks or boughs of the aged Eucalypti, the eggs are two to three in number, white, with almost round reddish spots, sprinkled over the surface, and with specks and dots of the same tint, here and there ; the markings are rather closer together on the thick end. Length 0·9 x 0·67 in.

MELIPHAGIDÆ.

19. Philemon sordidus, *Gould.* Pl. 3, fig. 16.

The nest of this species is very similar to that of the members of the genus *Tropidorhynchus*, a cup-shaped structure of bark and grass, slung by the rim between forks of the twigs at the end of some horizontal or drooping bough. It is about half the size of that of *Tropidorhynchus corniculatus*, and equal to that of *Philemon citreogularis* of which this species is but a northern variety. The eggs are two to three in number, of a rich salmon red, spotted with a darker tint, some of the spots fleecy, confluent, and distributed alike all over the surface of the shell, rather closer near the thicker end but not forming a zone there ; in A. a few are confluent on the thick end forming a blotch on the top of the egg. In B. the spots are more scattered and obsolete markings of pale lilac are dispersed here and there over the surface. Length A. 1·04 x 0·7 in. ; B. 1·05 x 0·75 in.—(*From Mr. Barnard's Coll.*)

20. Myzantha flavigula, *Gould.*

The nest is a neat round structure of fine twigs occasionally ornamented with wool and the egg bags of spiders &c., giving the outside a beautiful white appearance ; the inside is lined with hair of different kinds and wool, the inside diameter is three inches, the depth two and a quarter inches ; it is usually placed among the branches of trees and shrubs frequently near the ground. The eggs are four to five for a sitting, of a rich salmon colour with dark salmon red spot and dots all over the surface of the shell, but larger and closer on the thicker end. Length 1·02 x 0·75 in. ; 1·02 x 0·76 in. ; 1·02 x 0·75 in. ; 1 in. x 0·75 in. (*Mus. Dobr., J. R.)*

PSITTACI.

21. Eolophus roseicapilla, *Vieiell.*

Like all the members of this section the Rose Cockatoo nests in the hollow branches of large trees, laying its eggs on the debris of decaying wood usually found in such places, they are three to five in number, white, rather oblong in form, and slightly granular; length A. 1·4 x 1·05; B. 1·4 x 1·04.—(*Mus. Dobr.*)

22. Platycercus pallidiceps, *Gould.*

The eggs of the Moreton Bay Rosella are from three to five in number, white, round or oblong-oval in shape; length from 1 in. to 1·06 by from 0·88 to 0·9 inch, they are laid in the hollow boughs of trees during the months of August to December.

ACCIPITRES.

23. Milvus isurus, *Gould.* Pl. 5, fig. 4.

Nest, of sticks and twigs rather loosely constructed, and lined with a few Eucalyptus leaves, placed in a fork of some of the higher branches of the trees, or in the interior where the trees are stunted and low, in any suitable branch that will bear its weight. Eggs two to three in number, the ground colour white, on the thicker end are blotches, smudges and scattered irregular spots of reddish brown or rusty red, with minute dots here and there sprinkled over the surface, frequently one egg in a set is blotched at the thin end, some are more heavily and more deeply marked than others, one specimen is covered (more numerously at the thin end) with irregular freckles only, in many places superimposed; length A. 2·03 x 1·57; B. 1·97 x 1·76; C. 2·06 x 1·67 in.—(*Mus. Dobr.*)

24. Accipiter cirrhocephalus, *Vieill.*

The nest is a scanty structure of a few sticks generally placed crosswise over a thick horrizontal bough, where a few twigs spring to support it, and is lined with a few leaves. Being often at a considerable distance from the ground and far out on the boughs it is difficult to get at. The eggs are usually three for a sitting, sometimes only two, and are the smallest of any of our Australian Hawk's eggs. The ground colour is greenish white, with smears and specks of yellowish buff, with here and there an irregular shaped spot of the same tint. Length A. 1·74 x 1·43; B. 1·8 x 1·42 inches.—(*Mus. Dobr.*)

COLUMBÆ.

25. GEOPELIA TRANQUILLA, *Gould.*

The nest like that of all the members of this family, is a frail scanty structure of a few sticks and twigs placed usually near the end of a bushy bough, or top of a broken off thick limb. They are slightly larger than those of *G. cuneata,* oval in form and of a pure white colour. Length 0·8 x 0·6; 0·78 x 0·58.—(*Mus. Dobr.*)

26. GEOPELIA CUNEATA, *Lath.*

The nest similar to that of the last species, Mr. John S. Ramsay found this bird breeding in numbers at Cardington Station on the Bell River, the nests were placed on the flattened top of the vine-stakes in the vineyord, the birds were remarkably tame, and would allow themselves to be almost taken with the hand. The eggs were invariably two in number, oval, pure white length 0·7 x 0·55, they breed during September and the two months following.—(*Dobr. Mus.*)

HERODIONES.

27. PLATALEA FLAVIPES, *Gould.*

The Australian Museum is indebted to Mr. K. H. Bennett for a fine pair of the eggs of this Spoonbill; they are rather limey, long and pointed in shape, and minutely pitted all over the surface of the shell. The colour is of a bluish white, with here and there a spot or smear of pale buff.—(*Aust. Mus., Syd.)*

I have also had an opportunity of examining three other eggs of this species in Mr. Whittell's Collection, which do not differ from those sent by Mr. Bennett. Lengths 2·7 x 1·85 ; 2·73 x 1·85 ; 3·05 x 1·8. "The nest is rather a loose structure placed on branches of trees overhanging the borders of swamps and lagoons but sometimes placed on the ground by a tussock of grass or herbage."—(*Whittell.)*

28. Nycticorax caledonicus, *Lath.*

The nest is a loose structure of a few sticks placed crosswise over forks on the branches of trees overhanging creeks, &c. ; the specimens under consideration were taken by Mr. Alex. Morton, from some low bushes on Schnapper Island, near Port Stephens, they are two in number of a pale bluish green, in length 2·1 x 1·55, and 1·47 inch in breadth.

29. Botaurus australis, *Cuv.*

Nest made of sedges and herbage, placed like that of a Water Hen's, near the ground on the margins of swamps and lagoons, &c. The eggs in this instance were two in number of a very pale olive brown without spots or markings ; length 2·1 x 1·5 inch.—(*From Mr. Campbell's Collection*).

30. Butoroides flavicollis, *Lath.*

The nest is a slight structure of sticks placed in a horizontal branch over the water. Eggs three to four, they are white with a very faint tint of greenish inside. Length 1·88 x 1·38 ; 1·72 x 1·35 ; 1·8 x 1·33.

I expected to find these eggs something similar to those of the next species, *B. macrorhyncha*, taken by my brothers at Dobroyde in 1860-1-2, but Mr. Barnard assures me there can be no mistake about them, and sent me a skin of the bird.—(*Mr. Barnard's Col.*)

31. BUTOROIDES MACRORHYNCHA, *Gould.*

Nest, of a few sticks placed on the boughs of a Mangrove on the Parramatta River. Eggs two and three in number, of a pale bluish green ; length 1·65 to 1·75 x 1·2 inch.—(*Dobr. Mus.*)

FULICARIÆ.

(RALLIDÆ).

32. TRIBONYX VENTRALIS, *Gould.* Pl. 3, fig. 5.

Mr. Gould has I think described the eggs of some other water fowl, probably those of *G. tenebrosa*, under this name ; they are certainly not those of the present bird, which are very distinct ; the nest is like that of a *Gallinula* and similarly placed. They breed in October and the two following months, also in January and February. When the back country is flooded these birds literally overrun it and breed at almost any time of the year, the eggs are four to 5 in number of a pale greenish tint with roundish spots of light reddish brown sprinkled all over the surface. Length 1·85 x 1·28 ; 1·85 x 1·3 ; 1·76 x 1·27 ; 1·7 x 1·15 ; 1·88 x 1·3 inch. These eggs are of an oblong pointed form, those of *Gallinula* are more rounded and swollen as described below.—(*From Mr. Whittell's Collection.*)

33. GALLINULA TENEBROSA, *Gould.*

Eggs white or cream colour rather rounded in form, spotted with light reddish spots thicker on the larger end sparingly dispersed over the rest of the surface. 1·55 to 16 x 1·2.—(*Mus. Dobr.*)

34. PORZANA PALUSTRIS, *Gould.* Pl. 3, fig. 14.

The nest is an irregular loose structure of dry grass and weeds &c., rather scanty, placed on the ground among the grass and reeds in the vicinity of water, they are plentiful on the margins of lagoons in the neighbourhood of Lake George, I also found them breeding during October to January on the Clarence River near Grafton; the eggs are three in number of a uniform dark olive brown, average length 1·07 x 0·81.—(*Mus. Dobr.*)

LIMICOLÆ.

35. Scolopax australis, *Lath.* Pl. 3, fig. 15.

Ground colour of the eggs are cream white, almost completely hidden by irregular broad lines of black wound round the thicker end and extending longitudinally towards the thin end, the lines are curved and twisted forming loops and blotches. The nest was placed on the margin of a swamp. Length A. 1·4 x 1·1 in.; B. 1·4 x 1·0 in.; C. 1·43 x 1·02.—(*From Mr. Whittell's Coll.*)

36. Ægialitis monacha, *Geoff.*

The eggs are four in number, placed with the thin end pointing inwards, in a slight depression in the shingle on the sea coast, they are pale stone colour or light creamy white, some almost white with dots of black and brownish black, some of which are obsolete or appear beneath the surface of the shell, some of the black dots confluent forming irregular markings of various shapes. The birds are said to breed plentifully in the neighbourhood of Georgetown and on various Islands in Bass Straits. Length 1·4 x 1·05.—(*From Dr. Lucas' Coll.*)

37. Cladorhynchus pectoralis, *Dubus.*

The eggs are four in number for a sitting placed in a scanty nest of a few dry reeds and water-grasses; the ground colour varies from an olive brown to creamy brown irregularly spotted and blotched with black, in shape oval but slightly pointed. Length 1·9 x 1·4; 1·88 x 1·3.—(*From Mr. Whittell's Coll.*)

38. Spatula rhynchotis, *Lath.*

An egg from a set of six taken on Phillip Island, in October, 1880, measures 2·35 x 1·55, and this appears to be an average sized specimen, the colour is of a creamy white with a shade of a very pale greenish tint.—(*Mus. Dobr.*)

Some eggs taken by Mr. Whittell vary much in size. Length (1.)2·1 x 1·55; (2.) 2·2 x 1·63; (3.) 2·25 x 1·55; (4.) 2·15 x 1·53. (*From Mr. Campbell and Mr. Whittell's Collections.*)

39. Malacorhynchus membranaceus, *Lath.*

For a member of the *Anatidæ*, this bird certainly selects the most unique spots imaginable in which to make its nests. The first instance was brought under my notice by Mr. K. H. Bennett of Yandenbah, a most enterprising naturalist, to whom the Australian Museum is indebted for several rare specimens. Mr. Bennett informs me having occasion to visit a nest of the White Fronted Heron, *Ardea novæ-hollandiæ*, he was surprised to find it much altered in appearance, and from the mass of down which covered the whole of the upper part of the Heron's nest, the duck flew off, leaving two eggs, which with the nest have been transmitted to the Museum; the eggs unfortunately were broken in transit, this deficiency however, is supplied by specimens taken by Mr. Whittell from a similar mass of dark slatey grey down, which was placed on a flattened portion of a thick horizontal bough about ten feet from the ground, overhanging the water, on the bank of the Darling River near Wilcannia; in this instance the eggs were six in number of a rich light cream colour, rather pointed ovals. Length 1·85 x 1·3 in.; 1·82 x 1·3 in.

The beautiful structure above mentioned, sent by Mr. Bennett consisted of the platform of sticks which formed the nest of the Heron being thickly covered with down which formed a rim four inches in height, a large quantity of down was worked in among the sticks and covered the greater part of the sides, it closed over the eggs above in an elastic mass quite hiding them.—(*From Mr. K. H. Bennett's Coll.*)

40. Casarca tadornoides, *Jard.*

Mr. Whittell informs me that he found the nest of this species placed on the ground behind a mass of Polygonum bushes, it was made of grass and debris with a few sticks; the eggs were eight in number and covered over with the lining of the nest (grass). The colour is of a light cream, dull white, or whity-brown, rough to the touch, oval, in length 2·7 in. x 1·92 inch in short diameter. I have never taken the eggs of this bird myself but Mr. Faithful informed me of a nest similarly placed on the banks of a creek near his residence near Goulburn.—(*Mr. Whittell's Coll.*)

41. Nyroca australis, *Gould.*

On the authority of Mr. Whittell who is well acquainted with this bird, and seems to have no doubt as to the authenticity of the eggs in question, I give the following description:—The eggs are large for the size of the bird, have a glossy look and feel greasy to the touch, they are of a light cream colour, rather oval, swollen, both ends nearly alike; in length A. 2·52 x 1·88 in.; B. 2·5 x 1·8 in.—(*Mr. Whittell's Coll.*)

GAVIÆ.

42. Sterna nereis, (*Gould.*)

Eggs slightly pyriform, length (A.) 1·39 to (B.) 1·43; breadth (A. and B.) 1·02. The colour is of a light yellowish brown stone colour, or creamy buff; one (A.) thickly sprinkled all over with black dots and irregular shaped spots, the other (B.) has large black blotches on the thicker end. These eggs were sent as those of the "minute tern" from Tasmania, where the bird is common. (*From Mr. Campbell's Coll.*)

Notes on a Cruise to the Solomon Islands.

By Alex. Morton, Assistant Taxidermist, Australian Museum, Sydney.

Having recently returned from a collecting trip to the Solomon Islands it has been suggested to me that a short account of my tour might be of interest to the Society.

Our naval authorities having thought it expedient to investigate the cause of some recent murders committed there, H.M.S. Cormorant was despatched on the service, and an opportunity being afforded the Trustees of the Museum of sending a Collector, I left in the "Cormorant" on the 16th of April 1881, and arrived at the Solomons on the 26th. Crossing a narrow strait between the islands of St. Christoval and Ugi we anchored near the latter in a well sheltered roadstead. On the afternoon of the same day we landed and were hospitably received by Mr. John Stephens, after which we set out for a small native village situated on the shores of the Bay, about a mile from Stephen's homestead. Our route lay through extensive groves of Cocoanut trees, thickly interspersed with various kinds of Palms among which I recognised two species of Betle Nut, an Areca, and a Ptychosperma besides the Ivory Nut Palm common throughout the South Seas; a very large and beautiful species of Ficus was abundant on the trunk and larger stems on which grew great quantities of fruit; a large species of a very beautiful Tree Fern was plentiful. In the gorges and on the hill sides several species of Lycopodiums and mosses completely covered the ground with a dense undergrowth.

On arriving at the village we found it to consist of about thirty houses, almost uniform in size and design; they were constructed for the most part of split bamboos, and neatly thatched with the leaves of the Cocoanut and Ivory Palms.

While here we noticed that the greater number of the children differed strongly in many typical characters from the majority of the adults, this anomaly we afterwards ascertained was due to the strange custom of many of the inhabitants of Ugi, who in order to avoid the trouble of rearing their own offspring, usually destroy them at birth without respect to sex; preferring to adopt at a more mature age, the purchased children of another tribe, inhabiting the neighbouring Island. Even on the death of their Chief or head-man, in place of electing a successor from among his own kindred or people, a youth thus obtained is frequently chosen and invested with the name, honors, privileges and power of the deceased, the last named attribute being, except on the occasion of some great feast or in time of war, merely nominal.

Polygamy is sanctioned, but is not very prevalent, the men as a rule, finding that they have quite enough to do to maintain one family. Yams, Taro, Sweet Potatoes, Bananas, and other tropical fruits and vegetables are carefully cultivated in neatly fenced enclosures of from two to five acres in extent throughout the whole of the Group. Pigs are highly prized and cared for, the Ugi women having been known to suckle the young ones.

A miserable lot of half-starved and mangy dogs are to be found in all the villages, and are much esteemed by their savage masters. As far as we could understand any form of religion is decidedly at a discount among the Solomon Islanders, vague ideas as to the existence of evil spirits or devils being the only definite form it assumed, and among the animated objects that are regarded as supernatural are Fire Flies. Cannibalism is still practised but only the flesh of enemies, slain either by themselves or some friendly tribe, is eaten.

I must not forget to mention a very beautiful species of dwarf Cocoanut Palm which I noticed planted on a low mound and held in great reverence, it was surrounded with Crotons, and Dracænas, and the mound on which it was growing was ornamented with Coral boulders and large shells ; the nuts were small, about four inches in diameter and the leaves were remarkable for their beautiful golden yellow tinge.

Sexual morality is certainly at a low ebb among these people, and promiscuous intercourse with the unmarried females is permitted ; once married however a woman is obliged to lead a chaste and virtuous life, however loose her conduct might have been previously ; so strict is this law that the penalty of death is often inflicted on those committing adultery. An instance of this occurred while we were cruising among these islands, a woman who had been previously caught, detected, and cautioned, having again been found in the act, was beheaded on the beach; the execution being witnessed by the Captain and crew of one of the trading schooners.

A peculiar and perhaps unique custom in connection with their marriage is worth relating; the bride being taken on trial for "one Yam," (a term corresponding with our year), and at the end of this period if she has given satisfaction to her husband, he pays whatever was agreed upon to her father or guardian, if not, as in several instances pointed out to us, the marriage is not consummated and the girl returns to her parents. Syphilis in a more or less virulent form is very prevalent in both sexes, but they appear to have no idea of curing or in any way mitigating this wretched disease. Honesty is one of the few virtues that can be placed to the credit of these savages, petty theft being of rare occurrence; this was exemplified by the careless manner in which articles of value were left about the Traders' dwelling.

Besides the produce of their gardens and plantations, their food consists principally of fish and several kinds of Mollusks that abound on the coral reefs surrounding the islands. Feasts are of frequent occurrence and often occasion serious disturbances. But not the least peculiar of their customs, is their method of disposing of their dead; the corpses of people of no rank or importance are simply wrapped in grass mats with heavy stones at their feet and buried; but the remains of a chief, or any one of note is placed on a platform erected for that purpose in the woods; two men being appointed to attend to it every day, washing it down until the bones are quite clean; the skull is then taken and hung up in the house of one of the deceased's relatives or friends, and the rest of the skeleton buried.

Grotesque, and rudely carved figures representing men, birds, fishes, and reptiles embellish the door posts and other heavy timbers of their dwellings. *The Tabu* house of a village I visited contained a curious colossal sarcophagus—an immense log carved in the form of a shark—and held the bones of a young and favourite chief, to whose spirit the natives offered every season the first fruits of the soil.

Their rude stone tomahawks have long been thrown aside for the Traders' axes; two forms seem to have been employed, one an elongated cone, flattened towards the base with a rounded cutting edge, and bevelled on one side only, as in an adze, in which manner it seems to have been principally used; the other also somewhat cone shaped, but spreading out wider and more flattened on the cutting edge, which is ground on both sides, as in an ordinary axe or tomahawk. Not less completely have firearms superseded the bow and spear as weapons of war, nearly every Solomon Islander possessing some description of gun, and occasionally breech loading rifles of modern kinds; as they are expert marksmen, the possession of such weapons renders them formidable opponents.

After remaining at Ugi for two or three weeks, we sailed for the Floridas, another portion of the Solomon Group, one of which was the scene of the massacre of the late Lieut. Bower of H.M.S. Sandfly and his boats' crew. Having under threats enforced the assistance of the native chiefs in securing three of the principal men implicated in this affair, they were summarily executed, two being shot, and the third hanged in the presence of a large number of their tribe. The "Cormorant" then returned to Ugi and finding that by remaining here I should have more opportunities of collecting, I took up my quarters on shore with Mr. Stephens, where I remained until the return of the Cormorant from her cruise among the Islands.

During my stay here I succeeded in obtaining a fair collection of Birds, several of them being new to science, have since been described by the Curator of the Museum; among these novelties is a very beautiful Pigeon—*Ianthenas philippanæ;* a fruit dove—*Ptilopus lewisii ;* a small ground pigeon which has been named—*Chalcophaps mortonii ;* a hawk—*Astur versicolor ;* a starling—*Sturnoides minor ;* and a king-fisher—*Halcyon salomonis.* This branch of my collection contained 200 specimens representing 50 species, among which were also many rare kinds not hitherto represented in the Museum.

Mammals were very scarce, an opossum—*Cuscus orientalis*, the species common throughout the islands, and a Rat, an undescribed species of *Mus*, being the only species obtained.

Fishes were plentiful, both fresh and salt water kinds, of the former I obtained about 20 species. Of fresh water Crustacea I only obtained two species. The reptiles collected consist of a common species of Python, one species of tree snake *Dendrophis*, one venomous species, and a few Lizards common to all the Islands.

Land shells were numerous ; I found in all 28 species, several of them being rare kinds, which determined the localities of some that were of doubtful origin. Fresh water shells were not plentiful, but I succeeded in getting over 20 species, chiefly on Ugi. Ethnological specimens were the most difficult to obtain, a few stone Tomahawks similar to those described being all that I procured worth mentioning. I secured however, an interesting series of human skulls, and the head of a native from the Lord Howe's Group in spirits.

On the return of the Cormorant, provisions and coal being short, we sailed direct for Noumea, New Caledonia, and arrived safely after a short and pleasant passage. On arriving Captain Bruce unexpectedly determined to return to the Solomons, there to meet H.M.S. Miranda, before proceeding to Sydney. So after a few day's residence in the French colony I returned to Sydney in the s. s. City of Melbourne with my collections.

NOTES AND EXHIBITS.

Dr. Cox exhibited the club of a chief of Malanta Island, Solomon Group, the handle beautifully inlaid with 'mother of pearl,' at one end a stone encased by being worked over with fibre and at the distal end a conventional representation of a human boot.

Mr. E. P. Ramsay, F.L.S., exhibited drawings of the dentition, skull, and feet of the new rat, (*Mus salamonis*), described in his paper; also, the egg of the Victorian Lyre Bird, (*Menura victoriæ*, Gould) from Port Phillip: drawings of a new species of Bat *Taphozous sp.*? from New South Wales, and a sketch of a restored jaw of *Thylacoleo carnifex*, Owen.

Mr. Alex. Morton exhibited the following very choice and rare Birds from the Solomon Islands:—*Chalcohaps mortoni*, Ramsay; *Ianthena philippeanæ*, Ramsay; *Astur versicolor*, Ramsay; *Astur albigularis*, Grey; *Ptilopus richardsi*, Ramsay; *Ptilopus lewisii*, Ramsay; *Ptilopus eugeniæ*, Gould; *Sturnoides minor*, Ramsay; *Trichoglossus margarettæ*, Tristram; *Myzomela sp.*?; *Myzomela tristrami*, Ramsay.

WEDNESDAY, 22ND FEBRUARY, 1882.

The President Dr. James C. Cox, F.L.S., in the Chair.

Mr. H. Tryon, from New Zealand, and Mr. A. G. Ralston, B.A., were introduced as visitors.

MEMBERS ELECTED.

Dr. P. H. MacGillivray, of Victoria; Dr. Ewan, Wynyard Square; Mr. J. F. Bailey, Swanston Street, Melbourne.

DONATIONS.

Description of some remains of the Gigantic Land Lizard (*Megalania prisca*, Owen) of Australia, parts II. and III., by Prof. Owen, C.B.

From the Government of Western Australia—Report on the Forest Resources of Western Australia, by Baron Ferd. Von. Mueller, K.C.M.G.; Lecture on Injurious Insects, by Miss Eleanor A. Ormerod, F.M.S.

From Prof. Ralph Tate, of Adelaide, South Australia, the following papers:—On the Australian Tertiary Palliobranchs; Anniversary Address to the Royal Society of South Australia; the Geology about Port Wakefield; Supplement to a Census of the Indigenous Flowering Plants and Ferns, 1881; on the Geographical relations of the Pulmoniferus mollusca of Victoria; descriptions of some new species of South Australian Pulmonifera; description of a new species of Belemnite. from the mesozoic strata in Central Australia.

From the Royal Microscopical Society—the Journal for December, 1881.

Southern Science Record, January, 1882, Vol. II., No. 1.

PAPERS READ.

Note on Fossarina petterdi, Brazier.

By F. W. Hutton, Hon. Mem. Roy. Soc. Tas.

Some time ago I received from Mr. Petterd, among other Tasmanian shells, several specimens labelled *Fossarina petterdi*, One of these contained the animal, and I extracted it and examined its dentition with the view of comparing it with my *Fossarina varius*. I found that the Tasmanian animal has a multispiral horny operculum, and the characteristic dentition of the *Trochidæ* much like *Cantharidus*. It is therefore not a *Fossarina* (a genus made I believe by Adams and Angas for some true *Littorinidæ*) but may perhaps belong to *Adeorbis*, the operculum of which does not seem to be known. I should like to examine the other species of *Fossarina*.

LIST OF THE FRESHWATER SHELLS OF NEW ZEALNAD.

BY PROFESSOR F. W. HUTTON, HON. MEM. ROY. SOC., TAS.

In my Manual of the New Zealand Mollusca, (1880) I have collected together the names and descriptions of all the fresh water shells said to occur in New Zealand; I have made no attempt in it either to revise the nomenclature, or to eliminate species probably put down to New Zealand in error; but it seems to me that I might now attempt to give, what I believe to be a true list of our fresh-water shells as at present known, as a supplement to the Check List of Australian Fresh-water Shells by Messrs Tate and Brazier, published in Vol. VI., p. 552 of our Proceedings.

Aplexa antipoda, *Sowerby*, in Reeve's Conch. Icon. Physa, fig. 37.

Aplexa tabulata, *Gould*, Pro. Bost. Soc. Nat. Hist. 1848, p. 214.

Aplexa variabilis, *Gray*, in Dieffenbach's Travels in N.Z., vol. ii., p. 248, (1843).=*P. gibbosa*, Sow., fig. 27, (not of Gould) =*P. guyonensis*, T.-Woods, P.L.S. of N.S.W., iii., p. 138,=*P. hochstetteri*, Dunker. Described (?)

Aplexa mœsta, *Adams*, P.Z.S., 1861, p. 144. Conch. Icon. f. 32.

Planorbis corinna, *Gray*, P.Z.S., 1849, p. 167.

Latia neritoides, *Gray*, P.Z.S., 1849, p. 168=*L. lateralis*, Gould.

Melanopsis trifasciata, *Gray*, in Dieffenbach's Travels in N.Z., ii., p. 263 (1843). Voy. Ereb. and Terror, Moll. pl. 1, f. 18-22.=*M. Zealandica*, Gould, (1848), P.B.S., N.H., p. 225.=*M. strangei*, Reeve, Conch. Icon. f. 3.=*M. ovata*, Dunker, Mal. Blatt. 1861, vii., p. 150.

Hydrobia (Potamopyrgus) cumingiana, *Fischer*, Journ. de Conch. 1860, p. 208. Hutton, Trans. N.Z., Inst., Vol. 14.= *Melania corolla*, Reeve, fig. 366 (not of Gould.)

Hydrobia (Potamopyrgus) corolla, *Gould*, (Melania) Pro. Bost. Soc. of Nat. Hist., 1847. *Stimpson* in Smithsonian Miscellaneous Collections, vii., No. 201, p. 49. Hutton, Trans. N. Z. Inst., vol. xiv., (1881).=*A. badia*, Gould, Pro. Bast. Soc., Nat. Hist. 1848.=*H. fisheri*, Dunker, Mal. Blatt., 1861, p. 152.=*H. reevei*, Frauenfeld, Abh. Zool. Bot. Ges. Wien., 1862, p. 1024.

Hydrobia (Potamopyrgus) antipodum, *Gray*, in Dief. Travels in N.Z. ii., p. 241, (1843).=*A. zealandiæ*, Gray, l. c., p. 241. =*A. egena*, Gould, Pro. Bost. Soc., iii. (1841), p. 75.= *A. gracilis*, Gould, Am. Exp. Exp. (1852), p. 127.=(?) *H. splæa*, Frauenfeld, l. c. (1863) p. 1022.

Hydrobia (Potamopyrgus) pupoides, *Hutton*, Trans. N. Z. Inst., vol. xiv. (1881), p. (Brackish water.)

Pisidium lenticula, *Dunker*, Mal. Blatt., viii. (1861), p. 153. (Sphærium.) *Hutton*, Trans. N. Z. Inst., vol. xiv. p. =*P. novo-zeelandicum*, Prime, Ann. Lyc. Nat. Hist. of New York, viii. (1867), p. 91.

Unio menziesii, *Gray*, in Dief., Travels in N. Z., (1843), ii., p. 257. *Hutton*, Trans. N. Z. Inst., vol. xiv. p. =*U. aucklandica*, Gray, l. c., ii, p. 257.=*U. zelebori*, Dunker, Abh. Zool. Bot. Gesell in Wien. 1856, p. 915.

Unio lutulentus, *Gould*, Pro. Bost. Soc., Nat. Hist., iii. (1850) p. 295. Reeve, Conch. Icon. fig. 122 (not fig. 386.)

Unio hockstetteri, *Dunker*, Mal. Blatt. viii., (1861) p. 163. A doubtful species.

The Fishes of the Palmer River.

By William Macleay, F.L.S., &c.

The Revd. J. E. Tenison-Woods procured while at the Palmer River, in Northern Queensland, a small collection of the Fishes of that river, which he has asked me to examine and if necessary to describe. He is indebted to Mr. Selheim, a German naturalist resident in the Palmer District, for the greater number of them. They are all fishes of the head waters of the Palmer, cut off by numerous falls from the lower part of the river, and therefore fresh water fishes in the strictest sense of the term.

1. Therapon fasciatus, Casteln.

Proc. Linn. Soc., N. S. Wales, Vol. 5, p. 363.

This species seems to be confined to the rivers flowing into the Gulf of Carpentaria. A similarly marked, though very distinct species—*Therapon percoides*, Gunth.—is found in the East Coast rivers of Queensland. *Therapon terræ-reginæ*, Castelnau, I believe to be identical with *T. percoides*.

2. Therapon truttaceus, Macleay.

Proc. Linn. Soc., N. S. Wales, Vol. 5, p. 366.

I described this fish originally from a specimen sent me from the Endeavour River. It is easily recognizable from *T. unicolor* and other unicolorous species, by the broad head, fleshy lips and smooth preorbital bones.

3. Eleotris planiceps, *n. sp.*

D. 6/10. A. 8.

Head broad, flat, and one third of the total length; mouth large and flat, the lower jaw protruding, the maxillary reaching to below the middle of the eye. The eye rather small and more than three diameters apart. The scales on the body are rather large and finely ciliated, those on the head smaller, and on the fore part of the head between the eyes there are a number of small impressed nonimbricate scales. The colour is brownish with occasional darker spots, and with a number of whitish or pearly spots on the under surface of the head and branchiostegals. The fins are all more or less spotted with dark brown, the first dorsal almost barred. The tail is rather pointed.

This species belongs to the Ophiocephalus group of *Eleotris*. One specimen $9\frac{1}{2}$ inches in length.

4. Aristeus cavifrons, *n. sp.*

D. $\frac{1}{5}$, $\frac{1}{10}$. A. $\frac{1}{20}$. L. lat. 34.

Very compressed; belly trenchant; height of body nearly one third of the total length. Head small, about one fifth of the length of the body, depressed and almost excavated from the snout to behind the eyes; eyes large and about their diameter apart; snout shorter than the diameter of the eye. Mouth wedge-shaped when closed, rounded in front, the upper lip enlarged in the middle and fitting into a wide sinuation in the lower—the edge of both lips covered with small hooked teeth, the flat space on the forehead naked and uneven, and emarginated in front with a tubercle in the middle; the head beneath horse shoe-shaped with three or four large pores on each side, a few large pores also on the preorbital bones. The preoperculum is short and scaly, the angle extending backwards subacutely; the operculum is rounded and covered with two or three large smooth scales. The rays of the first dorsal fin terminate in filaments, the spine of the second dorsal is strong, but not so long as the rays which lengthen towards the tail; the tail is not emarginate, the ventrals are placed much behind the line of the origin of the pectorals, and close together; the pectorals are small and rather above the middle of the body. The colour is bluish silvery, with a lighter silvery stripe along each scale; the membranes of the dorsal, anal and ventral fins are of a pinkish hue; a few minute spots on the root of the caudal.

Three specimens, $3\frac{1}{2}$ inches in length.

5. Synaptura Selheimi, *n. sp.*

D. + C. + A. 155. P. 6. L. lat. 81.

Height of body one third of the total length, eyes small, nearly on the same plane, and nearly two diameters apart. Scales small, strongly ciliated or toothed on both sides; vertical fins low, lengthening gradually to the tail, which is rather pointed; ventral fins small, opposite, the right one longest; pectoral fins very small, the right one longest. Colour brown mottled all over with black.

Several specimens averaging four inches in length.

This is the first instance I have come across in this country of a fresh water sole. Both this and the last described Fish—*Aristeus cavifrons*—were captured by a very small hook baited with a fragment of a blade of grass.

6. Neosilurus Hyrtlii, Steind.

Proc. Linn. Soc., N. S. Wales, Vol. 6, p. 208.

This species seems to be found in most of the rivers of Northern Queensland. The specimen from the Palmer River is only half grown.

7. Chætoëssus Erebi, Richards.

Proc. Linn. Soc., N. S. Wales, Vol. 4, p. 368.

One specimen of small size. It is found all over the North and West Coasts of Australia both in fresh and salt water.

On the Plants of New South Wales.—No. VIII.

By the Rev. Dr. Woolls, D.D., F.L.S., &c.

Class III. Acotyledones.

The only Cryptogams described in the *Flora Australiensis* are the higher Vascular orders, as Mr. Bentham did not think it advisable, at his advanced age, to enter on the Mosses, Fungi, Lichens, Algæ, and their respective allies. This great work has now been taken up by Baron F. von Mueller, who has already furnished in his *Fragmenta Phytographiæ Australiæ*, lists of all the known lower orders of Cryptogams in Australia. As, therefore, he proceeds in utilizing the labours of those who have preceded him, or in recording the species new to science which are being collected and forwarded to European specialists, the acotyledonous plants of Australia will become better known than they are at present. The orders to which Mr. Bentham confined his attention are—

1. *Lycopodiaceæ.* 2. *Marsiliaceæ.* 3. *Filices.*

Of the Lycopods, *Isoeles* and *Phylloglossum* do not extend to New South Wales, the former occurring in Tasmania and Western Australia, and the latter in Victoria, Tasmania, and West Australia. *Lycopodium laterale* and *L. densum* are found near Sydney and also on the Blue Mountains, but *Selaginolla uliginosa* (which is distinguished from *Lycopodium* by having two kinds of spores as well as a different habit) has a wide range in swampy places throughout the Colony. The same may be said of *Azolla pinnata* and *A. rubra*, (floating plants with branching and rooting leaf-stems) which are common in ponds and lagoons. *Tmesipteris tannensis* has a pendulous habit, and is found for the most part about the caudices of Tree-ferns, whilst *Psilotum triquetrum* may be found in an erect state, or pendulous from the crevices of rocks. There seems to be a difficulty in determining the species of *Marsilea* or Nardoo, for whilst some Botanists reckon ten species, others would reduce them all to one. The fact is, this plant varies very much in the size of the fronds and the length of the stipes, for it may be found growing at the edge of lagoons or marshes with small fronds and stipes, whilst as it occurs farther in the water, it accommodates itself to circumstances and becomes proportionally larger. Mr. Bentham makes three species for New South Wales (*M. quadrifolia*, *M. hirsuta*, and *M. Drummondii)*, whilst Baron Mueller is inclined to reduce all its numberless forms to *M. quadrifolia*. *Pilulifera globulifera* which is common to the old and new world, has hitherto been found only in Tasmania and West Australia.

In proceeding to the large and beautiful order of the Ferns, it may be remarked, that, with one exception, all the genera found in Australia are represented in other parts of the world, and even with regard to that one *(Platyzoma)*, Mr. Baker describes it as "a genus too nearly allied to *Gleichesia*," whilst Baron Mueller (Frag. Vol. 5, p. 114) reduces it to *G. platyzoma*. Ranging our ferns under the six tribes of the *Flora*, the first *(Ophioglosseæ)* has two species of *Ophiglossum* (one of which, *O. vulgatum*, is common in warm or temperate climates), and one of *Botrychium* (*B. ternatum)* which occurs also in America, Asia, and New Zealand.

The most admired of the second tribe or Marattieæ do not extend so far South as New South Wales; but the climbing *Lygodium* and three spscies of *Schizæa* (one of which *S. dichotoma* spreads over Tropical Asia and Africa) are found here and there throughout the colony, though *S. bifida* and *S. rupestris* are much more common. Of the tribe Osmundeæ, the aquatic fern *Cerytopteris* and the truly Australian *Platyzoma* seem limited to North Australia and Queensland; but four species of *Gleichenia* and one of *Todea (T. barbara)* have a wide range in New South Wales. *T. Fraseri*, which is certainly one of the most delicate and beautiful of Australian Ferns, has been found in a stunted form in a creek near Parramatta. Its favourite habitat, however, is the deep gullies of the Blue Mountains, where it sometimes has an erect caudex and fronds exceeding three feet in length. The fourth tribe, Hymenophylleæ, which is characterised by its thin and almost transparent fronds, is represented by five species of *Trichomanes* and eight of *Hymenophyllum*. Several of these are common to New Zealand and the islands of the Pacific, whilst *H. Tunbridgense* my be regarded as cosmopolitan, for it occurs in most of the temperate and cooler regions of the Globe. The fifth tribe comprehends the much admired tree ferns, of which one species of *Cyathea* and three of *Alsophila*, vary in height from a few feet to 60 or 70. *Cyathea* is rare, but *Alsophila australis*, *A. Leichhardtiana*, and *A. Cooperi* are plentiful in some parts of the Blue Mountains, Illawarra, and further South. It is difficult to distinguish the species in dried specimens, but as they differ very much in the character of the caudex and the scales, they can readily be determined in living plants. *A. Leichhardtiana* is a much more slender species than *A. australis*, and the veins of the fronds are more forked, whilst *A. Cooperi* is distinguished by the oval scars of the caudex.

Tho sixth tribe, Polypodieæ, is a very large one, and divides itself naturally into those genera which have an indusium and those which have not. Of the first division, *Dicksonia* has 3 species, *Deparia* 1, *Davallia* 2, *Vittaria* 1, *Lindsæa* 4, *Adiantum* 5, *Hypolepis* 1, *Cheilanthes* 1, *Pteris* 9, *Lomaria* 4, *Blechnum* 3, *Doodia* 3, *Asplenium* 13, and *Aspidium* 12. The species of *Dicksonia* are remarkable for their size and beauty, two (*D. antarctica* and *D. Youngiæ*) being Tree-ferns, and one (*D. davallioides*) attaining sometimes the height of five feet and upwards with delicate and membranous fronds. *D. antarctica* flourishes on Mount Tomah and some parts of the Kurrajong. A. Cunningham was the first to notice the fact, that the seeds of the beautiful *Quintinia Sieberi* frequently germinate in the caudices of *D. antarctica*, and that the curious *Fieldia australis* is often seen adhering to the same Tree-fern. *Deparia prolifera* has hitherto been found only at Illawarra, and *Vittaria elongata* seems limited to the Northern parts of the Colony, but the species of the other genera are widely distributed. *Lindsæa trichomanoides* occurs sparingly on the Blue Mountains and is not specifically distinct from the New Zealand plant; whilst *L. incisa*, which approaches *L. microphylla*, has recently been collected at the Clarence River. Of the species of *Adiantum*, *A. æthiopicum* is the most abundant, and in some of its larger forms (especially that found at the Macleay River by Mr. K. D. Fitzgerald) it resembles the European *A. capillus-veneris*, but the sori are not on the apices of the lobes as in that species. Many Pteridologists doubt whether *Hypolepis tenuifolia* is distinct from *Polypodium punctatum*, and whether *Pteris paradoxa* and *P. rotundifolia* are distinct from *P. falcata*.

The same remark is applicable to the species of *Doodia* which seem to pass insensibly into each other, and also to some species of *Asplenium*, which Baron F. von. Mueller reduces to the European *A. marinum; Asplenium flabellifolium*, *Lomaria discolor* and *L. Patersoni* are sometimes very sportive in their growth and deviate considerably from the typical forms. The tendency to produce bipinnatifid fronds in *L. discolor*, has been noticed not only near Sydney, but beyond the Dividing Range. In the genus *Aspidium*, there is great difficulty with the species *A. decompositum* and *A. tenericaule*, for some forms which have no indusium are referred to these plants. Besides the ordinary forms of *A. decompositum* (of which *A. tenerum* seems only a variety), *A. acuminatum* or *A. glabellum* is also joined with it. This last has a short root and different habit, and, in the opinion of Mr. Bailey, F.L.S. of Brisbane, must be regarded as a distinct species. From specimens procured at the Kurrajong, I am disposed to agree with him, and also that *A. tenericaule* and *Polypodium pallidum* are identical. Mr. Bailey would, likewise, separate from *Aspidium*, under the name of *Polypodium aspidioides*, a fern very similar to *A. acuminatum*, but apparently without indusium. This fern occurs in the northern parts of the colony and in Queensland. There is yet one form remaining for consideration, and that is the fern which Mr. Baker refers to *A. lancilobum*, but which, from the absence of indusia, more closely resembles *Polypodium rufescens*. When Mr. Bentham had before him large numbers of specimens from all parts of Australia, he was led to unite several forms under *A.*

decompositum, but the amalgamation is not in all respects satisfactory.

In the second division of Polypodieæ, we have of *Polypodium* 11 species, of *Nothoclæna* 2, of *Grammitis* 2, of *Acrostichum* 1, and of *Platycerium* 2. Whilst in the former section, *Asplenium trichomanes* is common to Australia and many parts of the old and new World, we have, in the second division, *Grammitis rutifolia* common to the South West of Europe, Chili and New Zealand, and *G. leptophylla* common to the old world and the Andes of the new. From a review of the species of ferns, it seems that of the 200 known to flourish in Australia, New South Wales has about 108; whilst "of the 38 Australian genera, of which 29 are represented in this colony, no less than 29 have a general range over the New and Old World."—(Bentham.)

Botanical Notes on Queensland.—No. I.

By the Rev. J. E. Tenison-Woods, F.G.S., F.L.S., Vice-President of Linnean Society.

In the course of many visits to Queensland during the last four years I have noted several peculiarities in the flora of that colony which will be of interest to botanists generally. Up to this time the labours of collectors have been directed to the discovery of new species, while the range or the abundance of the same has been little noticed. Now that the grand work of describing and cataloguing has been accomplished by the illustrious botanists Bentham and Mueller, humbler laborers may step in to add to the account of knowledge: This is the purpose of the present notes. I have found for instance that the spread of tropical plants south of the tropical line occurs to an extent which is hardly realized by those who have not visited the place. I shall begin to illustrate this by observations made upon the Burnett River, Lat. about 25°. My travels extended to about

35 miles from the mouth of the stream which is all occupied by a generally level country of gravel or volcanic soil. The latter is wooded with thick forest, known here by the local name of scrub, but as it is formed by high trees closely matted by vines and creepers, it must not be confounded with what is termed scrub in other colonies or even other places in the colony. The mouth of the river is bordered by boulders of doleritic lava, not very vesicular and but little decomposed. To the south there is a small conical hill, three miles distant, which is entirely basaltic and may be the source of the lava. All round the light house there is a dense growth of *Sorghum fulvum*, Beauv., and it extends over the open ground to the edge of the forest. It is a tall not very stout grass attaining sometimes six to eight feet high and here makes the ground appear like a dried marsh. The panicles are of a rich brown colour and very ornamental. The species has not been hitherto recorded south of Keppel Bay. It is also found in tropical Asia, from Ceylon to the Archipelago and in South China and Japan. A closely allied genus—*Chrysopogon*, covers all the alluvial flats further up the river, this is *Chrysopogon parviflorus*, Benth., a species very widely distributed from Carpentaria to Victoria. It is called here "scented grass" on account of the peculiar smell emitted by the young flower heads when rubbed between the hands. It is not esteemed as a fodder plant. Bentham and Mueller say that it is probably found in India and New Caledonia.

Another marked feature of the banks of the Burnett on the cleared ground is the abundance of *Phytolacca octandra*, Linn., this is closely allied to an American plant which has long been cultivated in Europe and is known as the Mexican Verbachina. It has established itself pretty extensively in the neighbourhood of Sydney and Melbourne, but I do not know that it has been recorded from any part of Queensland. On the sides of the Burnett it covers the cleared volcanic ground very thickly in erect herbaceous plants from four to six feet high. It may be as well to mention that the dark purple berries of a kindred species or variety are used for a tincture which is much valued in America as a remedy for rheumatism, and was once a celebrated remedy for cancer. The root is an emetic and cathartic, and the young shoots when well boiled are eaten as a vegetable. In the West Indies the leaves are used like washing soap.

Another weed which literally covers the land in fallow as closely as grass, but growing up into a tall straight thicket five or six feet high is a species of *Erigeron* (*canadensis* or *linifolius*). It goes by the name of cobbler's peg, from the ready way in which the erect fragments of old stems penetrate the shoes.

The agricultural land is nearly always the cleared forest on the banks of the rivers and this is not upon the alluvial banks of the river so much as the red volcanic soil which follows the south bank of the Burnett in a belt varying in width from a few hundred yards to a mile. It has evidently come from a small rounded hill near the sea coast which is surrounded with fragments of scoriaceous lava. Usually the red soil is quite free from stone or scoriæ, from which I suppose that the deposit is a thick flow of the volcanic mud which is always connected with eruptions the forest is very dense and of the kind usually called scrub in Queensland near the coast. This scrub is mainly distinguished by the absence of that Australian aspect which the presence of Eucalypts, Acacias, and Proteaceæ would give it. They are almost totally wanting in these forests which are composed of several species of *Ficus*, *Harpullia Hilli*, *H. pendula*, *Diploglottis Cunninghami*, *Cupania anacardioides*, *C. semiglauca*, *Dysoxylon Muelleri*, *D. rufum*, with here and there immense trees of *Flindersia Oxleyana*. Underneath these trees there is a tangled growth of brushwood, at least near the edge of the forest, but when one penetrates any distance where the growth of tall trees is very thick and the light obscure, the ground is encumbered with dead logs and the humus from decayed leaves which only supports fungi, lichens, mosses, and a few scattered ferns of which the most common are *Pteris tremula* and *Adiantum hispidulum.* The common grass is *Oplismenus compositus.* This I have found, I may say, universally diffused through these and similar forests.

Many of the tallest trees are bound together by certain creepers which form vines or masses of leaves and flowers. The principal of these are *Tecoma australis,* and *T. jasminoides, Clematis glycinoides, Rhipogonum album* (a thorny climber of the lily tribe) *Flagellaria indica, Eustrephus latifolius* (the bulbs of this are excellent eating), *Geitonoplesium cymosum, Jasminum didymium, J. racemosum, J. lineare.* Other trees more or less common in the forests of the Burnett, are *Marlea vitiensis* the only species of the genus and order in Australia, but one which is found in all the forests of the coast and extending to New South Wales. *Gardenia chartacea, Castanospermum australe, Apnanthe philippinensis, Canthium lucidum, C. citriobatus, C. multiflorus, Kibara macrophylla,* are interspersed with many other species which were not in flower or otherwise indeterminable by me. The edge of the scrub has a thick growth of *Rubus rosæfolius* which produces a small tasteless raspberry, and the growth of the weed *Verbena bonariensis* is also very thick. I do not attempt to give an exhaustive list of species, as these forests are so rich, but I may remark that they are nearly tropical in character as the river is not more than 100 miles south of the tropical line. Sterculias or bottle-trees are not common.

In those parts of the river from which the scrub recedes the usual Australian vegetation reappears. The banks are thickly lined with *Melaleuca genistifolia,* a species very extensively distributed through marshy places in New South Wales and Queensland. It sometimes forms a dense brushwood as most species of tea-tree do in marshy situations. There is a brush of this kind on the north side of the river a little to the east of the town. It is principally formed of the tea-tree and stunted trees of *Ficus aspera.*

Near the ford on the north bank are some fine specimens of *Hibiscus splendens* a species not often met with out of the tropics though it appears occasionally in river scrubs on the east side of the range as far south as the Hastings River. It is a tall shrub about 25 feet high, with flowers of a beautiful rose colour. The anthers are arranged in a pyramidal form of dark crimson. There are five deep red round stigmas which produce a splendid effect. Mr. Frazer the botanist who introduced it into England says of it, " I consider this the king of all known Australian plants. I have seen it 22½ feet high. The flowers measured nine inches across and were of a most delicate colour, literally covering the whole plant with pink and crimson." How strange it is that we scarcely ever meet with this species in private cultivation in Australia.

Near this *Hibiscus* there is rather a close growth of that singular Euphorbiaceous plant *Phyllanthus Ferdinandi*, a species which extends from Carpentaria to Port Jackson. It grows to a small tree and in flowering time the blossoms though small have a pretty effect. This is in the neighbourhood of where the forest has been cleared and its place is being rapidly filled up by a dense growth of *Castanospermum australe*, *Macaranga tanarius*, and *Cudrania javanensis*, all of which tend to form a dense thicket. Two introduced plants are also extremely common and thick. They are *Asclepias curassavica*, and *Tagetes glandulifera.* The latter grows here to a height which I have never seen attained anywhere else. There are large thick succulent plants to be found ten feet in height. The species is of South American origin, though generally called the African Marigold. It is spread as a weed also in New South Wales along the Hunter and Nepean Rivers.

A few sections of cleared ground on the west side of the north township are now covered with a large *Solanum* which I supposed to be *S. verbascifolium.* It grows to a tall slenderly branched shrub with large leaves. It is indigenous in the neighbourhood, so that its spread is remarkable.

In the more open gum forests on the bank of the river *Eucalyptus teriticornis* is the most abundant. It is called the red gum here and is exactly like the red gum (*E. rostrata*) which lines all the rivers and creeks of Sonth Australia and Victoria, and grows in so many inundated plains that it bears the name of flooded gum. The wood is of the same quality, and held in equal esteem. The only difference seems to be in the operculum or cap of the bud, which in *E. rostrata* has a small point or hollow beak on the top, and this in *E. tereticornis* becomes enormously prolonged into a curved horn. But on the banks of the Nogoa in Central Queens-and I gathered from the same tree buds which were like *E. rostrata* and *E. tereticornis.* Baron v. Mueller thinks that they are closely allied. *E. acuminata,* Hook., was suppressed by Bentham as a species because of its being an intermediate variety ; that is a form of *E. rostrata,* which approached *E. tereticornis* in the shape of the operculum.

In the same locality we have rather numerous specimens of *Careya arborea,* I am not aware that this tree has ever been recorded so far to the south before. It is a very common tree in the open forests of the tropics. Bentham has doubts if this species can be considered as the same as *C. arborea* of the Coromandel coast, the flowers of which are sessile and the fruit globular. The Australian species are all ovoid and the flower with a long pedicel. The blossom is seldom seen on the tree for as the bvd opens the ring of stamens becomes detached and falls off as a graceful fringe to the ground. The blacks eat the seeds and I have heard it said that they roast and eat the fruit as well. One peculiarity has not been noticed in this tree, and that is the colour of the leaves. They are very often a brilliant crimson with every intermediate shade of yellow, orange, and red, a few of the older leaves being a pale grey green.

I noticed here and there a few species of that beautiful member of the *Boragineæ*, viz. *Corda myxa*. It has dense clusters of a pale yellow or pink fruit which is as viscid as birdlime, but eaten sometimes by the children ; the flavour is not unpleasant.

In the gum forests on the more open banks of the Burnett the trees are principally *E. teriticornis*, *Petalostigma quadriloculare*. *Tristania conferta*, *Jacksonia scoparia*, and *Melaleuca leucodendron*, All these are very abundant. *Eucalyptus corymbosa* is in thick sandy places when the undergrowth is of shrubby young plants or stunted plants of all the preceding species. Here also are found small species of *Hakea robusta*, a most valuable as well as beautiful timber tree, which has been with the exception of the saplings entirely cleared off the ground.

Wherever gravel from the river bed has been used along the railway as ballast, there is a rather thick growth of *Sesbania aculeata*. The seeds of this plant are eaten by the natives. It grows in all warm marshy places in Queensland. By many it is thought that this was the Nardoo which Burke and Wills thought came from the spores of a *Marsilea*. It is hard to suppose that any nourishment would be obtained from the spore-cases of the latter plant or that the natives would use it. Besides this the spore-cases are so few in number.

The *Fungi* noticed by me on the Burnett were not numerous, but I may mention having found very fine specimens of *Hexagon crinigera*, Fr., on a dead trunk of a tree in the forest. The pileus is covered with a coarse growth of branched bristles. It was considered rare in Queensland and the specimens small, but I found 20 or 30 together all over four inches in diameter. The ground in the neighbourhood was as thickly strewn as it could be with dead shells of *Helix Cunninghami* and *H. Incei*.

A tree held in great estimation here and not uncommon in the forests, is the *Myrtus gonoclada*. The only drawback to it is that the timber is so small, and the wood too hard to be worked with ordinary tools. But where small tough wood is required there is nothing like it. It seems to me excellently adapted for wood engraving.

I must not pass over the occurrence of one little plant, if it were only to warn collectors to avoid it, and that is *Tragia Novæ Hollandiæ*, which like most species of the genus has very annoying stinging properties like the common nettle. I mention this as its stinging has been called in question by Dallachy. It belongs to the *Euphorbiaceæ* and is a twining herb with small leaves not easily noticed until its sting is felt. The species is widely spread and very abundant in the scrubs. With it is associated another Euphorbiaceous plant *Mallotus claoxyloides*, which gives such a peculiar smell to all the forests of the eastern waters, from the endeavour River in North Queensland to the Richmond River in New South Wales. *Mallotus philippinensis* is as abundant and extends to South China. The latter however extends a good distance into the interior and far from forest scrubs.

Entada scandens or the large Queensland bean does not come so far south as the Burnett river, nor *Abrus precatorins* with its beautiful scarlet seeds. But in place of them we have a twiner with beautiful blue seeds, *Rhyncosia Cunninghami*. This plant only differs from the South American, *R. phaseoloides* in having a large blue instead of a scarlet spot round the hilum. It is often seen twining round *Zanthoxylum brachyacanthum*. I mention with regard to this latter species that it is described as a slender tree, but on the Burnett the trunk is thick and the tree large, being very conspicuous for the stout conical thorns with which it is covered.

Remarks on some Fluviatile Shells of New South Wales.

By J. Brazier, C.M.Z.S., &c.

A few days ago I received a small parcel of Fluviatile Shells from Mr. C. S. Wilkinson, Government Geologist for identification, the specimens having been collected by Mr. E. G. Vickery, District Surveyor of the Mining Department; below I append list of species.

1. Melania oncoides.

Melania oncoides, Tenison-Woods, Proc. Linn. Soc., N. S. W., Vol. III., p. 5, 1878.

Hab. Sturts Depôt, Glen River, County Evelyn, also Darling River near Wilcannia (*E. G. Vickery.*) Creeks near Bourke, Darling River (*James Ramsay.*)

Owing to the very dried up state of the rivers and creeks for some monthz past, many of the specimens have become quite denuded of the periostracum; the specimens that have lain in the baked mud and not exposed to the sun's rays retain the periostracum; it is evidently a very common species in the wet season. The type specimens in the Australian Museum are dead.

2. Paludina sublineata.

Paludina sublineata, Conrad, Proc. Acad. Nat. Sc., Philad., p. 11, 1850, American Journ. Conch., Vol. II., p. 79, pl. 1, fig. 8, 1866.

Hab. Darling River, near Wilcannia, Sturt's Depôt, Glen River, County Evelyn (*E. G. Vickery.*). Darling River, Australia (Conrad.)

This species is easily determined by its very fine revolving lines being closely arranged, but so minute as to be invisible without the aid of a lens, very large specimens scarcely show it even with the lens.

Specimens from Sturt's Depôt, Glen River, measure in Alt. 28; breadth, greatest, 22; least 20 mill.; small specimens from same place, Alt. 10; breadth, greatest, 9; least 7 mill. Darling River specimens, largest Alt. 23½; breadth, greatest, 19; least 15 mill; next size specimens, Alt. 16; dreadth, greatest 15;

least 12 mill.; smallest specimens, Alt. 14; breadth, greatest 12; least 10 mill.

3. Physa Newcombi.

Physa newcombi, Adams & Angas, Proc. Zool. Soc., p. 416, 1863; Reeve, Conch. Icon., pl. iii., sp. 21.

Hab. Sturt's Depôt, Glen River, County of Evelyn, New South Wales (*E. G. Vickery*). Mount Margaret, Central Australia (*F. G. Waterhouse*).

The type specimens were obtained during Stuart's Exploration of Australia in 1861—1862.

4. Unio Novæ Hollandiæ. ?

Unio Novæ Hollandiæ, Gray, Proc. Zool. Soc. p. 57, 1834.

Hab. Darling River, New South Wales (*E. G. Vickery*).

What I have before me for identification is three-quarters of a valve of a very thick species bleached perfectly white, scaling off in flakes with the point of a knife and showing nothing but a pearly nacre; until a few good examples turn up my identification is doubtful.

5. Alasmodon Stuartii.

Unio (*Alasmodon*) *stuarti*, Adams and Angas, Proc. Zool. Soc., p. 417, 1863. Reeve, Conch. Icon. pl. 54, sp. 279, 1866. *Anodon Stuarti*, Sowbery in Reeve's Conch. Icon., pl. 34, sp. 136, 1870.

Hab. Wittabrinna Creek, Sturt No. 7 River, County Tongowoke, Albert District, New South Wales (*E. G, Vickery*). Lagoons, Mount Margaret, Central Australia (*F. G. Waterhouse*).

6. Corbicula Nepeanensis.

Cyclas Nepeanensis, Lesson, Voy. Coq., Vol, 2, p. 428, pl. 13, fig. 14, 1830.

Hab, Darling River near Wilcannia (*E. G. Vickery*). Nepean River (*Lesson*).

This is about one of the commonest Fresh Water bivalves we have, it is found in nearly every river and small stream in New South Wales. One specimen and two valves were obtained by Mr. Vickery.

Notes on the Zoology of Lord Howe's Island.

By E. P. Ramsay, F.L.S., Curator of the Australian Museum.

The Zoology of Lord Howe's Island has always been looked upon with considerable interest by Naturalists. The fauna blending as it were, types of two distinct Zoological Provinces, the Australian and New Zealand Regions. The attention of some of our early Naturalists was drawn to this Island by finding there, the now extinct "White Gallinule," then called (*Fulica alba*), but which proves to be a species of *Notornis*. This bird appears to have been first mentioned by Callam in 1783 and afterwards in "Philipp's Voyage to Botany Bay," 1789, p. 160, and again under the name of *Gullinula alba,* by White, in his "Voyage to New South Wales," 1790, p. 238. Furrher notices of this bird will be found in Herr von Pelzeln's Paper, in the "Ibis" 1871, p. 44; where its relation to the genus *Notornis* was first pointed out, a good figure of it also will be found, in the "Ibis," 1873, pl. x.

During the last three years I have made every exertion through the settlers on the island, to ascertain if this bird still exists there, but without effect. On one occasion "Red bills" were reported to me by Capt. Armstrong as having been seen on the hill side, but on my correspondent sending there nothing was heard or seen of them. The only other large land bird known, and which still exists on the Island is the "Wood Hen"—*Ocydromus sylvestris* and of which I have recently seen specimens, but this species also is fast becoming extinct, being easily captured or killed. One pigeon only is now found—*Chalcohaps chrysochlora.* Although numerous large birds of this family were formerly said to exist there.

There seem to be no indigenous four footed Mammals. I have heard of a *Mus*, but as yet none have come to hand; and two small Bats of the genus *Scotophillus* are all I have seen of the order Cheiroptera.

Among some Geological specimens received from Mr. Berry, who has, I believe, recently returned from the Island; I found a portion of the pelvis of a Turtle, the fossil was much water-worn and encrusted with carbonate of lime, upon my making this known, further search was made by other parties and I believe other bones found, which I regret I did not see before they left the colony. I believe the bone above referred to will prove to belong to a large sea turtle, but from the only fragment I have seen it would be very risky to draw any definite conclusions respecting its genus. One Gecko, *Gehyra oceanica,* is all I have seen of the Reptilia.

I append a list of the Birds of the Island from which it will be seen how closely its avifauna approaches that of New South Wales on the one hand, and in two important particulars, that of the New Zealand Region on the other. The genera found in the New Zealand Region and not in the Australian, are *Notornis, Ocydromus, Aplonis, Merula*; all the other genera are represented in New South Wales by the same or allied species; there being of the whole avifauna only 9 species as far as is at present known, peculiar to the Island, the names of these are printed in larger type.

No. of Species.	List of Birds found on Lord Howe's Isld.	Species peculiar.	New Zealand. Genus.	New Zealand. Species.	N. S. Wales. Genus.	N. S. Wales. Species.
1.	MERULA VINITINCTA, *Gould*	*				
2.	APLONIS FUSCUS, *Gould*	*				
3.	Myiagra plumbea, *Vig. & Horsf*				*	*
4.	RHIPIDURA CERVINA, *Ramsay*.	*	*		*	
5.	GERYGONE INSULARIS, *Ramsay*	*	*		*	
6.	Pachycephala rufiventris, *Lath.*				*	*
7.	Pachycephala gutturalis, *Lath.*				*	*
8.	ZOSTEROPS STRENUUS, *Gould*.	*	*		*	
9.	ZOSTEROPS TEPHROPLEURUS, *Gould*.	*			*	
10.	Cuculus flabelliformis, *Lath*		*		*	*
11.	Chalcites lucidus, *Gml.*		*	*	*	*
12.	Eurystomus pacificus		*	*	*	*
13.	STREPERA CRISSALIS, *Sharpe*.	*			*	
14.	Halcyon vagans, *Less*.		*	*	*	
15.	Ninox boobook, *Lath*.		*		*	*
*16.	Haliaster sphenurus, *Vieill*.				*	*
*17.	Haliaetus leucogaster, *Lath.*				*	*
18.	Chalcophaps chrysochlora.				*	*
19.	Hypotænidia australis, *Pelzln*‡		*	*	*	*
20.	OCYDROMUS SYLVESTRIS, *Sclater*.	*	*			
*21.	Porphyrio, melanotus.		*	*	*	*
22.	NOTORNIS ALBA, *White*.	*	*			
23.	Nycticorax caledonicus, *Lath.*		*	*	*	*
24.	Ardetta minuta, *Linn*.		*	*	*	*
*25.	Anas superciliosa, *Gmel.*		*	*	*	*
26.	Cinclus interpres, *Linn.*		*	*	*	*
27.	Ægialitis (bicinctus ?) *juv*.		*	*	*	*
28.	Charadrius xanthocheilus, *Gould.*		*	*	*	*
29.	Limosa uropygialis, *Gould*.		*	*	*	*

‡ This is *Rallus pectoralis*, of Gould's Bds. Aust,

No. of Species.	List of Birds found on Lord Howe's Isld.	Species peculiar.	New Zealand. Genus.	New Zealand. Species.	N. S. Wales. Genus.	N. S. Wales. Species.
30.	Anous cinereus, *Gould.*				*	*
31.	Anous stolidus, *Lath...*				*	*
32.	Onychoprion fuliginosa, *Gmel.*				*	*
33.	Phæton phœnicurus, *Gml*				*	*
34.	Procellaria sp		*		*	*

On consulting the table it will be seen that, as I remarked before, 9 species only are peculiar to the Island; and when we know more about the adjacent islands, Norfolk and Philipp Islands, it will probably be found that some of these inhabit also those Islands. Of the New Zealand region, although there is only one species represented, of the important New Zealand genera *Notornis* and *Ocydromus*, these, being birds of most limited flight form a very important link. Some stress might be laid on the occurrence of an Aplonis (*A. fuscus*), for it is only in the most northern part of Australia that the allied genus—*Calornis* is found, and that species (*C. metalica*) has evidently migrated from the Malayan region, so that the genus *Aplonis* can hardly be said to be Australian, the great stronghold of the genus being the Fiji, and New Hebrides Islands, but it is also found on the Fead Islands, (*Aplonis feadensis*), the Solomons and South East portion of New Guinea (*A. Cantoroides*) besides other islands in the Pacific.

The genus *Merula* is found throughout most of the islands of the Pacific, each group having one or more peculiar species or varieties, it extends from New Caledonia over the Fiji, Sandwich and New Hebrides Islands, and recently I have received information of a *Merula* inhabiting the Solomon Islands. It is somewhat remarkable that while the genus *Merula* is found so close to Australia as on Lord Howe's Island, no species of the genus has been recorded from the mainland, and from the close affinity of its fauna to that of New South Wales one would certainly expect to find some trace of the genus left, but in all probability the islands are the remains of a sunken Continent which had never been connected with Australia.

It may be worthy of notice that 21 out of the 32 *genera* found on Lord Howe's Island have also representatives in New Zealand and there is not one genus peculiar to the Island; moreover it must be remembered that, Norfolk and Philipp Islands, not so far off, were inhabited by a genus of Parrot (*Nestor*) now strictly New Zealand.*

Of New South Wales species we find no less than 24 out of 34, and some of these are birds of weak flight, such as *Pachycephala rufiventis, P. gutturalis, Myiagra plumbea.* The occurrence of a *Strepera* there, a *strictly Australian genus* is important.

The genera *Gerygone* and *Pseudogerygone* are found in New Caledonia, New Zealand, and as far north as New Guinea, the great stronghold of the genus is New Guinea and Australia. *Rhipidura, Pachycephala* and *Zosterops* are found all through the S. S. Islands and New Guinea as well as Australia, the genera *Cuculus, Chalcites, Eurystomus, Halcyon, Ninox, Haliastur, Haliaetus, Hypotænidea, Nycticorax, Ardetta, Cinclus, Limosa, Anous, Phæton,* and *Procellaria,* are found throughout the greater portion of the Southern, and some of them also in the Northern Hemisphere.†

Since the above was written, one of the employees of the Museum has returned from a visit to Lord Howe's Island made on behalf of the Trustees, bringing with him a most interesting collection on which I shall offer a few remarks in an early number of this journal.

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* I am glad to say we have still in the Museum a specimen of the now extinct Philipp Island Parrot, *Nestor productus.*

† Reported only, as yet I have not any specimens of them.

NOTES AND EXHIBITS.

Dr. Cox exhibited specimens of a moth of the family Lithosiadæ, which he stated had made its appearance on the 20th February, in enormous numbers, at his residence in Hunter Street.

The Hon. William Macleay exhibited a very peculiar species of fungus, which had been found growing in a tank at Ashfield, pendent from dry bricks.

Dr. Cox exhibited copies of "White's Voyage to New South Wales, 1790," and "Philipps' Voyage."

Mr. Brazier exhibited, on behalf of Mr. Bailey, of Melbourne, Victoria, a reversed specimen of *Triton quoyi*, Reeve; also *Bulimus loyaltyensis*, from Mare, Loyalty Islands.

Mr. Ramsay exhibited specimens of silicified rock with tertiary leaves and porphyritic granite, received from Mr. Steel. The specimens were found near the mouth of the Richmond River.

Professor Stephens exhibited two species of fossil land shells, a *Bulimus* and *Helix* from Kent's Group, Bass' Straits.

WEDNESDAY, 29TH MARCH, 1882.

The President J. C. Cox, M.D., F.L.S., &c., in the Chair.

MEMBERS ELECTED.

The Rev. James Kennedy, St. Leonards.

Alex. G. Ralston, B.A., Ashfield.

D. H. Campbell, Esq., Cunningham Plains.

John Clark, Esq., Murrumbidgee.

The Rev. C. Kalchbrenner, of Wallendorf, Hungary, and William Mitten, A.L.S., Sussex, England, were elected Corresponding Members.

DONATIONS.

From the Field Naturalists' Club of Victoria, "Southern Science Record," Nos. 1 to 13, and vol. ii., No. 2.

"Mémoires de la Société Nationale des Sciences Naturelles et Mathèmatiqués de Cherbourg, Tome xxii., et Catalogue de la Bibliothèque, Première Partie." From the Society.

From the Linnean Society, London—"Journal of Botany, Nos. 109 to 113: Zoology, Nos. 84 and 85: List of Members and Council.

From the Museum of Comparative Zoology at Harvard College, Cambridge Mass., "Bulletin, vol. ix., Nos. 1 to 5 ; also "Annual Report of the Curator."

"Jahresbericht des Vereins für Naturwissenschaft zu Braunschweig für das Geschaftsjahr, 1880-81." From the Society.

"Annual Report of the School of Mines, Ballarat, for the year 1881." From the Directors.

Journal and Proceedings of the Royal Society of Tasmania for 1880. From the Society.

New Catalogue of the Public Library of Victoria, vols. 1 and 2 complete. From the Trustees.

Proceedings and Report of the Royal Society of London, Nos. 206 to 213. From the Society.

Transactions, Proceeding, and Report of the Royal Society of South Australia, vol. iv., 1880-82. From the Society.

From the Rev. J. E. Tenison-Woods, F.G.S., &c.: "Œuvres d' Histoire Naturelle et de Philosophile de Charles Bonnet," tomes 1 à 8, 4to, 1879 à 1783; "Astronomical and Meteorological Observations made during the year 1874, at the United States Naval Observatory"; "Donnegan's Greek Lexicon."

PAPERS READ.

On a new Species of Stomopneustes and a new Variety of Hipponoe variegata.

By the Rev. J. E. Tenison-Woods, F.G.S., F.L.S., &c.

[Plates VI. and VII.]

Hitherto there has been only one species of *Stomopneustes* known, and I formerly believed our Australian species to be identical with it. Under this impression I classified the only specimen I had ever seen as *Stomopneustes variolaris*, Lamark. See Proceedings Linnean Society, N. S. Wales, Vol. 2 (1877-78), p. 156. In Vol. 5 of the same Proceedings I gave my reasons for regarding the species as distinct (see p. 198), and distinguished it by the name of *S. atrapurpurea*. I there stated that it is very common on the N. E. coast within the tropics. I now figure the species and give the following diagnosis:—

Stomopneustes atrapurpurea, *n. s.*, Plate 6.

Test circular or obscurely pentangular, in large and old specimens eccentric, of a pale brownish pink colour with darker purple stains. Poriferous zone slightly undulating, rather narrow, the inner or third row on each line separated by a line of secondary tubercles. Ambulacral and interambulacral areas thickly covered with primary, secondary, and miliary tubercles, the latter arranged in rings around the primaries. Ambulacral area with two rows of primary tubercles, bordered on each side by a row of secondaries, which alternate in size, being larger when they are opposite spaces between the primaries, and smaller when they are beside them. In the middle of the area there is a deep undulating groove bordered by a line of miliaries. This groove is continuous from the anal system to the actinosome. Interambulacral area with two rows of primary tubercles with irregularly scattered secondaries, the *primaries being slightly smaller than those of the A. areas*. Mammary bosses hemispherical and somewhat depressed, enamelled. Scrobicular area large elevated. Actinal surface flattening suddenly and conspicuously from the ambitus, and the tubercles thereon nearly uniform and gradually diminishing in size and number to the actinosome, which is of medium size, with the *notches broad and rather deep.* Auricles small, arch complete with a square summit and a somewhat oval or perfectly round foramen. Lantern tall, arches stout, and solid, teeth narrow, rather long, acute. *Anal system small* pentagonal. Genital plates, large, irregularly quadrate, with the pore large, subcentral or a tendency towards the outer edge. Ocular plates small subquadrate. Both kind of plates with secondary and miliary tubercles. Madreporic body large, somewhat elevated, broadly heart-shaped, pore quite on the outer edge, with scattered miliaries. Inner plates numerous, decreasing in size to an eccentric depression. Spines numerous; of *almost black purple color,* blunt, slender, but somewhat swollen in the centre, very finely grooved longitudinally. Miliary ring conspicuous but of uniform color. The secondary and miliary spines cylindrical.

The difference between this species and *S. variolaris* are: 1. The size, it being twice and a half times larger. 2. The color. 3. The disposition of the tubercles. 4. The size of the anal system. 5. The form of the genital, ocular, and madreform plates. 6. Actinal cuts. 7. The groove, which is less waved. I have in this diagnosis marked the special differences in italics. In page 198, Vol. v., Lin. Soc. N. S. Wales Proc., the specific name is misspelt *atropurpurea.*

HIPPONOE VARIEGATA, *Leske,* var. *alba nobis,* Plate 7.

I here figure a small and very interesting variety of this most variable species, in which the spines are small and slender, and the color white, with the test a rose pink. Usually in the tropics the color is pale violet almost approaching blue. In Sydney, if we are to regard the species as the same, the size is very much larger, and the test a deep purple brown.

On various deposits of Fossil Plants in Queensland.

By the Rev. J. E. Tenison-Woods, F.G.S., F.L.S., &c.

Attention has been called at various times and by different Geologists to the carbonaceous deposits and the included plant remains in Oueensland. They have generally been referred to two horizons, namely the Newcastle series and those of the so-called Mesozoic carbonaceous formations as seen in the Ipswich coal beds, the Clarence River series, and those of Jerusalem in Tasmania. The Newcastle series arc found at the Bowen River coal beds in Queensland in the upper or freshwater series. The middle or marine series are also found at Bowen, and in the coal beds of the Dawson River. These are in Lat 23° and were in 1844, discovered by Leichhardt. All these formations are characterized by certain fossils, such as *Glossopteris Browniana* in the lower formation and *Thinnfeldia odontopteroides* in the upper or Mesozoic.

In addition to these deposits I have to chronicle the following:

1. Coal beds in Cooktown with plant remains the only ones of which I could be certain were leaves of *Phyllotheca* (*indica ?*). This plant which is referred to the Equisetæ is found in both the upper and lower formations. It has also a wide range, being found in the Coal formation of India, Africa, and Europe.

2. Coal beds on the Central Railway about 130 miles west of Rockhampton. The coal is bad and full of sulphur. None of the plant remains could be identified.

3. Coal beds on the Burnett River. Five seams of very jet-like coal have been discovered on the Burnett at about 24 miles from the coast. I visited them shortly after their discovery. I venture to think that other valuable seams will be found in the neighbourhood. The plant remains were leaves of *Phyllotheca* (*indica ?*), *Zeugophyllites elongatus,* and probably *Thinnfeldia odontopteroides*.. Further down the river there is an exposed section

which I did not see. But fossil plants were brought to me with impressions of a *Sphenopteris* which I do not think has been described. The whole of these beds and those of Ipswich are distinguished by fossil impressions of a very broad and long leaf with parallel veins and no distinct mid rib. At present I do not attempt to refer it to any order.

4. Burrum River coal beds. These are about 30 miles south of those on the Burnett River or half way between Bundaberg and Maryborough. There are several seams. The coal is much like that of the Burnett and inclined at the same angle, but their relative positions have not been ascertained. I recognised some long narrow leaves with parallel veins amongst the plant impressions, and something like *Zeugophyllites elongatus*.. Mr. A. C. Gregory informs me that he found *Glossopteris* amongst the plant impressions, but the shale was so friable that it fell to pieces and the impressions were destroyed.

5. Rosewood Station about 25 miles west of Rockhampton. This is a formntion of sandstone and a grit of fine waterworn gravel. There is no trace of coal or even dark coloured shale yet every fragment of stone is covered with plant impressions in the most beautiful state of preservation. There seems to be but one or two species amongst them all. One is the broad leaved plant with parallel veins already referred to. The other a fern much like one found in abundance in the Clifton coal seam on the Darling Downs. All the fossils are more or less stained with per-oxide of iron. A more detailed account of this interesting formation will be given on a future occasion.

6. The Clifton coal seam, on the Darling Downs, about half-way between Toowoomba and Warwick. I have never seen a good collection of fossils from this place, and as the workings are now abandoned I could not obtain any on the spot. The only ferns I saw were as just mentioned, a form which is very like the one so common at Rosewood.

7. Coal beds near Peak Mountain, near the Fassifern line of railway, and about 20 miles from Ipswich. This is an outcrop, which has been cut through by a volcanic dyke and destroyed. There are many remains of fossil plants and much Siderite. The fossils are of a dark ferruginous color without any carbonaceous matter. The ferns were extremely like *Rhacopteris*, but await examination. If they belong to that genus, this would indicate a much lower horizon than any beds hitherto found in Queensland.

8. Plant beds in the Rosewood Scrub, about 10 miles from Ipswich. These appear to be quite unconnected with any coal formation, and I should say are of tertiary age. They consist of fragments of palms, and other endogenous plants, with a few ferns. They are imbedded in an extremely hard silico-ferruginous cement. I have not visited the locality, but from the abundance of the fossils brought to me, it must be an extensive and rich deposit.

9. Plant beds on the Darling Downs, near Toowoomba. This deposit is somewhat like that last mentioned, except that ferns are more abundant. I should think it was older. The cement is much more ferruginous and of a darker color, probably including a good deal of carbonaceous matter. I have not visited this locality. The specimens came from some portions of the volcanic rocks of the Darling Downs, and probably they have been entombed under some ash bed or basaltic overflow.

The whole of these different deposits have afforded me an extremely rich collection of vegetable remains, which are now under examination. I have refrained from speaking positively of the character of any species until the specimens have undergone the most careful comparisons and revision. As far as I have gone I am inclined to the belief that no very clear line of separation can be made between the coal beds of Newcastle and Queensland. They are I believe the lower and upper members of one immense formation, extending over a long period of geologic time. At present the Newcastle beds are regarded as Paleozoic, and the Ipswich beds as mesozoic. I cannot find any such clearly marked distinction. Many fossils are common to both deposits. The Ipswich coals are very rich in fossils, more rich and in better preservation than those of Newcastle. Yet strangely enough only seven species are recorded. On such slender materials it was hardly to be expected that satisfactory and final conclusions could be arrived at. Dr. Feistmantel's careful work has cleared the way, and made the work much more easy to local paleontologists. His complete figures and the number of them leaves nothing ambiguous or unsatisfactory. All Australian geologists will owe him a debt of gratitude, for his industry and zeal in the cause of our coal floras.

Record of new localities of Polynesian Mosses, with descriptions of some hitherto undefined species.

By William Mitten, F.L.S.

[When lately, on my request, the leading British Bryologist, Mr. W. Mitten, was induced to write a list of all known Australian Mosses, he noted also a number of Polynesian species, new either for science or for localities. These valuable manuscripts being placed unreservedly at my disposal, I beg now on his behalf to offer the Polynesian portion of his notes to the Linnean Society of New South Wales. As Port Jackson is that harbour in Australia from which communications with the South Sea Islands most extensively proceed, it will be easier for the Sydney Naturalists than for others, to see these searches for mosses followed up. The large bryologic collections formed by the Rev. Th. Powell in Samoa, and elaborated likewise by Mr. Mitten, lead us to anticipate that great riches of these kinds might also be gathered yet in many others of the island groups of the Pacific Ocean. The several mosses now recorded from the collections of Mr. Strange, have a melancholy interest, as emanating from a Naturalist, whose home was in the metropolis of New South Wales, and whose last exploit terminated in the greatest of sadness.—FERD. VON MUELLER.]

OCTOBLEPHARUM, *Hedwig.*

O. sanctum, Hampe.

Aneitum, Milne.

SYRRHOPODON, *Schægrichen.*

S. tenellum, C. Muell, in Bot. Zeist., 1857, 777.

Isle of Pines, Cuming.

S. albo-vaginatum, Schw.

Isle of Pines, Strange.

THYRIDIUM. *Mitten.*

Th. subfasciculatum, Hampe, (Codonoblepharum) in Linnæa, 1876, 303.

Tuo-Kuro Island.

CALYMPERES, *Bridel.*

C. Taitensis, Sullivant, in Amer. Expl. Exp , t. 4 (Syrrhopodon).

Aneitum, Milne.

LEIOSTOMA, *Mitten.*

L. brachypodium, C. Mueller.

Isle of Pines.

L. Tongense, Sull., in Amer. Expl. Exp. t. 5.

Isle of Pines (also Howe's Island).

RHIZOGONIUM, *Bridel.*

(*Pyrrhobryum*, Mitt.)

Rh. setosum, Mitt., in Seem. Fl. Vict., 384.

Aneitum.

RHACOPILUM, *Bridel.*

Rh. spectabile, Reinward and Hornsctuch.

Owen Stanley's Range, New Guinea; Rev. J. Chalmers.

Rh. convolutaceum, C. Muell.

Isle of Pines; Strange (also Australia).

DISTICHOPHYLLUM, *Dozy & Molkenbeer.*

(*Miniadelphus*, C. Mueller.)

D. capillatum, Mitten.

Caulis gracilis ruber; folia lateralia patula oblongo-ovalia, intermedia breviora. omnia flexuosa et apice in pilum tenuem acuminata, nervo tenui medio evanido ad marginem anguste limbata, integerrima, cellulis parvis rotundis pellucidis areolata

Aneitum, Strange.

D. cuspidato simile.

SPIRIDENS, *Nees ab Esenbeck.*

Sp. flagellosus, Schimper, in Nov. Act. 33, t. 4.

Aneitum, Milne; Isle of Pines, Strange.

OEDICLADIUM, *Mitten.*

O. purpuratum, Mitt., in Seem. Fl. Vit. 393.

Aneitum, Milne.

ENDOTRICHELLA, *C. Mueller.*

E. Campbelliana, Hampe.

Aneitum, F. A. Campbell.

E. pulchra, Mitten.

Rami simplices; folia dense inserta, compressu lateralia patentia, oblongo-lanceolata, concava, pluries plicata, apice excavata, acumine curvato terminata, ad margines superiores serrulata, nervis binis brevibus prædita, cellulis angustis elongatis areolata; perichætialia parva, erecta, ad apicem subito brevi-apiculata; theca in pedunculo æquilongo inclinata, ovali-cylindracea, operculum brevi-rostratum.

Owen Stanley's Range, New Guinea, Rev. J. Chalmers.

Rami 4-8 centim. longi cum foliis 7 mm. lati. Folia nitida.

BRAITHWAITEA, *Lindberg.*

(*Dendro-Leskea*, Hampe.)

Br. arborescens, Mitten.

Aneitum, Milne.

POROTRICHUM, *Bridel.*

(*Leiophyllum*, C. Muell.)

P. dendroides, Hook, Musci exot. t. lxix., sub Neckera. *P. intermedium*, Augstrœm in Hedwigia, 1875, 61 (Omalia).

Isle of Pines, Strange.

THAMNIUM, *Schimper.*

Th. Aneitense, Mitt. in Seem. Fl. Vit., 397.

Aneitum, Milne.

RHAPHIDORRHYNCHUM, *Schimper.*

Rh. contiguum, J. Hook. & Wils. in Fl. Tasm., ii., 213. *Rh. subhomomallum*, C. Muell. in Bot. Zeit., 1857, 781.

Isle of Pines, Milne, Strange.

Rh. Borbonicum, Belanger.

Isle of Pines, Strange.

ACANTHOCLADIUM, *Mitten.*

(*Acanthodium*, Mitt., olim.)

Ac. Strangei, Mitt. & F. v. M.

Folia (e medio caulis primaris) ovata, subulato-acuminata; ramea ovato-lanceolata, margine superne serrulata, cellulis oblongis areolata; seta biuncialis; theca arcuata, inclinata, oblonga, subhorizontalis.

Isle of Pines, Strange.

A. trimegisto similis. Color stramineus, haud nitens.

Ac. pedunculatum, Mitten.

Folia (e caulis primaris medio) ovato-lanceolata; subulato-angustata, subintegerrima; ramea compressa, nitida, oblongo-lanceolata, apice obtusiuscula, marginibus superioribus acute denticulata, cellulis elongatis areolata; perichætium subbasilare, foliis erectis longe angustissimeque attenuatis formatum; pedunculus fere triuncialis; theca ovalis, subæqualis, nutans.

Aneitum, Milne.

A. rigido simillimum.

ENTODON, *C. Mueller.*

E. pallidum, Mitt., in Seem. Fl. Vit. 398.

Isle of Pines; Milne, Strange.

E. Aneitense, Mitten.

Folia ovata vel ovato-lanceolata in apicibus ramorum apertis.

Aneitum; Milne.

ISOPTERYGIUM, *Mitten.*

Is. submicrothecum, C. Muell., in Bot. Zeit., 1857, 781.

Isle of Pines; Cuming.

ECTROPOTHECIUM, Mitten.

E. Sandwichense, Hooker.

Isle of Pines, Strange.

HYPNODENDRON, *C. Mueller.*

H. Milnei, Mitt., in Seem. Fl. Vit. 401.

Aneitum, Milne.

H. rigidum, Mitt., in Seem. Fl. Vit. 401.

Aneitum, Milne.

H. palmeum, Mitten.

Stipes radicellis fuscis brevibus obtectus, ramis approximatis pinnato divisis comam rotundatam formans; folia stipitis ad basim auriculata, hastata, sensim lanciformi acuminata, nervo tenui excurrente prædita, margine auricularum crenulata, apicem versus subintegerrima ; folia ramea ovato-lanceolata, nervo tenui percursa, margine serrulata, cellulis elongatis angustis areolata.

Statura adspertuque *H, fusco-mucronati*, (C. Muell. in Bot. Zeit. 1862). Stipes uncialis. Diametrus comæ circiter $\frac{3}{4}$--1 uncialis.

H. Chalmersii, Mitten.

Stipes eradiculosus, foliis appressis lanceolato subulatis tenui nervatis, margine remote serrulatis obtectus; rami recti curvati que simplices divisive in comam densam dispositi; folia compressa; lateralia patentia, parum majora ovata, acuta, nervo dorso dentato percursa, margine denticulata, cellulis elongatis areolata.

Owen Stanley's Range, New Guinea; Rev. J. Chalmers.

Stipes biuncialis; coma unciam sesque unciamve lata. Color pallide fusco-viridis.

THUIDIUM, *Schimper.*

Th. Campbellianum, Hampe.

New Hebrides, F. A. Campbell.

DAWSONIA, *R. Brown.*

D. superba, Greville.

Owen Stanley's Range, New Guinea, Rev. J. Chalmers.

[These have not yet been obtained in fruit; the foliage seems slightly different from that of the typical Australian species; hence I had distributed this grand moss as *D. Papuana.*—F.v.M.]

DEFINITIONS OF SOME NEW AUSTRALIAN FUNGI.

BY THE REV. C. KALCHBRENNER.

Agaricus (*Lepiota*) *rhytipelta*, F. v. Mueller.

Pileo carnoso, ovato-campanulato, primum umbrino, in umbone glabro, dein peripheriam versus in squamas validas dissumpente subquibus albo sericeo-striato; stipite subaequali basi bulbiformi dilatato, glabro, albo, deorsum fuscescente; annulo mobili membraneo, persistente; lamellis liberis, ventricosis, latis, subconfertis.

Lake Muir, Thomas Muir; Muellersville, near Rockhampton, Madame Thozet; Western Port, Miss M. Lewellin. Habitus Ag. Æypeslaris (Bulliard), sed major et annulus mobilis. Pileus 1-1½ uncias latus; stipes 3-4 uncias longus, 2-3 lineas crassus.

Agaricus (*Mycena*) *acutatus*, Kalchbr. & F. v. M.

Ab. A. filopede (Bulliard) cui proximus, conspicue differt *pileo* atro-cinereo, conico, *acuto*, 3 lineas alto, 2 lineas lato, stipite filiformi ad 4-5 pollices elongato, pallido.

Western Port, Miss M. Lewellin.

Agaricus (*Omphalia*) *glaucescens* Kalchbrenner.

Pusillus, pileo infundibulari; margine parum reflexo, 2-3 lineas lato, glauco (grey sagegreen); stipite filiformi laxo ½-1 pollicem longo, cum lamellis decurrentibus angustis subconfertis flavo-virente.

Western Port, Miss M. Lewellin.

Hygrophorus gilvus, Kalchbrenner.

Statura Hygr. Virginei (Fries), and totus fungus aurantio-gilvus, ultra pollicem longus, pileo umbilicato, dein infundibulari, 3-4 lineas lato, stipite pallidiore sursum incrassato cum lamellis in conum decurrente.

Western Port, Miss M. Lewellin.

Cum H. coccineo (Fries) ob lamellas *longe* decurrentes non conjugendus.

Hygrophorus (*Hygrooybe*) *Lewellinæ*, Kalchbrenner.

Totus lilacinus, ad pilei umbilicum saturatior, ad stipitis basim dilutior; pileo convexo leviter umbilicato, demum revoluto et fissili, sesqui-unciam et ultra lato; stipite fistuloso, æquali, nudo, 1½ uncias longo, 2-3 lineas crasso; lamellis adnexis ventricosis, latiusculis, subdistantibus.

Western Port, Miss M. Lewellin. Fungus perelegans.

Clavaria Kalchbrenneri, F. v. Mueller.

Tenuis, pallide luteo-aurantia, subcæspitosa; trunco tenui, nudo; ramis brevibus, acutis, dichotomis aut fasciculatis.

Western Port, Miss M. Lewellin.

Inter Cl. flaccidam et Cl. croceam media.

Clavaria lurida, Kalchbrenner.

Caespitosa, ramosissima, sordide albida: trunco tenui; ramis ramulisque congestis, elongatis, acutis, siccitate fuscescentibus et subfiliformibus.

Western Port, Miss M. Lewellin.

Polyporus (*Pleuropus*) *Strangerii*, F. v. Mueller.

Pileo suberoso-coriaceo, eumorpho, reniformi, convexo, sub-umbilicato, azono, impolito, unbrino-nigrescente; stipite brevi cylindrico incurvo incrustato undique nigro; poris minimis, rotundis, obtusis, cum substantia pilei niveis.

Riverina, C. F. Stranger, Esq.

Pol. melanopodi (Fries) proximus. Pileus 1-1½ pollices latus, 1-2 lineas crassus, margine acuto incurvus. Stipes vix 3 lineas longus, 2 lineas crassus, basi in discum dilatatus.

Wallendorf, December, 1881.

ON A SPECIES OF *Galaxias* FOUND IN THE AUSTRALIAN ALPS.

BY WILLIAM MACLEAY, F.L.S., &c.

I received from Baron von Mueller a few days ago, two specimens of a small fish which inhabits the icy ponds of the snowy range in the neighbourhood of Mt. Kosciusko. The Baron writes as follows: "I saw the same little creature in several of the waters high up in the Alps, during my exploration of the Snowy Mountains in 1853-4, and 1855, and again in later years when travelling, but I was in the then pathless alpine regions, unable to preserve zoological specimens. When in 1874, I for the second time ascended Mt. Kosciusco, I saw this species of fish again in the little glacier ponds, but missed catching any, my time being so much occupied, during my brief stay on the snowy summit, in the pursuit of plants."

The two specimens now sent me were captured by S. Findlay, Esq., J.P., on Mt. Kosciusko a short time ago, and in accordance with the learned Baron's expressed wish, I dedicate the species to its finder.

GALAXIAS FINDLAYI, *n. sp.*

D. 9, A. 12, P. 14, V. 7, C. 16.

The height of the body is about one-tenth of the total length, and the length of the head about one-fifth of the same. Head blunt and rounded in front, the space between the eyes broad and nearly flat; eyes small; the cleft of the mouth reaching to beneath the front margin of the eye; teeth minute in the jaws, and two rows of similar small teeth on each side of the vomerine ridge. There are numerous pores on the head. The length of the pectoral fin is less than the distance between its extremity and the ventral fin, and the length of the ventrals is less than their distance from the vent; the dorsal fin is situated almost entirely in front of the anal; the caudal is rather long and emarginate, a fold of skin joining it above and below to the body—the upper fold largest, but in neither case extending to the vertical fins, which are distant from the tail. A distinct anal papilla. Colour in sprits yellowish brown, the back densely speckled with very minute brownish dots, taking the form of very indistinct fasciæ.

Both specimens are small—the largest not exceeding three inches in length,—and are evidently immature. In a paper contributed by me to our Proceedings, Vol. v, p. 45, in describing another species of this genus from the head waters of the Colo River at Mt. Wilson, I point out the probability of fishes of this kind being abundant and probably of considerably size in the cold streams of the Snowy Mountains. In the same paper I gave a list of all the genus then known, with remarks on the peculiarities of the family. These consist of, first, the perfect isolation of the group, there seemingly being no relationship with any other family of fishes, unless the remarkable Mud Fish of New Zealand (*Neochanna*) forms an exception. The species are numerous, but so much alike, that it is, looking at their distribution, more than probable that they are one and all only permanent local varieties of the same fish.

But the chief interest attached to these fishes is in their distribution. They are found only in the rivers of Southern Chili, Magellan Straits, the Falkland Islands, Tasmania, New Zealand, and those parts of Australia where the rivers take their rise in the Snowy Mountains or in cold elevated table lands. So that in fact we find this singular fish in all the lands which extend into the colder regions of the Southern Pacific and nowhere else. The deduction from this singular fact is very plain. At one period,—probably very remote even in a geological sense,—the area of land above the sea in the antarctic regions must have been very much in excess of what it is at present, at all events sufficiently extended to admit of some kind of continuity across the whole width of the Pacific between the southern extremity of South America and Australia. There is no other way of accounting for the appearance of these fishes in such widely different localities.

There are other instances of similarity in the Fauna of South America and Australia, and Professor Hutton several years ago in an essay, " On the Geographical relations of the New Zealand Fauna," (N. Z. Instit. Trans., vol. 5.) showed from the distribution of the Struthious birds in the Southern Hemisphere that there must formerly have existed a huge Antarctic Continent, connecting South America, South Africa and Australia. What has become of this gigantic continent? The Geologist's answer will of course be that it has sunk, and such a theory is a most convenient one, as it at once gets rid of all troublesome questions as to the How and the Why. I think it however, more likely and much more intelligent, that it has been submerged by the gradual filling up of the sea during the break up of the glacial period.

Mr. Belt, the author of "The Naturalist in Nicaragua," was I believe, the first to suggest the melting of the ice at the end of the glacial period as accounting for the disappearance of large masses of land beneath the sea. He pointed out that the gradual accumulation of the waters of the earth during the long glacial period, on the land in the shape of glaciers, must have to that amount decreased the volume of the sea, and consequently increased the extent of dry land. He calculates, the addition to the depth of the sea, by the break up of the glacial period at 2,000 feet, and he shows, the very considerable area of the present Atlantic Ocean which must have been dry land up to that time.

A mere rise in the ocean of 2,000 feet would not, however, account for the submergence of such a vast continent as has disappeared in the South Pacific, but if we suppose a difference of level of 1,000 fathoms, the result would be very different.

Is the estimate of 1,000 fathoms as the increased depth of the sea at the end of the glacial period excessive or impossible? I think not. Of course if we take the proportions of land and water as they appear at present, it would seem impossible that such a mass of ice as this supposition would involve could ever have been heaped up on the land as it is now, but the lowering of the level of the sea by even a few hundred feet would largely increase the area of dry land, and a lowering of, as I suppose, 1,000 fathoms would reduce the sea to very small limits, and leave a very preponderating extent of dry land for the storage of ice. It strikes me that Mr. Belt's theory is worthy of more consideration than has been generally given to it. It gives a probable and intelligible reason for the submersion of whole continents, whereas the subsidence theory gives none.

NOTES ON *Apogon Guntheri*, OF CASTELNAU, AND DESCRIPTIONS OF TWO NEW FISHES FROM N.S.W.

BY E. P. RAMSAY, F.L.S., &c.

Finding that this species has been very meagrely described, I beg to offer a few detail notes on the subject.

APOGON (*Apogonicthys*) GUNTHERI, *Casteln.*

D. 7-$\frac{1}{9}$. A. $\frac{2}{8}$. P. 12-19. V. $\frac{1}{5}$.

Lat. line 26; the last scale elongated and with a row of 5 pores on either side and one large pore at apex.

L. Transverse, 3 above, 8 below lateral line between soft dorsal and anal; on the tail 2 above, 3 below the lateral line.

First dorsal spine small, the third and fourth about equal and longest, much curved backwards, situated in a line with the pectoral and the ventrals.

Teeth on both jaws, and in a narrow band on either side of the palate, minute, viliform; the maxillary reaches past the centre of the eye, the mouth very wide, preoperculum serrated, no serrations on the operculum, the length of the head equals the height between the root of the pectoral and the first ventral spine (a little less in the female distended with eggs), and is three times in the total length, the length of the pectoral is a little longer than half the length of the head; the length of the snout about two-thirds the diameter of the eye; eye large, greater than the interorbital space which is slightly elevated and rounded.

Colour uniform dark or light olive brown, golden brown on the head. From a specimen dredged off Ball's Head, 17 fathoms, mud bottom, Port Jackson.

Mr. Macleay is of opinion that this *Apogon Guntheri* of Castelnau, will prove to be *A. novæ-hollandiæ* of Valenciennes, (see P.L.S. of N.S.W., 1881).

SYNGNATHUS CINCTUS, *sp. nov.*

D. 23. Osseus rings 17 + 40.

Body rings 17, without the head. Caudal 40. Pouch extending over 14 caudal rings. Dorsal fin of 23 rays, 3 on the five first caudal rings, anal fin distinct. The operculum without a ridge, the snout equals the length of the head from centre of the orbit, and $1\frac{1}{2}$ diameters of the orbit; a deep narrow groove between the orbital ridges, a narrow, short sharp ridge in front on the forehead behind the orbits on the head but not extending on the neck ring. A small tubercle on the orbital ridge but no filament over the eye. The length of the head and snout is from $8\frac{1}{2}$ to $8\frac{3}{4}$ in the total length. The tail is $1\frac{1}{6}$ of the trunk, with the head. Each of the dorsal and ventral ridges on the last two osseous caudal rings, end in 3 or 4 sharp spiniform tubercles or serrations.

The rings which support the pouch are dilated on the outer margins, the lateral ridge ends abruptly on the third caudal ring, the height of the dorsal rings equals their width on the ventral surface, the width across their dorsal surface is about $1\frac{1}{4}$ less.

The colour varies from light grey to dark olive brown, the body with blackish bands, the caudal portion with spots; round the operculum except on its upper border is a white line margined with black, and there are a few white streaks on the throat, and six transverse white marks on the lower surface of the snout.

In a young female the lateral margins are not serrated on the last two osseous rings, as in the male.

Dredged in 17 fathoms, Port Jackson.

SOLEA FLUVIATILIS, *sp. nov.*

D. 65 to 66. A. 50 to 52. V. 5. C. 18.

Eyes small, on the right side, the upper very slightly in advance of the lower; the straight portion of the lateral line commences at about three rows of scales behind the eye, its upper branch at 11 scales, and the lower branch at about 8 scales from the lower eye; the lateral line extends over 120 scales from the upper branch to the tail; no pectoral fins; body scales with 8 to 10 spines; width of the interorbital space less than the diameter of the eye; mouth very small, opening to below the centre of the orbit. The greatest height is about the centre of the body, and is $2\frac{1}{3}$ in the total length, without caudal; the head is five times in the same, without caudal, and $2\frac{1}{6}$ times in the height. The breadth of the tail at the base is $1\frac{1}{2}$ times in its length. Colour light brown, covered with irregular wavy narrow transverse bands of a dark tint, 35 or more in number, with irregular interspaces, some of the lines confluent, others in regular waves. Length of specimen 3 inches, without caudal; tail 0·6 inch.

Hab. Freshwater, Hunter River.

This specimen was presented to the Museum by His Honor Judge Windeyer, in 1875. Type in the Australian Museum.

Description of the Eggs of Five Species of Fijian Birds.

By E. P. Ramsay, F.L.S., C.M.Z.S.

My friend, Mr. A. Boyd, has forwarded me some rare eggs of Fijian birds, which I believe have not hitherto been described.

1. Vitia ruficapalla, *Ramsay.*

(Drymochæra badiceps, *Finsch.*)

The egg of this interesting species is of a rich chocolate red, uniform in tint, and a little brighter than those of *Chthonicola sagittata*, which they resemble. Length, 0·75 in.; breadth, 0·55 in. The form is of a long oval. The nest is a dome-shaped structure of grasses, &c., not unlike that of some of the *Sericornis*, of the section to which *S. pontalis* belongs. The eggs are two in number.

2. Procellaria albogularis, *Finsch.*

I think if the adults of *Procellaria Cookii* be compared with the *P. albogularis* of Dr. Finsch, they will be found to be identical. Mr. A. Boyd, of Waidau, Fiji, informs me "that this species breeds during the months of May and June, in the thick forests in high mountain tops, digging a hole in the earth in a slanting direction, about two feet in length, and lay one, but sometimes two eggs at the end of the burrow, without making any other preparation for their reception. I found them common on *Muani vatu*, the highest peak in the interior of Viti-levu, and they are also found breeding on Ovalau. The males assist in incubating. Out of two dozen taken from their holes, the majority were of that sex (♂). Their note is a low mournful cry." The eggs are ovate, rather pointed, of a dull white, with a few yellowish brown stains, probably from the earth on which they were laid. Average length, 1·9; breadth, 1·4.

3. Artamus mentalis.

Eggs light cream color, almost white, with dots and spots of reddish brown, and larger irregular obsolete markings of a pale lilac, sometimes forming a zone on the thicker end. Length, 1 in.; breadth, 0·7.

4. Merula vitiensis, *Layard.*

(*Toula* of the natives.)

Eggs pale green, with reddish brown spots and freckles all over the surface, crowded on the thicker end. Form oval, the thin end rounded. Length 1·1 x 0·83 in.

5. Merula ruficeps, *Ramsay.*

(M. bicolor, *Layard, MSS.*)

Eggs very light green, with freckles of reddish brown, sprinkled sparingly over the surface, crowded into a blotch on the thick end; the thinner end pointed. Length, 1·15 in by 0·8 in. The nest is similar to that of others of the genus,—a round cup-shaped structure of sticks, lined with finer material and grass, &c.

(*To be continued.*)

Note upon the Bark of a reputed Ecbolic Plant from New Caledonia.

By Dr. Thomas Dixon, Sydney.

Some two months ago I received from this Society about ($2\frac{1}{2}$) two and a half ounces of bark, sent by Mr. Layard, of New Caledonia; it was in pieces apparently from an undershrub—inside it was fibrous and brown, outside it had a corky layer $\frac{1}{20}$ inch thick, with a grey-brown surface more or less tuberculated. On tasting it had a slightly astringent barky flavor only. Perchloride of iron gave a black infusion, caustic potash solution darkened it, shewing presence of tannic acid. Having so little to work with I made a cold infusion of some, then spirituous etherial extract from the rest, and finally I made a decoction of the already used bark. The result was three very light brown clear fluids, very slightly astringent in the case of the infusions. I added all three together, carefully dried at a temperature of 120° Ft., and made thus an extract weighing some nine grains, which was chiefly fine powder from the bark. I gave a cat (in kitten) three grains as a pill,—no effect of any kind visible, even on the pupil of the eye. I gave her a week later the remaining six grains in milk, which she devoured greedily, though it made the milk quite brown,—no effect resulted. A kitten three months old took a little left in the milk dish, with no visible effect. The cat littered four mature kittens two days after.

Now, be it remembered that here was six grains of extract from $1\frac{3}{4}$ oz. of bark given to an animal 6 lbs. weight, which should be a powerful dose if the medicine had any potency of consequence. Reputed Ecbolics are numerous, but the only good ones known are *Claviceps purpurea* (Ergot of rye), and *Ustilago maidis* (smut of corn). These are low vegetable growths; investigation would probably show that this Ecbolic property is a characteristic of this coniomycetous group, as are the physiological properties of other plants and groups.

The bark probably is an astringent of little value, since we have many such of much more pronounced qualities,—and, moreover, mere astringency is a property less and less estimated in medicine as science advances.

Note on the Anatomy of two rare genera of Pigeons

By William A. Haswell, M.A., B.Sc.

Ædirhinus insolitus.

The genus *Ædirhinus* is distinguished among the fruit-eating pigeons by the possession of a bony excrescence on the nasal and frontal regions of the skull, very much resembling that occurring in certain varieties of the domestic fowl. An examination of its anatomy, however, shews that in all other respects this rare pigeon is a very near ally of the genus *Ptilopus*. As in the latter genus there is no gall-bladder the *ambiens* muscle is absent and the gizzard has a cruciform lumen in transverse section owing to the development of four muscular masses. One point hitherto unnoticed in the myology of *Ptilopus* is likewise shared by *Ædirhinus*. In a previous note on the myological characters of the *Columbæ* published in the proceedings of this Society, (Vol. iv., p. 306, 1879), I gave as one of the peculiarities of the muscular system in the Pigeons the absence of a posterior belly of the *latissimus dorsi*. At that time I had only had the opportunity of examining members of the subfamilies *Columbinæ* and *Phapinæ* of Garrod, and in these this modification of the muscle seems to be universal. In *Ædirhinus*, however, and in *Ptilopus*, I find that, as in all other birds except the *Columbinæ* and *Phapinæ*, the posterior belly of the muscle is well developed.*

The Treroninæ may thus be defined myologically as Columbidæ wanting the *ambiens* muscle, but possessing a posterior belly of the *latissimus dorsi*.

TURACÆNA CRASSIROSTRIS.

The genus *Turacæna* of Gould is a granivorous pigeon resembling *Macropygia* in most respects, but distinguished from it by the possession of a very large and powerful bill, rivalling that of *Didunculus* in size. As in *Macropygia* and the rest of the *Columbinæ*, there are twelve long rectrices and the gall bladder is absent. The gizzard has a squarish outline on a front view, contrasting with the oval shape of that of *Macropygia*; in length it is an inch and a quarter, and the breadth is nearly equal to the length. The cavity is wide and somewhat oblique, the mass of the muscular fibres being aggregated at the anterior and right, and posterior and left angles. The intestine is about 30 inches in length and is devoid of cæca. As in the rest of the *Columbinæ* and *Phapinæ*, there is an *ambiens* muscle and the posterior belly of the *latissimus dorsi* is absent.

The form of the bill and the shape of the gizzard remove *Turacæna* somewhat widely from *Macropygia*, and the absence of intestinal cæca seems to favour this genus being placed in the subfamily *Phapinæ* rather than the *Columbinæ*.

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*In this as in various other points *Didunculus strigirostris* approximates rather to the Treroninæ than to the *Columbinæ* or *Phapinæ*.

A List of Cypræidæ, found on the Victorian Coast, Collected by Mr. J. F. Bailey.

By J. Brazier, C.M.Z.S.

Our new and energetic Victorian Fellow, Mr. J. F. Bailey, has sent me, to exhibit on his behalf, eight species of *Cypræa*, collected by him on various parts of the Victorian coast. I herewith append a list of all the species, with references where described, and other remarks on some of them.

1. Luponia umbilicata.

Cypræa umbilicata, Sowerby, Tankerville Catalogue, p. 30, 1825 ; Zoological Journal, Vol. ii., p. 495, (1826) ; Woods, Index Test. Suppl., pl. 3, fig. 13, (1828) ; Gray, Zoological Journal, Vol. iv., p, 77, (1828) ; Sowerby, Zoological Journal, Vol. iv., p. 221. *Cyprovula umbilicata*, Gray, P.Z.S., p. 124, (1848) ; Angas, P.Z.S., p. 205, (1867). *Cypræa umbilicata*, Sowerby, Thes. Conch. pl. 7, figs. 42, 43, 44. *Cypræovula umbilicata*, Brazier, P.Z.S., 1872, p. 85.

Hab. Cape Schank and Portland (*Bailey*).

Examples of this once very rare shell have been dredged off the coast of New South Wales. Reeve, in Conch. Icon., 1845, termed the only specimen he had seen a monstrosity of *Cypræa pantherina*, Solander, from the Red Sea. Dr. Gray, in 1849, says, "To give some idea of the extraordinary price which is now sometimes required for shells, I may state that the second specimen of this Cowrie, sent home by Mr. Gunn to a London collector, was offered by him to Miss Saul for £30, and eventually realized that price." At the present day the shell is quite common, being found on the beaches at Circular Head, Tasmania, during winter gales.

2. Luponia angustata.

Cypræa angustata, Gmelin (non Gray), Syst. Nat., p. 3421 ; Wood, Index Test., pl. 17, fig. 52 ; Reeve, Conch. Icon., pl. 17, sp. 91 ; Sowerby, Thes. Conch., pl. 28, fig. 296-297.

Hab. Jan Jue, about 18 miles on the coast below Geelong, Queenscliffe (*Bailey*).

The specimens obtained are in the very best condition, the back is of a very dark chocolate brown, sides marked with very large chestnut brown dots, some of the dots are jet black; one specimen was on the card with *C. Comptoni.*

3. Luponia Comptoni.

Cypræa Comptoni, Gray, Voyage of H.M.S. "Fly," Appendix. Vol. ii., p. 356, pl. 1, fig. 3 (1847); Sowerby, Thes. Conch., pl. 28, figs. 292, 293, 294, 295.

Hab. Queenscliffe, Victoria (*Bailey*).

This species runs into *angustata.* Mr. Angas, in P.Z.S., p. 170, 1865, says, "that the animal of *Comptoni* is of a bright orange color, whilst that of *bicolor* of Gaskoin is of a pale lemon." I should like our southern friends to look after the animal of *angustata.* Gray's locality, Port Essington, as given by him either on the authority of Jukes or Cuming, in the Voyage of the "Fly," is wrong.

4. Luponia declivis.

Cypræa declivis, Sowerby, Thes. Conch., p. 31, pl. 28, fig. 287, pl. 30, fig. 328, 329, (1879.)

Hab. Portland, Victoria (*Bailey*).

Two specimens Mr. Bailey had on the same card with *piperita,* Sol. As that species it was well figured by Mr. Sowerby in 1870. It is a much more solid shell than *angustata,* with the whole dorsal surface covered with small light chestnut specks, giving it the appearance of being dusted over with capsicum pepper. The sides are less spotted than any of the species mentioned in this paper. It is also found in the northern parts of Tasmania.

5. Luponia piperita.

Cypræa piperita, Solander MSS.; Gray, Zoological Journal, Vol. i., p. 498 (1824); Reeve, Conch. Icon., pl. 17, sp. 87; Sowerby, Thes. Conch., pl. 28, figs. 285, 286.

Hab. Jan Jue and Hobson's Bay (*Bailey*).

The specimens from the above localities are in splendid condition, and of very large size.

6. Luponia bicolor.

Cypræa bicolor, Gaskoin, Proc. Zool. Soc., p. 92, (1848); Sowerby, Thes. Conch., pl. 26, figs. 252, 253.

Hab. Jan Jue, very rare (*Bailey*).

7. Aricia annulus.

Cypræa annulus, Linn., Syst. Nat., p. 1179; Reeve, Conch. Icon., pl. 15, sp. 71; Sowerby, Thes. Conch., pl. 26, fig. 252, 253; Brazier, Proc. Zool. Soc., p. 83, (1872).

Hab. Portland, Victoria (*Bailey*).

This is quite a new home for this species, the most southern record we have of it is Botany Bay, New South Wales, along with *moneta* mentioned in my paper on the *Cypræidæ* published in the Proceedings of the Zoological Society for 1872. The species appears to extend from Portland in the south all along the eastern, northern, and western coast of Australia. Some of Mr. Bailey's examples are in splendid condition, others again are very poor and beach-worn. It is very strange that we should get so many of the Indo-Pacific species in southern waters. He also found a large quantity of *Strombus floridus*, Lam., at the same time and place; it is also common to East, North, and North-east Australia and Solomon Islands, &c.

8. Trivia australis.

Cypræa Australis, Lam., (non Gray) An sans Vert., Vol. 7, p. 404. Reeve, Conch. Icon,, pl. 24, sp. 138. Sowerby, Thes. Conch., pl. 34, fig. 439, 444.

Hab. Western Port, Victoria ; very common (*Bailey*).

Some of the specimens are very fine ; the largest measure 19 millimetres long ; the smallest 10 mill. ; it is very common on the coast of New South Wales, washed up on the outer beaches after gales. I have obtained living specimens from 10-15 fathoms in Port Jackson, and under stones during low spring tides.

9. Trivia oryza.

Cypræa oryza, Lam., Anim. sans Vert., Vol. 7., p. 403. Gray, Zoological Journal, Vol. 3, p. 369, 1827. Forbes, in Voyage of H.M.S. Rattlesnake, appendix, Vol. 2, p. 365. Sowerby, Thes. Conch., pl. 35, fig. 474, 475, 476. *Cypræa nivea*, Reeve, Conch. Icon., pl. 24, sp. 136. *Trivia candidula*, Angas (non Gaskoin), Proc. Zool. Soc., p. 94, 1871. Brazier, *l. c.*, p. 86, 1872.

Hab. Jan Jue, Victoria, not common (*Bailey*).

I have seen a great many specimens some good in condition, others very much sea-worn. I obtained living examples under stones, one specimen I sent to Mr. Angas some years ago and he recorded it as *Trivia candidula*, Gaskoin. I was led into the same error with it; since then I have large numbers of the true *Trivia oryza* found on various parts of the coast of New South Wales, Queensland, Torres Straits, Northern Australia, New Caledonia, Solomon Islands, Caroline Island, Kingsmill Group, and Marshall Group. *T. candidula* is quite distinct from *T. oryza.*

There has been a great deal of confusion about this species in illustrated Monographs, the shell *Cypræa nivea*, figured by Reeve Conchologia Iconica, pl. 24, species 136, is *Cypræa oryza*, Lam.

The *Cypræa* figured by Reeve, Conch. Icon., pl. 24, species 140, is the *Cypræa scabriuscula*, Gray. The same error occurs in Sowerby's Conch. Illust. The true *Cypræa nivea*, Gray, Zoological Journal, Vol. i., p. 511, 1824, is a white variety of *Cypræa eburnea*, Barnes. Gray's shell was pierced with two holes, and was supposed to have been worn by some savage islander. Gaskoin, in Proc. Zool. Soc., p. 98, 1848, says that the specimen before him is a white variety of *Cypræa turdus*. Gray's description of *nivea* answers in every respect to *eburnea*, Barnes. Dr. Gray was a rather acute observer, and I don't think for one moment he would call a *Cypræa turdus* an *eburnea*, even if it was a white variety. The *Cypræa nivea* figured in Wood, Index Test. Suppl., pl. 3, fig. 12, 1828, is *Cypræa lutea*, Gronovius, *Humphreyii*, Gray. *Oryza* was dredged at Port Philip in five fathoms by Mr. John Macgillivray, Naturalist to H.M.S. "Rattlesnake," in 1848, so it is a very old southern record.

Notes on Bulimus Gunni.

By J. Brazier, C.M.Z.S.

Professor W. J. Stephens handed to me some weeks ago a fossil *Bulimus* from Kent's Group, Bass' Straits, found in the Travertine of that Group. I have identified it with *Bulimus Gunni*, described by G. B. Sowerby from a cast in Strelitzki's, New South Wales and Van Diemens Land, p. 298, I notice that Mr. Robert, M. Johnson, Proc. Royal Soc., Tasmania, 1879, p. 90, mentions it being found in the Yellow Limestone, Hobart Town; he says, "that he should infer that it is closely allied to the existing species, *B. Tasmanicus*." The whorls are striated, irregularly transversely, as in the existing species *B. Tasmanicus*. Professor Stephens' specimen corresponds exactly with Mr. Johnson's description; the specimen I have before me has been fractured twice before being fossilised; in my opinion there does not exist the least specific difference between *B. Gunni* and *B. Tasmanicus,* the last name will have to be laid aside.

Length of specimen 33 millemetres.

On the Edible Oysters found on the Australian and Neighbouring Coasts.

By J. C. Cox, M.D , F.L.S., &c.

Some years ago I read a paper before the Acclimatization Society of New South Wales, on "The Oysters and Oyster Beds of New South Wales," which was published in the columns of the *Sydney Morning Herald.* In it was embodied all the information I then possessed on the different species of Oysters found on our coasts, and it went fully into the different varities of the same species which were found at most of the beds that were then being worked.

Since then our knowledge of the different species found on this and the neighbouring coasts of Tasmania, New Zealand, Lord Howe's Island, and Queensland has so improved that it will not be uninteresting to many scientifically, and to others commercially, to have a condensed resumé of the species as now defined, published in our journal.

In 1867, Mr. G. F. Angas published in the Proc. Zool. Soc., London, a list of the species of Marine Mollusca found in Port Jackson, in which he enumerated four species of *Ostrea* as having been found there, (see page 934), namely, *Ostrea purpurea,* Hanly, *Ostrea mordax,* Gould, *Ostrea circumsuta,* Gould, and *Ostrea virescens,* Angas.

The same author, also in a valuable list of the Marine Fauna of South Australia, published in the Proc. Zool. Soc., London, for 1865, mentioned that two species of Oysters were found on that part of our coast—*Ostrea edulis*, Linn., or a variety of it, and *Ostrea cucullata*, of Born.

The Rev. J. E. Tenison-Woods, in his "Census of the Marine Shells of Tasmania," records four species of Oysters as found on the Tasmanian shores, namely, *Ostrea edulis*, Linn., *Ostrea mordax*, Gould, *Ostrea rutupina*, Jeff., a variety of *O. edulis*, and *Ostrea Angasi*, Sowerby.

In Hutton's "Manual of New Zealand Mollusca," (Marine and Land Shells), published in 1880, I find recorded as found on the New Zealand coast four species, *Ostrea edulis*, Linn., *Ostrea discordia*, Gould, *Ostrea glomerata*, Gould, *Ostrea reniformis*, Sowerby.

In Reeve's "Monograph on the genus Ostrea," published in 1871, in Conch. Icon., I find that there are five species recorded as being found on the Australian Coasts, namely, *Ostrea myrtiloides*, Lam., *Ostrea virescens*, Angas, *Ostrea Angasi*, Sowerby, *Ostrea discordia*, Gould, and *Ostrea subtrigona*, Sowerby.

So that thirteen species have been recorded by these various authors as being found on our Australian Coasts proper, Tasmania, New Zealand, Lord Howe's and Norfolk Islands, two of which are considered only varieties of *Ostrea edulis*. They are as follows :

1. *Ostrea Angasi*, Sowerby.
2. ,, *circumsuta*, Gould.
3. ,, *cucallata*, Born.
4. ,, *discordia*, Gould.
5. ,, *edulis*, Linn.
6. ,, *glomerata*, Gould.
7. ,, *mordax*, Gould.
8. ,, *myrtiloides*, Sowerby.
9. *Ostrea purpurea*, Hanley, a variety of *O. edulis*, Linn.
10. *Ostrea reniformis*, Sowerby.
11. ,, *rutupina*, Jeff., a var. of *O. edulis*, Linn.
12. *Ostrea subtrigona*, Gould.
13. ,, *virescens*, Angas.

This does not include all the species which so far have been found on our shores, we shall have to add :

14. *Ostrea Cristagalli*, Linn.
15. *Ostrea imbricata*, Lam.

But it must not be supposed that, because we have had these fifteen species diagnosed and recorded as coming from our coast, that therefore, there really are fifteen species found here, the diagnosis made of these species has been very imperfect, and in most instances very incorrect. I propose therefore, to give what I consider a correct list of species which have been more recently determined as having been found here, at the same time to assist those who are engaged in studying our Oysters scientifically or commercially, to give the diagnostic characters of each species, and shall begin with those that are found on the coast of New South Wales proper; they are :

1. *Ostrea Angasi*, Sowerby ; our Mud Oyster.
2. ,, *subtrigona*, Sowerby ; our Drift Oyster.
3. ,, *glomerata*, Gould ; our Rock Oyster.
4. ,, *circumsuta*, Gould ; a rare species.
5. ,, *virescens*, Angas ; also a rare species.

The two last are of no commercial value, being very rare, of small size and difficult to remove perfectly from the rocks to which they are attached.

1. Ostrea Angasi, *Sowerby*.

"Shell large, compressed, roundly subtrigonal, cinereous, a little purple towards the margin, inequi-valve, white within; lower valve thick, ribbed, its margin expanded, fluted, with bluish border; upper valve depressed, armed with broad, thin, smooth scales fluted towards the margin; muscular impression large in both valves."

The above is Sowerby's original description of this species as given in Reeve's Conch. Icon. An excellent figure of this species is given in Vol. xviii of Reeve's Conchologia Iconica, Mon. Ostrea plate xiii., Sp. 27, fig. 28, by mistake, it should be fig. 27.

This is the Mud Oyster found in Port Jackson and near the mouths of our rivers and harbours emptying themselves on the

East Coast of New South Wales. This is the species which Angas gave in his list of the species of Marine Mollusca, found in Port Jackson, already referred to in the Proc. Zool. Soc., Lond., for 1867, page 934, as *Ostrea purpurea*, Hanley, a variety of *Ostrea edulis*, of Linn., and did so on Mr. Hanley's authority—an authority of no mean importance, and which should have great weight in determining this vexed question. It has however, since been created into a distinct species by Sowerby, and I am willing to adopt this decision as final. Sowerby says that the sculpture of it is much less coarse than in equally large specimens of *Ostrea edulis*, Linn., and the upper valve is more convex than in *edulis*. Angas says that it differs from *edulis* by the laminate scales being much larger and more regularly filled, and the valves are dentate at the margins.

The largest specimens of this species found in the waters of New South Wales measure about six inches in diameter.

This species is now comparatively very rare, I say comparatively, for judging from the masses of this shell in the old camp ovens of the aborigines, along the shores of our river mouths and bays, it must have yielded an abundant supply of food in former days to those tribes which have now almost disappeared from amongst us.

I am of opinion that this is the same species of shell as is found in Tasmania, and which is recorded in the list of Tasmanian shells by the Rev. J. E. Tenison-Woods as *Ostrea edulis*, Linn.; the specimens found in Tasmania however are much larger and more ponderous than the shells of those found here; some from Tasmania exhibited at the late Universal Exhibition in Sydney, measured over seven inches in breadth. By adopting the name of *Angasi* we get rid of the species, *O. edulis* and its varieties, *O. purpurea*, and *O. rutupina* from our list. It is now extremely rare to see this species exhibited for sale in the shop windows of our fishmongers, which is to be regretted, as it is considered by many of superior quality to our other oysters; it would be well worth while to attempt to cultivate so fine a species in its native waters, otherwise it is probable that it will soon altogether disappear. The variety of it diagnosed by the Rev. J. E. Tenison-Woods as *O. rutupina* of Jeffrey's is still plentiful in some of the Tasmanian waters.

Ostrea edulis of Linnæus, is not recorded by Reeve as being found in any other locality except Europe, but he instances five varieties as arranged by Jeffreys of it.

1. *O. parasitica* of Turton, adhering by a large part of its under surface to shells &c.

2. *O. hippopus* of Lam, not gregarious like the ordinary form but solitary, and living in deep water.

3. *O. deformis* of Lam., including those varieties elongated perpendicularly or laterally.

4. *O. rutupina* of Jeffreys, a small regularly formed, not very flaky variety, known as "Natives."

5. *O. tincta* of Jeffreys, like the last regularly formed and flat, but differing in having the sides coloured with purplish brown.

It is difficult to understand why so able a monographer as Reeve has omitted to mention in any way the variety *purpurea* of Hanley, either as a synonym of this species or any other, or has not recorded it as a distinct species, which Mr. Angas considered it.

2. Ostrea subtrigona, *Sowerby.*

Figured in Reeve's Conch. Icon., pl. xviii., sp. 38, fig. 38, a. b. and described as follows:—"Shell subtrigonal, oblong or subquadrate, ponderous, rather narrowed towards the umbones broad at the ventral margin, quadrate; margin strongly plicated lower valve deep, greenish white, edged (slightly) with purple, without radiately plicated, concentrically banded with fawn and purple; hinge acuminated, sides crenulated near the hinge. The sculpture of the shell is bold and large, and the square character of the ventral margin is striking."

The habitat given by Reeve is Australia.

This undoubtedly is our drift oyster, dredged so abundantly in beds at the mouths and in the channels of the rivers emptying themselves on the East Coast, and now so valuable an article of export from this city to the neighbouring colonies.

Ostrea subtrigona of Sowerby may justly be placed as the second species of importance—if it should not take first position—found in the Australian waters, it is the "drift oyster" of the harbours of New South Wales, the oyster in most common use as an article of food throughout the whole of New South Wales, and largely exported to Melbourne, Adelaide, Brisbane, Tasmania and even New Zealand and Fiji.

It is difficult to account for the absence of this abundant and valuable species in the list of Conchifera from Port Jackson and the adjacent coasts as published by Angas in 1867, I can only conclude that he considered it one and the same species as our rock oyster, which he erroneously considered *Ostrea mordax* of Gould, whereas it really is *Ostrea glomerata* of Gould. This species has attained the name of Drift Oyster on the supposition that the beds which it forms itself into are shifted from one part of the bay or river to another by the influence of tides or storms; these so-called beds are composed for the most part of free unattached individuals, or attached in masses to drift matter, or to each other by slight adhesion of the lower valve. It is always found in moderately deep water in beds well out in the stream and is never uncovered by the fall of the tide; it lives in a zone considerably below the zone occupied by the Mud Oyster and Rock Oyster.

It is popularly supposed and believed that this and our common Rock Oyster are one and the same species, so confident are some that such is the case, that oysters are gathered off our rocky shores in large numbers and are laid down in positions in which it is thought a bed of oysters would thrive similarly to the beds which are found of this species, and that they will there grow spawn and reproduce Drift Oysters; this is a great error, and a want of knowledge of the true habits of this species and our common Rock Oyster (*Ostrea glomerata*), has led to disappointment and loss in attempts which have been made to cultivate oysters as a commercial investment.

The spat from our Rock Oyster will never produce this species, and if this species is placed in a position where it is uncovered by every receding tide it wastes and dies, but if kept well immersed it will thrive, fatten and reproduce itself, especially if it is placed in a position where there is a good current of water. Again our Rock Oyster has been placed in a similar position to the natural beds of the Drift Oyster (*Ostrea subtrigona*) but always with disappointment; when our Rock Oysters are placed in such a position they will not thrive and fatten, and in fact will not live very long, but will live longer than if the Drift Oyster is placed in the natural position of the Rock Oyster, uncovered night and morning by the fall of the tide. This species is considerably preyed upon by other mollusks.

3. Ostrea glomerata, *Gould.*

The common Rock Oyster of this harbour. Mr. Angas has, as I have already pointed out erroneously called this species in his list of Port Jackson Shells, *Ostrea mordax* of Gould. The Rev. J. E. Tenison-Woods in his "Census of the Marine Shells of Tasmania," tells us of the existence of a Rock Oyster similar to the Rock Oyster of New South Wales, which he also calls *Ostrea mordax* of Gould; and Mr. Angas in his paper on the "Molluscan Fauna of South Australia" speaks of the common Rock Oyster of that locality as *Ostrea cucullata*, Born, and states that it extends from King George's Sound to New South Wales, (this is also an error), and it is recorded by Hutton as the Rock Oyster of Auckland, but not found further south in New Zealand. The fact is this species has a very wide range, from King George's Sound along the Great Australian Bight to South Australia, thence all along the coasts of Victoria and New South Wales as far north as the Tweed River.

This oyster occupies a zone above any of the other species, it is seldom found in the zone occupied by the Mud Oysters, and certainly never in such deep water as that in which *Ostrea subtrigona* is found. Generally it is found adhering to the rocks considerably above low water mark, and in places in the upper Marine zone among the *Trochocochlea* and *Nerita*; it varies much in form and appearance, at times being beautifully and delicately edged with a frill of a purple hue, at other times it is large hooded and unfringed at the edge, the latter forms are generally the best oysters.

If individuals of this species are placed in proper trenches or in positions where clear fresh sea water will flow over them at each tide, they thrive and fatten to an extent which makes them a valuable article of food, and an important commercial product; and by placing low stakes of wood or other material for the spat to adhere to when emitted from the mother shell, they are easily and successfully propagated; but when placed in such positions, especially on mud-flats which are uncovered by every tide, they are liable to the attack of a number of other Mollusks, and unless the water which flows over them is pure and free from decomposed vegetable matter and grit, they suffer from irritation caused by such particles, some discolor and waste, others die, and considerable loss may occur to the Cultivator from causes which may or may not be within his control.

The following is Reeve's description of this species:—"Shell thick, irregular, sharp-ribbed with the margin dentated or lobed, very inequivalve; upper valve opercular, compressed, wrinkled with thick concentric laminæ; lower valve cucullated, purple-white within edged with purple or black; lateral margins denticul, ated; hinge generally attenuated, produced, pointed."

Having made a very careful examination of our common Rock Oyster and compared it with the description of this species and that of others, I conclude that our Rock Oyster must be referred to this species; it is not *Ostrea cucullata.* The only other species which it could be referred to is the one which it was referred to by Mr. G. F. Angas—*Ostrea mordax* of Gould. The latter is acutely denticulated within between the lobes, and the border between the denticles is of a deep purple brown; these characters are the most important and are not found in our common Rock Oyster as they are in the Oyster adhering to the rocks on the eastern shores of Queensland.

I do not concur with Reeve in looking upon *Ostrea spinosa*' Quoy, as possibly a young of *O. glomerata* or *O. cucullata*; the young of these two species never approach that form.

4. Ostrea mordax, *Gould.*

This species is a Rock Oyster found adhering very firmly to the rocks by the whole of the lower valve from Brisbane in Queensland to far North beyond Port Denison where probably it is found in greatest perfection; by consumers it is considered a great luxury and of finer flavour than any of our Southern species, it occupies a zone so as to be uncovered by the falling tide, which is very great in those localities.

The habitat of this species, is given doubtfully by Reeve as California, but it is not found there. Mr. John Brazier found it at Samoa, and at the Fiji Islands. It is also found at Port Denison, Queensland, and probably all along the coast north of Moreton Bay to Cape York, and at Lord Howe's Island, &c.

It is a compressed shell deeply lobed at the margins, between these lobes within it has acute denticles, and the border between these denticles is of a deep purple brown; the hinge margin is straight and squared at the ends. Upper valve very flat, cinnamon-tinted within, variegated with purple between the denticles and margin lobes; lower valve thick and whitish within.

This is the species which Mr. George French Angas erroneously referred our common Rock Oyster to when he wrote his valuable list of the Marine Mollusca of Port Jackson Harbour and the adjacent coast.

5. Ostrea cristagalli, *Linneus.*

I am doubtful if this species should be included with the edible oysters, it is said to be freely eaten in Northern Queensland by the natives, and also in the South Pacific Islands, but I have not had any experience of it myself. I have specimens of it from Port Denison and other of the Northern Queensland Ports, and it is abundant in the Solomon and other Islands of the Pacific. It is known as the Cock's Comb Oyster. Figured in Reeve's Conch. Icon., Pl. xi., Species 22, Ostrea.

6. Ostrea imbricata, *Lamarch.*

Anim. sans Vert. Ostrea, No. 46. Figured in Reeve's Conch. Icon., Pl. xvii., sp. 36, a. b.

This Chinese species has recently been procured in fine condition at Port Denison, Queensland. I am not aware if it is an oyster which is used much as an article of food, but judging from its shell the occupant should be a delicious morsel.

It is a large foliaceous, thin shell, loosely radiately plicated, pinkish and ornamented with irregular purple spots, other shells are of a pale fawn, tinted with reddish brown; the lower valve often foliaceous.

7. Ostrea virescens, *Angas.*

Described in the Pro. Zool. Soc., Lon., 1867, p. 911, pl. xliv, fig. 13.

A suborbicular solid inequivalve shell, with the margins of the shell crenulately frilled, of a greenish-olive colour within, paler at the margins; the upper valve smallest, flattened, radiately plicate and laminately scaled, about 1¾ inches long and 1½ broad. Found attached to rocks and Madrepores at the edge of low spring tides at Watson's Bay, Port Jackson.

This species is also well figured in Reeve's Conch. Icon. Mon., Ostrea, Pl. xi., sp. 23, fig. 23.

This is not a species likely ever to be of any commercial value, it is rare, and its green internal hue is uninviting.

8. Ostrea circumsuta, *Gould.*

United States Expedition. Figured in Reeve, Conch. Icon. Pl. xxvi., sp. 64, fig. 64, a. b.

The habitat given by Reeve, with doubt, of this species, is Massachusetts, but the fact that it is not included in the Marine Shells cf the United States by Tryon, pretty clearly proves that this locality is a mistake. Mr. G. F. Angas was the first to point out that the species is found on those shores, he gives Botany Bay as the exact home of this shell, which statement I have much pleasure in endorsing; it is found there attached to rocks, not abundant, but specimens can easily be procured. It is about two inches long and one broad, and derives its name from the stitch-like appearance of the denticles in the upper valve, and corresponding indentations in the inner surface of the margin of the lower valve. It is whitish or purplish externally, plicated at the margin and tinted with purple or green within.

9. Ostrea discoidea, *Gould.*

Figured in Reeve, Conch. Icon., Pl. xiii., Fig. 26, sp. 26.

A rounded, flattened, finely striated, whitish-brown species, rayed with pale purple; valves almost equal, the lower one convex and the upper one much compressed; the hinge is comparatively small and contracted.

I have never seen this species, and neither Reeve or Hutton mention if it is an attached species or not.

Hutton gives the habitat of this species as Pelorus Sound, Catlin River, New Zealand. "A doubtful identification; perhaps the same as *Ostrea edulis*, Linn."—Hutton.

Reeve mentions that it is also found in Fiji.

10. Ostrea reniformis, *Sowerby.*

Figured in Reeve's Conch. Icon., vcl. xviii., fig. 57.

"The Rock Oyster of Dunedin is referred with great doubt to this species."

Reeve in his Monograph records it as coming from Australia, which I think is a mistake.

11. Ostrea mytiloides, *Lamarch.*

Lamarch, in Animaux sans vertebres, Ostrea No. 21. Reeve, Conch. Icon., vol. xviii., fig. 3.

A parasitic species, solid, oblong, attenuated towards the hinge, plicato-crenated at the sides, deep violet, obscurely rayed, about four to five inches long, and two wide, generally attached to the Mangrove trees, and occupies a zone above low water mark in the bays and mouths of the Queensland Rivers. Mr. Brazier has a specimen of this species from Port Jackson.

12. Ostrea cucullata, *Born.*

Born, Mus. Ind., Cæs. Tab. vi., fig. 11, 12. Reeve, Conch. Icon., plate xvi., sp. 34, fig. 34, a. b. c.

I do not consider this an Australian species.

Reeve states that Hanley has referred this species, which is a very variable one to *Ostrea cornucopiæ,* Chemn., and *Ostrea Forskali*, Chemn., with which he agrees, but gives no habitat for it. I have included it in this list as it is to this species that

Mr. G. F. Agnas referred the Rock Oyster of South Australia when he wrote his paper on the "Marine Molluscan Fauna of South Australia," in 1865, p. 643, part ii.

It is found Mr. Angas says, common everywhere on rocks between tide-marks from King George's Sound to New South Wales; excellent eating and of a delicious flavour.

Two years after, when writing on the Marine Mollusca of Port Jackson and the adjacent Coasts, he does not include this species and refers our Rock Oyster in Port Jackson to *Ostrea mordax* of Gould, I presume he had altered his opinion on the South Australian species, and referred them both to *Ostrea mordax*, but I include them both under one and the same species—*Ostrea glomerata*, of Gould.

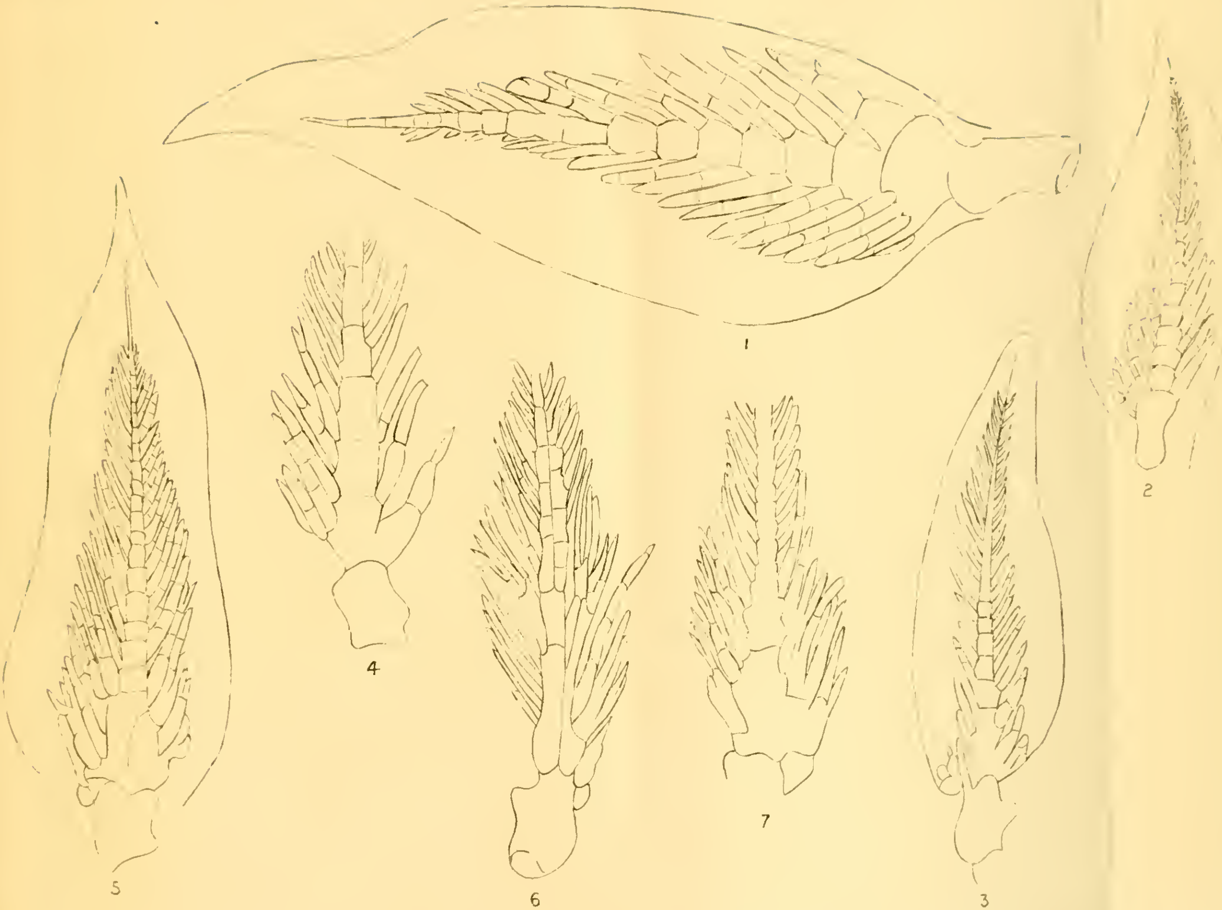
NOTES AND EXHIBITS.

Mr. Brazier exhibited the following specimens of *Cypræa* forwarded by Mr. J. F. Bailey of Melbourne—*Cypræa angustata, bicolor, declivis, piperita, Comptoni, annulus, Australis, oryza*; also the lower valve of a Corbula, named *C. sulcata*, by Mr. Bailey, but really belonging to *C. tunicata*, a species of wide distribution; also a *Clausilia*, collected in the Botanic Gardens, Melbourne, but evidently introduced with imported plants.

Mr. Ramsay exhibited the Fishes referred to in his paper, and specimens of *Rhomboidichthys pavo*, from the New Hebrides; a species of *Clupea* from Broken Bay; large specimens of *Galaxias Coxii*, from Mount Wilson; and a new species of *Virgularia* from Broken Bay; also a skull of a native of the Dawson River, showing a remarkable width of the dentary arches.

Mr. H. Selkirk exhibited a stone axe from the Kurrajong.

Dr. Cox exhibited a large block of wood which was taken out of a shaft which was sunk at Penrith a few weeks since. The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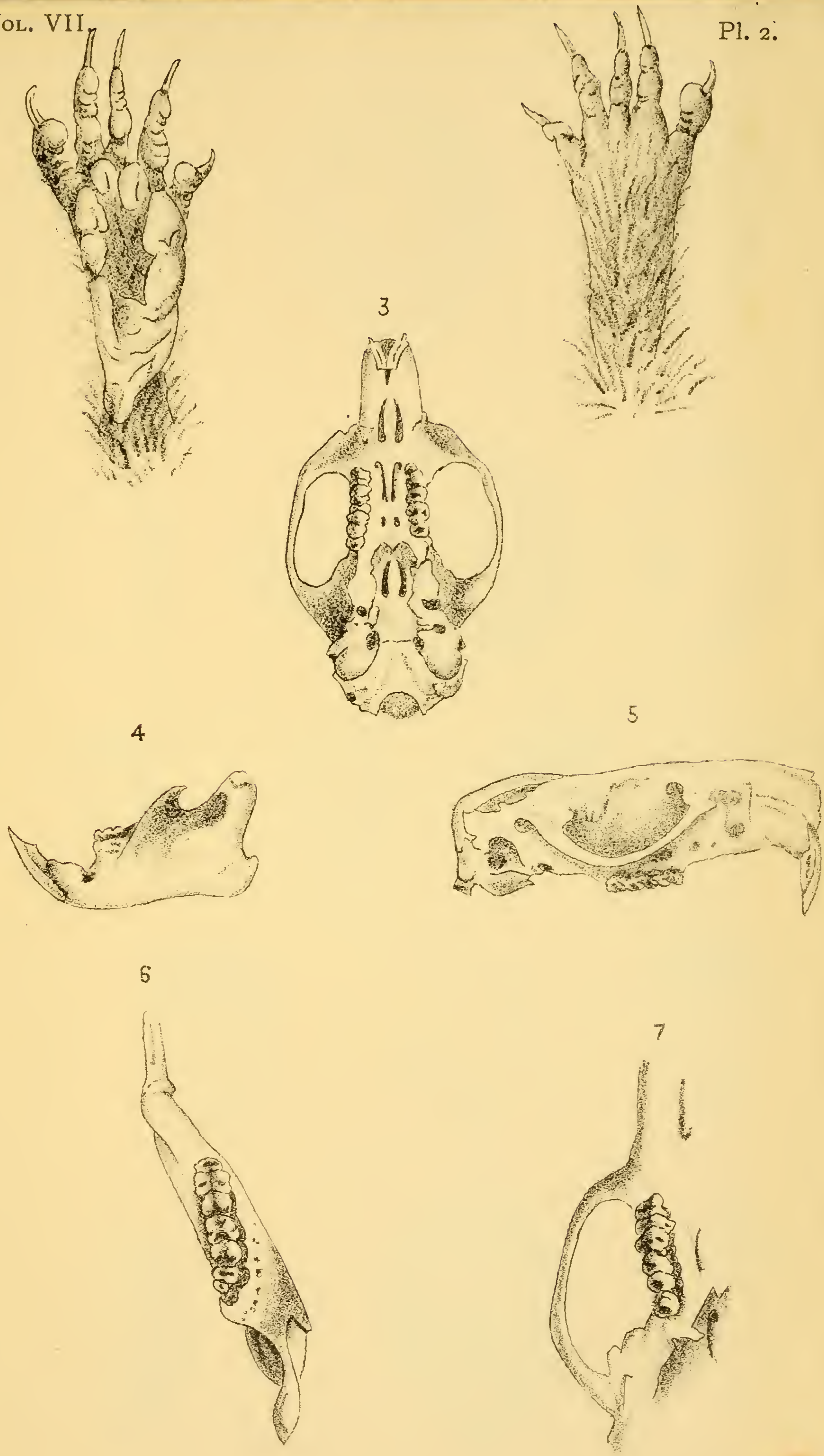

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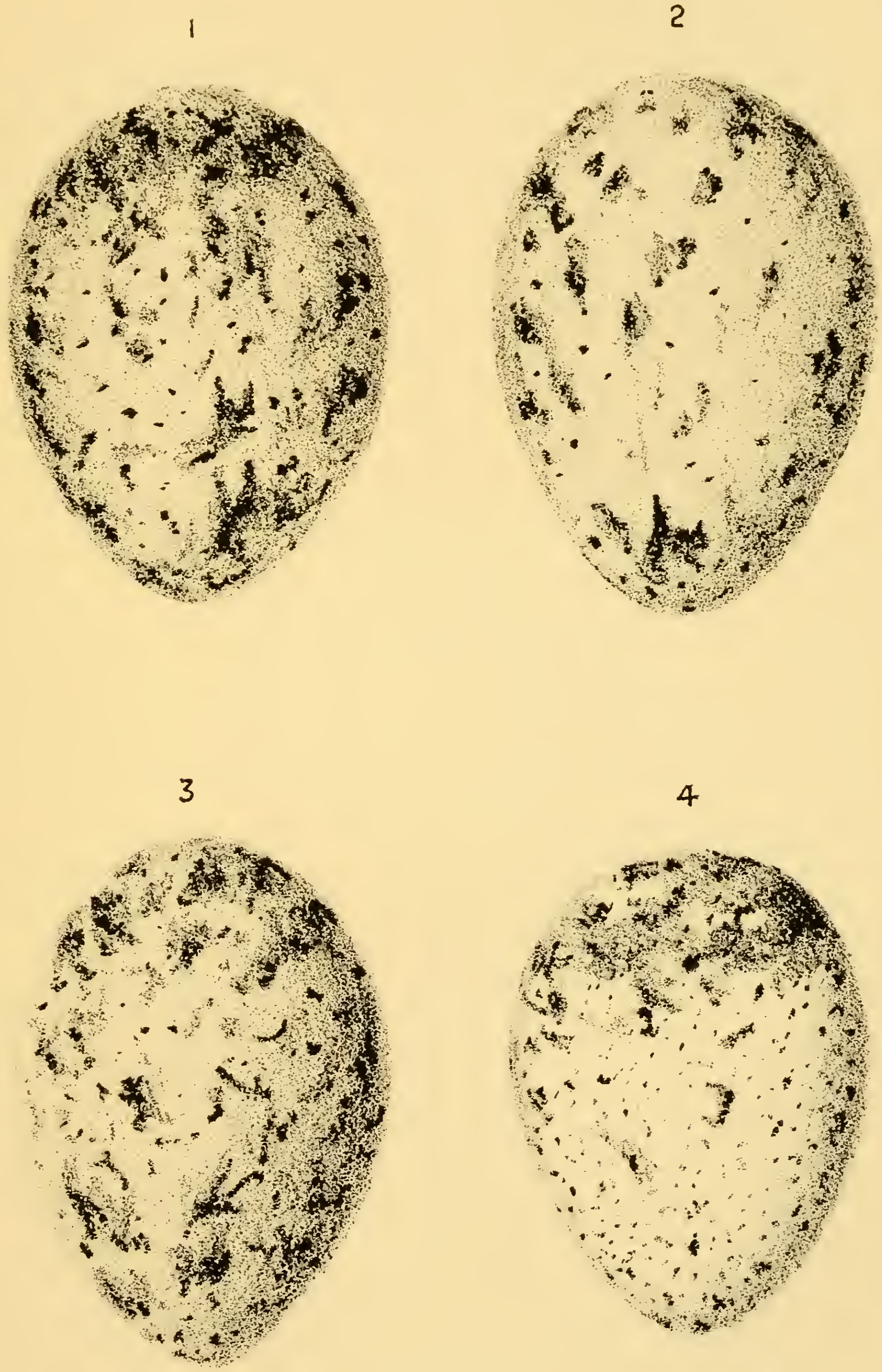
G.H Barrow del et lith [Reprint]



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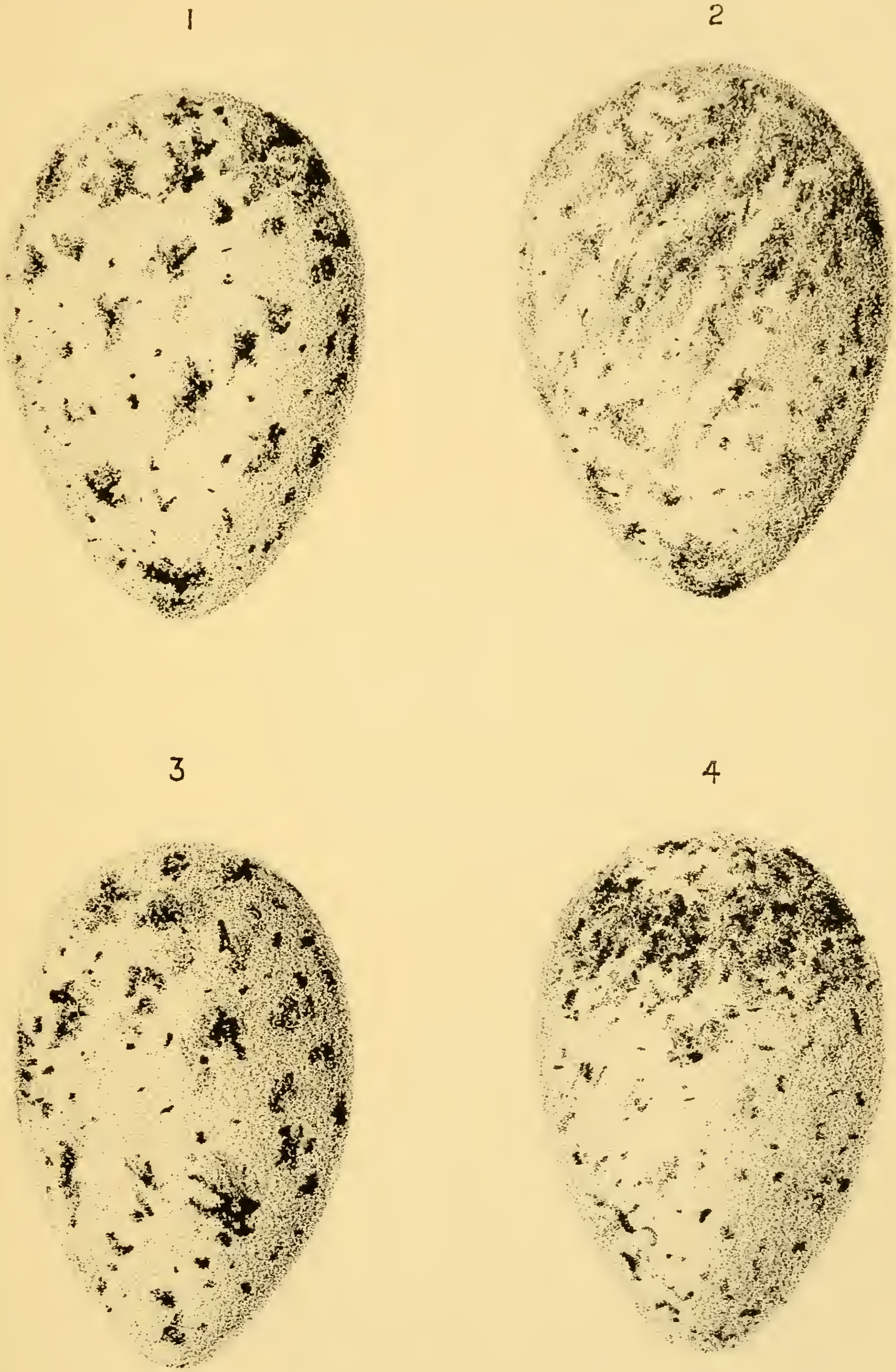

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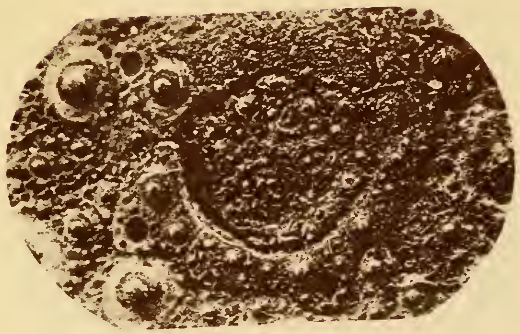

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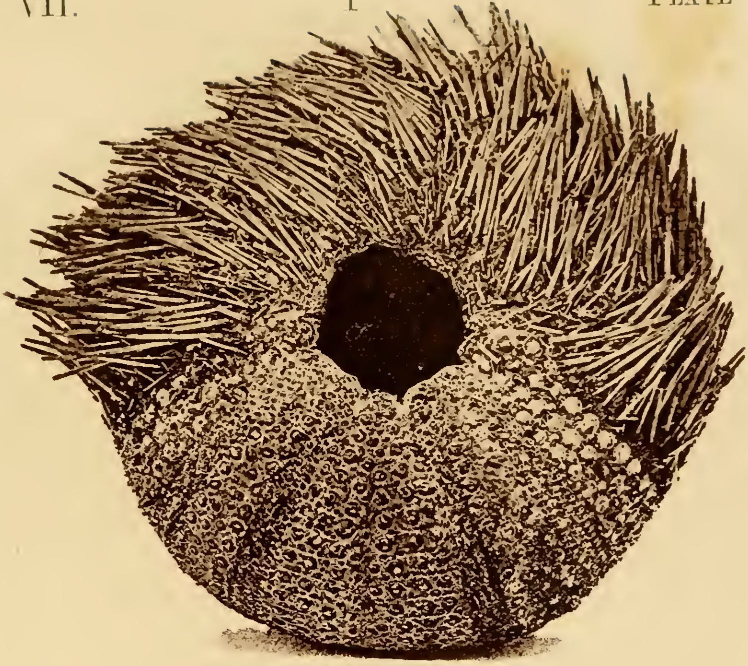

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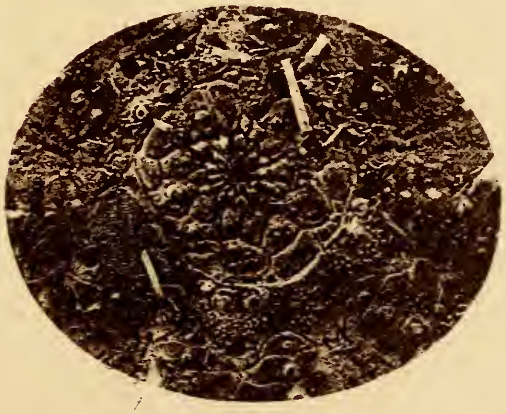

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shaft was sunk 140 feet from the edge of river water, with the object of procuring a supply of water for the use of the Railway Engines; at the depth of 140 feet a bed of rock was reached without finding the supply of water desired. It was then decided to run a shaft along the surface of this bed towards the river; this shaft which was 8 feet below the present surface of the water in the river, was carried 94 feet towards the river when a large log of wood was met with, so large that it had to be cut across; the specimen exhibited is a section of this log. The shaft has since been carried on towards the river within about 10 feet of the water (13th March.) The drive is six feet long and four wide, the roof and sides of the drive are composed of cemented boulders. The trunk of this tree was about four feet in diameter.

WEDNESDAY, 26TH APRIL, 1882.

The President J. C. Cox, M.D., F.L.S., &c., in the Chair.

MEMBER ELECTED.

Dr. William Williams, Darlinghurst Road.

DONATIONS.

Southern Science Record, Vol. II., No. 3, March 1882.

From Baron Ferd. von. Müeller, K.C.M.G., Eucalyptographia, 8th Decade.

From the Microscopical Society of Victoria—Journal, Vol. I., No. 4, Vol. II., No. I.

From H. C. Russell, F.R.A.S., Results of Rain and River observations in New South Wales during 1881.

From the Australian Museum, Sydney—Catalogue of the Australian Stalk- and Sessile-eyed Crustacea, by William A. Haswell, M.A., B.Sc.

From Dr. R. B. Read—Figures of Molluscous Animals selected from various authors by Maria E. Gray, 4 vols. 8vo, 1842—1850.

PAPERS READ.

Botanical Notes on Queensland.—No. II., The Tropics.

By the Rev. J. E. Tenison-Woods, F.G.S., F.L S.

These notes are meant to give something more than a mere list of names and the habitats of plants, but to supply, as far as my observations have extended what has not been included in any of our published floras. This is to point out the range, and where I know them, the economical uses of any of the Northern Queensland plants. It must be observed however that in so incomplete and desultory a series of observations, that any systematic order cannot be followed.

Dilleniaceæ.

Wormia alata, R. Br. This splendid tree becomes first visible on the coast about Cairns. I did not see it at Townsville or on any part of the more southerly tropical shores. From Cairns right up to Cape York it is the constant and abundant ornament of the sea coast. It grows very close to the waters edge and sometimes in places where it must be occasionally inundated by the sea. The leaves are of very large size, often over a foot in length and four or five inches wide, bright green, and shining above, with prominent midrib and side veins. This is the only Australian representative of the true tropical Dilleniads, which however are closely allied to the peculiarly Australian tribe *Hibbertiæ*. A more showy or valuable tree for its shade, with its large handsome yellow flowers could not be imagined. It has a light brown scaly bark on which grows a new and pretty fungus which is peculiar to Australia (*Laschia Thwaitesii*). There is a prejudice amongst the northern settlers against this tree which is supposed to be the cause of fever, but I think that the blame should rather be laid upon the places where it grows. No peculiar properties either medicinal or otherwise are attributed to this species, which is endemic and therefore little known, but the order is generally astringent and the timber good. The usual *Hibbertiæ* of southern regions are not seen on the coasts within the tropics.

Malvaceæ.

Bombax malabaricum, De Cand. I have noticed this tree in all the thick jungle forests on the coast side of the range from Cairns to Cooktown. In the flora it is only recorded as from Careening Bay on the North Coast. It is a very conspicuous tree when in flower as the blossoms are of a brilliant crimson, of large size, and during the time of their appearance the tree is quite denuded of foliage. This is the first recorded habitat on the north-east. It is called the cotton tree from the beautiful mass of long silk-like hairs surrounding the seed. No use is made of this but its extremely fine silky character must give it some value. The species has a considerable range in India, where the fibre is used for stuffing cushions &c. It is said that the want of adherence between the hairs prevents its use as a cotton.

Thespesia populnea, Corr. This wide-spread species which we share with all the tropical coasts of Eastern Africa, Asia, and the Pacific Islands is extremely common on all the tropical coast. It should be of much use as a shade tree on sandy places, for it will grow on the very poorest sand and salt is its nourishment. In consequence of this peculiarity I suppose it is that the wood will not decay in water and therefore is in much request in India for the under portions of boats. The rich yellow gum in the seed vessels is like gamboge and ought to be valuable. I wish most emphatically to draw attention to this tree. Its abundance on the coasts where it forms a handsome object should point out to the colonists how easily it is propagated. The inhabitants of Townsville for instance are fond of getting their houses as near the beach as possible where they try in vain to raise a shade and shelter around them by planting trees that never can grow in such places. If the *Thespesia* were used we should see the villas on the beach soon surrounded by an agreeable shade of healthy vegetation.

Urena lobata, L. This hardy shrub with rather pretty small flowers is found on the coast right through the tropics. It forms a thick undergrowth like *Sida rhombifolium.*

Abroma fastuosa, R. Br. I noticed this plant all through the the forests on the rivers Mossman, Daintree, Endeavour, Mowbray and Barron. My attention was directed to it by Mr. Stuart on the Daintree as being a plant of great value for the length and strength of its fibre. It is widely distributed over the Indian Archipelago, though only hitherto recorded from the Endeavour River in Australia.

MELIACEÆ.

Turræa pubescens, Hellen. Very common on all the tropical coasts where its white sweet-scented flowers make it a conspicuous object.

Carapa moluccensis, Lam. The traveller can scarcely fail to be struck with the appearance of this tree when covered with its conspicuous fruits. They are like immense green apples, eight or ten inches in diameter. I noticed it on all the north-eastern rivers from Port Denison northwards. The nuts are also scattered very abundantly on all the coral islets. In India an abundant and valuable oil is obtained from these nuts.

RHAMNEÆ.

Colubrina asiatica, Brogn. Common on all the north-eastern coast where it occupies the place in forming thickets, which *Pomaderris* does in Victoria and Tasmania and *Alphitonia* in the interior of Queensland. These closely allied genera are both found within the tropics.

Alphitonia excelsa, Reissek. A very widely spread and hand some tree, equally abundant on the coast and in the interior. It is one of the very characteristic trees of the "Brigalow" scrubs.

Pomaderris elliptica, Labill. This tree which forms dense scrubs and thickets in Tasmanian and Victorian sub-alpine regions and also in some portions of Southern New South Wales, was found by me on the Herberton Ranges at a height of about 3,600 feet above the sea. This is certainty its first discovery within the tropics, and adds an interesting fact to the peculiarities of our alpine flora. Baron von Mueller is of opinion that *P. lanigera*, *ferruginea* and *phillyreoides* are only varieties of this species, to which Mr. Bentham thought *P. grandis* should be added. As far as my observations go, I may say that I know of no characteristic feature of any one of these so called species which does not by insensible gradations merge into the others.

Ventilago viminalis, Hook. On the dry plains and ridges about the banks of the Mitchell, Hodgkinson, and Walsh Rivers. I did not see it on the east side of the range.

LEGUMINOSÆ.

Mucuna gigantea, De Cand. I have noticed this peculiar climber all through the coast jungle as far as the Endeavour River. The rusty-brown hairs on the pod have the irritating properties of cow-itch, under the microscope they are seen to consist of twisted spindle-shaped slender spines, very sharp at both ends and very hard. The least touch sends them into the skin, but they are not barbed like the thorns of the *Opuntia*.

Entada scandens, Benth. In all the coast jungle from Port Mackay to Endeavour River. The seeds also are abundantly strewn on the coral islets. In the Flora it is only recorded as from Cape York. This is the well known "Queensland Bean," the large seeds of which are made into match boxes. It is not peculiar to Queensland, but is found in the tropical countries of the whole world. The long distances to which the seeds can be carried without losing their germinating power will account for this. The same is true of the two next species to be mentioned.

Abrus precatorius, L. Another world-wide tropical species found in all the jungle close to the sea from Rockhampton to Cape York. Every one must be familiar with the brilliant scarlet and black seeds which are so often bought as curiosities from the East and West Indies, and used as beads, ornaments for boxes, &c.

Guillandina bonducella, L. Another world-wide tropical plant with remarkable grey or bluish grey seeds about half-an-inch in diameter and extremely hard. Found close to the sea shore all along the tropical coast and on the coral islets. The pods are covered with thorns and the recurved spines on the branches make it a most troublesome bush to fall in with. The seeds are prized as ornaments. The kernel is intensely bitter, valued as a tonic in cases of fever. Specimens have been known to be cast upon the south coast of Ireland by the Gulf Stream.

Pithecolobium priunosum, Benth. Common in the coast jungle from Port Mackay to the Gulf. The seed pods are a most brilliant crimson within when open and curled up with the attached black seeds they are like handsome flowers at a little distance.

Pithecolobium moniliferum, Benth. This very elegant tree which is one of the floral beauties of the Indian Archipelago is rather common on the banks of the Mulgrave River. This is the first recorded habitat on the eastern side of the watershed. When in flower the tree is one mass of globular heads of yellow or pale orange silk-like stamens. It is also very fragrant.

Castanospermum australe, A. Cunn. This truly handsome tree was first recorded from the Endeavour River, where it was found by Sir Joseph Banks in Cook's Expedition. Nevertheless it is not nearly so abundant within the tropics as between Moreton Bay and the eastern rivers as far north as the Fitzroy.

Canavallia obtusifolia, DeC. This is a South American, African and Asiatic species (tropics) and is known all along our eastern coast, tropical or not. From Cairns to the Endeavour River it is more constantly met with. Its trailing habit and pretty pink flowers making it an attractive object.

Gastrolobium grandiflorum. F. von. Muell. This is the well known poison plant which is so fatal to cattle and horses. Unfortunately, it is rather common on the range between Herberton and the Great Western Tin Fields, where in the dry season cattle often die from its effects. It is also found on the Walsh River.

Acacias. I have found it extremely difficult to identify some of the numerous species of *Acacia* for the various kinds graduate into one another by such insensible degrees. The genus requires a thorough revision, and then it is not too much to say that one third of the present species will have to be rejected. The coasts are much overgrown with thickets of *A. julifera* or *A. Solandri, A. leptostachya,* or *A. glaucescens,* which seem to me to be all varieties of one. A very broad leaved *Acacia* with phyllodia from four to six inches long is found everywhere along the coasts from the Burnett River to Cape Flattery. It is *the* Acacia of the North Queensland Coast. I believed it to be *A. dimidiata,* but was equally inclined to consider it *A. polystachya.* It was very commonly associated with *A. aulococarpa* which occurs all along the coast from Moreton Bay to Cape Tribulation, if not further. *Acacia Bidwilli* is an unmistakable species, which is found on all the open tablelands. It is particularly common near Charters Towers, further south its place on the tableland appears to be taken by *Albizza basaltica* which in habit it somewhat resembles. The latter though a small tree yields a valuable wood which is prized for stock whip handles. Even when cut very thin and light the wood is so tough that it will bear an enormous strain. The tree goes by the grotesque name of "Dead Finish." *A. salicina* and *A. excelsa*, are occasionally seen north of the Burdekin, but the home of these species is the basaltic tablelands, as I shall show when I come to speak of the Queensland scrubs.

Hovea longifolia, R. B. Not uncommon on the high lands about Herberton. It is found everywhere in Australia and its pretty blue flowers render it an agreeable addition to the dry vegetation.

Tephrosia purpurea, Pers., var. *sericea*. Almost as widely distributed as the last. Herberton Ranges.

Flemingia lineata. Roxb. An East Indian species common on the banks of the Mulgrave, Barron, Daintree, Mossman, and Endeavour Rivers.

Vignea lutea, A. Gray. All along the coast. Found throughout the maritime sands of the tropics throughout the world.

Cæsalpinia nuga, Ait. Barron, Daintree, and Endeavour Rivers. An East Indian and Chinese species.

Derris uliginosa, Benth. Fitzroy Island, and other islands northward, also at the mouth of the Daintree River. It had not hitherto been recorded south of Cape York. Common in East Indies.

Crotalaria Mitchelli, Benth. Burdekin River, *C. verrucosa*, an East Indian species which is found on the lowlands of the eastern rivers as far south as the Mulgrave, and strangely enough on the Wilde River, 3,000 feet above the sea where the flora is sub-alpine. *C. crispata*, F. v. Muell.—Hitherto only found around Carpentaria, Endeavour River. *C. trifoliastrum* from Moreton Bay to Endeavour River, and very common.

Cassia concinna, Benth. Mitchell River.

Tribulus cistoides, L. (*Zygophylleæ*). This covers the shore on Fitzroy Island, and is common on all the coral islets. It is widely distributed through the tropics all over the world, though rare in Asia and Africa. I may mention that this plant is one of the most annoying little pests on the sea coast. The prickles which cover the dry carpels adhere to everything and penetrate the flesh most painfully. It is especially dreaded by the beche-de-mer fishers, as their avocation obliges them to go about bare-footed. The sharp points get between the toes and cause great pain and lameness. When on Green Island fishing, our party had to leave several camps because of the proximity of this weed. It would be difficult to give an idea of the various modes in which its seeds tormented us. There was no such thing as trying to penetrate the scrubs on the islet where it grew.

Vitis trifolia, L., (*Ampelidæ*). This very fleshy-leaved vine produces a grape which the settlers value. It was found by me at Port Douglas, Cairns, and Endeavour River. It was never previously recorded from the east coast. Common in India and the Archipelago.

RUTACEÆ.

Geigera salicifolia, Schott. This tree was seen by me on the Mulgrave River, and also on the table lands of the Hodgkinson and Mitchell Rivers. It belongs more properly to the Brigalow Scrubs of Central Queensland where with *G. parviflora* it is a very common tree. The latter is found all over Australia. The first named extends from Queensland only into the northern portions of New South Wales.

Acronychia Baueri, Schott. It is already known that this species extends all along the East coast from Wollongong to Port Mackay, in dense river forests; I have traced it to the Endeavour River.

Boronia ledifolia, J. Gray. A doubtful species of this genus was submitted to Baron v. Mueller who referred it to the variety *triphylla*, (Sieb. in Spreng. Syst. Cur. Post. 148). The flowers were exceedingly small. It was found on the banks of the Wilde River at Herberton. The genus is peculiarly Australian, and therefore not a common one in North-east Australia, but if ever Australian species do manifest themselves in this part of the continent it is only on the very high lands.

Eriostemon Banksii, A. Cunn. Barron and Daintree River mouths; sandy places also on the loose sandy country between Cape Bedford and M'Ivor River.

Philotheca ? australis, Rudge. A species which I took to be the above was found by me on the basaltic tablelands of Emerald Downs. The specimen has been subsequently mislaid.

Zanthoxylon brachyacanthum, F. v. Muell. In the scrubs near Mackay.

Glycosmis pentaphylla, Corr. Daintree River, Range near Port Douglas. An Asiatic species of wide tropical range.

Clausena brevistyla, Oliv. Port Douglas, Coral Islets off Cape Flattery.

Atlanta glauca, Hook. On all the volcanic table lands of the interior, within the tropics as far as the Burdekin River. I did not notice it further north. It is a constant ingredient in the "Brigalow Scrubs."

Citrus australasica, F. v. Muell. The common Queensland wild orange which in spite of its intensely acid flavonr is readily eaten by children. I have seen it on all the eastern river jungles as far north as the Barron River.

Before I leave the *Rutaceæ* I should mention that I collected some species on the Wilde River which I thought at the time were *Zieria Smithii*. This plant forms dense thickets in the sub-alpine regions of Tasmania and it would be in keeping with the other alpine species to find it at Herberton, rendering the flora of that locality still more interesting. A good many specimens of my herbarium were lost on my return to Cairns. One of my pack horses bolted and ran into the scrub, where some of his burden was irrevocably lost. Amongst the packages missing were many of the alpine species of Herberton.

GERANIACEÆ.

Oxalis corniculata, L. Burdekin River. High tablelands about the Hodgkinson.

MELIACEÆ.

Owenia acidula, F. v. Muell. All through the Brigalow Scrubs as far as the Burdekin. The fruit is acid and astringent, but grateful to the taste of a thirsty traveller in these hot arid regions. With this species I think *O. venosa*, F.v.M., should be united.

Owenia cerasifera, F. v. Muell. This is the well known Queensland plum which bears a fine juicy red fruit with a large stone. When fresh-gathered it is very acid, but on keeping or better still, burying for a day or two in sand, it is both palatable and refreshing.

Cedrela toona, Roxb. This common Asiatic species extends through all the jungles and forests whether on the coast or tablelands, all through the tropics. It is especially abundant on the high lands about Herberton, where the houses are all built of red cedar ; the peculiarity of the tree here is that it is confined to rich alluvial or volcanic soil. Granite or sand stops its spread, thus the edges of the tropical forests are as clearly defined as if cut with a knife.

Flindersia maculosa, F. v. Muell. A common accompaniment of the vegetation of the high tablelands. The most northerly station seen by me was the Hodgkinson and Mitchell Rivers. *F. Oxleyana*, F. v. Muell., is a splendid tree extending into the tropics on the coast-tropical forests. The Pioneer River (Mackay) is the most northerly habitat known to me.

CELASTRINÆ.

Celastrus australis, Harv. and Muell. In the Brigalow Scrubs.

C. Cunninghamii, F. v. Muell. Seen occasionally on the river scrubs on all the east coast as far north as M'Ivor River, Cape Bedford.

Elæodendron australe, Vent. One of the common trees in tropical Brigalow Scrubs.

Stackhousia viminea, Sm., (*Stakhousieæ*). Not a common member of the tropical flora, but yet occasionally met with in poor open lands as far north as Herberton.

SAPINDACEÆ.

Cupania anacardiodes, A. Rich. In the dense jungle of the Baron, Mulgrave, Daintree, and Mowbray Rivers.

Atalaya hemiglauca, F. v. Muell. This is a constant ingredient of the Brigalow Scrubs and desert floras right through Australia (tropical and sub-tropical) When in flower it attracts a multitude of insects by its fragrance. Flowers white, abundant in all October. Five specimens on open sandy plains of Burdekin River at the railway bridge, Charter's Towers Road. The samaræ or seed vessels with which it is covered in November and December make it very interesting.

Nephelium connatum, F. v. Muell. In all the river forests on the east coast as far as Endeavour River.

Heterodendron oleæfolium, Desf. Much the same station as *Atalaya hemiglauca*, with which I have constantly found it associated.

Dodonæa lanceolata, F. v. Muell. Occasionally met with on the more open banks of the eastern rivers and on the low lands, with *D. viscosa* and *D. vestita* as far north as Endeavour River.

Spondias Solandri, Benth. Daintree and Mulgrave Rivers.

Drosera indica, L., (*Droseraceæ*). This common member of the Indian and Chinese flora was found by me in all low swampy places on the north-east coast. *D. Burmanni*, Vall. the same.

Halorageæ.

Haloragis ceratophylla, Endl. Herberton. I have also seen it on other tropical table lands, where open sandy soil supported a heath-like vegetation.

Myriophyllum verrucosum, Lindl. In all the almost stagnant fresh water holes of the tropics.

Ceratophyllum demersum, L., Barron River.

Rhizophoreæ.

Rhizophora mucronata, Lam. Mangrove thickets but not the commonest species in the tropics.

Ceriops Candolleana, Arn. Mangrove thickets, but not the commonest species in the tropics.

Bruguiera Rheedii, Blume. This is the most common constituent of all the mangrove swamps. Its rich, dense foliage redeem the otherwise desolate character of the mud flats of the tropics. *B. gymnorrhiza* is sometimes mixed with it.

Terminalia melanocarpa, F. v. Muell (*Combretaceæ*). This is a very common tree between Cairns and Cooktown. It grows quite close to the sea and on the coral islets, where the pigeons (*Carpophaga spilorhoa*) greedily devour its fruits. These are about an inch long with a very large hard stone, in fact there is scarcely any sarcocarp, so that one wonders how the birds find any nourishment in it. The taste is bitter and unpleasant. *T. oblongata*, F. v. Muell., is rather common in the Brigalow Scrubs of the tropics.

Addenda to *Malvaceæ*.

Abutilon graveolens, Willd, Mulgrave River, where it forms thickets. *A. muticum*, Don., Fitzroy Island *Hibiscus manchot*, L., Mulgrave River.

On a new species of *Gobiesox* from Tasmania.

By E. P. Ramsay, F.L.S., C.M.Z.S., &c.

Gobiesox cardinalis, *sp. nov.*

D. 8. A. 6. V. 4. P. 22.

Caudal fin truncate, of 18—20 rays; a small, well defined spine at the angle of the operculum; head compressed, snout rather pointed; teeth in both jaws in bands, the outer series the largest, canine, curved, no teeth on the vomer, or tongue; two nasal pores in front of the eye, each with a tentacle; branchiostegals five; space between the orbits equal to the distance between the centre of the orbit and the snout; mouth opens to the vertical from the anterior margin of the orbit; the length of the head is $3\frac{1}{3}$ in the total, without caudal; the height of the caudal portion of the body between the dorsal and anal fins is $8\frac{1}{2}$ in the total length, without caudal; the breadth across the body between the gill covers is $3\frac{1}{5}$ of the total length without caudal. The vent is situated midway between the snout and the tip of the tail; the distance between the centre of the orbit and the snout is three times in the distance between the snout and base of the pectoral fin; the distance between the tip of the mandible and symphysis of gill opening is six times in the total length, without caudal. The head is very much compressed, and is lower than the height of the body behind the pectorals. Colour rich salmon red, reticulated on the back and sides with wavy lines of yellowish. —(Spirit specimen).

Hab. Near George Town, Tasmania; clinging to stones at low water.

Descriptions of Australian Micro-Lepidoptera.

By E. Meyrick, B.A.

VII. Revisional.

Before entering upon the larger families of the *Tineina* I have thought it best to correct such errors as I have hitherto discovered in my previous papers, and to add descriptions of the new species which have in the meantime come into my possession. I have also rearranged on a proper system of classification the species of *Crambidæ*, *Phycidæ*, and allied families, which were classified at first without due appreciation of the value of the neuration as a guiding character; in my later papers I have considered it of primary importance.

The investigation of the venation of the *Crambidæ* has revealed results of unexpected interest, such as would of themselves go far to confirm the importance which I attach to this subject. The venation of the extra-European genera does not seem to have been at all studied, and the genera are often distinguished by Zeller only on the most trifling and superficial characters; yet, so far as my material enables me to judge, they possess in the venation sharply-defined marks of distinction. Thus *Argyria* differs from *Crambus* in having veins 10 and 11 of the forewings stalked; *Prionopteryx* in having only 9 veins in the forewings and 7 in the hindwings; *Diptychophora* in having vein 11 of forewings running into 12 before costa; and so on. In *Diptychophora* I have examined nine of the thirteen known species, and found the venation constant. But the most interesting discovery has been the fact that almost the whole of the Australian species referred to *Crambus* have veins 8 and 9 of the forewings on a separate stalk, not rising out of 7, and therefore belong to the genus separated by Heinemann as *Thinasotia* Hb., represented in Europe by three or four species only, and not yet recognised elsewhere, except one species in New Zealand. In my opinion this conclusively proves the distinctness of the genus, which was previously doubtful. Consequent upon this is the remarkable fact that the true genus *Crambus* is virtually absent from the native Australian fauna, though universally present elsewhere, and numerously represented in New Zealand; I say virtually, for of the two Australian species one, *C. hapaliscus*, appears to have its home in Africa, and to have found its way hither through Ceylon, thus not being truly aboriginal, whilst the other, *C. cuneiferellus*, being thus left a solitary exception, must be held insufficient to prove the native origin of the genus, since it is more probable that with extended knowledge it also will be found to be derived from elsewhere.

I have been obliged to create several new genera, principally in the *Phycidæ*, where the variation of structure is considerable; some of these will doubtless be found to occur elsewhere. For instance, it is possible that to *Ptochostola* should be referred the species of *Crambus* described by Zeller as having only three-branched median veins, *i.e.*, vein 5 absent in both wings; but as *Ptochostola* has other points of distinction, I can only conjecture the relationship; these species are *C. incanellus*, Z., and *C. pygmæus*, Z., (South America), *C. troglodytellus*, Snell., and *C. inconspicuellus*, Snell., (South Africa). Again, to the genus *Cateremna* is referable the European *Euzophera terebrella*, Zk.

The distinction between the families of the *Chilonidæ* and *Crambidæ*, as hitherto constituted, is utterly untenable. Heinemann makes the difference lie in the cell of the hindwings being closed in the *Chilonidæ* and open in the *Crambidæ*, but in at least half the genera of the *Crambidæ*, such as *Thinasotia*, *Diptychophora*, &c., the cell is very distinctly closed, and the character is proved merely a generic one. Zeller seems to rely rather on the *Chilonidæ* frequenting water-plants and the *Crambidæ* dry ground, surely a most unreliable and trivial point, and wholly inapplicable in practice. I consider that *Chila* is by no means closely allied to *Schœnobius* and *Scirpophaga*, but that its points of resemblance are merely analagous and due to similarity of habit; and I have made the point of distinction between the two families consist in the pectination of the lower median vein of the hindwings, which is always present in the *Crambidæ*, and absent in *Schœnobius* and its allies; *Chilo* is therefore removed to the *Crambidæ*. This separation is in my opinion both natural and easy of application. Indeed, so near is *Chilo* to *Thinasotia*, that it was with difficulty that I was enabled to separate them generally. The position of *Erotomanes* in the *Schœnobiadæ* may excite surprise, but the superficial appearance of the only species is peculiar anywhere, and in structure it agrees so nearly with *Schœnobius* that I was puzzled to find satisfactory distinctions.

The *Crambidæ* being found to have sometimes as few veins as any of the *Phycidæ*, the distinction of these families cannot be based on any one character, but will be readily granted on a consideration of the sum of characters given, by which any species can be with ease correctly referred; the maxillary palpi afford the best single test known to me.

I give now the classified catalogue of the Australian species of these families, with accurate diagnoses of all the genera, both old and new. It should be understood that the veins are assumed to be all separate, unless otherwise stated. The New Zealand species are not included, as they are in course of publication elsewhere.

I am of opinion that in the *Schœnobiadæ* must also eventually be included some genera usually classed with the *Botydæ*, such as *Scoparia*, but as I have not yet finished my investigations, I forbear to do more than mention the possibility, since it would in no way interfere with the system here given.

Fam. I. SCHŒNOBIADÆ.

Labial palpi porrected. Maxillary palpi triangular, porrected, conspicuous. Forewings with 12 veins, 1 simple, 7 separate, 8 and 9 stalked. Hindwings with 8 veins, 3, 4, 5, rising near together, not stalked, 7 and 8 stalked, lower median not pectinated at base.

Gen. 1. Scirpophaga, Tr.

Antennæ of male half as long as forewings, ciliated, of female much shorter. Labial palpi short, not much longer than head. Abdomen very elongate, in female with dense anal tuft.

exsanguis, n. sp. *ochroleuca*, n. sp.

Gen. 2. Schœnobius, Dup.

Antennæ of male half as long as forewings, crenulate, ciliated, of female much shorter. Labial palpi elongate, much exceeding head, attenuated. Abdomen elongate, in female with dense anal tuft.

imparellus, Meyr., Vol. III., 176.

Gen. 3. Erotomanes, n. g.

Antennæ of male half as long as forewings, slender, pubescent, of female equally long. Labial palpi elongate, much exceeding head, broadly haired. Abdomen in male elongate, stout, in female shorter, anal extremity laterally compressed, not tufted.

mirabilella, Meyr., Vol. III., 213, IV., 333.

Fam. II. CRAMBIDÆ.

Labial palpi porrected. Maxillary palpi triangular, porrected, conspicuous. Forewings with 12 (rarely 11, 10, or 9) veins, 1 simple, normal veins 8 and 9 stalked, 7 sometimes from same stalk. Hindwings with 8 (rarely 7) veins, 4 and 5 often stalked, normal veins 7 and 8 stalked, lower median pectinated at base.

Gen. 1. Chilo, Zk.

Antennæ of male finely ciliated. Labial palpi very long, attenuated. Forewings with 12 veins, 8 and 9 stalked. Hindwings with 8 veins, 4 and 5 from a point, 6 very closely approximated at origin to 7, 7 and 8 stalked, cell closed.

parramattellus, Meyr., Vol. III., 178.
leptogrammellus, Meyr., Vol. IV., 207.

Gen. 2. Crunophila, n. g.

Antennæ of male stout, strongly pectinated. Labial palpi very long, attenuated. Forewings with 12 veins, 8 and 9 stalked. Hindwings with 8 veins, 4 and 5 from a point, 6 very closely approximated at origin to 7, 7 and 8 stalked, cell closed.

ramostriella, Walk., Vol. IV., 207 (*schistellus*).

Gen. 3. Thinasotia, Hb.

Antennæ of male finely ciliated, rarely pectinated. Labial palpi long, attenuated. Forewings with 12 veins, 8 and 9 stalked. Hindwings with 8 veins, 4 and 5 stalked or from a point, 6 widely remote at origin from 7, 7 and 8 stalked, cell closed,

milvella, Meyr., Vol. III., 181.
recurvella, Walk., Vol, III., 186 (*bivittellus*).
bivittella, Don., Vol. III., 185 (*trivittatus*).
aurantiaca, Meyr., Vol. III., 184.
bifractella, Walk., Vol. III., 197.
argyroëles, n. sp.
pleniferella, Walk., Vol. III., 187.
impletella, Walk., Vol. IV., 210.
longipalpella, Meyr., Vol. III., 196.
hoplitella, Meyr., Vol. III., 188.
perlatalis, Walk., Vol. IV., 213.
relatalis, Walk., Vol. III., 191.
panselenella, n. sp.
opulentella, Z., Vol. III., 192.
grammella, Z., Vol. III., 194 (*enneagrammos*).
invalidella, Meyr., Vol. III., 193.
acontophora, n. sp.
torrentella, Meyr., Vol. III., 183.
lativittalis, Walk., Vol. III., 183.

Gen. 4. Diptychophora, Z.

Antennæ of male very finely ciliated. Labial palpi rather short, somewhat triangular. Forewings with hindmargin twice indented on upper half; with 12 veins, 8 and 9 stalked, 11 coalescing with 12 before costa. Hindwings with 8 veins, 5 from above angle, 6 moderately approximated to 7, 7 and 8 stalked, cell closed.

præmaturella, Meyr., Vol. III., 198.

Gen. 5. Argyria, Hb.

Antennæ of male finely ciliated. Labial palpi moderate or rather long, attenuated. Forewings with 12 veins, 8 and 9 stalked, rising out of 7, 10 and 11 stalked. Hindwings with 8 veins, 4 and 5 stalked, 6 closely approximated at base to 7, 7 and 8 stalked, cell open.

argyraspis, Vol. IV., 216.

Gen. 6. Ancylolomia, Hb.

No tongue. Antennæ of male dentate or strongly pectinated. Labial palpi very long, attenuated. Forewings with 12 veins, 8 and 9 stalked, rising out of 7. Hindwings with 8 veins, 4 and 5 almost from a point, 6 widely remote at origin from 7, 7 and 8 stalked, cell closed.

Westwoodi, Z., Vol. IV., 208.

Gen. 7. Crambus, F.

Antennæ of male finely ciliated, rarely pectinated Labial palpi very long, attenuated. Forewings with 12 veins (rarely 11 through obsolescence of vein 9), 8 and 9 stalked, rising out of 7. Hindwings with 8 veins, 4 and 5 usually stalked or from a point, 6 approximated at base to 7, 7 and 8 stalked, cell open.

hapaliscus, Z., Vol. III., 182 (*concinnellus*).
cuneiferellus, Walk., Vol. III., 189.

Gen 8. Ptochostola, n. g.

Antennæ of male finely ciliated. Labial palpi very long, attenuated. Forewings with 10 veins, 6 and 7 stalked, 6 to below apex, 9 coalescing with 10 before costa. Hindwings with 7 veins, 4 from angle of cell, 5 closely approximated at base to 6, 6 and 7 stalked, cell open.

dimidiella, Meyr., Vol. III, 190,

Gen. 9. Prionopteryx, Stph.

Antennæ of male finely ciliated. Labial palpi rather long, hardly attenuated. Forewings with hindmargin once indented above middle; with 9 veins, 6 and 7 stalked, 6 running to costa. Hindwings with 7 veins, 3 and 4 from a point, 5 remote at origin from 6, 6 and 7 stalked, cell closed.

apicistrigella, Meyr., Vol. IV., 209.

Fam. III. PHYCIDÆ.

Labial palpi porrected or recurved. Maxillary palpi pencil-like or usually filiform, generally concealed, sometimes absent. Forewings with 11 (rarely 13 or 9) veins, 1 simple, normal veins 7 and 8 stalked. Hindwings with 8 or 7 veins, 4 and 5 usually stalked, 3 sometimes from same stalk, normal veins 7 and 8 stalked, lower median pectinated at base.

Gen. 1. Ceroprepes, Z.

Antennæ of male strongly pectinated on one side, towards apex simple, with a small tooth of scales on basal joint, and a small thickened tubercle above it. Labial palpi moderate, curved, ascending. Maxillary palpi short, filiform. Forewings with 11 veins, 7 and 8 stalked. Hindwings with 8 veins, 4 and 5 stalked, 7 and 8 stalked.

almella, Meyr., Vol. III., 210.

Gen. 2. Myelois, Z.

Antennæ of male finely ciliated. Labial palpi moderate, curved, ascending. Maxillary palpi short, filiform. Forewings with 11 veins, 7 and 8 stalked. Hindwings with 8 veins, 4 and 5 from a point (or stalked in extra-Australian species), 7 and 8 stalked.

œnobarella, Meyr., Vol. IV., 228.

Gen. 3. Euzophera, Z.

Antennæ of male very finely ciliated. Labial palpi moderate, curved, ascending. Maxillary palpi short, filiform. Forewings with 11 veins, 4 and 5 stalked, 7 and 8 stalked. Hindwings with 7 veins, 3 and 4 stalked, 6 and 7 stalked.

cosmiella, Meyr., Vol. III., 212.

Gen. 4. Cateremna, n. g.

Antennæ of male very finely ciliated. Labial palpi moderate, curved, ascending. Maxillary palpi short, filiform. Forewings with 11 veins, 7 and 8 stalked. Hindwings with 7 veins, 3 and 4 stalked, 6 and 7 stalked.

leucarma, Meyr., Vol. IV., 230.
subarcuella, Meyr., Vol. III., 211.
microdoxa, Meyr., Vol. IV., 231.

Gen. 5. Zophodia, Hb.

Antennæ of male dentate, strongly ciliated. Labial palpi long, straight, porrected. Maxillary palpi minute, filiform. Forewings with 11 veins, 4 and 5 stalked, 7 and 8 stalked. Hindwings with 7 veins, 3 and 4 stalked, 6 and 7 stalked.

neotomella, Meyr., Vol. IV., 226.
ensiferella, Meyr., Vol. III., 208.

Gen. 6. Eucarphia, Hb.

Antennæ of male finely ciliated. Labial palpi long, straight, porrected. Maxillary palpi obsolete. Forewings with 11 veins, 7 and 8 stalked. Hindwings with 8 veins, 4 and 5 stalked, rising out of 3, 7 and 8 stalked.

vulgatella, Meyr., Vol. III., 207,
cnephæella, Meyr., Vol. IV., 227.

Gen. 7. Etiella, Z.

Antennæ of male finely ciliated, strongly sinuate above base, with a large tuft of scales in sinuation. Labial palpi long, straight, porrected, terminal joint long, exposed. Maxillary palpi in male long, pencil-like, in female short, filiform. Forewings with 11 veins, 7 and 8 stalked. Hindwings with 8 veins, 4 and 5 stalked, 7 and 8 stalked.

sincerella, Meyr, Vol. III., 204.
chrysoporella, Meyr., Vol. III., 206.
Behrii, Z., Vol. III., 205.

Gen. 8. Salebria, Z.

Antennæ of male dentate, finely ciliated, with a tuft of scales in sinuation at base. Labial palpi moderate, curved, ascending, terminal joint short. Maxillary palpi in male long, pencil-like, in female short, filiform. Forewings with 11 veins, 7 and 8 stalked. Hindwings with 8 veins, 4 and 5 stalked, rising out of 3, 7 and 8 stalked.

eucometis, n. sp.
rufitinctella, Meyr., Vol. III., 203.
oculiferella, Meyr., Vol. IV., 222.
digrammella, Meyr., Vol. IV., 223.
caliginosella, Meyr., Vol. IV., 221.
strigiferella, Meyr, Vol. III., 202, IV., 221.

Gen. 9. Pempelia, Hb.

Antennæ of male dentate, finely ciliated, with a tuft of scales in sinuation at base. Labial palpi moderate, curved ascending, terminal joint short. Maxillary palpi in male pencil-like, in female short, filiform. Forewings with 11 veins, 7 and 8 stalked. Hindwings with 7 veins, 3 and 4 stalked, 6 and 7 stalked.

opimella, Meyr., Vol. III., 201.

Gen. 10. Lasiocera, Meyr.

Antennæ of male with basal half thickly clothed above with rough scales. Labial palpi moderate, curved, ascending. Maxillary palpi short, filiform. Forewings with 11 veins, 7 and

8 stalked. Hindwings with 7 veins, 3 and 4 stalked, 6 and 7 stalked.

canilinea, Meyr., Vol. III., 209.

Gen. 11. Trissonca, n. g.

Antennæ of male finely ciliated, with three small projecting teeth above near base. Labial palpi moderate, curved, ascending. Maxillary palpi short, filiform. Forewings with 11 veins, 7 and 8 stalked. Hindwings with 7 veins, 3 and 4 stalked, 6 and 7 stalked.

mesactella, Meyr., Vol. IV., 225.

Gen. 12. Ampycophora, n. g.

Antennæ of male dentate, ciliated, with a tuft of scales in sinuation at base. Labial palpi moderate, curved, ascending. Maxillary palpi in male pencil-like, in female short, filiform. Forewings with 10 veins, 6 and 7 stalked. Hindwings with 7 veins, 3 and 4 stalked, 6 and 7 stalked.

apotomella, Meyr., Vol. IV., 224,

Gen. 13. Heosphora, n. g.

Antennæ of male dentate, ciliated, with a tuft of scales in sinuation at base. Labial palpi very long, straight, porrected, terminal joint concealed. Maxillary palpi obsolete. Forewings with 10 veins, 7 and 8 stalked, rising out of 6. Hindwings with 7 veins, 3 and 4 stalked, 6 and 7 stalked.

virginella, Meyr., Vol. IV., 233.
psamathella, Meyr., Vol. IV., 234.

Gen. 14. Crocydopora, n. g.

Antennæ of male dentate, finely ciliated, with a tuft of scales in sinuation at base. Labial palpi rather long, stout, porrected, terminal joint short. Maxillary palpi obsolete. Forewings with

10 veins, 6 and 7 stalked. Hindwings with 7 veins, 3 and 4 stalked, 6 and 7 stalked.

stenopterella, Meyr., Vol. III., 200.

Gen. 15. Hypophana, n. g.

Antennæ of male very finely ciliated, with a tuft of scales in sinuation at base. Labial palpi moderate, slender, recurved, ascending. Maxillary palpi short, filiform. Forewings with 11 veins, 7 and 8 stalked. Hindwings with 8 veins, 4 and 5 stalked, sometimes rising out of 3, 7 and 8 stalked.

euraphella, Meyr., Vol. IV., 217.
infusella, Meyr., Vol. IV., 218.
melanostyla, Meyr., Vol. IV., 220.
petalocosma, n. sp.

Gen. 16. Eucampyla, n. g.

Antennæ of male finely ciliated, with a short acute tooth on basal joint above. Labial palpi moderate, slender, porrected. Maxillary palpi short, filiform. Forewings with 11 veins, 4 and 5 stalked, 7 and 8 stalked. Hindwings with 7 veins, 3 and 4 rising near together, 6 and 7 stalked.

etheiella, n. sp.

Gen. 17. Homoeosoma, Curt.

Antennæ of male finely ciliated, with a short notch above basal joint. Labial palpi moderate, slender, somewhat ascending. Maxillary palpi short, filiform. Forewings with 11 veins (or in extra-Australian species 10 through obsolescence of vein 8), 4 and 5 stalked, 7 and 8 stalked. Hindwings with 7 veins, 3 and 4 rising nearly from a point, 6 and 7 stalked.

vagella, Z., Vol. III., 214.
fornacella, Meyr., Vol. IV., 219.

Gen. 18. ANERASTIA, Hb.

Antennæ of male pubescent or finely ciliated. Labial palpi long or moderately long, porrected or ascending. Maxillary palpi short, filiform. Forewings with 10 veins, 6 and 7 stalked. Hindwings with 7 veins, 3 and 4 stalked, 6 and 7 stalked.

distichella, Meyr., Vol. III., 215.

Gen. 19. EPHESTIA, Gn.

Antennæ of male pubescent. Labial palpi moderate, curved, ascending. Maxillary palpi short, filiform. Forewings in male with a tuft of hairs beneath folded base of costa; with 9 separate veins. Hindwings with 7 veins, 3 and 4 rising near together or from a point, 6 and 7 stalked.

sericaria, Scott., Vol. IV., 235.
elutella, Hb., Vol. III., 215.
ficulella, Barr., Vol. IV., 234.
interpunctella, Hb., Vol. III., 216.

FAM. IV. GALLERIDÆ.

Labial palpi differing in sexes, porrected or ascending. Maxillary palpi minute, concealed. Forewings with 12 (rarely 11 or 10) veins, 1 furcate at base, normal veins 7 and 8 stalked, 9 usually from same stalk. Hindwings with 8 or 7 veins, 4 and 5 stalked or coincident, normal veins 7 and 8 stalked, lower median pectinated at base.

Gen. 1. CALLERIA, F.

Antennæ with a tooth of scales on basal joint, in male very finely ciliated. Labial palpi in male moderate, ascending, in female moderate, porrected. Forewings with hindmargin obtusely projecting above anal angle; with 12 veins, 7 and 8 stalked, rising out of 9. Hindwings in male with 8 veins, 4 and 5 stalked, rising out of 3, 7 and 8 stalked; in female with 7 veins, 3 and 4 stalked, 6 and 7 stalk.

mellonella, L , Vol. III., 216.

Gen. 2. CALLIONYMA, n. g.

Antennæ with a tooth of scales on basal joint, in male very finely ciliated. Labial palpi in male short, ascending, in female rather long, porrected. Forewings with 12 veins, 8 and 9 stalked, rising out of 7. Hindwings with 8 veins, 4 and 5 stalked, 7 and 8 stalked.

sarcodes, n. sp.

Gen. 3. APHOMIA, Hb.

Antennæ with or without a tooth of scales on basal joint, in male pubescent. Labial palpi in male short, ascending, in female rather long, porrected. Forewings with 12 veins, 4 and 5 sometimes stalked or in male obsolete, 8 and 9 stalked or near together, rising out of 7. Hindwings with 7 veins, 3 and 4 stalked, 6 and 7 stalked.

tripartitella, Meyr., Vol. IV., 236.
pachytera, Meyr., Vol. IV., 227.
latro, Z., Vol IV , 238.

Gen. 4. ACHROEA, Hb.

Antennæ with a tooth of scales on basal joint, in male pubescent. Labial palpi in male short, ascending, in female very short, porrected. Forewings with 11 veins, 4 and 5 stalked, 7 and 8 stalked. Hindwings with 7 veins, 3 and 4 stalked, 6 and 7 stalked.

grisella, F., Vol. III., 216.

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In the following notes the changes of specific nomenclature made in this list are explained, and the new species included are described.

SCIRPOPHAGA, Tr.

Scrip. exsanguis, n. sp.

♂ ♀. 8″-11½″. Head, palpi, antennæ, thorax, abdomen, and legs snow-white ; palpi more or less infuscated at base externally, sometimes very slightly, sometimes second joint entirely fuscous externally; abdomen sometimes faintly infuscated, anal tuft pure white; legs dark fuscous beneath, posterior tibiæ sometimes slightly infuscated above. Forewings moderately broad, costa arched, more strongly towards apex, hindmargin strongly rounded, moderately oblique; snow-white, slightly shining. Hindwings snow-white, slightly shining. Forewings beneath in male moderately infuscated, in female nearly white.

Amongst described species this seems to come nearest to *Scirp. virginea*, Z., from South Africa, from which it appears to differ principally by the legs being white above and dark fuscous below, and by the infuscated under-surface of the forewings; but I have not seen Zeller's species. The colouring of the palpi seems variable and unreliable.

Very common round Sydney in March, sitting sluggishly on the stems of rushes in swampy places, and also taken at Brisbane in September; there can be little doubt that the larva feeds in the stems of a *Juncus*.

Scirp. ochroleuca, n. sp.

♂. 10″-11″. Head, palpi, antennæ, thorax, abdomen and legs white, faintly and unevenly ochreous-tinged; antennæ of male not half as long as forewings; anal tuft ochreous-whitish; legs, ochreous-white beneath. Forewings slightly narrower than in *S. exsanguis*, costa gently arched, hindmargin moderately oblique, strongly rounded; ochreous-white, becoming pure white towards apex. Hindwings ochreous-white, becoming pure white towards apex. Forewings beneath ochreous-white.

Certainly distinct from the preceding, though the female is yet unknown; readily distinguished from it by the wholly ochreous-white legs, and absence of infuscation on lower surface of fore-wings, as well as by the shorter antennæ and general ochreous tinge.

Two specimens sent from near Duaringa, Queensland, by Mr. G. Barnard.

CRUNOPHILA, n. g.

Crun. ramostriella, Walk.

(*Crambus ramostriellus*, Walk., Brit. Mus. Cat. 172; *Ubida receptalis*, ibid. 186; *Chilo schistellus*, Meyr., Proc. Linn. Soc., N.S.W., IV., 207.)

15″-21″. The male only differs from the female in the slightly broader forewings, and in having the hindwings smoky-fuscous, except towards the base, which is white. The species varies somewhat in depth of colouring, being often broadly suffused with brownish-whitish towards dorsal margin; thorax also often suffused with whitish; infuscation of hindwings in female variable in extent.

Several specimens sent by Mr. G. Barnard from near Duaringa, Queensland.

THINASOTIA, Hb.

Thin. bivittella, Don.

Prof. Zeller now informs me that his identification of this species, which I accepted, was erroneous, the description in reality referring to the insect described by him as *Cr. trivittatus*; so that for the Western Australian species the name of *recurvellus*, Walk., must be adopted. The synonymy of these two species will therefore be as follows:

Thin. bivittella, Don.

Crambus bivittellus, Don., Walk.; *C. trivittatus*, Z., Meyr.

Thin. recurvella, Walk.

Crambus recurvellus, Walk.; *C. bivittellus*, Z., Meyr.

Thin argyroëles, n. sp.

♂. 9″. Head pale ochreous, with a dark fuscous spot on middle of forehead, another between antennæ, and one on anterior margin of eye. Maxillary palpi pale ochreous, with two black bands. Labial palpi rather short, greyish-ochreous, mixed with blackish on sides, beneath ochreous-white at base. Antennæ dentate, shortly ciliated, dark fuscous. Thorax light brownish-ochreous, anterior margin with four dark fuscous spots. Abdomen pale ochreous. Anterior tibiæ with basal half greyish-ochreous, terminal half suffusedly blackish, tarsi black with ochreous-whitish basal and apical rings on each joint; middle tibiæ white, base black, posterior tibiæ wholly white, middle and posterior tarsi dark fuscous-grey with whitish rings at apex of joints. Forewings rather short, moderately broad, costa very slightly arched, apex obtuse, hindmargin distinctly sinuate, rather oblique, light yellowish-ochreous, becoming ochreous-brown along costa and on anterior half of disc, more greyish-tinged towards anterior half of inner margin; a few scattered black scales on anterior half of wing; a moderately broad silvery-white partially black-margined longitudinal streak immediately beneath costa from near base to slightly beyond middle, posterior extremity bent somewhat down, obtuse, anterior extremity acutely attenuated, somewhat suffused, almost touching costa; an irregular elongate-oval silvery-white spot a little below costa about two-thirds; a smaller roundish silvery-white subapical spot, not touching hind-margin, its upper angle suffusedly produced into apex; a moderately broad straight silvery-white black-margined longitudinal streak through disc from base to slightly beyond middle, slightly attenuated towards base; an elongate-oval silvery-white spot in disc below middle about two-thirds from base; a leaden-metallic line starting from between subcostal and median white streaks at one-fourth from base, running round posterior extremity of median streak, and curving back to inner margin somewhat before middle; an irregular leaden-metallic spot between subcostal streak and subcostal white spot; a similar leaden-metallic spot between anterior extremities of subcostal and discal white spots; the ground colour between subcostal and discal white spots, and between discal white spot and inner margin, is thickly strewn with black scales ; an ill-defined whitish-ochreous mark on costa at two-thirds; a similar mark on costa at three-fourths, giving rise to an outwardly curved leaden-metallic line passing round posterior extremities of subcostal and discal white spots, and ending on inner margin at about four-fifths; three sharply marked round black spots on hindmargin above anal angle ; a black line on hindmargin beneath apex : cilia smoky-grey, with a broad leaden-metallic basal line with violet reflections, becoming white at apex. Hindwings with a tuft of long whitish-yellowish hairs on costa towards base above; yellowish-whitish, more yellowish on costal half, with a roundish cloudy fuscous-grey spot at apex ; cilia yellowish-whitish.

Nearly allied to *T. bifractella*, Walk., but readily known by the different shape and detachment from costa of the subcostal white spot, by the different course of the first metallic line which is curved obliquely inwards to inner margin, instead of being perpendicular to it, by the darker ground colour, metallic basal line of the cilia, and various other minute points, as well as the costal tuft and whitish-yellow colour of the hindwings, which latter are perhaps only sexual characteristics.

A very handsome species; one very perfect specimen taken near Brisbane at the end of September.

Thin. relatalis, Walk.

The description of *Crambus argyroneurus*, Z., Cr., 47, certainly refers to this species, and, being slightly later, Zeller's name must rank as a synonym only. I should have identified it before, but for a misunderstanding of the wording of the original description.

Thin. panselenella, n. sp.

♂ ♀. 13″-14½″. Head brownish-ochreous, face darker, with an ochreous-whitish spot on anterior margin of eyes. Maxillary palpi light ochreous, towards base externally dark fuscous. Labial palpi very long, greyish-ochreous mixed with dark fuscous, beneath white at base. Antennæ dark fuscous, basal joint ochreous-whitish. Thorax light ochreous, shoulders ochreous-brown, centre of back black, with a longitudinal white stripe on each side of back, not reaching anterior margin. Abdomen light ochreous-yellow. Legs dark fuscous, posterior tibiæ light ochreous above. Forewihgs moderately broad, costa gently arched, apex obtusely pointed, hindmargin slightly sinuate. moderately oblique; ochreous-brown, darkest on disc, becoming light brownish-ochreous towards inner and hindmargins; extreme costal edge white from one-fourth almost to apex, a very slender snow-white streak immediately beneath costa from near base almost to middle; a straight narrow snow-white longitudinal streak running from a little below costa at one-fourth to costa immediately before apex, anterior extremity finely attenuated, upper edge tending to emit slender streaks to costa posteriorly; a moderate nearly straight snow-white central longitudinal streak through disc from base to hindmargin, margined with dark fuscous, somewhat sinuate beyond middle, slightly attenuated at base; from its lower edge beyond middle proceed three slender ill-defined white streaks to hindmargin at equal distances; a variable elongate-wedge-shaped ill-defined white longitudinal streak immediately above posterior fourth of median streak, sometimes more clearly marked, anteriorly finely attenuated; above this sometimes an ill-defined irregular white spot on hindmargin; between the white streaks posteriorly are cloudy dark fuscous lines; beneath third branch of median streak is a slender ill-defined white streak from middle to hindmargin, not touching median streak; a straight slender cloudy white streak from base to anal angle, and another from base to inner margin at one-third; a clearly-marked blackish hindmarginal line: cilia pale ochreous-grey, with a snow-white basal line. Hindwings pale dull ochreous-yellow, in female somewhat infuscated towards hindmargin; a fuscous-grey hindmarginal line, in female darker and sharply marked; cilia pale ochreous-yellow.

Closely allied to *Thin. opulentella*, Z., which it nearly resembles in markings, differing especially by the yellow hindwings and darker ground colour, which contrast handsomely with the snow-white markings; it is also somewhat larger, and is therefore the largest species of this group.

Five specimens taken at Blackheath in the Blue Mountains, at an elevation of 3,500 feet, at the end of February, in dry grassy places.

Thin. grammella, Z.

Prof. Zeller, to whom I sent specimens of the species described by me as *Cr. enneagrammos* (Proc. Linn. Soc. N.S.W., III., 194), assures me that it is identical with his *grammellus*, which name must therefore be adopted for the species. Zeller's original type would seem to have been a slight variety.

Thin. acontophora, n. sp.

♂ ♀. $10\frac{1}{4}''$-$11\frac{1}{4}''$. Head ochreous-white, centre of forehead and collar brownish-ochreous. Maxillary palpi white, externally except at apex ochreous mixed with dark fuscous. Labial palpi very long, ochreous mixed with dark fuscous, internally and beneath white. Antennæ whitish-ochreous. Thorax whitish-ochreous, becoming brownish-ochreous on shoulders and anterior margin. Abdomen pale whitish-ochreous. Legs pale whitish-ochreous, anterior pair ochreous-fuscous internally. Forewings rather short, moderately broad, costa rather strongly and evenly arched, apex almost acute, hindmargin sinuate, rather strongly oblique; pale whitish-ochreous, sometimes slightly tinged with brownish-ochreous, especially towards base of costa, and with a few scattered black scales; a narrow white central longitudinal streak through disc from base nearly to hindmargin, towards base very finely attenuated, posteriorly very suffused and indistinct, lower margin ill-defined, upper margin edged by a blackish line, above which is a cloudy dark fuscous streak, broadest in middle and attenuated towards base, posteriorly bending upwards near hindmargin and continued suffusedly to apex of wing, where it becomes again more distinct; a round blackish dot on lower margin of white median streak at two-thirds from base, and sometimes another a little above it; a whitish suffusion along hindmargin, and sometimes confused indications of slender whitish streaks on veins towards lower half of hindmargin; a hindmarginal row of black dots; cilia ochreous-whitish, with two cloudy fuscous-grey lines. Hindwings ochreous-grey-whitish, with a grey hindmarginal line; cilia ochreous-whitish.

Nearly allied to *T. grammella*, Z., and *T. invalidella*, Meyr., but differing from both in the absence of the white subcostal streak, and the obsolescence of the branches of the median streak; the hindwings are lighter than in *T. grammella*, but not white as in *T. invalidella*.

Five specimens taken in March in dry grassy places at Mittagong, New South Wales, at an elevation of 2,000 feet.

Crambus hapaliscus, Z.

This name, originally published by Zeller (Lep. Caffr.) in 1852, has the priority of *concinnellus*, Walk.; on account of the description being taken from South African specimens I had overlooked the identity, which is undoubted.

SALEBRIA, Z.

Sal. eucometis, n. sp.

♂. 11″. Head, palpi, antennæ, and thorax light ochreous, somewhat suffused with brownish; maxillary palpi yellowish. Abdomen light greyish-ochreous, somewhat irregularly brownish-tinged. Legs dark fuscous, middle tibiæ brownish-ochreous, posterior tibiæ light ochreous above. Forewings elongate, moderate, costa moderately and evenly arched, apex obtuse, hindmargin straight, moderately oblique; light ochreous, rather thickly but irregularly irrorated with light reddish-fuscous scales, especially immediately beneath the median streak and along hindmargin; costal edge suffusedly dark fuscous; a straight longitudinal ochreous-white streak a little above middle from base to hindmargin beneath apex, tolerably broad in middle, attenuated to both extremities, lower margin tolerably well-defined, upper margin very suffused and indistinct; cilia fuscous-grey, with whitish points. Hindwings fuscous-grey, slightly purplish tinged; a dark grey hindmarginal line: cilia whitish grey, with a darker grey line near base.

The ochreous-white median streak distinguishes this species from all others.

One specimen taken at Brisbane in September, in a dry grassy place.

Pempelia, Hb.

Pemp. opimella, Meyr.

The maxillary palpi of the male in this species appear to have but an apology for the usual pencil of hairs, so that it is somewhat doubtful whether the species is justly included in this genus, with which it fully agrees in other respects.

Hypophana, n. g.

I have no doubt of this genus being a natural one. The species are all rather inconspicuous grey insects, with notably transparent hindwings.

Hyp. petalocosma, n. sp.

♂. $7\frac{3}{4}''$. Head and thorax light grey, somewhat mixed with whitish. Palpi grey, towards base whitish, terminal joint and a subapical band on second joint suffusedly dark fuscous. Antennæ grey. Abdomen whitish-grey, prismatic. Legs grey-whitish, anterior pair suffused with dark fuscous above. Breast beneath on each side with a broad expansible pearly prismatic plate, composed of about a dozen oblong overlapping plates, behind which is an expansible tuft of thick ochreous-white hair-scales, resting on a circular patch of overlapping deep black plate-like scales; a short linear patch of black scales also extends along base of submedian fold on under-side of forewings. Forewings very narrow at base, gradually dilated posteriorly, costa at first straight, towards apex moderately arched, apex obtusely rounded, hindmargin rather strongly rounded, not oblique; light grey, slightly brownish-tinged, with irregularly scattered dark fuscous scales; a cloudy dark fuscous transverse mark at one-fourth, not reaching costa or inner margin; a very faint slender irregular dark fuscous transverse line somewhat before middle, slightly curved outwards; a very ill-defined small dark fuscous spot in disc at two-thirds, and another near inner margin a little beyond middle; a slender cloudy dark fuscous outwardly-curved transverse line from a little before apex to a little before anal angle, bent inwards beneath costa, closely followed by another much fainter similar line; a blackish hindmarginal line: cilia light grey, with rows of blackish points. Hindwings whitish-grey, transparent, hindmarginal edge suffusedly darker; a short linear streak of thick black scales at base below middle; cilia grey-whitish, with a well defined dark grey line near base.

The ornamental neck-frill of this species is very extraordinary, and reminds one somewhat of similar appendages in some humming-birds; it is probably less developed in the female.

One specimen taken at Sydney in October, amongst dry bush.

Hyp. melanostyla, Meyr.

This species differs from the other three of the genus in having vein 3 of the hindwings rising out of the stalk of 4 and 5. It is however closely allied to the others; the female, which is alone known to me, has on the breast a cuirass of pearly scales, indicating near relationship with the preceding species ; it would therefore be conceivable that they should be the sexes of the same species, but the difference in neuration, as well as in superficial marking, renders this hardly probable.

EUCAMPYLA, n. g.

Euc. etheiella, n. sp.

♂. 9¾″. Head and thorax light fuscous-grey. Palpi dark fuscous-grey, towards base whitish-grey. Antennæ dark fuscous. Abdomen whitish ochreous. Legs dark fuscous, posterior tibiæ light ochreous above. Forewings very narrow at base, gradually dilated throughout, costa at first straight, towards apex moderately arched, apex round-pointed, hindmargin very oblique, strongly rounded ; a tuft of hairs concealed under the folded base of costa beneath ; rather light dull fuscous, sprinkled with dark fuscous scales ; costa suffused with dark fuscous ; an indistinct narrow dark fuscous transverse line from two-fifths of costa to a little before middle of inner margin, strongly bent outwards somewhat above middle ; a cloudy dark fuscous transverse spot in disc at two-thirds ; a narrow cloudy dark fuscous transverse line from five-sixths of costa to inner margin before anal angle, sending a sharply angulated tooth inwards above middle, and appearing to be margined posteriorly by a paler line, through the absence of dark fuscous scales from the groundcolour ; a cloudy dark fuscous hindmarginal line ; cilia ochreous-grey, with a pale ochreous basal line. Hindwings whitish, costa towards apex suffused with light fuscous-grey ; some short whitish-ochreous hairs at base ; a cloudy grey hindmarginal line ; cilia white, round apex ochreous-tinged and with a faint grey line.

Resembles the genus *Ephestia* in form and colouring, as well as in the costal tuft of hairs of the male, but differs markedly in neuration. One specimen taken at light near Sydney in August.

CALLIONYMA, n. g.

Call. sarcodes, n. sp.

♂ $7\frac{3}{4}''$, ♀ $9\frac{1}{2}''$. Head, palpi, and thorax grey-whitish, more or less tinged with pale carmine; sides of frontal cone in male dark grey. Antennæ whitish, annulated with grey, basal joint carmine-tinged. Abdomen whitish-ochreous. Legs grey-whitish, slightly carmine-tinged, anterior and middle pair fuscous-grey beneath, tarsal joints fuscous-grey except at apex. Forewings somewhat oblong, rather broad, costa gently arched, apex acute, hindmargin nearly straight, slightly sinuate, oblique; dull ochreous-grey-whitish, in female slightly, in male strongly suffused with light brownish-carmine; extreme costal edge darker brownish-carmine; a very indistinct irregular somewhat outwardly curved brownish-carmine tranverse line from one-third of costa to two-fifths of inner margin; a similar line from two-thirds of costa to four-fifths of inner margin, irregularly bent outwards in middle; a small indistinct fuscous carmine spot in disc beyond middle; a strongly-marked broad cloudy blackish hindmarginal line; cilia pale ochreous-carmine, with a deep carmine basal line. Hindwings in male light fuscous-grey, in female whitish-grey, with a dark grey hindmarginal line; cilia grey-whitish, with a faint grey line near base.

A very distinct and elegant species.

One pair beaten from *Eucalyptus* bushes in November, the male at Parramatta, the female at Murrurundi, New South Wales.

TORTRICIDÆ.

PROSELENA, Meyr.

Pros. camacinana, n. sp.

♂ ♀. 5″-6″. Head, palpi, and thorax in male yellowish-whitish, in female whitish-ochreous, somewhat mixed with dark fuscous-grey. Antennæ dark fuscous. Abdomen whitish-ochreous-grey. Anterior and middle tibiæ blackish, with ochreous-whitish median and apical rings, tarsi blackish with whitish rings at apex of joints;

posterior legs ochreous-whitish, tarsi dark grey towards base of joints. Forewings in male rather short, moderately broad, in female more elongate and narrower, costa rather strongly arched towards base, apex round-pointed, hindmargin nearly straight, in male moderately, in female rather strongly oblique; whitish, irregularly mixed with light grey, and in male with whitish-yellowish, in female pale ferruginous-yellow scales, which tend to accumulate on margins of dark markings; outer edge of basal patch generally sharply defined by a blackish-fuscous line from one-fourth of costa to one-third of inner margin, angulated outwards in middle, dilating gradually from middle to inner margin so as to form an erect wedgeshaped mark; between this line and base are some scattered blackish-fuscous scales; a slender indistinct grey transverse striga a little beyond and parallel to outer edge of basal patch; central fascia moderate, blackish-fuscous, darkest on edges, starting from middle of costa obliquely outwards, bent sharply back in middle of disc, ending abruptly on fold, not reaching inner margin, tooth of angulation ill-defined and sometimes posteriorly obsolete; beneath extremity of central fascia are two small dark fuscous spots on inner margin; beyond upper half of central fascia a slender dark fuscous parallel striga, terminating in the angulation; an irregular quadrilateral blackish-fuscous spot on costa at three-fourths, suffused beneath, anterior angle darkest; an elongate-triangular dark grey spot on anal angle, rather outwardly oblique, suffused towards apex, incompletely connected with costal spot by two indistinct strigæ; two oblique grey strigæ from costa just before apex to hindmargin below apex; an elongate cloudy blackish-grey mark along middle of hindmargin; cilia on costa and anal angle ochreous-whitish, on hindmargin dark grey, mixed with whitish, and with a blackish-grey line. Hindwings fuscous grey, speckled with darker; cilia grey, with a dark grey basal line.

Superficially very different from *Pros. annosana*, Meyr., and much more nearly resembling the species of *Isochorista* or *Capua*;

but the pecular venation, and absence of a costal fold, leave no doubt of its true position.

Common at about 2,000 feet of elevation on the ascent of Mt. Wellington, Tasmania, flying readily over a mossy bank at the beginning of February.

Dichelia (?) humerana, Walk.

Having recently obtained specimens of this species in Tasmania, I am able to announce that, as conjectured, it does not belong to the *Tortricina* at all, but to a genus of *Tineina*, allied to *Depressaria*, Hw.

CACOECIA, Hb.

Cac. psapharana, n. sp.

♂ 8″, ♀ $8\frac{3}{4}$″. Head, palpi, antennæ, and thorax pale whitish-ochreous; palpi in male twice as long as head, in female hardly longer, slightly speckled externally with fuscous. Abdomen ochreous-whitish, anal valves of male large, tufted. Legs ochreous-whitish, anterior tibiæ, and anterior and middle tarsi speckled with dark fuscous, posterior tibiæ white. Forewings oblong, moderately broad, costa in male rather sharply bent somewhat before middle, in female rather strongly arched towards base, apex obtusely pointed, hindmargin slightly rounded, rather oblique, in female slightly sinuate below apex; costal fold of male very slight, short and imperfect; very pale whitish-ochreous, with faint regular slightly darker transverse strigulæ; basal patch wholly obsolete; central fascia very faintly defined, running from slightly before middle of costa to anal angle, light greyish-ochreous, upper third very narrow, lower two-thirds rather broad, posterior margin sharply incised below middle; a very indistinct light greyish-ochreous flattened-triangular patch on costa about three-fourths, and a similar triangular patch on middle of hindmargin; cilia ochreous-whitish. Hindwings whitish, irregularly strigulated with light grey; cilia white.

Intermediate between *C. postvittana*, Walk., and *C. mnemosynana*, Meyr., but differing from both in the very pale colouring and extremely faint markings; in the rudimentary costal fold of the male, and the whitish hindwings, it resembles the latter species, but in the markings of the forewings it rather approaches the former; the palpi of the male are proportionately longer than in either. The sexes do not perceptibly differ in colouring.

A fine pair taken *in cop.* near Launceston, Tasmania, amongst dry bush at the end of January.

Arotrophora, Meyr.

Arotr. ochraceella, Walk.

(*Crambus ochraceellus*, Walk., Brit. Mus. Cat., 177.)

♂. 15″-16″. Head white, with an orange spot on anterior margins of eyes. Palpi three and a half times as long as head, white, externally ochreous-orange. Antennæ ochreous-orange. Thorax white, anterior margin and shoulders suffusedly yellowish-ochreous. Abdomen elongate, stout, white. Legs white, beneath ochreous-tinged. Forewings broad, oblong, rather dilated posteriorly, costa gently arched, apex obtusely pointed, hindmargin rather sinuate, slightly oblique; deep ochreous-orange, lighter and mixed with white in disc below middle and towards hindmargin, the darker tint seeming to form a broad suffused subcostal streak, a narrow dorsal streak, and a round suffused spot in disc at two-thirds from base; a white costal streak from base almost to apex, attenuated to each extremity, somewhat speckled with orange, its lower margin suffused into ground colour; a very ill-defined white suffusion along vein 1; cilia light ochreous-orange mixed with white (defective). Hindwings white, faintly speckled with pale orange; cilia white.

This remarkable and very striking species, from its large size and conspicuous colouring, cannot be confused with any other insect. From the neuration, and structure of the palpi and antennæ, there can be no doubt of its being a true *Arotrophora*, with more traceable relationship to *A. arcuatalis*, Walk., than to any other species.

One specimen beaten from *Banksia serrata* near Sydney in October; I have also seen two others from the same locality.

Arotr. hemerana, n. sp.

♂. 7‴-7½‴. Head, palpi, antennæ, thorax, and abdomen whitish-grey; palpi two and a half times as long as head, externally ochreous-tinged and speckled with dark grey. Legs whitish, anterior and middle tarsi and tibiæ grey with whitish rings. Forewings moderate, posteriorly dilated, costa strongly arched, apex obtusely pointed, hindmargin very slightly sinuate, rather strongly oblique; light grey, finely strewn with whitish scales, with fine irregular dark grey transverse strigulæ, and a few scattered blackish scales; some very inconspicuous, sometimes almost obsolete, markings composed of brownish-ochreous scales mixed with blackish, forming some small irregular spots in disc about one-third, a narrow fascia from middle of costa to two-thirds of inner margin, interrupted on disc and very ill-defined on lower half, some speckles near costa tewards apex, and an elongate tolerably well-defined straight slender streak very near and parrallel to hindmargin from near apex to anal angle; a tolerably conspicuous black dot in disc at three-fifths; a row of very ill-defined blackish dots on hindmargin, mixed with ochreous; cilia grey-whitish, with a sharply defined dark grey line near base, and two other very cloudy grey lines. Hindwings whitish-grey; cilia grey-whitish, with two very faintly darker lines.

Allied to *A. confusana*, Walk., but considerably larger than it or the narrower-winged *A. lividana*, Meyr., and *A. atimana*, Meyr.; in form of wing it nearly resembles *A. confusana*, but may be known by its very uniform grey colouring, without distinct dark transverse markings, or reddish-ochreous suffusion.

Five specimens taken amongst luxuriant bush on the ascent of Mount Wellington, Tasmania, at an elevation of about 3,000 feet.

CONCHYLIDÆ.

HYPERXENA, n. g.

Thorax with a double erect posterior crest. Antennæ in male —? Palpi very long, straight, porrected, second joint with long rough obliquely projecting hairs above, terminal joint very loug, roughly scaled above. Posterior tibiæ fringed with short hairs above. Forewings elongate, narrow, costa (in male probably simple) strongly arched, apex acute, hindmargin very oblique; surface with raised scales. Hindwings elongate, as broad as forewings, cilia long. Forewings with veins 7 and 8 separate, 7 running to costa, secondary cell indicated, vein 1 furcate at base (?). Hindwings with 8 veins, 3 and 4 remote at origin, parrallel, 5 nearly parallel to 4, 6 running to costa, 6 and 7 remote at origin, nearly parallel.

This interesting genus is nearly allied to *Heliocosma*, Meyr., which previously stood alone; the curious venation is nearly identical, the essential point of distinction being that vein 7 of the forewings runs to the costa, a very unusual character among the *Tortricina* which recurs in the remote genus *Teras*, Tr., and vein 6 of the hindwings also runs to the costa. The thoracic crest, very oblique hindmargin of the forewings, and long cilia are also notable characters.

Hyperx. scierana, n. sp.

♀. $7\frac{3}{4}''$-$8\frac{3}{4}''$. Head, palpi, and thorax fuscous-grey, finely irrorated with whitish. Antennæ grey. Abdomen ochreous-whitish. Anterior and middle legs fuscous-grey, with cloudy whitish rings at apex of joints; posterior legs grey-whitish. Forewings narrow, costa strongly and evenly arched, apex acute, hindmargin almost straight, very oblique; fuscous-grey, finely irrorated with grey-whitish, and with scattered dark fuscous scales; some raised scales at about one-fourth from base on disc and towards inner margin; very faint indications of a darker outwardly oblique streak from costa at one-fourth to middle of inner margin, and a spot in disc at two-thirds; cilia grey with whitish points, mixed with darker fuscous-grey at base. Hindwings pale whitish-grey; cilia grey-whitish, with a faint grey line near base.

A peculiar and abnormal-looking insect, at first sight not at all like the *Tortricina*. It is very possible that the male may be more distinctly marked.

Two specimens beaten from scrub, one at Parramatta in August, the other at Blackheath on the Blue Mountains in September.

HETEROCROSSA, n. g.

Thorax smooth. Antennæ in male with long fine cilia. Palpi rather long or very long, second joint roughly haired above and towards apex beneath, attenuated, terminal joint moderate, exposed. Posterior tibiæ fringed with hairs above. Forewings elongate, narrow, costa in male simple, moderately arched, apex pointed, hindmargin oblique; surface with raised scales. Hindwings elongate, broader than forewings, lower median vein pectinated towards base. Forewings with veins 7 and 8 separate, 7 running to hindmargin, secondary cell absent, upper fork of vein 1 obsolete. Hindwings with 6 veins, 3 and 4 stalked from posterior angle of cell, 5 from upper angle of cell to slightly above apex, 6 free.

Closely allied to *Paramorpha*, Meyr., but differing from it and all other genera of the family in the basal pectination of the lower median vein. The absence of this pectination is a family characteristic, but although this case proves that the characteristic is not an infallible one, yet it will be observed that the family is still absotutely distinguished from the other two by the origin of vein 2 from near before the angle, and, as I have remarked in my general paper on the *Tortricina*, the exceptional failure of a character need not vitiate its general value, since families can rarely be distinguished by a single point, but by the consideration of the sum of general characters.

The genus occurs in Australia and New Zealand, three species being known to me, two of which I had erroneously included elsewhere.

1. *Het. neurophorella*, Meyr.

(*Epischnia neurophorella*, Meyr., Proc. Linn. Soc., N.S.W., IV., 232).

The only Australian species, distinguishable by the dark longitudinal lines on the veins.

2. *Het. abreptella*, Walk.

(*Paramorpha abreptella*, Meyr., Proc. Linn. Soc., N.S.W., VI., 698).

The basal pectination was partially obliterated in my originally described specimens, but I have since obtained a series from Christchurch, N.Z., which leave no doubt of its true position. The fuscous-grey colouring, which is sometimes very deep, will distinguish this from the other two species.

3. *Het. gonosemana*, n. sp.

♀. 9‴. Head white. Palpi about twice the length of head, upper half white, lower half dark fuscous, terminal joint white, dark fuscous at base. Antennæ white, with indications of dark rings. Thorax white, on shoulders ochreous-tinged. Abdomen ochreous-white. Anterior and middle legs dark fuscous, with ochreous-white rings at apex of joints; posterior legs ochreous-white. Forewings elongate-oblong, narrow, costa slightly arched, bent and roughened with scales about one-third, apex obtusely pointed, hindmargin straight, moderately oblique; white, with a few scattered grey scales, towards inner margin very faintly ochreous-tinged; a thick black streak along basal fifth of costa, attenuated at each end; a black dot on costa closely beyond it; a small irregular black mark in disc at one-third, immediately preceded by a small dark fuscous-grey suffusion, and followed by two tufts of raised scales, half blackish and half white; a small subquadrate rather inwardly oblique black spot on costa at one-third, almost connected with discal black spot; all these black markings are somewhat mixed on margins with ochreous; some raised scales towards base, and inner margin at one-third; five short cloudy blackish marks on costa at equal distances between one-third and apex, rather oblique inwardly; five small spots of raised whitish-ochreous scales arranged in an oval in disc, each with a few black scales on margin; between these, and above posterior of them, is an ill-defined grey suffusion; a very ill-defined cloudy grey irregular dentate transverse line from second of the five costal marks to inner margin at four-fifths, only distinct on upper half and on inner margin; a more distinct dentate grey line from third costal mark to inner margin before anal angle, strongly curved outwards and sinuate, containing a series of ill-defined black dots; a row of very ill-defined black dots on hindmargin: cilia grey, closely irrorated with whitish points. Hindwings whitish-slaty-grey, cilia white, with a faint grey line.

A very distinct species, through the white ground colour, and black marks towards base.

I took one perfect specimen at Dunedin, New Zealand, amongst dry bush at the beginning of February, and have seen two others from the same place.

Bondia, Newm.

Thorax smooth. Antennæ in male with long fine ciliations, basal joint broadly flattened. Palpi in male moderate, curved, ascending, second joint broadly scaled, scales angularly projecting in front, terminal joint slender, scaled, erect; in female moderate or long, straight, porrected, second joint broadly scaled, laterally compressed, terminal joint slender, scaled, porrected. Posterior tibiæ fringed with hairs above. Forewings elongate, very narrow, costa in male simple, nearly straight, apex obtuse or almost acute, hindmargin very oblique; surface with tufts of raised scales. Hindwings elongate, apex attenuated, as broad or somewhat broader than forewings, cilia very long, as broad or broader than hindwings. Forewings with veins 7 and 8 separate, 7 running to hindmargin, secondary cell absent, 1 furcate at base. Hindwings with 6 veins, 3 and 4 separate, more or less remote at origin, 3 from upper angle of cell to slightly above apex, 6 free.

Immediately separate from the other genera possessing only 6 veins in the hindwings, by the remoteness of veins 3 and 4 at origin; in all others they rise from a stalk. The peculiar ascending palpi of the male are also a very singular characteristic, reminding one of some of the *Tineidæ*, such as *Scardia*, but the palpi of the female approximate to the ordinary type of the group.

All the species are blackish, with the forewings much roughened and their habit is to sit on the blackened and charred fibrous bark of some species of *Eucalyptus*, where they are practically invisible until induced to move. I possessed those here described before the publication of my last papers, but so curious is their superficial appearance that I had never suspected their affinity until lately. They are in fact closely allied to the genera previously described, though it may be doubted whether any one, who had not closely studied the neuration, would be induced to believe, without seeing the connecting links, that *Bond. attenuatana* really belonged to the *Tortricina*.

I may mention here that *Carposina*, HS., represented by two European species, is without doubt referrable to this group, though erroneously placed hitherto in the *Gelechidæ*, to which it has no affinity; the six-veined hindwings, long straight porrected palpi, and tufts of scales on forewings, are sufficient proofs. Superficially it nearly resembles *Heterocrossa*.

Newman's description of this genus is perfectly recognisable, and sufficient for characterisation, although the neuration is omitted.

The larvæ must certainly be attached to species of *Eucalyptus*, feeding either in the bark or perhaps in the fruit-capsules.

1. *Bond. nigella*, Newm.

(*Bondia nigella*, Newm., Trans. Ent. Soc., Lonn., Vol. III., N.S., 289).

♂ ♀. $7\frac{1}{2}''$-$8\frac{3}{4}''$. Head, palpi, antennæ, and thorax blackish, sprinkled thinly with ochreous-grey; palpi in female rather long. Abdomen light grey. Anterior and middle legs blackish; posterior legs ochreous-grey-whitish, tarsi suffused with fuscous-grey except at apex of joints. Forewings very narrow, oblong, costa straight, slightly bent at base and apex, apex round pointed, hindmargin almost straight, very oblique; blackish, with a few fine scattered ochreous-whitish scales; numerous scattered tufts of raised scales; posterior half of costa with faintly indicated strigulæ; a C-shaped whitish-ochreous or pale yellowish-ochreous transverse mark in disc at three-fifths, extremities directed outwards: cilia blackish. Hindwings and cilia in male pale grey, in female somewhat darker.

Easily distinguished from all the others by the pale ochreous C-shaped mark in disc.

Taken near Sydney in July and September, and also received from Victoria.

2. *Bond. dissolutana*, n. sp.

♂ $6\frac{3}{4}''$-$9''$, ♀ $8\frac{3}{4}''$-$10''$. Head, palpi, antennæ, and thorax blackish, finely sprinkled with ochreous-grey; palpi in female long. Abdomen in male blackish, in female grey. Legs blackish; posterior tibiæ ochreous-grey-whitish, in male sometimes blackish, tarsi with ochreous-whitish rings at apex of joints. Forewings narrow, in female rather broader, oblong, costa straight, slightly bent at base and apex, apex round-pointed, hindmargin almost straight, very oblique; blackish, sprinkled with ochreous-whitish scales; numerous scattered tufts of raised scales; cilia blackish. Hindwings in male bright orange-yellow, apex irregularly dark fuscous, costa and upper part of hindmargin very narrowly and irregularly dark fuscous, cilia dark fuscous-grey; in female light grey, towards base ochreous-tinged, apex and hindmargin towards apex suffused with dark grey, cilia light grey, darker round apex, with an indistinct darker line near base.

The male is immediately known by the orange-yellow hindwings; the female may be distinguished from the other unicolorous species by its large size, long palpi, rather broader forewings, and the ochreous tinge of hindwings.

Taken at Blackheath on the Blue Mountains (3,500 feet) in October; Mr. G. H. Raynor also met with it at Melbourne.

3. *Bond. maleficana*, n. sp.

♂ ♀. $5\frac{1}{4}''$-$6\frac{1}{4}''$. Head, palpi, antennæ and thorax blackish, sprinkled with whitish-ochreous; palpi in female moderate. Abdomen grey. Anterior and middle legs dark fuscous, posterior legs grey, all tarsi with pale rings at apex of joints. Forewings very narrow, oblong, costa gently arched, apex round-pointed, hindmargin nearly straight, very oblique; blackish, with scattered whitish-ochreous scales; numerous scattered tufts of raised scales; cilia blackish. Hindwings light grey, apex rather darker; cilia light grey.

Much smaller than female of the preceding species, narrower-winged, with shorter palpi; considerably larger than *B. attenuatana*, darker, and broader-winged, with shorter cilia.

Common at Sydney and Parramatta in September and November.

3. *Bond. attenuatana*, n. sp.

♂ ♀. $3\frac{3}{4}''$-$4\frac{1}{2}''$. Head, palpi, antennæ, and thorax blackish-fuscous, sprinkled with whitish-ochreous; palpi in female moderate. Abdomen grey. Anterior and middle legs dark fuscous, posterior legs grey, all tarsi with pale rings at apex of joints. Forewings very narrow, oblong-lanceolate, costa gently arched, apex almost acute, hindmargin extremely oblique; blackish-fuscous, sprinkled with greyish-ochreous, towards base somewhat mixed with whitish ochreous; numerous tufts of raised scales: cilia blackish-fuscous. Hindwings strongly attenuated, light fuscous-grey, apex rather darker; cilia broader than hindwings, light grey.

Recognisable by its small size and extremely narrow wings, very long cilia, and less deep colour.

Met with once in abundance at Parramatta in July.

GLYPHIPTERYGIDÆ.

Hypertropha, Meyr.

Hyp. desumptana, Walk.

(*Orosana desumptana*, Walk., Brit. Mus. Cat. 460; *Hypertropha thesaurella*, Meyr., Proc. Linn. Soc., N.SW., V., 209).

Not identified until my recent inspection of the type. The species is included by Walker in his imaginary genus *Orosana* (affectionately referred to by Butler as "this little Australian genus") which contains a motley collection of *Hypertropha*, *Eupselia*, and various *Pyrales*.

Simaëthis, Leach.

Sim. combinatana, Walk.

Simaëthis abstitella, Walk., Brit. Mus. Cat. 997, may be added as a synonym of this species.

Eupselia, Meyr.

Eups. carpocapsella, Walk.

On reference to the Museum types of this species and *E. beatella*, Walk., the species which I possess proved to belong to this species, to which therefore my description of *E. beatella* (Proc. Linn. Soc., N.S.W., V., 219) refers, as well as the description of *E. carpocapsella* quoted from Walker.

Eups. beatella, Walk.

(*Orasana* (?) *beatella*, Walk., Brit. Mus. Cat., 999.)

"♂. 8‴. Forewings hardly acute, slaty-cinereous, with several brownish interrupted transverse lines, and with two dark brown purple-tinged patches; first patch extending from inner margin to disc; second much larger than first, extending from anal angle to disc; hindmargin with deep black points and with a purple marginal line. Hindwings yellow, inner and hind margins dark fuscous."

The above is an abstract of all that has any importance in Walker's description. The locality (given as Australia) is perhaps Queensland.

GLYPHIPTERYX, Hb.

Glyph. cyanochalca, n. sp.

♂. 5½‴-6¼‴. Head and thorax ochreous-bronze, back dark fuscous. Palpi short, rather drooping, roughly scaled, whitish-ochreous, second joint mixed with blackish towards apex, with indications of two whorls, terminal joint minute. Antennæ dark fuscous. Abdomen whitish-ochreous, segments suffused with dark fuscous towards base. Legs dark fuscous, posterior tarsi with indistinct ochreous-whitish rings at apex of joints. Forewings moderate, not dilated, hindmargin very slightly rounded, not sinuate; rather light brassy-ochreous; markings silvery-metallic with brassy reflections, margined with grey; an upwards-curved streak from base beneath costa to inner margin before middle; a parallel curved transverse streak from costa at one-fifth, not reaching beyond fold; a nearly straight transverse fascia from slightly before middle of costa to inner margin beyond middle, attenuated or interrupted on fold; an inwardly oblique wedge-shaped streak from costa at three-fifths, reaching half across wing, becoming ochreous-white on costa and produced as an ochreous-white streak along costa to five-sixth; a narrow longitudinal streak in disc beneath the ochreous-white costal streak, its posterior extremity sometimes turned up and connected with it; an erect roundish spot on inner margin before anal angle, with a small black spot on each side of its apex; a slightly curved streak close before hindmargin from a white spot before apex to anal angle; cilia with basal half brassy-ochreous, terminal half light grey, separated by a blackish-grey line. Hindwings and cilia dark fuscous.

By the absence of any black discal patch, white hindmarginal indentation, or apical hook in the cilia, this species stands at once distinguished from all other described Australian species, and it would seem to have most relationship with the very differently marked European *G. bergstræsserella*, F. The palpi are much shorter than in any other Australian species, and the general aspect is peculiar, but the venation is of the ordinary type.

Three specimens taken in grassy bush at Mittagong (2,000 feet) and Blackheath (3,500 feet) in the Blue Mountains, in February and March.

Glyph. cyanophracta, n. sp.

♂. $4\frac{1}{2}''$-$5''$. Head and thorax greyish-bronze. Palpi with four oblique whorls of black ochreous-white-tipped scales, apex black, with ochreous white longitudinal lines above and below. Antennæ dark fuscous. Abdomen dark fuscous, segments with obscure ochreous-whitish apical rings. Legs dark fuscous, with obscure ochreous-whitish rings at middle and apex of tibiæ, and apex of all tarsal joints. Forewings moderate, posteriorly dilated, hindmargin rounded, slightly sinuate; ochreous-bronze, an ill-defined yellowish-white spot at base of inner margin, not reaching costa; a straight violet-blue-metallic fascia from twosevenths of costa two-fifths of inner margin, becoming ochreous-white on inner margin ; a second straight violet-blue-metallic fascia from slightly before middle of costa to slightly beyond middle of inner margin ; a large roundish black patch resting on anal angle and extending nearly to costa, its upper half crossed by six whitish-ochreous longitudinal lines, of which the four upper terminate anteriorly in one small round violet-golden-metallic spot, the two lower extend from posterior edge only halfway across ; a small violet-blue-metallic spot on costa beyond middle, touching the black patch ; some pale ochreous scales in the black patch near its lower anterior angle, and seven small roundish violet-golden-metallic spots scattered through its lower half ; a slightly outwards-curved violet-blue-metallic fascia from costa at five-sixths to hindmargin at lower posterior angle of black patch ; an elongate transverse violet-blue-metalic apical spot : cilia grey, basal half scaled with light bronzy-ochreous, beneath black patch with whitish-ochreous, and separated by a broad blackish-grey line, with a triangular ochreous-white indentation above middle of hindmargin, costal cilia dark grey with a small ochreous-white spot above ante-apical fascia, and a larger wedge-shaped ochreous-white spot above apex. Hindwings and cilia dark fuscous.

A beautiful species, intermediate in size and general characteristics between the much larger *G. cometophora*, Meyr., and the much smaller *G. iometalla*, Meyr., differing from both in the violet-blue tinge of the metallic fasciæ, and in the more numerous metallic spots on the black patch ; from the former also by the whitish dorsal spot near base and the less numerous longitudinal lines, from the latter by the completeness of the first fascia, and more numerous and conspicuously developed longitudinal lines.

I found this species pretty commonly near Burragorang, New South Wales, at the bottom of the deep gorge which receives the confluence of the Nattai and Wollondilly Rivers, flying in the sun over grassy banks in April ; and afterwards met with it frequenting the blossoms of a species of *Carex* on the summit of the surrounding table-land.

Glyph. triselena, Meyr.

The description of this species (Proc. Linn. Soc., N.S.W., V., 234) is very defective in respect of the basal markings of the forewings, which are peculiar and highly characteristic, and is also inaccurate in some minor points, owing to the inferior condition of the two original specimens; I have thought it best therefore to redescribe the species from a series of specimens in fine condition, taken at Christchurch, N. Z., in February.

♂ ♀. $4\frac{1}{2}''$-$5''$. Head and thorax greyish-bronze, with an ochreous-whitish longitudinal line on each side of back from behind eyes through thorax, shoulders golden-ochreous. Palpi black, with four whorls of black white-tipped scales. Antennæ dark fuscous. Abdomen elongate, grey, with white apical rings on segments, apex white. Anterior and middle tibiæ and tarsi dark fuscous with whitish rings, posterior tibiæ and tarsi light grey with whitish bands. Forewings elongate, narrowed posteriorly, hindmargin very oblique, slightly sinuate; light golden-ochreous; an ochreous-whitish streak along inner margin from base nearly to middle, broadly and suffusedly margined above with dark grey; a curved leaden-metallic streak from base nearly to middle, broadly and suffusedly margined above with dark grey; a curved leaden-metallic streak from base beneath costa to near inner margin at one-third from base; a slightly curved oblique leaden-metallic streak from costa at one-fourth, reaching half across wing, terminating above apex of basal streak; two straight parallel direct leaden-metallic transverse fasciæ, one before, the other slightly beyond middle; from second below middle proceeds a rather narrow longitudinal black band, bent downwards to anal angle, thence continued along lower half of hindmargin, containing two golden-metallic spots in the bend and two others on the hindmargin; the space above this nearly to costa is filled by six whitish longitudinal lines, partially confluent or separated by narrow black interspaces; two indistinct leaden-metallic spots on costa, merged beneath in the whitish lines; a transverse leaden-metallic subapical spot: cilia whitish-grey, basal third within a blackish line scaled with light golden-ochreous, with a whitish indentation beneath apex, costal cilia grey with whitish spots on costal streaks. Hindwings slaty-grey, cilia rather lighter grey.

Immediately recognisable amongst its allies by the narrow forewings, light groundcolour, and longitudinal basal markings, which are especially noticeable when the wings are closed.

Glyph. amblycerella, n. sp.

♂. $5\frac{1}{4}''$. Head and thorax greyish-bronze. Palpi white, with four oblique whorls of black white-tipped scales, lowest one indistinct, apex black with a white lateral line. Antennæ dark fuscous. Abdomen dark fuscous, segments with obscure whitish apical rings. Legs dark fuscous, with slender whitish rings at middle and apex of tibiæ, and apex of all tarsal joints. Forewings moderate, slightly dilated, hindmargin rather strongly sinuate beneath apex; bronzy-ochreous, towards base indistinctly suffused with fuscous, and narrowly along costa and inner margin; all markings suffusedly edged with dark grey; a clearly defined outwardly oblique elongate transverse white spot on inner margin near base, reaching half across wing, apex irregularly truncate, posterior edge rather concave; a straight violet-metallic fascia from slightly beyond one-third of costa to middle of inner margin, including an ochreous-white dot on costa, and ending in a white quadrilateral spot on inner margin; a short oblique obsolete pale streak from costa before middle, beyond extremity of which is a very irregular suffused black spot; a longitudinally elongate black spot in centre of disc, its posterior extremity containing a roundish violet-silvery-metallic spot; two small roundish violet-silvery-metallic spots in disc beneath central spot, partially surrounded with black scales, a third similar spot on inner margin at three-fifths, a fourth slightly above and beyond third, and a fifth in disc below middle above anal angle ; beyond the fifth the black scales tend to form a small separate spot ; an oblique violet-silvery-metallic streak from costa slightly beyond middle, almost reaching fifth discal spot, and containing an ochreous-white costal dot ; a similar shorter streak a little beyond it ; an outwardly curved violet-silvery-metallic fascia from a white dot on costa at five-sixths to hindmargin below middle, thence produced to anal angle, interrupted above hindmargin ; a short violet-silvery-metallic subapical streak from a white dot on costa before apex to hindmarginal indentation : cilia on hindmargin with basal half bronzy-ochreous, terminal half white, separated by a broad blackish-grey line, with a triangular white indentation above middle, on anal angle dark grey, with a white dot beneath inner-marginal spot, costal cilia dark grey, with white wedge-shaped spots on extremities of two posterior metallic streaks. Hind-wings and cilia dark fuscous.

Allied to *G. asteriella*, Meyr., but easily known by the white dorsal spot near base only reaching half across wings, and the absence of the regular black longitudinal lines posteriorly, as well as by various differences of marking. There is no complete black patch, but it is indicated by the scattered black scales round the posterior metallic spots.

One specimen taken by Mr. G. H. Raynor at Warragul in Gippsland, Victoria, in December.

Glyph. holodesma, n. sp.

♂. $6\frac{1}{4}''$. Head and thorax bronzy-grey. Palpi whitish, with three oblique whorls of black ochreous-white-tipped scales, apex black with an oblique ochreous-white lateral line. Antennæ dark fuscous, towards base with ill-defined whitish-ochreous annulations. Abdomen dark grey, segments suffusedly whitish at apex, extremity whitish-ochreous. Legs dark fuscous, with ochreous-whitish rings at middle and apex of tibiæ, and apex of all tarsal joints. Forewings moderate, posteriorly dilated, hindmargin very slightly sinuate beneath apex; bronzy-greyish-ochreous, costa and inner margin narrowly suffused with dark fuscous; all markings irregularly edged with dark fuscous; six silvery-metallic transverse fasciæ starting from white spots on costa; first nearly straight, oblique, from one-fourth of costa to before middle of inner margin, ending in an ochreous-white spot on inner margin; second parallel, bent in disc, ending on fold; third parallel, reaching half across wing, ending in a small dark fuscous-spot; fourth outwardly curved, from two-thirds of costa to three-fourths of inner margin; fifth parallel to fourth, ending in anal angle sixth subapical, from costa before apex to hindmarginal indentation; a small roundish blackish apical spot: cilia on hindmargin bronzy greyish-ochreous towards base, terminal half white, separated by a blackish-grey line, and with a small triangular white indentation beneath apex, and a whitish spot at anal angle; costal cilia blackish-grey, with white spots on extremities of fasciæ. Hindwings dark grey, cilia rather lighter grey.

A very distinct species, allied to the group of *Glyph. asteriella*, Meyr., but characterised especially by the absence of any indications of the black patch, and by the regularity and completeness of the metallic fasciæ.

One fine specimen taken flying over rushes in a damp place on the ascent of Mount Wellington, Tasmania, at about 2,500 feet of elevation, at the beginning of February.

Glyph. tetrasema, n. sp.

♂. 5‴-5¼‴. Head and thorax greyish-bronze. Palpi white, with four oblique whorls of black white-tipped scales, apex white with a black line beneath. Antennæ dark fuscous. Abdomen dark fuscous, apex whitish. Legs dark fuscous, with slender whitish rings at middle and apex of tibiæ, and apex of all tarsal joints. Forewings moderate, rather dilated, hindmargin sinuate;

pale brassy-ochreous, irregularly mixed with ochreous-bronze; all markings broadly and suffusedly margined with dark fuscous; two similar straight oblique transverse quadrilateral white spots on inner margin, first near base, second in middle, suffusedly truncate above, reaching about half across wing; seven oblique white streaks from costa, first broadest, nearly reaching apex ot second dorsal spot, next four all short, narrow, reaching abouf one-third across wing, last two very short, close together before apex; about five small ill-defined shining white, slightly violet-metallic spots irregularly placed in disc beyond middle, mixed with a few black scales, a sixth on inner margin a little before anal angle, a seventh on anal angle, two others near hindmargin below middle, a tenth towards hindmargin above middle, an eleventh on hindmarginal indentation, and a twelfth below apex, adjoining a small roundish black apical spot: cilia on hindmargin white, basal third scaled with brassy-ochreous and separated by a black line, with a deep white triangular indentation below apex; cilia on anal angle grey, with a white spot before anal angle; costal cilia dark grey, with white spots on costal streaks, and a blackish-fuscous spot above apex, lower edge sharply defined, forming a short incomplete apical hook. Hindwings rather dark grey, cilia rather lighter.

Belongs to the group characterised by the possession of two pale dorsal spots which do not give rise to metallic transverse lines; in this group it is intermediate between *G. meteora*, Meyr., and *G. leucocerastes*, Meyr., differing from the former by the first dorsal spot reaching only half across wing, and from the latter by both dorsal spots being obtusely truncate, not attenuated; it is further distinguished amongst the whole group by the number of the posterior metallic spots.

Two specimens taken in a damp place about 3,000 feet up Mount Wellington, Tasmania, early in February. This species has veins 7 and 8 of the forewings stalked, a character which recurs in two or three other species which are not specially allied to one another, and in this genus appears to be of no importance, though usually elsewhere of great value.

Glyph. acinacella, n. sp.

♂. $3\frac{1}{2}''$. Head and thorax dark shining greyish-fuscous. Palpi white, with four oblique whorls of black white-tipped scales, apex white with a black line beneath. Antennæ dark fuscous. Abdomen blackish-fuscous. Legs blackish-fuscous, with slender white rings at middle and apex of tibiæ, and apex of all tarsal joints. Forewings moderate, not dilated, hindmargin sinuate; dark fuscous, slightly bronzy-tinged; a narrow curved very oblique white streak from inner margin before middle, attenuated gradually throughout to extremity, somewhat broken at two-thirds of its length, reaching half across wing, ending in disc beyond middle; five slender oblique white somewhat violet-shining streaks from costa, indisdinctly darker-margined anteriorly; first from slightly beyond middle of costa, reaching half across wing to just beyond apex of dorsal streak; second rather shorter; other three very short, wedge-shaped; a short erect whitish violet-shining streak from inner margin before anal angle, nearly reaching apex of second costal streak; some indistinct scattered whitish violet-shining scales towards anal angle and lower half of hindmargin; a small violet-metallic spot on hindmargin beneath apex, adjoining a round blackish apical spot: cilia rather shining fuscous-grey, with a suffused darker grey line, and a triangular ill-defined indentation beneath apex, costal cilia dark grey with white spots on costal streaks, no defined apical hook (?). Hindwings and cilia dark fuscous.

Nearest allied amongst Australasian species to *G. actinobola*, Meyr., but immediately known by not possessing any white streak from before middle of costa. It comes nearer to the European group of *G. equitella*, Sc., *G. fischeriella*, Z., and their allies, but the dorsal streak is rather nearer base, and the first costal streak somewhat further from base than in any species known to me, the dorsal streak is somewhat longer and more finely attenuated than in *G. fischeriella*, and the second costal streak does not unite with the dorsal spot before anal angle. The cilia are not in good condition, and it is very possible that the white extremities and apical hook have been worn away.

One specimen taken by Mr. G. H. Raynor at Warragul in Gippsland, Victoria, in December.

ERECHTHIADÆ.

Eschatotypa, Meyr.

Esch. derogatella, Walk.

(*Tinea derogatella*, Walk., Brit. Mus. Cat. 485; *Eschatotypa melichrysa*, Meyr., Proc. Linn. Soc., N.S.W., V., 257).

I did not identify Walker's description until I had seen the type.

Erechthias, Meyr.

Erech. stilbella, Doubl.

This species should have been quoted as of Doubleday, being originally described by him in Dieffenbach's New Zealand, Vol. II., p. 289; Walker's description refers to the same species.

GRACILARIDÆ.

Gracilaria, Z.

Grac. argyrodesma, n. sp.

The only specimen of this insect, which I possess, was unfortuately greatly damaged by an accident whilst being set; but as it is very distinct, and one forewing is perfect, and moreover the larval habits are known, I give what will probably be a sufficient diagnosis.

$2\frac{1}{2}''$. Forewings dark fuscous, with two transverse fasciæ and four spots snow-white, black-margined; first fasciæ at one-fourth, straight, direct, rather narrow, suddenly attenuated on margins, posterior edge incised in middle; second about middle, slender, somewhat sinuate, slightly oblique, obscurely interrupted above middle; a small roundish spot on costa about three-fourths, and another slightly larger exactly opposite it on inner margin; a very small dot on costa before apex, and a still smaller one on inner margin beneath apex; cilia dark fuscous, with a blackish line round apex. Hindwings and cilia dark grey.

The smallest species of the genus known to me, belonging to the group of *G. autadelpha*, Meyr., and *G. cænotheta*, Meyr., in which it is characterised by its small size, dark groundcolour, the slenderness and interruption of the second fascia, and smallness of the marginal spots.

The larva mines a nearly flat discoloured blotch in leaves of *Grevillea linearis* (*Proteaceæ*), occupying apical half of the narrow leaf, upper surface slightly contracted. Pupa in a firm cocoon, not within the mine. I collected a larva accidentally in August amongst a great number of larvæ of one of the *Gelechidæ* feeding on the same shrub, and did not observe it until the imago emerged in September, when on examination I found the mine and cocoon.

Grac. chionoplecta, n. sp.

♂ ♀. $2\frac{3}{8}''$-$3\frac{1}{4}''$. Head, palpi, and thorax snow-white, labial palpi with two black rings. Antennæ dark fuscous, basal joint white. Abdomen pale silvery-grey, segments with white apical rings, apex white. Anterior tibiæ blackish with indistinct basal and median white rings, tarsi white with blackish bands at apex of each joint; middle tibiæ slightly thickened, blackish with broad median white band, tarsi white with narrow blackish rings at apex of each joint; posterior tibiæ white, apex dark grey, tarsi white with dark grey rings at apex of joints. Forewings dark greyish-ochreous, with scattered black scales, and with two fasciæ and seven spots snow-white, black margined; some irregular white scales near base; first fascia about one-fifth, very broad, broadest on inner margin, edges irregularly sinuate; second fascia about two-fifths, as broad as first, very irregularly curved outwards in middle, sometimes narrowly connected on inner margin with first fascia and first dorsal spot; a minute indistinct spot on middle of costa; a moderate subquadrate spot on costa about two-thirds, and a considerably larger irregular spot slightly before it on inner margin, nearly reaching it, only separated by the black margins, forming a rather oblique black line; two small spots on inner margin beyond the large dorsal spot, and a small spot between them on costa; a small apical spot, cutting off a black apical dot: cilia pale whitish-grey, costal cilia grey with white spots on costal spots, Hindwings grey, cilia pale whitish-grey.

Allied to the group of *G. cœnotheta*, Meyr.; distinguished by the number of the posterior spots, and the breadth of the fasciæ.

Larva rather stout, cylindrical, tapering at both ends, head small; ochreous-yellowish, with a rather large transverse-oval or elongate-transverse deep bright carmine-pink spot on back of each segment, second segment somewhat suffused with carmine-pink; head brownish-ochreous, suffused with dark fuscous on margins. Mines a broad tubularly inflated gallery in leaves of *Phebalium dentatum* (*Rutaceæ*), lower surface somewhat contracted, both surfaces discoloured. Pupa in a firm white cocoon on under surface of leaf. I found this beautiful larva commonly near Sydney, where however its foodplant is local, in August, and bred eight specimens early in October.

Grac. ida, Meyr.

Larva moderate, thickest anteriorly, gradually tapering behind, head small; light yellowish; head pale ochreous, mouth dark fuscous. Mines first a gallery in leaves of *Eucalyptus piperita* (?) (*Myrtaceæ*), mine at first slender, contorted, then straight, tubular, discoloured to reddish-brown; when nearly full-grown leaves the mine and feeds within a conical chamber made of a small leaf spirally rolled. Pupa in a flat cocoon beneath the leaf, causing the edges to contract. I found several of these larvæ, on a dwarfed seedling which I believe to be correctly referred as above, in August, and bred five specimens in September, showing no sign of approximation to *G. formosa*, Stt.

Grac. toxomacha, n. sp.

♂. $3\frac{1}{2}''$. Head snow-white, with a dark fuscous spot on anterior margin of eyes. Labial palpi white, with a black band on second joint becoming two rings internally, and a black sub-apical ring on terminal joint. Maxillary palpi dark fuscous. Antennæ dark fuscous, with slender whitish annulations. Thorax white, sides brownish-ochreous. Abdomen grey, anal valves very large. Anterior tibiæ blackish, tarsi blackish with white bands at apex of joints; middle tibiæ dark grey, with two suffused whitish bands, tarsi blackish with white rings at apex of joints; posterior tibiæ white, apex blackish, tarsi blackish with white rings at apex of joints. Forewings dark greyish-ochreous; costal edge slenderly dark fuscous; an irregular white streak from base near inner margin to inner margin at two-thirds from base, beneath suffused, above margined by an interrupted black line, twice sinuate posteriorly; a very oblique sinuate gradually attenuated white black-margined streak from costa at one-third almost to anal angle, very slender posteriorly; a suffused shorter oblique sinuate whitish streak from costa immediately beyond it, reaching half across wing, most distinct on disc; a straight oblique attenuated white black-margined streak from costa at two-thirds, reaching half across wing, and a similar hardly oblique streak a little beyond it, almost touching one another in disc; a slender black-margined streak from inner margin opposite and in a line with the second of these, almost meeting it; a white apical spot, containing an elongate black dot: cilia pale whitish-ochreous-grey, with two sharply-marked black lines round apex, on costa fuscous, with white spots on costal streaks. Hindwings grey, cilia whitish-ochreous-grey.

Belongs to the group of *G. thalassias*, Meyr., but very distinct; easily recognised by the remarkable length and obliquity of the first costal streak.

Larva moderately attenuated from second segment throughout, head much narrower than second segment, semi-oval; pale whitish-green; head light brownish. Mines an irregular loose flat discoloured blotch in leaves of *Pultenæa sp.*--(?) (*Leguminosæ*), under surface slightly contracted. Pupa in a firm cocoon outside the mine. The food-plant is not common, and being unable to find a specimen in blossom, I did not identify the species; I collected some number of the larvæ near Sydney in July, but only bred one imago, early in September.

Grac. alysidota, Meyr.

Larva mines a flat irregular discoloured blotch beneath upper surface of phyllodia of *Acacia longifolia* (*Leguminosæ*). Pupa in an elongate flat white cocoon on surface of phyllodium between contracted edges. I found one larva only of this species, which I consequently could not describe, in July, and bred the imago in September.

Grac. didymella, Meyr.

Larva moderately attenuated posteriorly, not flattened; dull greyish-yellowish, head suffused with blackish. Mines a large irregular elongate blotch in phyllodia of *Acacia longifolia*, (*Loguminosæ*); blotch bladderlike, both surfaces inflated, not discoloured, walls thick, fleshy. Pupa in a flat white cocoon in an angle of a bent phyllodium. The mine is readily distinguished from that of *G. alsidota* on the same tree by the inflation and thickness of the walls. I found the larva tolerably common near Sydney in July, and bred eight specimens at the end of August and beginning of September. The species does not vary, and is certainly distinct from *G. ochrocephala*, Meyr., and *G. nereis*, Meyr., which probably feed on other species of *Acacia*.

LITHOCOLLETIS, Z.

Head roughly tufted on crown, forehead and face smooth; no ocelli; tongue moderate. Antennæ nearly as long as forewings, slender, filiform. Maxillary palpi obsolete. Labial palpi rather short, straight, drooping, second joint smooth, terminal joint pointed. Forewings elongate, moderately narrow, pointed. Hindwings narrowly lanceolate, less than half forewings, cilia four times as broad. Posterior tibiæ hairy above and below. Forewings with 7 veins, 3 branches to costa, cell closed, 1 simple. Hindwings without cell, median two-branched.

Larva fourteen-legged, mining blotches in leaves. Pupa naked or in a cocoon, always enclosed in the mine.

The species here described is not truly Australian, or at any rate does not belong to the indigenous fauna, so that my remarks on this subject remain in force; it has been introduced with its foodplant. The genus is readily distinguished from *Gracilaria*, to which it is most allied, by the tufted head and simpler neuration, in respect of which this species is perfectly typical, the venation not differing in the least from that of European species.

Lith. aglaozona, n. sp.

♂ ♀. $1\frac{1}{2}''$-$2\frac{1}{3}''$. Face shining coppery-black, tuft of head deep black. Palpi dark fuscous. Antennæ black, apex white. Thorax shining coppery-metallic. Abdomen brassy-blackish, beneath brassy-metallic. Legs dark fuscous. Forewings shining ochreous-orange; base conspicuously black; four costal and three dorsal subquadrate violet-silvery-metallic strongly black-margined spots; first costal spot at one-fourth, second in middle not oblique, first and second dorsal spots exactly opposite them, almost or sometimes quite uniting with them to form straight direct fasciæ; third costal spot somewhat before three-fourths, rather inwardly oblique; third dorsal on anal angle, rather beyond third costal, erect; fourth costal spot somewhat inwardly oblique, close before apex, adjoining a round black apical spot: cilia dark grey, basal third within a black line blackish round apex. Hind-wings dark fuscous-grey, cilia dark grey.

A magnificent species, though some specimens are amongst the very smallest of the *Lepidoptera;* it is undoubtedly allied to the North American *L. desmodiella*, Clem., differing, so far as can be judged from the description, principally in the orange ground-colour, deep black base, and somewhat differently arranged markings.

Larva gradually attenuated from second segment throughout, head triangular, much smaller than second segment; glossy whitish, dorsal vessel dark green; head faintly amber-tinged. Mines a small blotch beneath lower surface of leaves of *Desmodium sp.*—(*Leguminosæ*), the epidermis contracting to produce a dilated chamber. Pupa free within the mine. I found the larva early in March in the Botanical Gardens, Sydney, and bred the imago in abundance towards the end of the same month, and also took them sitting on the leaves of the food-plant.

I hope to obtain further information on the origin of this species. There are only two specimens of the food-plant in the gardens, without name or indication of country, and I have not seen it elsewhere; I believe it to be a true *Desmodium.* The insect is certainly of an American type, but I have found no other instance of a leaf-feeding *Micro* being imported from such a distance, though it would not seem impossible; I am not aware of any described American species with which it is identifiable. Possibly it may come from the islands.

LYONETIDÆ.

Stegommata, Meyr.

Steg. sulfuratella, Meyr.

Larva mines an irregular slightly inflated discoloured blotch occupying apical half of leaves of *Banksia integrifolia* (*Proteaceæ*) ejecting excrement through several small holes, in April. Pupa in a very slender close white cocoon, suspended in the air by stretched threads from each end.

The habit of the pupa is, so far as I know, quite peculiar in the family.

CEMIOSTOMA, Z.

Head smooth, rarely with erect hairs behind; no ocelli; tongue rudimentary. Antennæ shorter than forewings, filiform, with a moderately large eyecap. No palpi. Forewings elongate, moderately narrow, pointed, apex rather produced. Hindwings linear-lanceolate, much narrower than forewings, cilia four times as broad. Forewings with 7 or 8 veins; 2 or 3 branches to costa, cell open or finely closed, 1 simple. Hindwings without cell, median three-branched.

Larva sixteen-legged, mining large flat blotches in leaves, or galleries under cuticle of shoots. Pupa in a silken, often ridged, cocoon, usually without the mine.

This genus has not hitherto been observed outside Europe, where are about a dozen closely allied species. There is no doubt that the following species is a true *Cemiostoma*, though I have not yet been able to examine the neuration. The genus is well distinguised by the smooth head and absence of palpi.

Cem. chalcocycla, n. sp.

♂. 3″-3¼″. Head, antennæ, thorax, abdomen and legs snow-white. Forewings snow-white; a slender very oblique dark fuscous streak from costa at two-thirds, reaching half across wing; a second, much shorter and much less oblique, in costal cilia at five-sixth; a third as short as second, inwardly oblique, in costal cilia immediately before apex; a smal roundish brassy-metallic spot on anal angle, margined anteriorly and posteriorly by a blackish line, and above by a small pale yellowish indistinctly grey-marginal spot, faintly produced into cilia above apex; a minute round black apical dot; cilia white, with a grey projecting line above apex, besides the lines in costal cilia. Hindwings and cilia white.

The absence of any oblique yellowish costal spot readily separates this insect from the European species, which in other respects it closely resembles.

Four specimens beaten from bush, at Warragul in Gippsland, Victoria, in September, and at about 2,000 feet up Mount Wellington, Tasmania, early in February.

Note on a reputed poisonous Fly of New Caledonia.

By William Macleay, F.L.S., &c.

Some weeks ago I received a communication from Mr. E. L. Layard, C.M.G., H.B.M. Consul New Caledonia, on the subject of a "Fly," said to be destructive to human life in that Country. Mr. Layard writes as follows:

"After my arrival here my attention was early attracted by several terrible deaths, said to be caused by a fly, which was called the "Mouche Charbonneuse" (poisonous or pestilential fly.) I tried to find out what this fly could be, but received the most contradictory answers to my enquiries. Some said it was a "Blow Fly," ("Blue Bottle"—or rather "*Green* Bottle," for I never saw a *Blue* one here)—others, that it was a common house fly; others again said that it was a special species, but all agreed that the deaths originated from the introduction into the blood of the victim of putrid matter, upon which the fly had been feeding.

"This opened another question: How was the poison introduced into the human body? Did the fly *puncture* the flesh, or did it seek a wound, or abrasion through which to introduce it?

If the former mode were adopted, it would not be a common fly, or a "Bottle," green or blue. If the latter, any fly could communicate the virus.

"A very sad death occurred, that of a worthy butcher, he was bitten or stung—or whatever the wound was—under the ear, and died in awful agony in a few hours. He received the virus from a fly at his own slaughter house, where it was supposed to have been feeding on some putrid garbage.

"The Colonial Government in a blind panic published an "Arrêté," (Ordinance), commanding under pain of fine or imprisonment, or both, that every land-owner should instantly bury or burn, not only every carcase but every bone on his property. It was in vain I pointed out to the officials that this could be made an engine of official oppression, or private spite, to an alarming extent, and quite inconsistent with "the liberty of the subject." * * * * Unfortunately the first victim of the "Arrêté" was a cranky half-mad Englishman—a large landed proprieter. You must here understand that the French Gendarmerie is a peculiar corps. The members are "Sworn to the truth" when first appointed. This oath serves them for ever. If a member makes a "process verbal" against you, you are deemed guilty, unless you can prove you are innocent. You may never have the power of crossquestioning your accuser, he may be a hundred miles away, but you must prove you are not guilty.

"A Gendarme found a dead bullock in the forest, on the land of my cranky countryman. He ordered it to be burned, saw it done, and the fragments buried by the native servants of the land-owner—so far so good; but, weeks after, the Englishman impounded the Gendarme's goats for a trespass on his garden. Unhappy man! the Gendarme found on the ground at the place of incremation, a dry bone of the defunct ox. The landowner says he dug it up. A "process verbal" was immediately made, and my cranky countryman, suffering judgment to go by default, was sentenced to some weeks imprisonment." * * * * * "It was with great difficulty," Mr. Layard adds, "that the liberation of this unfortunate man was effected." * * * He goes on to say, "But to return, what was the fly that caused all this panic, trouble, and death? No one could tell me with certainty, but the majority of my evidence pointed to a common house fly (*Musca*).

"One day sitting in my verandah reading, I was suddenly stung with such violence in the hand, that I dropt my book, and sprang from my seat with the agony. * * * And I was for the moment horror struck at perceiving that my assailant was apparently a common house fly. The "Mouche Charbonneuse" I thought, at last, and I remembered with dismay the bodies of certain birds I had skinned and then hurled into the bushes. There was a bleeding puncture in my hand, which I applied to my mouth and sucked with as fervent a zeal as did Queen Eleanor the poisoned wound of her husband King Edward. I watched my wound for some days anxiously, but no evil came of it. A second time I was stung, and there was no mistaking the fiery pain of the puncture. I tried to catch the stabber, but failed, though the opportunity gave me time to observe the fly. It was generally like a house fly, but I knew it could not be one, as no fly's sucker could thus pierce the skin.

"A third time I felt the stab, it was now on my foot, and through my stocking. As I had come off scot-free from poison twice, I let mine enemy drive his dagger in without flinching, while my son, to whom I had called, brought me the butterfly net, and I soon had the villian in my toils. I send him to you, by the hands of my son, in a glass tube, hoping that some of our members may be able to tell us what he is."

The fly is a *Stomoxys*, an insect not uncommon in this country, and very probably introduced as Mr. Layard suggests into New Caledonia and the Isle of Pines from Australia, as the maggot of the fly lives in horse dung. The bite of this fly is, as stated by Mr. Layard, intensely sharp and stinging, but I have never known any bad effects to follow. I think it very likely that the fatal cases mentioned by Mr. Layard were not due at all to the instrumentality of this fly, but to some of the many *Muscidæ*, who are peculiarly attracted by dead bodies.

The case of the butcher in Noumea, is evidently one of malignant pustule, caused by a fly settling on a spot where the skin was slightly abraded, after feasting upon the carcase of an animal, not in a putrid state, for that would be comparatively innocuous, but freshly dead from "Charbon," "Anthrax," "Splenic Fever," or "Cumberland Disease,"—all names for one and the same disease. Under the last name the disease is well known in New South Wales, and many fatal cases of malignant pustule in human beings have occurred from time to time from it, and I believe in all or nearly all of them the disease was traced to flies carrying the poison from dead cattle. The Government of New Caledonia, in their praiseworthy efforts to prevent the spread of infection as mentioned in Mr. Layard's letter, erred seriously in allowing the option of burying or burning the dead cattle. There is no safety except in burning. *Bacillus anthracis*, the organism which is the cause of the disease, is most tenacious of life ; it has been known to retain its vitality in dried bones and skins for years, and M. Pasteur has lately proved that even where a carcase has been buried to a depth of 12 feet, the *Bacilli* will in course of years find their way to the surface in the bodies of earth worms, and that they are then as capable as ever of propagating the disease.

NOTES AND EXHIBITS.

Mr. Brazier exhibited Part 4 of the French Journal of Conchology for 1881, with Plate 12 showing a splendid figure of

Bulimus Rossiteri, Brazier, described in Vol. 6, page 586, of the Proc. Linn. Soc. N.S. Wales; also two specimens of *Partula Layardi*, Brazier—one an Albino variety.

Mr. E. P. Ramsay exhibited a collection illustrative of the fauna of Lord Howe's Island, which had been recently obtained there by Mr. Alexander Morton, including the following:—Birds: *Porphyrio melanotus, Strepera crissalis, Procellaria Gouldii, Halcyon vagans, Dactylopsitta arivirgata.* Echini: *Strongylocentrotus* (*sp.*), *Hipponoe esculentus, Echinometra lacunter, Breynia Australasiæ.* Geological specimens: Twenty specimens of various rocks from the sea level to a height of 2,840 feet; some specimens of recently formed rocks containing semi-fossilized shells of *Bulimus divaricatus* and *Helix* (*sp.*), and portions of the carapace of a turtle. Mollusca: Five recent species of land shells, *Helix sophiæ, Helix textrix, Helix* (*sp.*), *Vitrina Hillii, Bulimus divaricatus.* Two species of oysters—*Ostrea mordax* and *Ostrea cucullata, Tridacna elongata.* Corals: *Tubipora* (*sp.*), and a large reef coral. Fishes: Two species of *Serranus*, and about ten species of rock fish (*Labridæ*). Mr. Ramsay also exhibited a native head-dress from New Guinea, beautifully ornamented with the feathers of the Paradise Bird.

The Rev. J. E. Tenison-Woods exhibited among other rare *Bryozoa* from New Caledonia, a specimen belonging to a new genus, cup-shaped, with the cells on the external surface.

WEDNESDAY, 31st MAY, 1882.

The President J. C. Cox, M.D., F.L.S., &c., in the Chair.

MEMBERS ELECTED.

Alex. Cameron, Esq., Booligal.

Cecil Darley, Esq., Harbours and Rivers Department.

Dr Cecil Morgan, Australian Club.

William Reid, Esq., Australian Joint Stock Bank.

DONATIONS.

From Professor Liversidge—Tables of Qualitative Chemical Analysis, 1881. Paper on Stilbite from Kerguelens Island. Analyses of Queensland Soils.

From the Royal Microscopical Society, (London), Journal, February, 1882.

From Baron Ferd. von Müeller, K.C.M.G.—On a new Casuarina. Definitions of some new Australian Plants. On two new Orchids from the Solomon Islands.

From the Zoological Station at Naples, Transactions.—Vol. III., Parts 1 and 2.

From "La Société Hollandaise des Sciences à Harlem."—Archives Neerlandaises des Sciences exactes et naturelles, Tome 16. Livraisons 3, 4, 5.

From the Zoological Society, (London)—Proceedings, Volumes for 1877-78,-79,-80 and 1881, Parts 1, 2, and 3.

Southern Scienc Record, Vol. II., No. 4. April 1882.

From John Brazier, C.M.Z.S.—List of Marine Shells collected on Fitzroy Island. On Helix Pulchella and H. Cellaria in Australia. List of Cypræidæ found in Morton Bay, Queensland.

PAPERS READ.

On a New Species of Allopora.

By the Rev. J. E. Tenison-Woods, F.G.S., &c.

Sub-King. *Cœlenterata.* *Phylum Nematophora.* Sub-Ord. *Hydro Corallinæ.* Family *Stylasteridæ.*

Genus *Allopora.* Generic character. Cyclo-systems, budding from one another somewhat irregularly.

Allopora incompleta, *spec. nov.*

Coral dendroid with irregularly cylindrical branches, loosely straggling, free. Cœnenchyma well developed and distinctly undulately grooved with longitudinal striæ. Grooves narrower than the interstices Culices somewhat close with an irregular quincuncial arrangement, but on the youngest branches sometimes alternate, projecting, semicircular, the septa of the upper side being replaced by a transverse ridge. Septa six to nine, ordinarily eight, thin at base, rapidly narrowing. All round the calices an irregular series of ampullæ as large as the calices. No columella visible in the somewhat deep fossa. The diameter of the branches is about two millim., diminishing to half that measurement near the tips. At the base there is a thick cœnenchyma from the coalescence of the branches, and in this the calices are clustered irregularly, and the calices are complete circles in some few cases, and do not project so much as those on the branches. The diameter of the largest is scarcely half a millimetre.

This species possesses remarkable characters which distinguish it from any other. Such are the semicircular calices, and the ridge which separates the upper, or non-septate side from the cœnenchyma. The small number of the septa also distinguishes it, and makes a correction necessary in the definition, which says that there are always 12 tentacles in the gasterozoids.

These specimens were dredged in great numbers from a depth of 30 fathoms off Port Stephens, and the colour was a fresh pink. Type specimens in the Sydney Museum.

ON AUSTRALIAN FRESH-WATER SPONGES.

BY WILLIAM A. HASWELL, M.A., B.SC.

Two years ago I found a species of Fresh-water Sponge inhabiting a pond near Brisbane, and sent to this Society a note describing briefly the spiculation of the species, together with that of a species the spicules of which were first observed by Dr. Morris in the Sydney water from the Botany Reservoirs. Shortly afterwards I heard from a correspondent in Victoria that in lagoons near Bairnsdale he had seen fresh-water sponges and would endeavour to procure specimens for me, and I consequently withdrew from my publication my previous note in the expectation of acquiring further material. Specimens of the Victorian species have not come to hand; but a few days ago Mr. E. P. Ramsay succeeded after a persevering search in finding large specimens of a species of *Meyenia* in the river Bell at Wellington.

Only one species of Australian Fresh-water sponge has been described, it is the species named by Bowerbank* *Spongilla Capewelli*, from Lake Hindmarsh, Victoria, a species differing considerably from both the New South Wales and the Queensland species.

Spongilla sceptroides, *sp. n.*

Sponge green, encrusting, smooth, moderately elastic, not crumbling. Skeletal spicules very slightly curved, fusiform, acute at both ends, ornamented with scattered minute projecting points, which only become visible under a fairly high power. Statoblast spherical, defended by long, slender, straight, cylindrical spicules which are armed with numerous acute spinules, chiefly aggregated round the extremities, where they form distinct heads, the intermediate shaft having but two or three very small spinules.

Found in a pond near Brisbane, growing on submerged branches and twigs.

Spongilla botryoides, *sp. n.*

Sponge yellowish, flat, encrusting. Skeletal spicules curved, fusiform, acute, usually with scattered, extremely minute projecting points. Statoblast protected by a crust of short, strongly curved spicules which are provided at each end with a head composed of numerous short blunt or subacute spines producing a somewhat botryoidal appearance; the intermediate curved shaft free from spines.

Found growing side by side with the preceding.

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* A Monograph of the Spongillidæ, Proc. Zool. Soc., 1863.

Meyenia Ramsayi, *sp. n.*

Sponge massive, tubercular, or with finger like projections, the oscula being situated between the tubercles or projections; rather brittle; colour grass-green to greyish-yellow. Skeleton-spicules curved, fusiform, rather abruptly acute, perfectly smooth. Statoblasts spherical, protected by a layer of birotulate spicules, consisting of a stout cylindrical shaft armed with 1-10 acute and prominent spines, and terminal rotulæ, the edges of which are deeply dentate or spinous, the teeth—to the number of between 12 and 20—being irregular in size and acute.

Found by Mr. E. P. Ramsay in the Bell River at Wellington, growing in considerable masses attached to submerged timber.

This species is rather nearly related to *S. Meyeni*, from Bombay, which has the amphidiscs of a very similar form; but the skeleton-spicules of that species are obsoletely spinous, and the spines on the shaft of the amphidisc are fewer.

Of the fifth Australian species of Fresh-water Sponge, which occurs in the Botany Reservoirs I have only a few spicules kindly given me by Dr. Morris—the sponge itself not having yet been found, probably from the fact of its being, like *Meyenia Ramsayi*, a rather deep-growing species, and not to be readily got at unless when the water is exceptionally low. It is a species of *Meyenia*, and quite distinct from *M. Ramsayi* and *M. Capewelli*.

NOTE ON THE BRAIN OF THE TIGER SHARK (*Galeocerdo Rayneri.*)

BY WILLIAM A. HASWELL, M.A., B.Sc.

The acquisition a few months ago by the Australian Museum of a large specimen of *Galeocerdo Rayneri* (18 feet in length), enabled me to examine and make a few notes on its brain, which, as far as I can ascertain, has not been previously described or figured. Unfortunately the specimen had been dead for more than two days before I had the opportunity of dissecting it, and, the weather being hot, the brain was far from being in a good state of preservation ; but as the opportunity of procuring the brain of one of those sharks does not often occur, and as it presents some marked peculiarities, these imperfect notes and drawings may be of some interest.

The *cerebrum* is somewhat heart-shaped, much broader in front than behind, and considerably broader than long. It does not display a marked division into lobes, a shallow depression alone separating the two halves. The *thalamencephalon* is almost entirely covered by the cerebellum, very little of it being visible when the brain is looked at from above. The *cerebellum* (*middle-brain* of Miklouho-Maclay) is not very largely developed. In front it overlaps the thalamencephalon, but behind it does not in any way overlie the commencement of the fourth ventricle. It is nearly symmetrical, and is divided into two principal parts by a transverse fissure, each of the two lobes thus formed being similarly subdivided into several lobules. The *corpora restiformia* are remarkably simple; owing to the state of the specimen, I could not attempt to reproduce the arrangement of the convolutions in detail. The *medulla oblongata* is remarkable for its extreme length, being nearly as long as the whole of the remainder of the brain.

I have not yet had the opportunity of comparing the brain of this shark with that of other *Selachii* more nearly allied to it than *Cheiloscyllium*, but on comparing it with Miklouho-Maclay's figure and description of the brain of *Carcharius*,* which is regarded as an allied genus, it presents some marked differences of which the chief are the smallness of the cerebellum, the great breadth of the cerebrum (though, it should be added, this feature may have been somewhat exaggerated by the condition of the specimen), and more particularly the remarkable length of the medulla oblongata.

*Beiträge zur Vergleichenden Neurologie der Wirbelthiere, i., p. 24, pl. vi., fig. 1.

NOTES AND EXHIBITS.

Mr. Morton exhibited, on behalf Mr. Ramsay, Curator of the Australian Museum, a new species of *Solea* from Port Jackson, and of *Coris* from Lord Howe's Island, the same species having also been found in Broken Bay; a Tomahawk formed of hard quartzite by cleavage, showing four faces, and used as a weapon by the blacks of the Northern Territory of South Australia; knives of chert, said to have been used for the purpose of laying open the urethra, and ovariotomy, in the northern districts; a spear headed with obsidian, and block of the same, from the Admiralty Islands; brushes used by the natives of the Northern Territory, and formed of the crest feathers of Leadbeater's Cockatoo, inserted in the wing bone of the Native Companion; two specimens of a *Pinna* from the Island of Rarotonga, where they are considered rare.

Mr. Haswell exhibited a specimen of the female generative organs of the Platypus, showing the ova in a stage ready to be discharged; impregnation had not taken place and on examination of the uteri they showed no trace of a fœtus.

WEDNESDAY, 28TH JUNE, 1882.

The President Dr. James C. Cox, F.L.S., in the Chair.

MEMBER ELECTED.

Rev. Joseph Campbell, M.A.

DONATIONS.

"Anniversary Memoirs of the Boston Society of Natural History published in celebration of the Fiftieth Anniversary of the Society's Foundation (1830-1880).

"Annual Report of the Smithsonian Institute," 1879.

"Proceedings of the Academy of Sciences, Philadelphia," yearly volume for 1880.

"Report of the Botanic Garden, Adelaide," from Dr. Schomburgh.

"Bulletin No. 1 of the American Museum of Natural History," December, 1881.

"Index to the Reports and Transactions of the British Association for the Advancement of Science," 1830-1860.

"Abhandlungen des Naturwissenschaftlichen Vereines zu Bremen, Bd. vii., Heft 3," 1882.

"Bulletin de la Société Imperiale des Naturalistes de Moscou," 1881, No. 2.

Fragmenta Phytographiæ Australiæ," by Baron F. von. Mueller, K.C.M.G., Vol. xi.

"On the Round Orange Scale," by Fraser S. Crawford.

"Neue Untersuchungen ueber die Bahn des Olbers'schen Cometen und sein Wiederkehr," von. F. K. Ginzel.

PAPERS READ.

Half century of Plants new to South Queensland.

By the Rev. B. Scortechini, L.L.B., F.L.S.

A more thorough and more extensive research into the plants which constitute the Flora of the territory, the limits of which were described in my last paper, now enables me to place on record the existence of other species as coming within these boundaries. Some of these species, enjoying as they do a wide distribution, might have been expected to occur in the districts where I have been collecting. Still many have been discovered which have hitherto been considered tropical, or belonging to cooler regions, and these present some anomalies in the geographical distribution of plants, and offer data for generalization on this important point. Not only species, the congeners of which were recorded previously among ours, but representatives of genera with no member of their family known to exist here, and even of an order, may be claimed to enrich our already wealthy Flora.

I have abstained from enlisting in the roll of our plants some new species brought within the last twelve months to the light of science by our veteran Botanist Baron Mueller, and which have been discovered in this locality. Likewise many varieties into which more or less elastic species are apt to sport have no place in this supplementary revision. Although the study of the variations to which many plants of a wide geographical range are subject, in connection with that of the causes which influence these changes within specific limits, such as the nature of soil, from which they draw nutriment, the heat and moisture of the atmosphere in which they grow, the light, insects, neighbouring plants and many more agencies, is of the highest interest for the solution of a more general problem, still the material for it is as yet so scanty as to scarcely deserve mention.

In the prefatory remarks to my former paper Australian Cryptogamology was numbered among those subjects of botanic science for which little or nothing had been done. This statement might engender the wrong impression that no attention whatsoever was paid to Cryptogamic Botany. The supplements that Baron Mueller has added to the eleventh volume of his *Fragmenta* show what an immense stride has been made in the knowledge of Australian Cryptogamic plants. Without reckoning the Ferns, Lycopodiads, the few Marsileaceæ, the number of known cryptogamic forms rises to over three thousand, one-third of which belong to the Fungal class, another to the Algal, and the last to Characeæ, Musci, Jungermanniæ and Lichens. It is mainly due to the labour of the learned Baron to have brought together, and offered for identification and description to eminent European specialists so many species. The words of my assertion may be taken to mean that although much has been done for the Cryptogamic Botany of Australia, still compared with what remains undone in this department we may truly say that ittle or nothing has been done towards it. It has been asserted by high authorities that the fungal flora alone equals in richness and variety of its forms that of the planerogamous flora. The Australian mycologic flora is as yet scarcely one-eighth of the phanerogamic, and in its turn one-third of the whole known cryptogamic flora, so that we may well assert that only a small fraction of cryptogamic Botany is known to us.

Ranunculaceæ.

Ranunculus lappaceus, Sin., in Rees' Cycl.

This species, although most common and very attractive in rich pasturage on account of its beautiful golden cups, has no previous record of its occurrence among the members of the South Queensland Flora.

Magnoliaceæ.

Drymis dipetala, F. v. Muell., Pl. Vict. I. 21.

From the Southern slopes of Mount Lindsay, (New South Wales territory) this pepper scrub may be traced westwards in the dense scrubs up to Wilson's Peak and through the Dividing ranges, eastwards to Point Danger in the scrubs about Tallebudgera, and northwards at the top of Tambourine mountains.

Cruciferæ.

Cardamine hirsuta, Linn.

Very rarely met with.

Capparideæ.

Capparis Mitchellii, Lindl.

A few individuals of this species so much resembling *C. nobilis*, may be noticed along the edges of scrubs at the head of the Logan, and as one moves westwards towards Warwick they gradually become more plentiful.

PITTOSPOREÆ.

[*Comesperma sphærocarpum*, Steetz., in Pl. Preiss.

About swamps at Stradbroke Island, and many other places in the mainland towards Nerong Creek.

CARYOPHILLEÆ.

Stellaria glauca, With.

In moist places commonly met with, as well as along the Logan and Albert Rivers.

HYPERICINEÆ.

Hypericum japonicum, Thunb., Fl. Jap.

I could discover only one specimen of this plant at Tambourine Mountain. Its vicinity to a garden where imported seeds were sown suggests that it might have been introduced into Queensland; still as the mountain is rich with specimens of New South Wales vegetation and as *H. japonicum* is recorded as indigenous in New England, and on the Clarence, localities much akin to this mountain, it may with safety be assumed that it appears here not by introduced seeds, but by natural processes of distribution. Although scanty it is indigenous to the Mountain.

MALVACEÆ.

Malvastrum tricuspidatum, A. Gray.

Very seldom to be seen; about the edges of scrubs.

STERCULIACEÆ.

Sterculia Bidwillii, Hook., Herb.

Tambourine Mountain.

Sterculia lurida, F.v.M.

Coochin Coochin.

Sterculia acerifolia, A. Cunn.

Nothing can surpass the grandeur of a mountain when in the month of November, clothed by this blooming *Sterculia*, its sides seem all a-flame. The campanulate calix of a brilliant coral-red, hanging in profuse panicles, imparts a red tinge to the whole scenery. Some slopes of forest mountains at the head of the Logan where flame-trees predominate above all other vegetation present this magic spectacle. It is easy from a long distance to see the red spots where, in the midst of dark foliage in the scrubs of Wilson's Peak and its neighbourhood, the flame-tree presents such a charming appearance.

Sterculia rupestris, Benth., Fl. Aust. I., 230.

To the scrubs, which for many miles extend along the ridges dividing Dugundan from Fassifern, these bottle-trees give a remarkable aspect. Their spindle-shaped trunks attain a great height, quite in contradistinction to the short and thick bottle-shaped trunk of the same *Sterculia*, which grows on the flats of Northern Queensland.

Seringia platyphylla, J. Gray, Mus. Par.

By the main road which from Nerang Creek leads to Tallebudgera an isolated cluster of this *Seringia* may be seen growing.

TALIACEÆ.

Sloanea Woollsii, F.v.M., Frag. VI., 171.

Judging from the amount of echinate capsules strewn on the ground in the Tallebudgera jungles one is led to think this tree to be very prevalent in the midst of that rich vegetation. Owing to the want of flowers I should have been unable to identify the species but for the kind assistance of Baron von Mueller.

ZYGOPHYLLEÆ.

Zygophyllum apiculatum, F.v.M., in Linn.

No more than a single plant was I able to detect on the edge of Dugundan scrub.

GERANIACEÆ.

Erodium cicutarium, L'Her.

Found in company with *Hypericum japonicum*, Thunb., on Tambourine mountain. This is another reason for supposing that the mountain is a natural habitat.

Pelargonium australe, Willd.

In crevices of rocks, bathed by streams; this *Pelargonium* grows abundantly near Wilson's Peak.

RUTACEÆ.

Acronychia melicopoides, F.v.M., Frag. V.

About the scrubs of Tambourine mountain, on the stony ridges of Tallebudgera, I have detected the *Acronychia*. It is remarkable for its tri-foliate leaves, and for its acidulous and aromatic fruits which are succulent and palatable in its wild state. By cultivation it might be made an excellent table fruit.

Halfordia drupifera, F.v.M., Frag. V., 43.

In the stunted jungles, which cover the sandy shores near the mouth of Nerang Creek, and the south end of Stradbroke Island it can be seen very abundantly intermixed with some *Eugenias*. The large cymes of white flowers which appear in the month of March, succeeded by dark red berries give it a beautiful appearance.

Evodia accedens, Blume, Bijdrag, 246.

On that part of Stradbroke Island, that is called Dunwich, near the edges of those extensive swamps so rich in varied vegetation, it grows rather scantily, in company of what appears to be a *Cryptocarya* perhaps as yet undescribed, but not recognisable by me, because I have not yet seen its flowers. This same Laurel which is of large size with deep, soft bark of a reddish colour, and aromatic flavour grows in greater abundance on the banks of Nerang Creek, and I traced it at the entrance of the Tweed River.

SIMARUBEÆ.

Cadellia monostylis, Benth., Fl. Aus. I., 375.

This *Cadellia* was observed by me in the scrub of Wilson's Peak, where it is most plentiful as the fugacious yellow petals scattered on the ground indicate. It was by Baron Mueller elevated to the rank of a monotypic genus under the name of *Guilfoylia* (Frag. VIII., 34); but now it has been placed in its former position of a *Cadellia*, in the recension of Australian genera by the illustrious Baron and among Quassiads. The genus *Guilfoylia* is now omitted.

OLACINEÆ.

Pennantia Cunninghamii, Miers. Ann. Nat. His.

A rare tree; both male and female plants to be seen in the Upper Coomora scrubs. The female flowers are two-thirds the size of the male ones, with barren anthers, and the leaves of the female tree are longer and broader than those of the male plant.

CELASTRINEÆ.

Leucocarpon (*Denhauria*) *pittosporoides*, F.v.M.

Seen at Tallebudgera and Mount Maroon at the source of the Logan. The generic appellation *Leucocarpon* is to be preferred to *Denhauria* as Baron Mueller remarks in Frag. VI., 203, and in fact he adopts it in his census of our genera, because of its priority. It was abandoned because bryologists had preoccupied it, however as bryologists now have dropped the genus *Leucocarpon* by right of priority it must be restored to its former appellation.

RHAMNEÆ.

Cryptandra amara Sm., Tran. Linn. Soc., X. 295

In one locality alone on the sandy ridges of the Logan near Timboomba, I came across this low shrub some years ago. After repeated researches on the same spot and thereabouts I never came across it again.

AMPELIDEÆ.

Vitis hypoglauca, F.v.M., Pl. Vict., I., 94.

Very frequently to be seen scaling and overtopping trees on the scrubby creeks of Tallebudgera. It knits together in a dense mass of foliage the rich seaboard undergrowth. Although very common, still there is no record of its existence in this district.

Vitis sterculifolia, F.v.M., Herb.

This plant more massive and less common than the foregoing may be seen growing near Dunwich. As Baron Mueller remarks, the stalklets of this Dunwich *Vitis* are longer than usual.

SAPINDACEÆ.

Heterodendron diversifolium, F.v.M., Frag. I. 46.

There is no plant so common in the scrubs of Dugundan, Mount Maroon, and Wilson's Peak as this. It can easily be traced from this peak down the Condamine River, as it wends towards Warwick through a majestic chasm in a high abrupt rock.

Harpullia alata, F.v.M., Frag. II., 103.

Rather scarce in the Tallebudgera scrubs. The racemes of flowers present a greater length than that of the typical form.

LEGUMINOSEÆ.

Mirbelia reticulata, Sm., Ann. Bot. I., 511.

In the swamps which for a considerable extent stretch north of Burleigh Heads, this slender plant is to be seen making its way through the low swampy vegetation.

Jacksonia Stackhousii, F.v.M., Proc. Linn. Soc., N.S.W.

There is little room for doubting that the scanty and imperfect specimens of a *Jacksonia* which I gathered at Burleigh Head swamps belong to this newly described species. Its low growth, the difference in the length of the calyx lobes as compared with those of *J. scoparia*, with which it might be confused, point to this species. Add to this that the locality from which the original specimen came is not far away from Burleigh Heads.

Viminaria denudata, Sm., Exot. Bot. 51, f. 27.

Among the swampy growth of Burleigh Heads. Also on cretaceous soil near the Logan Village. A common species in the Murray scrubs; South Australia.

Daviesia corymbata, Sm., Ann. Bot. I., 502.

In one locality alone have I met with this species. This was on the road from Nerang to Southport.

Daviesia arborea, F.v.M. and B. Scort. ined.

The student of cabinet specimens may find himself puzzled in discriminating this species from the foregoing. Yet when the two plants are studied in their natural habitats they offer no difficulty and one can conclude with certainty that they are specifically distinct. The subject of this note bears out fully its specific appellation. It attains the stature of a tree, so contrary to the habit of its congeners, most of which are puny shrubs. The heighth of *D. arborea* reaches as high as forty feet, having a thick trunk more than a foot in diameter of a hard, whitish wood. The aspect of the tree calls to mind some of the large *Acacias*. In my rambles I never met with this tree further north than Tambourine mountain. As one reaches the top of the mountain one sees it growing there. Its distribution as far as it could be noticed, is comprehended by a narrow zone. From the top of the mountain as we descend the eastern slopes it becomes more abundant till the Coomora is reached. There seems to be a break here, and we lose sight of it till we get near Burleigh Heads where it makes its appearance again, and follows up Tallebudgera Creek, down to the Tweed River. My excursions did not extend further. The copiousness of its racemes of bright yellow flowers covering it as with a mass of gold, and the graceful appearance of the tree recommend it to the attention of gardeners. It has found a home in European gardens.

Pultenea ternata, F.v.M., Frag. I. 8.

It presents the general aspect of *Daviesia squarrosa*; and like it too it covers many stony barren ridges of South Queensland.

Templetonia Muellerii, Benth., Fl. Aus. II., 169.

No more than one specimen could be discovered on the ridges of the Upper Logan.

Crotalaria trifoliastrum, *Willd.*

In some places on the Logan very abundant, spreading on cultivated ground. It has never been met prostate, but always presenting an erect shrubby appearance.

Psoralea tenax, Lind., in Mitch. Threc. Exp. II., 10.

Two varieties, one with conspicuous flowers and large leaflets, another with petals nearly hidden by the calices and linear leaflets, are to seen prostrate on many black soil flats of the Upper Logan.

Indigofera enneaphylla, L.

On the granite ridges along the course of the Teviot this humble *Indigofera* attracts our attention by the little gems of its ruby flowers.

Tephrosia Bidwillii, Benth., Fl. Aus. II., 210.

The variety *rufescens* grows on the Logan.

Lespedeza cuneata, G. Don., Gen. Syst.

Frequently to be seen on the alluvial flats of the Logan River.

Glycine tomentosa, Benth., Fl. Aust. II., 245.

The sandy ridges of Peel Island abound with this twining plant, as also several sandy hills of the Logan, but less so than on the Island.

Vigna lanceolata, Benth., in Mitch. Trop. Aust.

Towards Coochin, struggling among the grass. It grows also near Roma.

Rhynchosia Cunninghamii, Benth., Fl. Aust. II., 350.

In Barr's scrub near Beenleigh, Three-mile scrub near Brisbane, more plentiful around Bundaberg on the Burnett.

Guillandina Boduncella, Linn.

The only plant I came across was growing in a small island near Stradbroke. The seeds drifted perhaps by currents seem to work their way down south. It was noticed growing near Sandgate, a few miles from the northern banks of Brisbane, near the sea-shore. The intricate thorny branches of this species emulate *Caesalpinia sepiaria* of Roxb., and in *Mezoneuron Scortechinii*, F.v.M., they have a strong ally in forming an impenetrable hedge.

Acacia hispidula, Willd., spec. pl. iv., 1054.

This heath-like *Acacia* may be seen growing on the debris of granite rocks not far from the Logan Village.

Acacia myrtifolia, Willd., spec. pl. iv. 1054.

On the dry ridges leading from Nerang to Southport, and surrounding Tallebudgera, this pretty *Acacia* often claims the attention of the traveller. The small raceme of globose flowers with dark green leaves bordered at times with red cannot but present an attractive sight.

Acacia binervata, DC., Prod. II., 452.

A few trees of this wattle are scattered near the Tallebudgera scrubs, and on the eastern side of Tambourine mountain.

Acacia elongata, Sieb., DC., Prod. II., 451.

Among the broken rocks of Minto's Craig, near Coochin.

Acacia Baueri, Benth., in Hook., London Journ.

Close to the swamps near Burleigh Heads. It is redescribed by Baron von Mueller in Frag. xi., 33, from specimens obtained from the Richmond River, a locality not far off from Burleigh Heads.

Contribution to a knowledge of the Fishes of New Guinea.

By William Macleay, F.L.S., &c.

Mr. Andrew Goldie, the well known New Guinea Explorer and Naturalist, has from time to time for the last year or more, sent me collections of Fishes taken by him at Port Moresby, and Cuppa Cuppa. The first named locality is well known, the other is the name of an inlet of the coast a little way further north. The Fishes are with a few exceptions well preserved, the native name of each species is duly recorded, in many cases most valuable notes are made of the colours of the living specimen, and altogether Mr. Goldie has shown himself to be a most excellent and intelligent collector. The enumeration of the species given in this Paper, demonstrates pretty clearly the fact—that the Fishes of that part of the New Guinea Coast differ but little from those found by Dr. Bleeker to inhabit the seas of Netherlands India.

Family PERCIDÆ.

1. Pseudolates cavifrons, All. & Macl.

All. and Macl., Proc. Linn. Soc., N.S.W., vol. i., p. 262, pl. 3.

Dr. Klunzinger, and I believe others, seem to have satisfied themselves that this species is identical with *Lates calcarifer*, Bloch, if so, the existence of teeth on the tongue must remove it from the genus *Lates*.

2. Anthias manadensis, Bleek.

Atl. Ichth. Perc., p. 19, tab. 10, f. 5.—Gunth., Cat. App. 1, p. 502.

"Tara" of the Aborigines.

Mr. Goldie describes this fish as being of a deep rose-pink all over, with the belly, fins and tail orange.

3. Anthias cheirospilos, Bleek.

Atl. Ichth. Perc., p. 18, tab. 10, f. 1.—Gunth.,, Cat. App. 1, p. 502.

"Tara" of the Aborigines.

4. Serranus bœnack, Bl.

Bodianus bœnack, Bloch., 4, p. 44, t. 226. *Serranus bœnack*, Cuv. and Val., 2, p. 362.—Gunth., Cat. 1, p. 112. *Serranus bœlang*, Bleek., Atl. Ichth. Perc., pl. 68, fig. 5.—Quoy & Gaim., Voy. Astrol., Poiss., p. 657, pl. 3, fig. 4. *Serranus nigrofasciatus*, Hombr. & Jacq., Voy. Pole Sud., Poiss., p. 36, pl. 2, fig. 1.

"Guna-Guna" of the Aborigines of Port Moresby.

A species of very wide range within the tropics, extending from the East Coast of Africa to the Polynesian Islands.

5. Serranus urodelus, Forst.

Cuv. & Val. 2, p. 306, 6, p. 513.—Gunth., Cat. 1, p. 122.—Journ. Mus, Godef., Heft. 3, p. 3, tab. 3, fig. A.—Bleek., Atl. Ichth. Perc., pl. 43, fig. 2.

"Balala" of the Aborigines.

Serranus guttatus, Bl.

Bodianus guttatus, Bloch., taf. 224. *Cephalopholis argns*, Bl., Schn., p. 311, taf. 61, *Serranus myriaster*, Cuv. and Val. ii., p. 233.—Rüpp. Atl. p. 107, taf. 27, fig. 1.—Less. Voy. Coq. Poiss. pl. 27. *Serranus argus*, Cuv. & Val., ii., p. 360.—Gunth., Cat. 1, p. 115.—Bleek., Atl. Ichth. Perc., tab. 42, fig. 3. *Serranus guttatus*, Gunth., Cat. 1, p. 119.—Journ. Mus. Godef. Heft, 3, p. 5, taf. 4.

7. Serranus Hœdtii, Bleek.

Gunther, Cat. 1, p. 139.—Journ. Mus. Godef., Heft. 3, p. 9, fig. 2.—Bleek., Atl. Ichth. Perc., tab. 5, fig. 2.

"Taguma" of the Aborigines.

One specimen twelve inches in length.

Serranus miniatus, Fork.

Gunth., Cat. 1, p. 118.—Journ. Mus. Godef., Heft. 3, p. 5, tab. 5. *S. cyanostigmatoides*, Bleek., Atl. Ichth., Perc. pl. 5, fig. 3.—Gunth., Cat. 1, p. 117.

"Balala" of the Aborigines—a name apparently given to several species of *Serranus*.

9. Serranus Goldiei, *n. s.*

D. 10/14. A. 3/7.

Of elongate slightly compressed form; the height of the body is one-fourth of the total length including the caudal fin, the length of the head from the extremity of the lower jaw to the end of the opercular flap is nearly equal to the distance from the flap to the commencement of the caudal fin; the profile of the head is a little convex near the snout, the space between the eyes is a little depressed and as wide as the diameter of the orbit; the eyes are large, about two diameters from the extremity of the lower jaw, and more than four from the point of the opercular flap. The teeth are strong, numerous and sharp on the jaws, vomer and palatine bones, with two strong canines on each side of each jaw placed outside of the others and very close together; the maxillary bone is very broad at its extremity and extends far beyond the vertical from the hind margin of the eye; the præ-operculum is rounded behind with a slight emargination above the angle, but no apparent serrations; the middle spine of the operculum is long and acute, the others are distant from it and very small. The scales are small all over the body and the lateral line is almost straight. The dorsal fin commences opposite the root of the pectorals, the spines are tolerably strong but not long, the first is the shortest, and from the fourth onwards the longest; the soft dorsal more elevated than the spinous; the caudal fin is slightly rounded behind; the anal has the first spine short and the third a little longer than the second, the rays are much longer, and the posterior ones are inserted a very little in advance of the last of the dorsal; the ventral fins take their rise behind the root of the pectorals, and do not reach to the extremity of them; the pectorals are large, spreading and rounded and are inserted in a line with the large opercular spine. The colour in spirits is yellowish-brown covered all over—head, fins and all—with pale brown spots, smaller than the interspaces, two spots of a large size show on the back, one about the end of the spinous dorsal, the others over the tail; the pectorals are more sparsely spotted except at the base.

I have only one specimen of this Fish, it measures about 16 inches in length; unfortunately the number of its label has become illegible, so that I am unable to give the native name or the colours in a fresh state.

10. SERRANUS FASCIATUS, Forsk.

Gunth., Journ. Mus. Godef., Heft. 3, p. 6, taf. vi.

"Balakala" of the New Guinea Natives.

Dr. Gunther considers this species identical with *S. oceanicus, S. marginalis,* and *S. variolosus* of Cuv. and Val. I have three specimens without any apparent marking, excepting the black tips to the dorsal spines. Mr. Goldie's note of the colour when caught is—"Light pink, top of head pinkish brown, side fins yellow, back fin with brown points."

11. SERRANUS SUMMANA, Fork.

Bleek., Atl., Ichth. Perc. p. 61, pl. 7, f. 4. *S. polystigma,* Bleek., Gunth. Cat. 1, p. 129.

"Balala" of the Aborigines. Two specimens. One about a foot long was captured in fresh water.

12. SERRANUS CORALLICOLA, Cuv. and Val.

Bleek., Ael. Ichth. Perc.. p. 53, pl. 30, f. 1. *S. altivelioides,* Bleek., Gunth. Cat. 1, p. 127.

"Balala" of the aborigines.

I have several specimens averaging about 10 inches in length. Mr. Goldie's description of the colouring when caught is—"Yellowish-brown with rich brown spots all over."

13. SERRANUS FUSCOGUTTATUS, Rüpp.

Gunth., Cat. 1, p. 127.—Proc. Linn. Soc., N.S.W., vol. v., p. 316.—Bleek., Atl. Ichth. Perc. p. 57, pl. 29, f. 3.

"Balala" of the Aborigines.

Mr. Goldie says of this Fish—"Light brown with dark brown spots all over, fins and tail grey with grey spots."

14. SERRANUS SALMONOIDES, Lacep.

Gunth. Cat. 1, p. 128. "Balala" of the Aborigines.

This fish grows to a large size; its colour according to Mr. Goldie when caught is—"Dirty white with golden-brown spots all over." It is quite distinct from *S. polypodophilus*, Bleek., with which Dr. Gunther seems to confound it.

15. Serranus hexagonatus, Forst.

Gunth. Cat. 1, p. 140.—Proc. Linn. Soc., N.S.W., vol. v., p. 318, —Bleek., Atl. Ichth., Perc., p. 54, tab. 54, fig. 5.—Gunth., Journ. Mus. Godef. Heft. 3, p. 7, tab. 7, f. A. B.

This species seems to be common on the New Guinea Coast, as it is in all the warm seas south of the equator.

16. Serranus magnificus, *n. sp.*

D. 11/16. A. 3/9.

Of a broad slightly compressed form, the height of the body is comprised three and a half times in the total length, the length of the head three times; the snout is short, broad and rounded, distant from the eye, which is small, about one diameter of the orbit; the space between the eyes is broad and almost flat; the maxillary bone reaches to beyond the vertical from the posterior margin of the eye, and is triangular behind with rounded angles; the canine teeth are rather small; the præoperculum is rounded, raggedly serrated, and densely covered with very minute scales; the opercular spines are obtuse, the middle one large and flat; the spines of the dorsal fin are strong, and excepting the first two, are of nearly equal height, the soft dorsal is much higher and is rounded posteriorly; the caudal fin is large and expanded, densely covered with minute scales and rounded at the apex; the anal fin is more pointed-looking behind than the soft dorsal, the spines are short, the third largest; the pectorals are large, round and expanded; the ventrals are much shorter. The general colour seems to have been of an olive-green, with numerous lighter patches all over, turning yellow on the belly; all the fins are of a yellowish-ground-colour, with very numerous large brown spots presenting as Mr. Goldie observes the appearance of tortoise-shell, the pectorals have two cross bars of the same colour at their base before the commencement of the spots.

I have only one specimen of this very handsome fish. It measures 18 inches in length and is of a heavy bulky appearance.

"Balala" of the natives.

17. Plectropoma leopardinum, Cuv. & Val.

Gunth., Cat. 1, p. 157.—Bleek., Atl. Ichth. Perc. p. 25, pl. 18, f. 3. "Bogi" of the Aborigines.

Mr. Goldie's description is "Body brownish sap-green, darker on back, covered with small bright spots, each with dark border, socket of eye edged with brilliant turquoise blue."

18. Anyperodon leucogrammicus, Cuv. & Val.

Gunth., Cat. 1, p. 96.—Bleek., Atl. Ichth. Perc., p. 28, tab 1, f. 4. "Balala" of the Aborigines.

19. Genyoroge bidens, *n. sp.*

D. 11/13. A. 3/8. L. lat. 48.

Height of body slightly more than the length of the head and about two and one-third times in the total length exclusive of the caudal fin. Profile of head slightly concave, snout rather pointed, the maxillary bone reaches to the vertical from the anterior margin of the eye. The eyes are large, and considerably more than one diameter apart, the space between them being smooth and convex, the distance from the eye to the extremity of the snout is equal to two diameters of the orbit. The præoperculum is somewhat acutely rounded at the angle and strongly serrated, about the middle of its posterior limb there is a large emargination in which is a deep notch receiving a knob of the interoperculum, and beneath it a smaller notch receiving an obtuse tooth rising from the sub and inter-opercular suture. The dorsal fin is tolerably uniform and low, the eleventh soft ray is the longest, giving a pointed appearance to the fin; the caudal fin is moderately forked; the second anal spine is thicker but rather shorter than the third, the fifth ray is the longest; the pectoral fins are situated in front of the ventrals, and are long and pointed. The colour of the living fish is, according to Mr. Goldie—"Back brown-pink, belly vermilion, orbit reddish-gold, fins pink edged with brown, tail reddish-brown edged with yellow." The axils and middle rays of pectorals brown.

Two specimens 11 inches long. Native name "Tadiva."

20. Mesoprion gembra, Cuv. & Val.

Gunth., Cat. 1, p. 193. *M. sambra*, Bl., and *L. yapilli* and *immaculatus*, Cuv. & Val. *Lutjanus argentimaculatus*, Bleek., Atl. Ichth. Perc. p. 74 tab 55, f. 1.

"Acara" of the Aborigines.

Mr. Goldie's only note is—"Bronze all over, darkre on back," a very poor description. This is a large bulky fish, and seemingly abundant, as I have several specimens. One of them is numbered and labelled as coming from a fresh-water stream near Cuppa-Cuppa, with the native name of "Jemera" and described as—"Bronze-grey on back, fins and tail, reddish on belly."

21. Mesoprion semicinctus, Cuv. & Val.

Gunth., Cat. 1, p. 209, and Journ. Mus. Geof., Heft 2, p. 15, taf 17. *Lutjanus semicinctus*, Bleek., Atl. Ichth. Perc. p. 63, tab 63, f. 3.

"Oddu-oddu" of the Aborigines.

22. Mesoprion bohar, Cuv. & Val.

Gunth., Cat. 1, p. 190, and Journ. Mus. Godef., Heft. 3, p. 13, tab. 15. *Lutjanus bohar*, and *quadriguttatus*, Bleek., Atl. Ichth. Perc. 64, tab 70, f. 4.

"Terho" of the natives.

23. Mesoprion fulviflamma, Cuv. & Val.

Gunth., Cat. 1, p. 201.—Bleek., Atl. Ichth. Perc. 65, tab 66, f. 3.

"Hau" of the natives.

Several specimens about 10 inches in length.

24. Mesoprion monostigma, Cuv. & Val.

Gunth., Journ. Mus. Godef., Heft 3, p. 14, taf. 16.

"Hau" of the natives.

This species has been frequently confounded with the preceding one. I have several specimens of both before me, and can confidently assert them to be distinct.

25. Mesoprion quinquelineatus, Cuv. & Val.

Gunth., Cat. 1, p. 209.—Bleek., Atl. Ichth. Perc. 56, tab 65, f. 4.

"Bonohiri" of natives.

This species seems to resemble *Genyoroge Bengalensis*, and may possibly be the same, Dr. Bleeker's plates of the two species only differ in the number of the blue longitudinal lines, a by no means satisfactory distinction.

26. Mesoprion vitta, Cuv. & Val.

Gunth. Cat. 1, p. 207.—Bleek., Atl. Ichth. Perc. 51, tab 62, f. 5.—Proc. Linn. Soc. N. S. Wales, Vol. 5, p. 330.

Syn.—*M. enneacanthus*, *phæotæniatus*, and *Ophusenii*, Bleek.

"Bai" of the Aborigines.

27. Mesoprion chrysotænia, Bleek.

Atl. Ichth. Perc. p. 50, tab 24, f. 4.—Gunth, Cat. 1, p. 192.

"Marawah" of the Aborigines.

28. Mesoprion rubens, *n. sp.*

D. 10/14. A. 3/8.

The height of the body is one-third of the total length, and a little more than the length of the head ; the profile is convex ;

the eyes are large and nearly three diameters apart, the space between being convex; the snout is rounded and is distant from the eye more than two diameters of the orbit; the teeth are strong with one more than usually large canine tooth in the upper jaw, lapping over the lower lip; the maxillary bone reaches backwards to beneath the middle of the eye; the præoperculum is unevenly serrated, and rounded at the angle with a large but shallow emargination receiving a swelling of the interoperculum. The dorsal fin commences in a line with the extremity of the opercular flap and the root of the pectoral fin, the spines are strong, the first small, the fourth and fifth longest, the rays are of uniform length, longer than the tenth spine, and are covered at the base with a scaleless skin; the caudal fin is broad and emarginate; the anal is enveloped in a skin like the soft dorsal, the third spine is the longest and strongest; the pectoral fins are large pointed and a little falcate, the ventrals are shorter, commencing a little behind the pectorals, and terminating before them. The scales on the body are rather large.

Mr. Goldie's description of the colours of this fish is "Dark-brown on back, vermilion on belly," the specimens, however, show pearly lines along the sides, a few spots on the head below the eyes, and the fins seem all to be more or less of a violet colour, or margined with black.

I have two specimens, both large and heavy fishes over twenty inches in length. The native name is "Tchro."

29. MESOPRION GOLDIEI, *n. sp.*

D. 10/13. A. 3/8. L. lat. about 48.

Height of body one-third of the total length and equal to the length of the head; profile straight; eyes large, rather more than one diameter apart, the space between convex; length from the eye to the extremity of the snout nearly equal to two diameters of the orbit; the teeth are small, those on the vomer very minute; the maxillary bone is broad and triangular, and reaches to below the anterior third of the eye; the præoperculum is strongly serrated on the angle which is rather acutely rounded, the emargination above it is large but very shallow, and receives a swelling of the suboperculum; the first dorsal spine is very short, the fourth and fifth are the longest, the second anal spine is much thicker than the third; the caudal fin is very slightly emarginate, the pectoral fins are pointed and reach almost to the first anal spine, the ventaals are shorter; the scales of the body are large, smooth, and rather deciduous. The colouration seems to have been dark on the back and sides, every scale having a dark centre, the lower part of the sides and the belly seem to have been silvery or pearly with a yellowish tinge; the head silvery, the dorsal, anal and caudal fins darkish, and the pectorals and ventrals yellow.

I have only one specimen of this fish and it is without a label. In the size of the scales and its general appearance it is unlike any *Mesoprion* I have hitherto seen. Length 20 inches.

30. Mesoprion parvidens, *n. sp.*

D. 10/16. A. 3/8. L. lat. about 58.

Form compressed; height of body one-half of the total length excluding the caudal fin, profile steep and straight; snout short, one and a half diameter of the orbit from the eye; the maxillary reaches to the vertical from the anterior margin of the eye; the teeth are small, the canines included; the eyes are about one diameter apart, the space between slightly convex; the posterior limb of the præoperculum is straight and finely serrated, the angle is more strongly serrated, and a little above it there is a deep notch receiving a knob of the interoperculum; the opercular spines are indistinct; the fourth and fifth dorsal spines are the longest; the soft dorsal, caudal and anal fins are covered with small scales for about half their length, the third anal ray is the longest, giving a pointed appearance to the fin, the second spine is stronger and slightly longer than the third; the pectoral fins are elongate and slightly falcate; the tail is slightly emarginate. The general colour is blackish, but every scale has a pearly portion, larger on the belly, which probably in the living specimen was red; a whitish spot shows on the lateral line below the middle of the soft dorsal; all the scaleless parts of the head and cheeks seem to have been covered with a number of bluish transverse streaks; the vertical fins and tail are very dark; the pectorals are black on the upper rays, and the ventrals have the rays yellow and the membranes black.

One specimen about 8 inches in length. The label attached to this species is illegible.

31. PRIACANTHUS HAMRUHR, Cuv. & Val.

Gunth., Cat. 1, p. 219.—Bleek., Atl. Ichth. Perc. p. 13, tab 75, f. 3.

"Daburu" of the natives.

"Bright crimson all over." (Goldie.)

32. AMBASSIS MACRACANTHUS, Bleek.

Gunth., Cat. 1, p. 227.—Bleek., Perc. p. 30.

Dr. Bleeker, who originally described this fish in his "Fishes of Batavia," subsequently, in his "Atl. Ichth. Perc.," makes it a synonym of *Ambassis Commersonii*. I am disposed to think that he was right in the first instance.

33. APOGON SANGIENSIS, Bleek.

Gunth., Cat. 1, p. 235.—Journ. Mus. Godef. Heft. 2, p. 20. *Amia sangiensis*, Bleek., Atl. Ichth. Perc. p. 95, tab 41, f. 4.

34. APOGON ZOSTEROPHORUS, Bleek.

Gunth., Cat. 1, p. 245.—*Amia zosterophora*, Bleek., Atl. Ichth. Perc. p. 103, tab 35, f. 2.

35. APOGON LEPTACANTHUS, Bleek.

Gunth., Cat. 1, p. 222.—*Amia leptacanthus*, Bleek., Atl. Ichth. Perc. p. 97, tab 71, f. 3.

36. Apogon nematopterus, Bleek.

Gunth., Cat. 1, p. 233.—*Amia nematopterus*, Bleek, Atl. Ichth. Perc. p. 79, tab 35, f. 1.

37. Apogon Cookii, M'Leay.

Proc. Linn. Soc., N.S. Wales, Vol. v., p. 344.

"Meta" of the New Guinea natives.

38. Apogon Amboinensis, Bleek.

Gunth., Cat. 1, p. 234.—*Amia Amboinensis*, Bleek, Atl. Ichth. Perc. p. 90, tab 68, f. 1.

39. Apogon aureus, Bleek.

Atl. Ichth. Perc. p. 92, tab 59, f. 1.—Day, Fishes of India, p. 61, tab 16, f. 8.

Syn.—*Apogon annularis*, Gunth.—*A. roseipinnis*, Cuv. & Val.

40. Apogon tæniopterus, Benn.

Gunth., Cat. 1, p. 235.—Benn., Pro. Zool. Soc., vol iii., 1835, p. 206.

41. Chilodipterus octovittatus, Cuv. & Val.

Cuv. & Val., Poiss. 2, p. 163.—Gunth., Cat. 1, p. 248.—*Paramia macrodon*, Bleek., Atl. Ichth. Perc. p. 105, tab 27, f. 2.

Syn.—*Peramia lineata* and *octolineata*, Bleek., and *C. heptagona*, Bleek.

42. Chilodipterus quinquelineatus, Cuv. & Val.

Cuv. & Val., Poiss 2, p. 167.—Gunth., Cat. 1, p. 248.—*Paramia quinquelineata*, Bleek, Atl. Ichth. Perc. p. 105, tab 48, f. 2.—*Apogon novemstriatus*, Rüpp.

43. Therapon argenteus. Cuv. & Val.

Gunth., Cat. 1, p. 283.—Bleek., Atl. Ichth. Perc. p. 114, tab 61, f. 4.

44. Therapon Cuvieri, Bleek.

Gunth., Cat. 1, p. 282.—M'Leay, Proc. Linn. Soc. N.S.W., vol. v., p. 362.

45. Therapon servus, Cuv. & Val.

Gunth, Cat. 1, p. 278.—Proc. Linn. Soc. N.S.W., vol. v., p. 361.—*Therapon jarbua*, Bleek., Atl. Ichth., Perc. p. 112, tab 34, f. 2.

"Toégala" of the New Guinea natives.

46. Dules ciliatus, Bleek.

Alt. Ichth. Perc., p. 120, tab 46, f. 2.—*Percichthys ciliata*, Gunth., Cat. 1, p. 62.—*Dules marginatus*, *maculatus*, and *malo*, of Cuv. and Val.

"Rurupeti" of the Aborigines.

Found in a small fresh-water stream near Cuppa-Cuppa.

47. Pristipoma hasta, Bl.

Gunth., Cat. 1, p. 289.—Proc. Linn. Soc. N.S. Wales, vol. v., p. 369. *Pomadasys hasta*, Bleek., Atl. Ichth. Perc. p. 28, tab 47, f. 3.

Syn.—*P. Commersonii*, *kakaan*, and *chrysobalion* of Cuv. & Val. *Labrus Commersoni*, and *Lutjanus microstoma*, of Lacepede.

48. Diagramma Goldmanni, Bleek.

Gunth., Cat. 1, p. 331.—Bleek, Atl. Ichth. Perc., p. 21, tab 17, f. 2. *D. hæmatochir*, Bleek., Atl. Ichth. Perc. tab 19, f. 3.—Gunth., Cat. 1, p. 332.

"Houmyri" of the natives.

49. Diagramma Papuense, *n. sp.*

D. 11/18. A. 3/8. L. lat 65.

This species has the general appearance of *D. pardalis*. but in all my specimens the number of the dorsal spines are eleven, whereas in *pardalis* and *chætodonoides* there are invariably twelve. The marking seems to be very variable, my larger specimens being spotted densely all over with brown, excepting on the belly, while others, smaller ones, are covered with very large brown spots, excepting on some whitish patches, which have smaller spots on them. All the fins are spotted, the pectorals most densely; the spinous dorsal is margined with black. The Papuan name is "Tanari."

Mr. Goldie's description of the colour is—"Bright purple with dark brown spots all over, mouth yellowish red."

50. Diagramma celebicum, Bleek.

Atl. Ichth. Perc. p. 18, tab 51, f. 3.

"Marawah" of the natives.

51. Diagramma crassispinum, Rüpp.

Gunth, Cat. 1, p. 319.—Bleek., Atl. Ichth. Perc., p. 16, tab 64, f. 1.

Syn.—*D. affine*, Gunth., *Pristipoma nigrum* of Cuv. and Val., Cant., and Gunth.

"Matavabo" of the natives.

52. Diagramma centurio, Cuv. & Val.

Gunth., Cat. 1, p. 322.

Dr. Bleeker makes this species and *D. punctatum* into synonyms of his *Plectorhynchus pietus*, but I can see no resemblance.

Papuan name "Gapio." Mr. Goldie's description is —"Light slate colour with small golden-brown spots all over."

53. Scolopsis margaritifer, Cuv. and Val.

Gunth., Cat. 1, p. 355.—Bleek., Atl, Ichth. Perc., p. 3, tab 39, f. 2. "Degari" of the natives.

Mr. Goldie's note to this species is—" Back greenish purple, scales yellow edged with white; belly white; orbit hazel, with violet rim; side fins and upper division of tail yellow; upper fins and lower part of tail purple."

54. Scolopsis ciliatus, Lacep.

Gunth., Cat. 1, p. 355.—Bleek., Atl. Ichth. Perc. p. 6, tab 38, f. 2. "Matabibi" of the natives.

55. Scolopsis bilineatus, Cuv. and Val.

Gunth., Cat. 1, p. 357.—Bleek., Atl. Ichth. Perc. p. 7, tab 45, f. 2. "Wonano" of the Aborigines.

56. Scolopsis trilineatus. Kner.

Gunth., Journ. Mus. Godef. Heft. 5, p. 31, pl. 25, f. A.—Bleek., Atl. Ichth. Perc. p. 5, tab 53, f. 2.

"Wonano" of the natives.

57. Scolopsis monogramma, Cuv. and Val.

Gunth., Cat. 1, p. 358.—Bleek., Atl. Ichth. Perc., p. 11, tab 57, f. 3.

"Bai" of the natives.

58. Scolopsis teemporalis, Cuv. & Val.

Gunth., Cat. 1, p. 360.—Voy. Coquille, Poiss. pl. 26.

59. Gerres abbreviatus, Bleek.

Atl. Ichth. Perc. tab 78, fig. 4.—Gunth., Cat. 4, p. 257.

60. Gerres gigas, Gunth.

Gunth., Cat. 4, p. 25.—Journ. Mus. Godef. Heft. 5, p. 30, tab 24, f. A.

"Heala" of the natives.

61. GERRES MACRACANTHUS, Bleek.

Atl. Ichth. Perc. tab 78, f. 1.—Gunth., Cat. 4, p. 261.

"Heala" of the natives. A fresh water species.

62. GERRES ACINACES, Bleek.

Atl. Ichth. Perc. pl. 77, fig. 2.—Gunth., Cat. 4, p. 262.

"Heala" of the natives.

63. PENTAPUS CANINUS, Bleek.

Atl. Ichth. Perc., p. 103, pl. 30, fig. 3.—*Heterognathodon xanthopleura*, Gunth., Cat. 1, p. 365.

"Kinkin" of the natives.

64. PENTAPUS AUROLINEATUS, Cuv. & Val.

Gunth., Cat. 1, p. 381.—Journ. Mus. Godef. Heft. 5, p. 33, pl. 25 B.

"Mocobura" of the natives.

65. CÆSIO CŒRULAUREUS, Cuv. & Val.

Gunth., Cat. 1, p. 322.—Bleek., Atl. Ichth. Perc. p. 39, tab 19, f. 4.

"Vaber-vaber" of the natives.

66. CÆSIO ERYTHROGASTER, Cuv. & Val.

Bleek., Atl. Ichth. Perc. p. 36, tab 34, f. 3.—*Odontonectes erythrogaster*, Gunth., Cat. 1, p. 265.—Proc. Linn. Soc., N.S.W., vol. i., p. 269.

"Cavi" of the natives; young named "Kera."

67. CÆSIO PISANG, Bleek.

Atl. Ichth. Perc. p. 38, tab 6, f. 2.—Gunth., Cat. 1, p. 391.

"Ciro-ciro" native name.

Family SQUAMIPINNES.

68. Chætodon strigangulus, Cuv. & Val.

Gunth., Cat. 2, p. 4, and Journ. Mus. Godef. Heft 5, p. 35, tab 26,—A.—*Megaprotodon strigangulus*, Bleek., Atl. Icht. Chæt. 54, tab 13, f. 4.

Syn.—*C. triangularis*, Rüpp.—*C. trifascialis*, Gunth.—*C. bifascialis*, Cuv. and Val., and *C. Leachii*, Cuv. & Val., and Gunth.

69. Chætodon auriga, Cuv. & Val.

Gunth., Cat. 2, p. 7.—Day, Fishes of India 1, p. 106, pl. 27, f. 3.—*Tetragonopterus auriga*, Bleek., Atl. Ichth. Chæt. 47, tab 11, f. 6.

Syn.—*C. setifer* of Bloch, Cuv. & Val., Lesson, Jennings, and Gunther, and *C. neogallicus* and *Sebanus* of Cuv. & Val.

I give these synonyms on the authority of Dr. Bleeker, who had certainly for many years ample opportunities of forming a correct judgment on such matters.

70. Chætodon ephippium, Cuv. & Val.

Gunth., Cat. 2, p. 7.—Journ. Mus. Godef. Heft. 5, 36 tab 27, A.—Less., Voy. Coq., Poiss. 2, p. 174, pl. 29, fig. 1.—*Tetragonopterus ephippium*, Bleek., Atl. Ichth. Chæt 36, tab 16, f. 2.

Syn.—*C. Garnoti*, Lesson, and *C. principalis*, Cuv. & Val.

71. Chætodon unimaculatus, Cuv. & Val.

Gunth., Cat. 2, p. 11.—Journ. Mus. Godef. Heft. 5, p. 37.—*Tetragonopterus unimaculatus*, Bleek., Atl. Ichth. Chæt. 45, pl. 13, fig. 5.

72. Chætodon Bennetti, Cuv. & Val.

Gunth., Cat. 2, p. 12.—Journ. Mus. Godef., Heft. 5, p. 37, pl. 99 A.—*Tetragonopterus Bennetti*, Bleek., Atl. Ichth., Chæt., p. 34, tab 14, f. 2.

Syn.—*C. vinctus*, Benn., Zool. Voy. Bloss., p. 72, pl. 17, fig. 1.

73. Chætodon speculum, Cuv. & Val.

Gunth., Cat. 2, p. 12.—*Tetragonopterus speculum*, Bleek., Atl. Ichth. Chæt., p. 34, tab 13, f. 3.

74. Chætodon falcula, Cuv. & Val.

Gunth., Cat. 2, p. 17.—Journ. Mus, Godef. Heft. 5, p. 39, pl. 27, f. c.—*Tetragonopterus falcula*, Bleek , Atl. Ichth. Chæt., p. 52, pl. 11, fig. 1.

Syn.—*C. ulietensis* and *dizoster* of Cuv. & Val., and Gunther.

" Bebi" of the natives.

75. Chætodon Kleinii, Bl.

Gunth., Cat. 2, p. 22.—*Tetragonopterus Kleinii,* Atl. Ichth., Chæt., p. 45, tab 11, fig. 3,

Syn.—*C. virescens*, Cuv. & Val.—*C. melastomus*, Bl.

76. Chætodon trifasciatus, Mungo Park.

Trans. Linn. Soc., 3, p. 34.—Gunth., Cat. 2, p. 23.—*Tetragonopterus trifasciatus*, Bleek., Atl. Ichth.. Chæt., p. 35, tab 15, f. 1.

Syn.—*C. vittatus* and *tau-nigrum* of Cuv. & Val. and Gunther.

77. Chætodon vagabundus, L.

Gunth., Cat. 2, p. 25.—Journ. Mus. Godef. Heft. 5, p. 43.—*Tetragonopterus vagabundus*, Bleek., Atl. Ichth. Chæt. p. 48, tab 16, f. 1.

Syn.—*C. pictus* of Cuv. & Val. and Gunther, *C. decussatus*, Cuv. & Val.

78. Chætodon Rafflesii, Benn.

Gunth., Cat. 2, p. 27.—Journ, Mus. Godef. Heft. 5, p. 44, pl. 35 c.—*Tetragonopterus Rafflesi*, Bleek., Atl. Ichth. Chæt. p. 45, tab 14, fig. 4.

Syn.—*C. princeps* and *Sebac* of Cuv. & Val.

79. CHÆTODON DORSALIS, Cuv. & Val.

Gunth., Cat. 2, p. 28.—Playfair, Fishes of Zanzibar, p. 34.—*Chætodon melanotus*, Bl., Gunth., Journ. Mus. Godef. Heft. 5, p. 44.—*Tetragonopterus melanotus*, Bleek., Atl. Ichth. Chæt. p. 43, tab 14, f. 1.

Syn.—*C. marginatus* and *abhortani*, Cuv. & Val.

80. CHÆTODON MILIARIS, Cuv. & Val.

Gunth., Cat. 2, p. 31.—Journ. Mus. Godef. Heft. 5, p. 46, pl. 35 A.—*Tetragonopterus miliaris*, Bleek., Atl. Ichth., Chæt., p. 39, tab 15, f. 3.

Syn.—*C. citrinellus*, Cuv. & Val., and Gunther, *C. guttatissimus* Gunther.

81. CHÆTODON LINEOLATUS, Cuv. & Val.

Gunth., Cat. 2, p. 30.—Journ. Mus. Godef. Heft. 5, p. 45, pl. 34 A.—*Tetragonopterus lineolatus*, Bleek., Atl. Ichth., Chæt., p. 51, tab 15, f. 2.

Syn.—*C. liniatus*, Cuv. & Val.—*C- oxycephalus*, Gunther.

"Bebi" of the natives.

82. CHÆTODON BARONESSA, Cuv. & Val.

Gunth., Cat. 2, p. 31—*Tetragonopterus triangulum*, Bleek., Atl. Ichth., Chæt., p. 53, tab 12, f. 1

Syn.—*C. triangulum*, *larvatus*, and *karras*, of Cuv. & Val.

83. CHELMO ROSTRATUS, L.

Gunth., Cat. 2, p. 36.—Proc. Linn. Soc., N.S.W., vol. v., p. 391.—*Chelmon rostratus*, Bleek., Atl. Ichth. Chæt. p. 22, tab 7, f. 2.—*Chætodon encelodus*, Shaw.

84. HENIOCHUS VARIUS, Cuv. & Val.

Gunth., Cat. 2, p. 41.—Kner., Voy. Novara Fisch. p. 103.—*Taurichthys varius*, Bleek., Atl. Ichth., Chæt., p. 27, tab 3, f. 2.—*Taurichthys viridis*, Cuv. & Val., Poiss. vii., p. 114.

"Zarariki" of the natives.

85. Holacanthus sexstriatus, Cuv. & Val.

Gunth., Cat. 2, p. 49.—Kner., Voy. Novara, Fisch, 104.—Proc. Linn. Soc. N.S.W., vol. v., p. 395.—Bleek., Atl. Ichth,, Chat., p. 66, tab 10, f. 2.

86. Holacanthus bicolor, Cuv. & Val.

Gunth., Cat. 2, p. 50.—Journ. Mus. Godef. Heft. 5, p. 51. pl. 39 b.—Bleek., Atl. Ichth. Chæt., p. 61, tab 7, f. 3.

"Hidia" of the natives.

87. Holacanthus xanthometopon, Bleek.

Bleek., Atl. Ichth., Chæt., p. 64, tab 9, f. 2.—Gunth., Cat. 2, p. 51. "Poporaka" of the natives.

88. Holacanthus nox, Bleek.

Bleek., Atl. Ichth., Chæt., p. 62, tab 6, f. 3.—Gunth., Cat. 2, p. 51. "Gau" of the natives.

89. Scatophagus argus, L.

Gunth., Cat. 2, p. 58.—Kner., Voy. Novara, Fisch. p. 106.—*Ephippus argus*, Bleek., Atl. Ichth., Chæt., p. 21, tab. 1, f. 2.

Syn.—*Scatophagus ornatus*, *Bougainvilli*, and *purpurescens*' Cuv. and Val.

90. Scatophagus multifasciatus, Richards.

Richards., Voy. Ereb. & Terr., Fishes, p. 57, pl. 35, f. 4-6.—Gunth., Cat. 2, p. 60.—Proc. Linn. Soc., N.S.W., vol. v., p. 396.

91. Drepane punctata, Cuv. & Val.

Gunth., Cat. 2, p. 62.—Proc. Linn. Soc. N.S.W., vol. 5, p. 397.—*Harpachirus punctatus*, Bleek., Atl. Ichth., Chæt., p. 19, tab 3, f 4.—*Drepane longimana*, Cuv. & Val., Poiss. viii., p. 101.

92. Toxotes jaculator, Cuv. & Val.

Gunth., Cat. 2, p. 67.—Casteln., Proc, Zool. Soc., Victoria, vol. 2, p. 84.—Bleek., Atl. Ichth. Chæt., p. 4, tab. 1, f. 4.—Proc. Linn. Soc., N.S.W., vol. v., p. 399.

"Baruki" of the natives.

MULLIDÆ.

93. Upeneoides vittatus, L.

Gunth., Cat. 1, p. 397.—Cuv. & Val., Poiss. 3, p. 448 and 7, p. 520.—Bleek., Atl. Ichth., Mull., tab 2, fig. 3.—Proc. Linn. Soc., N.S.W., vol. v., p. 402.

"Ciu" of the natives; the same name is given to all the species of the family.

94. Upeneoides tragula, Richards.

Richards, Ichth., China, p. 220.—Gunth., Cat. 1, p. 398.—Bleek., Atl. Ichth., Mull., tab 2, f. 2.—Proc. Linn. Soc. N.S.W., vol. v., p. 402.

95. Upeneus barberinus, Cuv. & Val.

Gunth., Cat. 1, p. 405.—Journ. Mus. Godef. Heft 7, p. 57, taf. 42.—Bleek., Atl. Ichth., Mull., tab 3, fig. 1.—Kner., Fishes of Novara, p. 7.—Proc. Linn. Soc. N.S.W., vol. v., p. 405.

96. Upeneus trifasciatus, Cuv. & Val.

Gunth., Cat. 1, p. 407.—Journ. Mus. Godef. Heft 7, p. 59, pl. 44 b and c.—Kner., Fishes of the Novara, p. 71.—Jenyns, Zool. Beagle, p. 25.—*Parupeneus multifasciatus*, Bleek., Atl. Ichth., Mull., tab 4, fig. 4.

97. Upeneus malabaricus, Cuv. & Val.

Cuv. & Val., Poiss. 3, p. 457.—Gunth., Cat. 1, p. 406.—Journ. Mus. Godef., Heft. 7, p. 58, pl. 45, fig. b.—Proc. Linn. Soc., N.S.W., vol. v., p. 405.

98. Upeneus luteus, Cuv. & Val.

Cuv. & Val., Poiss. 7, p. 521.—*Parupeneus luteus*, Bleek., Atl. Ichth., Mull., tab 4, fig. 1.

99. Upeneus cherserydros, Cuv. & Val.

Cuv. & Val., Poiss. 3, p. 470.—Gunth., Journ. Mus. Godef. Heft 7, p. 60, pl. 45 a.—*Parupeneus cherserydros*, Bleek., Atl. Ichth., Mull., tab 3, fig. 2.

Syn.—*Upeneus cyclostomus*, Cuv. & Val.—*U. oxycephalus*, Bleek.

100. Upeneus Jansenii, Bleek.

Gunth., Cat. 1, p. 410.—Bleek., Atl. Ichth., Mull., tab 2, fig 4.

SPARIDÆ.

101. Pachymetopon squamosum, All. & Macl.

All. & Macl., Proc. Linn. Soc. N.S.W., vol. i., p. 275, pl. 9, f. 1.

The number affixed to this fish was illegible.

102. Lethrinus rostratus, Cuv. & Val.

Gunth., Cat. 1, p. 454.—Cuv. & Val., Poiss. 6, p. 296—*Lethrinus miniatus*, Bleek., Atl. Ichth., Perc., p. 121, tab 31, fig. 3.—Gunth., Journ. Mus. Godef., Heft. 7, p. 63.

" Vanaka" of the natives.

103. Lethrinus amboinensis, Bleek.

Bleek., Atl. Ichth., Perc., pl. 33, fig. 3.—Gunth., Cat 1, p. 455.—Journ. Mus. Godef., Heft. 7, p. 63.

" Manahala" of the natives.

104. Lethrinus harak, Rüpp.

Gunth., Cat. 1, p. 458.—Kner., Fishes of the Novara, p. 81.—Proc. Linn. Soc. N.S.W., vol. v., p. 414.—Bleek., Atl. Ichth., Perc. p. 119, tab 49, fig. 3.

Syn.—*L. erythrurus*, Cuv. & Val.—*L. rhodopterus*, Bleek.

"Tabutu" of the natives.

105. Lethrinus variegatus, Cuv. & Val.

Cuv. & Val., Poiss. 6, p. 287.—Bleek., Atl. Ichth., Perc., p. 117, tab 39-50 and 52.

Syn.—*L. elongatus, semicinctus, microdon*, Cuv. & Val.—*L. latifrons*, Rüpp., Gunth., Cat. 1, p. 458,

"Ahuawia" of the natives.

106. Lethrinus ornatus, Cuv. & Val.

Cuv. and Val., Poiss. 6, p. 310.—Bleek., Atl. Ichth., Perc. p. 118, tab 72, fig. 4.—*Lethrinus xanthotænia*, Gunth., Cat. 1, p. 461.

"Daryya" of the natives.

"Head greyish-yellow, and grey on top; yellowish lines along sides; side fins yellow; top fins and tail crimson, two deep crimson marks across gills."—(Goldie.)

107. Lethrinus leutjanus, Cuv. & Val.

Gunth., Cat. 1, p. 461.—Bleek., Atl. Ichth., Perc., p. 120, tab. 76, fig. 5.

"Daragi" of the natives.

108. Lethrinus aurolineatus, *n. sp.*

The height of the body is greater than the length of the head, and about three and a half times in the total length. The profile is straight, the snout rather pointed; the intermaxillary reaches to the vertical from midway between the eye and snout, the distance from the eye to the snout is equal to three diameters of the orbit, and that between the eyes to nearly two diameters. The teeth are strong, the molars on the sides obtusely rounded. The dorsal fin commences in front of a line from the root of the pectorals, these long and pointed; caudal fin forked. Scales rather large, L. lat. about 45. The colour seems to have been a pale yellowish olive, with about eleven golden longitudinal streaks on each side of the body; the fins seem to have been of a uniform yellow; the head shows some traces of dark bands between the suout and eyes and between the eyes.

I have two specimens of this fish, the largest about 18 inches in length. Mr. Goldie gives no description of the colour.

CIRRHITIDÆ.

109. Cirrhites Forsteri, Bl.

Gunth., Cat. 2, p. 71.—Journ. Mus. Godef. Heft. 7, p. 69, pl. 49 A.—*Paracirrhites Forsteri*, Bleek., Atl. Ichth., Perc., p. 143, tab 71, fig. 5. *Cirrhites pantherinus*, Cuv. & Val.—Less., Voy. Coquille, Poiss. p. 225, pl. 22, fig. 1.

No native name.

SCORPÆNIDÆ.

110. Scorpæna gibbosa, Bl.

Gunth., Cat. 2, p. 119.—Journ. Mus. Godef., Heft. 7, p. 79, pl. 53.—*Scorpænopsis gibbosus*, Bleek., Atl. Ichth., Scorp., tab 6, f. 4. Syn.—*S. nesogallica*, Cuv. & Val. "Nohu" of natives.

111. Scorpæna polylepis, Bleek.

Sebastopsis polylepis, Bleek., Atl. Ichth., Scorp., tab. 5, fig. 1. —*Sebastes polylepis*, Gunth., Cat. 2, p. 106.

"Decaca" of the natives.

112. Pterois volitans, L.

Cuv. & Val., Poiss., 4, p. 258, fig. 88.—Gunth., Cat. 2, p. 122. —*Pseudomonopterus volitans*, Bleek., Atl. Ichth., Scorp., tab 2, f. 3.—*Pterois muricata* and *geniserra*, Cuv. & Val.—*P. miles*, Gunth.

"Manu-Manu" of the natives.

TEUTHIDIDÆ.

113. Teuthis corallina, Cuv. & Val.

Gunth., Cat. 3, p. 316.—Journ. Mus. Godef., Heft. 7, p. 88.—*Amphacanthus corallinus*, Cuv. & Val. 10, p. 139.

"Gani" of the natives.

114. Teuthis vermiculata, Cuv. & Val.

Gunth., Cat. 3, p. 317.—Proc. Linn. Soc. N.S.W., vol. v., p. 443.—*Amphacanthus vermiculatus*, Cuv. & Val., Pois. 10, p. 126.

"Urayo" native name.

115. Teuthis albopunctata, Schleg.

Gunth., Cat. 3, p. 318.—Journ. Mus. Godef., Heft 7, p. 88.—*Amphacanthus dorsalis*, Bleek.—*A. margaritiferus* and *fuscescens*, Richards.

"Gani" of the natives.

116. Teuthis doliata, Cuv. & Val.

Gunth., Cat. 3, p. 323.—Journ. Mus. Godef., Heft 7, p. 90.—*Siganus doliatus*, Cuv.—*Amphacanthus doliatus*, Cuv. & Val.

117. Teuthis puella, Schleg.

Gunth., Cat. 3, p. 323.—Journ. Mus. Godef., Heft 7, p. 91.—*Amphacanthus puellus*, Schleg., Bydr. tol de Dierk. 1852, p. 39, fig. 2.—*Amphacanthus cyanotænia*, Bleek., Ternate 2. p. 606.

"Gani" of the natives.

118. Teuthis tumifrons, Cuv. & Val.

Gunth., Cat. 3, p. 317.—*Amphacanthus tumifrons*, Cuv. & Val., Poiss. 10, p. 159.

119. TEUTHIS ARGENTEA, Cuv. & Val.

Gunth., Cat. 3, p. 322.—Journ. Mus. Godef. Heft. 7, p. 90.—*Amphacanthus argenteus*, Quoy and Gaim., Voy. Uran. Zool. p. 368, pl. 62, fig. 3.

120. TEUTHIS ROSTRATA, Cuv. & Val.

Amphacanthus rostratus. Cuv. & Val., Poiss., 10, p. 158.—*Teuthis rostrata*, Gunth., Journ. Mus. Godef., Heft 7, p. 89, taf. 60.

A MONOGRAPH OF THE AUSTRALIAN APHRODITEA.

BY WILLIAM A. HASWELL, M.A., B.SC.

[Plates VI.—XI.]

The Australian Marine Annelides have not formed the subject of any special investigations, but scattered notices of Australian species are to be found in the works of Schmarda,* Kinberg,† Baird,‡ and Quatrefages.§

Of the order to which the present paper is confined the last-named author enumerates and describes six Australian species including those described by Kinberg and Schmarda, and to those Dr. Baird adds five more from among the specimens in the collection of the British Museum. Though the thirty species enumerated in this paper cannot be regarded as a complete list of all the Australian Annelides belonging to this section, yet from the wide extent of coast from which they have been collected, from Torres Straits to Port Western, they may be looked upon as furnishing us with a tolerably correct idea of the general

* "Neue Wirbellose Thiere, Band I."

† "Oefversigt af K. Vet.-Akademiens Förhandlingar," 1855, p. 381; and "Eugenies Resa, Annulata."

‡ "Contributions towards a Monograph of the Aphroditacean Annelides." Proc. Linn. Soc., Vol. viii., p. 176.

§ "Histoire Naturelle des Annélés, Vol. I."

facies of this section of the Australian marine fauna. As might be expected from what is already known of the geographical distribution of the Chætelminthes,* there is little to markedly distinguish the Australian representatives of this group from those of northern seas; the species are different, but belong to the same or nearly related genera. As regards the distribution of the group within the Australian province itself, the only noteworthy point is that the species of the tropical shores of Queensland are entirely different from those of the temperate coasts of New South Wales and Victoria, a circumstance which affords illustration of the fact that Australia consists, so far as its another marine zoology is concerned, of two entirely distinct provinces—an intertropical or northern, and a temperate or southern, with, on the whole, considering the continuity of the coast line, remarkably few features in common.

A portion of the work on which this paper is founded was carried out last year during a cruise with H.M.S. "Alert" along the eastern coasts of Queensland; and I take this opportunity of placing on record my grateful thanks to Captain J. F. Maclear, Dr. R. W. Coppinger and the other officers of that vessel for much kindness and hospitality experienced during my stay with them, and for assistance liberally rendered in the way of boats and men for dredging when the requirements of the survey permitted.

A. Anatomy and Physiology.

The Elytra.

The possession of elytra or scales is one of the most distinctive points in the structure of the *Aphroditacea*. These elytra are flattened squames of varying shape, but always more or less rounded, sometimes delicate and membranaceous, at other times stiff and horny, which cover the back of the annelide in a double

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* Vide Quatrefages, "On the Geographical Distribution of the Annelida," Ann. Mag. N.H. (3) xiv., 1864, p. 239; also Hist. Nat. des Annelés, t. I.

row. Each elytron is attached to a peduncle or scale-tubercle, the surface of attachment, of circular or oval form, being situated about the centre of the elytron, and the attachment being effected through the medium of a series of muscular fibres, by whose contractions the various movements of the scale are brought about. The elytra are usually attached to every alternate segment—the intermediate segments having as their equivalent the cylindrical dorsal cirri. The dorsal cirri and the elytra may be said to be essentially identical in structure and mode of development. Each consists of an evagination of the integument containing a nerve, the evagination in the one case taking a cylindrical form, while in the other it becomes compressed and scale-like. Such a cutaneous fold ought to contain representatives of the cuticular, the subcuticular and the muscular layers of the integument, and such we find to be actually the case. Each scale contains three principal elements:—(1) an investing cuticle, (2) a double layer of cells or cell-equivalents, and (3) a fibrous layer.

(1). The cuticle varies considerably in its degree of development in different genera and species. Sometimes, as in *Aphrodita* and *Hermione*, it is exceedingly delicate and developes no appendages; sometimes as in *Iphione* and in many species of *Lepidonotus* and allied genera its upper layer attains a considerable thickness and density, and may be variously sculptured on the upper surface; where appendages, such as papillæ or fimbriæ, are present, it forms an investment for them when it does not constitute their entire substance.

(2). The cell-elements representing the subcuticular layer of the integument take the form of a layer of polygonal squames lying immediately under the cuticle. This layer is sometimes transparent—the outlines of the cells being only discernible with difficulty; at other times the cells are charged with pigment granules, a lighter space in the centre being apparently the expression of a nucleus. This double layer of cells was first pointed out by Ehlers* in *Polynoë pellucida*. I have found it in most species which I have examined, though in some cases the outline of the constituent elements were very difficult to trace.

(3). In focussing deeper than the upper layer of cells Ehlers states that he could distinguish a series of dots which he represents as arranged in radiating lines, and which he regards as indicating the existence of some tissue between the two layers of cells. It has been assumed, by Quatrefages, and others, that the scale is simply a flattened sac, between the two walls of which is a cavity communicating with the cavity of the body. The evidence in favour of this supposition is afforded by the fact that in certain species specimens have been observed with all the scales distended and globular, as if blown up by the pressure of fluid from within. I have never seen this phenomenon, which would appear to be of rare occurrence, but it is probably due to a forcible rupture tearing the two layers of the scale apart and producing a permanent malformation. Thus in *Aphrodita* the two membranes of which the scale is composed are firmly united together by fibrous tissue, and require some little force to effect their separation. This fibrous layer is visible in the undissected scale, and is seen still more distinctly when the layers are torn asunder, when the bundles of fibres will be seen curled up on the inner surface. The arrangement of the fibres, which are exceedingly fine, varies in different species; sometimes they are arranged in definite wavy bundles; sometimes the arrangement is quite irregular, the fibres crossing one another in all directions. Morphologically these fibres seem to represent the muscular layer of the integument.

In his account of the structure of the nervous system in *Aphrodita aculeata*† Quatrefages makes no mention of the

* "Die Borstenwürmer, p. 109, (1854)."

† Ann. des Sciences Nat. (3me série) t. xiv., p. 362, (1850.)

existence of nerves in the elytra, and their occurrence seems to have been first noticed by Ehleas.† In *Polynoë pellucida* the latter found a nerve entering the scale through the scale-tubercle and giving off radiating branches. A similar arrangement is very well seen in the scales of *Aphrodita* and some species of *Lepidonotus* and *Polynoë*, and is specially conspicuous after strong staining with haematoxylin or cochineal. The nerve divides near the point of entrance into numerous branches which radiate towards the periphery, and become divided again and again, giving off numerous minute twigs. In *Polynoë pellucida* Ehlers has traced each twig to one of the hollow processes on the surface of the scale. This definite termination of each twig may be well seen in successfully stained elytra of other species, and there can be little room for doubt that the papillæ on the surface of the scale are, in most instances at least, end-organs for the elytral nerve.

The functions with which the scales may be supposed to be connected are (1) protection, (2) the production of phosphorescent light, (3) sensation, (4) respiration, and (5) incubation.

The *protective* function of the scales is in some instances the predominating one. Thus in *Iphione* the scales are of extreme density and cover the entire dorsal surface with an armour which the animal is incapable of throwing off when irritated, and which gives it a remarkable superficial resemblance to *Chiton*. In others the scales, though tough, are more readily detached, and in some cases they do not completely cover the dorsal surface; while in many species of *Polynoë* they are so delicate, and so readily parted with on the slightest irritation that their direct protective action must be very slight. The greatest reduction of the protective function is, however, met with in *Aphrodita* and some allied genera, in which the scales are covered with a thick layer of matted hairs which form an efficient protective covering to the dorsal surface.

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† L. c., p. 110.

When certain species of *Polynoë* are irritated in the dark a flash of phosphorescent light will be seen to run along the scales, each being illuminated with a vividness which makes it shine out like a shield of light, a dark spot in the centre representing the surface of attachment where the light-producing tissue would seem to be absent. The irritation communicates itself from segment to segment, and, if the stimulation be sufficiently powerful, flashes of light may run along the whole series, one or more of the scales then becoming detached and being left behind still glowing with phosphorescent light. The species characterised by the phosphorescence of their scales are species also distinguished by the celerity of their movements and also by the readiness with which their scales are parted with when the animal is attacked; and it may be that the phosphorescence has a protective effect, the phosphorescent scales thrown off by the annelide distracting the attention of an assailant and enabling the former to make good its escape.

That the scales act, like the dorsal cirri, as organs of some special sense seems probable from their abundant innervation, as well as from the presence in many instances of fimbriæ and other appendages, some of which appear to be the end-organs of the nerve-branches. These appendages, the form of which varies greatly, are processes of the upper wall of the scale, and probably consist of the cuticular, subcuticular, and fibrous layers of the latter; the subcuticular layer is in most instances, however, difficult to make out, owing to the thickness of the cuticle, but in one species of *Polynoë* I find that certain vesicular processes which present a very delicate cuticle shew distinctly below it the layer of polygonal cells, and in the interior a series of fibres which radiate from the base of the vesicle to its outer wall, and many represent the fibrous layer of the scale, or may be of nervous nature.

In *Aphrodita* and *Hermione* the scales have been observed by Williams and Quatrefages to perform an important mechanical function in connection with respiration. In these genera the dorsal surface is covered with a coating of felted hairs which stretch across from one side to the other, and enclose a canal open in front and behind, and having for its floor the dorsal wall of the body with the elytra and the "branchial" tubercles These authors regard the oxygenation of the perivisceral fluid as taking place through the thin integument covering the scale-tubercles and the tubercles at the bases of the dorsal cirri, and have observed the scales to be subject to rythmical movements by means of which a current of water is driven constantly over the dorsal surface, thus renewing the water in contact with the "branchiæ." In species in which the felt-like dorsal covering does not exist, this function would appear to be in abeyance ; and in *Polynoë* and allied genera, so far as I have observed, the elytra remain perfectly motionless while the animal as a whole is at rest.

When the ripe ova are discharged from the orifices of the segmental organs, they are carried by ciliary action towards the under surface of the elytra, where they remain, adhering by means of a viscid secretion, until they are tolerably well advanced. Impregnation probably takes place while the eggs are in this situation ; and I have found still crowding in great masses under the scales, free embryos which had reached the cephalotrochous stage first described by Sars.*

Segmental Organs and Sexual Glands.

The position and relations of these organs have been entirely misunderstood both by Williams and Ehlers, and I find their statements repeated in the latest work on general zoology,† so that, though unable to obtain here all the literature of the subject, I am justified in concluding that these errors have not yet been corrected and explained.

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* Archiv. für Naturg., 1845.

† "Pagenstecher, Allgemeine Zoologie, Band iv."

Ehlers* in his remarks on the genus *Polynoë* states his opinion that Williams had seen the segmental organs of that annelide only imperfectly and the stages in the formation of the sexual products not at all.† A careful examination of the subject has led me to the conclusion that both of these observers were looking at the same thing from different points of view, but were entirely in error in regarding it as the segmental organ.

At first sight the accounts of the organs in question given by these two observers seem entirely irreconcilable. Williams's description of them is as follows:—"They appear under the character of pyriform tubuli commencing or ending in a single external orifice. Internally they are lined by a ciliated epithelium, the cilia being large, dense, and acting with great force and vigour. The current raised by these cilia sets up on one side and down on the other. The ciliary epithelium ceases at the point where the primary branches divide. All the rest of the organ is unciliated and filled with the reproductive products. This part is elaborately branched,—the branches as formerly stated, twining round the diverticula of the stomach. * * * The individual tubes are bridled on one side and grandular on the other."‡

"The author thinks it probable that if the roots or attached ends of these organs could only be followed through the integuments to their extreme outlets they would be found to divide into two limbs, an ingoing and an outgoing; a fact which would account for the clearly divided ciliary currents as they are seen in the dilated portions of the organs. If this fact of the bifurcation of the tube were clearly determined, there would be no difficulty whatever in connecting the segmental organs of

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* Die Borstenwürmer, p. 107.

† The words are "Ich zweifle nicht dass Williams die Segmentalorgane nur unvollständig, die Bildungsstätte der Geschlechsproducte überhaupt gar nicht gesehen hat."

‡ "On the Segmental Organs of Annelids," Phil. Trans. 1858.

Aphroditea with their homologues in the typical Annelids. In the absence of *proof*, however, upon this point, they must be described as commencing in a *single tube*, the internal extremity of which divides into a numerous system of branches. None of these branches communicate openly with the cavity of the body."

I have not had the apportunity of dissecting any fresh or well-preserved specimens of *Aphrodita*, but the above account is stated by Williams to apply also to the arrangement of the segmental organs in *Polynoë*, and I find the arrangement in that genus so totally different from that described by Williams, that I have been led to an explanation of Williams's observations and figures which at least reconciles them with what I find to exist in those *Polynoidæ* in which I have worked out this point. In the first place it is to be noted that Williams gives no clue to the position of the external orifice; he admits in fact that he had not been able to follow the canal through the integuments. In the second place, in the figure which he gives of the alimentary canal and supposed segmental organs in *Aphrodita* (l.c., pl. viii., fig. 26) he either has omitted altogether a portion of each intestinal cæcum, or, as I incline to believe, has represented it as the segmental organ. In the third place the figures which he gives of the segmental organ (fig. 27) of *Polynoë* resemble very closely the intestinal cæca in some species of that family when invested by the developing ova, and the position of the orifices relatively to one another and to the middle line answers very well to the position of the apertures of communication of the cæca with the intestine. Further it has to be observed that, were Williams's account to be accepted, we should be obliged to admit that the segmental organs and sexual glands of *Aphrodita* and *Polynoë* are framed on a type *totally unlike* that observed in any other Annelide; he represents the former as complexly branched tubes, not opening into the perivisceral cavity, but opening externally, and the latter as being situated in the interior of the former; whereas in other Annelides the segmental organs are unbranched, and nearly always open internally into the cavity of the body, and the sexual products are developed in the body cavity by a sort of germination of the lining membrane. Moreover I have found in these species of *Polynoina* whose structure I have specially studied segmental organs not markedly different from those of other Annelides, and sexual glands having the normal relations. It will therefore not be inadmissable to suppose that Williams's representation of these structures must have been founded in some way or other on erroneous inferences. It seems to me most probable that what Williams took for the segmental organ was a part of the dorsal branched portion of the intestinal cæca, and that his ciliated efferent duct was the ciliated neck of communication between the cæcum and the intestine. The intimate manner in which the ovaries are related to those cæca would help to account for this. When he states positively that the ova are most clearly seen in the interior of the branching tubuli, it is evident that he had mistaken the yellow cells for young ova; what he figures as spermatozoa do not at all resemble the spermatozoa of the *Polynoina* which I have studied, and here too there may have been a wrong deduction. Be this as it may, it is perfectly conclusive as shewing that William's descriptions, whatever be their precise explanation, are erroneous, that the fully developed sexual products both in *Aphrodita* and *Polynoë* are found floating freely in the perivisceral fluid, which could not be the case were they formed in the interior of cæcal tubes opening only on the exterior.

While there is some difficulty in explaining Williams's statements on this subject, Ehlers's description and figure on the other hand are so clear as to leave no doubt at all as to the nature of the error into which he has fallen. In describing the anatomy of *Polynoë pellucida* he states* :—" Segmentalorgane habe ich vom zweiten Segmente an in allen völlig ausgebildeten Segmenten

* L. c., p. 116.

gesehen. Ihre Lage haben sie im Hohlraume des Elytrenträgers und des Basalstückes des Rückencirrus und ragen von da in den Segmentalraum unter die Haut der Rückenfläche hinein. Der wesentliche und grosste Theil des Segmentalorganes (Taf. iv., fig. 3) ist ein fast die ganze Höhlung des Elytrenträgers oder Basalstückes des Rückencirrus einnehmender Sack, dessen Wand in sehr unregelmässiger Weise zu halbkugeliggeformten Ausbuchtungen vorgewölbt ist. Ich maas als grösste Längsdehnung dieses Sackes 0.55 mm. bei einem Dickendurchmesser von. 0·3 mm. Dieser Sack setzt sich in den Raum des Segmentes hinein mit einer cylindrisch ausgezögenen Verdünnung, dem Halse des Segmentalorganes, fort. unde auf dem ende dieses Halses der unter der Rückenwand des Körpers liegt, steht umgeben von einem etwas aufgewulsteten Rande die innere Öffnung des Segmentalorganes, an denen Eingange hier ein kıanz von Kurzen Wimperhaaren in lebhaft rädernder Bewegung ist. Der Durchmesser dieser inneren Öffnung betrug in einem Falle 0·027 mm., in einem anderen 0·11 mm., Unterschiede welche vielleicht auf Rechnung eines wechselnden Cotractionszustandes zu schieben sind. * * Ich habe bereits erwähnt dass auf der Oberfläche des Elytrenträgers Wimperrosetten in verschiedener Anordnung vertheilt seien, das gleiche gilt vom. Basalstücke des Rückencirrus. Diese Wimperrosetten stehen um kreisförmige Öffnungen, die äusseren Mündungen des Segmentalorganes; denn cylindrische Röhren gehen von der Oberfläche des Sackes ab zur Wand des sie bergenden Gliedes, durchbohren diese und münden dann an den mit den Wimperrosetten ausgezeichneten Öffnungen." * * *

"Die Wand des Segmentalorganes ist ziemlich dick, zumal im Halse; in den vörderen Körperringen war sie meist hell und farblos, in den hinteren bekommt sie dagegen im Sacke selbst eine gelbe Pigmentirung, indem hier auf ihrer Innenflache so gefärbte Kugeln einer Kornigen Masse von 0·0216 mm. Durchmesser aufgelagert sind; die Wand des Halses wie der Ausführungsgange war auch hier farblos und hell. Eine wichtige

Erscheinung beobachtete ich an dem Sacke, das ist seine Contractilität, welche vielleicht durch Elemente musculoser Natur, die der Wand eingebettel sind, veranlasst wird * * * In einem Falle bestand der Inhalt der Segmentalorgane aus blasenähnlichen Körpern, von 0·012—0·024 mm. Grösse, die fettartige Körnchen enthielten; sie bildeten an der Innenfläche des Sackes eine ungleichmässig vertheilte Masse, die bei auffallendem Lichte weiss aussah."

Two species of *Polynoë* which occur in Port Jackson—viz., *P.* (*Antinoë*) *præclara* and *P.* (*Antinoë*) *Wahlii*—seem to be near allies of *P.* (*Antinoë*) *pellucida.* In these the intestinal cæca (Pl. vi., fig. 1.) consist of a ventral portion, which is a rounded non-contractile sac, and a dorsal portion which is contractile, sometimes with a regular rhythm, and is also undivided externally (though internally partitioned), but presents rounded elevations of its outer wall. The latter portion occupies the cavities of the scale-tubercles, the bases of the dorsal cirri, and the bases of the parapodia. They are found from the second segment backwards, though not in all the segments of the anterior region of the body. These cæca are connected with the alimentary canal by a ciliated neck, which is very long in the anterior segments and very short behind, and the opening into the alimentary canal is funnel-shaped and thickly ciliated. The cæca are connected with the walls of the parapodia by bands of muscular fibres. In the anterior segments they are almost colourless; behind their walls are of a bright golden yellow owing to their containing numerous yellow cells.

Ehlers' drawing (l. c., taf. iv., fig. 3.) is a very faithful representation of one of these cæca as seen in *Polynoë præclara* save that the internal orifice of the supposed segmental organ is represented as opening into the body-cavity instead of into the intestine, and the bands of muscular fibres connecting the cæcum with the walls of the parapodium in the neighbourhood of the rosettes of cilia are represented as canals leading from the cavity of the cæcum to the exterior.

The true position of the segmental organs of *Polynoë* is very different from this. On the ventral surface of the body close to the base of each parapodium is a smooth elevation, the integument of which is very richly provided with vermiculate and flask-shaped subcuticular glands. At the posterior and external angle of this elevation is a process, the ventral tubercle. The only statement which I have met with regarding the nature of this tubercle is a conjecture by Prof. Huxley (*Anat. of Invert.* p. 231), that it may possibly be connected with the reproductive function. It is of varying shape; in some species short and vase-like with longitudinally folded walls; in *Antinoë præclara*, *A. Wahlii* and *Thormora argus*, in which I have studied it more specially, it is a cylindrical, smooth, cirriform process, sometimes a third of the length of the ventral cirrus. It is traversed by a canal with dilatable ciliated walls, which opens at its extremity either by a rosette of several mouths or by a single orifice. This canal is continued from the base of the process inwards and slightly forwards and ends in the body cavity at some distance from the middle ventral line. The walls of this inner portion of the canal are glandular and contain reddish-yellow bodies, some of which may, on the application of slight pressure, be seen to pass out through the external aperture. These bodies are of a quite different appearance from the concretions observable at the bases of the tentacles and cirri, they are clearer, browner and seem to be semifluid. Of the form of the internal extremity of the canal I did not succeed in satisfying myself; but there is no doubt that it opens freely into the perivisceral cavity. I found in one specimen spermatozoa in the act of being discharged through this canal. They passed along the canal by the action of the cilia in considerable numbers, and were driven into the outer portion, which became in some cases slightly distended with them, and passed gradually out at the external orifices. In the female the processes are shorter, and their aperture simple and wider than in the male. I have never succeeded in finding ova in the act of being discharged, but there can be no doubt that they pass out by the same channel as the spermatozoa. The ova are extremely viscous and very readily pass under the influence of a slight pressure through an aperture much smaller than their ordinary diameter. As already noticed, the ova in *Polynoë* undergo the earlier stages of their development on the dorsal surface of the mother under the protection of the elytra. In specimens of *Antinoë præclara* with matured sexual elements, the ventral border of the base of the parapodium was provided with a line of very long cilia, which curved round to the base of the ventral tubercle and acted in such a manner that anything that might be discharged through the ventral tubercle must have been driven upwards towards the dorsal aspect; both sides of the fissure between adjacent parapodia were likewise clothed with similar, though shorter cilia, the action of which was such as to receive and carry upwards to the cavity beneath the elytra any light objects driven within their reach by the first set. The object of this arrangement would seem to be to carry upwards the ova, when discharged, to the shelter of the elytra.

Apertures have sometimes been described as occurring in the walls of the parapodia in *Polynoë*, and through these it has been supposed that the sexual products are discharged. Such apertures do not occur in any species I have examined for them; short rows and rosettes of cilia often occur; these are always set in recti-linear or circular slits in the cuticle—the cilia being prolongations of the subcuticular layer—and in the case of the rosettes this may produce the appearance of circular apertures. I can only speak with certainty, however, of the absence of these apertures in the species I have examined, during the breeding-season; it may be that at that time apertures which exist at other seasons are closed to prevent the sexual products from escaping by any but the proper channels and thus being lost.

But, however this may be, it is not of very much consequence to the present question, namely, the true position and relations of the segmental organs.

As regards the position of the sexual follicles: in *Thormora* and *Polynoë* I have found the ova to be developed in the bases of the parapodia around the intestinal cæca, and the muscular bands passing from the latter to the body-wall, or along the middle ventral line around the ventral vessel. A representation of the developing ova is given in plate vi., fig. 5. They arise from nuclei formed in a membrane covering those parts, which membrane seems to be merely a modified portion of the peritoneum, and probably these "ovaries" are only temporary structures, and not to be detected save during the season of sexual activity. The matured ova when set free float freely in the fluid of the perivisceral cavity and afterwards collect into clumps, two in each segment, situated a little internally to the bases of the parapodia. Such as fail to be discharged subsequently undergo a process of degeneration, lose their full, rounded contour, become crenated or mulberry-like, and probably finally become broken up and absorbed.

The spermatozoa are formed in follicles which are situated, like the ovaries, either along the middle ventral line of the body (pl. vi., fig. 3) or around the intestinal cœca. Each follicle in *Polynoë præclara* is a lobed mass situated in the interval between two segments; along the axis of the follicles runs the ventral pseudohaemal vessel; in *Thormora argus* they are vermiform bodies situated between the branches of the gastric cæca in the lateral portions of the perivisceral cavity. The spermatozoa themselves are rod-like with a slightly thickened head in *Antinoë*, oval in *Thormora argus*. Further observations are necessary for a thorough understanding of the mode of development of these and of the ova.

The Intestinal Cæca.

These correspond in number with the segments, except that some of the anterior segments are commonly devoid of them, and a few of the posterior cæca are usually rudimentary. On account of the presence of the elongated gizzard, the cæca corresponding to the anterior segments are connected with the front portion of the intestine by greatly elongated necks, and thus assume a different form from that displayed by the rest. Taking one of the cæca from the middle of the intestine we find it to consist (1) of a narrow neck, (2) of a dorsal portion, and (3) of a ventral portion. The neck communicates with the cavity of the intestine by a funnel-like aperture, immediately around which the intestinal cilia are much longer than elsewhere. It is ciliated internally, and is subject to peristaltic contractions synchronous with those of the dorsal portion of the cæca. In structure its walls resemble those of the intestine. The neck leads into the dorsal portion of the cæcum, which winds round behind the dorsal muscles, and ends in close relation to the dorsal integument. From this opens the ventral portion, which bends downwards towards the ventral body-wall. This ventral portion is never branched; its walls are similar to those of the intestine, and it is usually found to be distended with opaque matter—evidently food undergoing the process of digestion. The dorsal portion is in some genera (*Aphrodita and Iphione*) complexly branched—the terminal branches being lodged in the interior of the scale tubercles and the bases of the dorsal cirri. In other forms (*Thormora*), it is simply divided into two or three branches, and in others (*Polynoë*), it is practically undivided, presenting merely irregular elevations. (pl. vi., fig. 1.)

When simple and sac-like the dorsal cæcum is divided internally by incomplete septa, which are prolongations inwards of the wall of the cæcum, consisting of muscular and connective tissue, with a few spindle-shaped nuclei. The interior of the cæcum is lined here and there with "hepatic cells." These are large spherical or oval cells with a delicate but distinct cell-membrane and golden-yellow, oil-like contents, with a nucleus, or, more frequently, two or three. It seems very likely that there is a delicate cuticle lining this layer of cells internally, but I have not been able to demonstrate it; it must be very delicate, as a very slight pressure is sometimes sufficient to cause the yellow cells to break loose into the cavity of the cæcum, and pass along into the intestine.

Among these yellow cells are a number of cells (pl. vi., fig. 2.) of about the same size, but of a very different character. Each consists of a delicate, transparent cell-wall, enclosing a varying number of smaller cells, each of which again consists of a delicate transparent sac enclosing a spherical green body, which varies in size in different cells, but is always considerably smaller than the enclosing sac, leaving around it a transparent space. The central green corpuscle appears homogeneous, and may be of an oily nature. The nature of these cells remains somewhat doubtful; but they are most probably early stages in the development of the yellow cells. They usually occur distributed pretty regularly among the yellow cells, so as to produce an appearance of dark mottling in the otherwise yellow cæca. More rarely they are so numerous as to give the whole cæcum a dark appearance.

The principal functions of dorsal portion of the cæca are undoubtedly secretory; they are to all intents and purposes secreting glands, never being found to contain food-particles. The secretion consists of the contents of the yellow cells, and is driven out by the action of the cilia and by the peristaltic contractions to which the cæca are subject. The ventral portions of the cæca are most probably the principal seat of the digestive and absorptive processes; the tube of the intestine itself is seldom found to contain food in specimens that have been kept for a short time in clean water.

Eisig* has recently published an interesting and thorough account of what he calls a swimming-bladder-like organ in the *Hesionidæ* and *Syllidea.* In his account of the homologous structures in other groups he makes no allusion to the cæca of the *Aphroditacea;* but the closeness of the correspondence between the latter and the organs which he describes leaves no room for doubt that they are homologous, and to some extent, analogous structures. Eisig † regards the principal function of the "swimming-bladder" as being to store up the oxygen separated from the sea-water by the intestine and to serve it out as required. The forms in which he regards this intestinal respiration, with the presence of air-bladders as storehouses for the oxygen, as being best marked are also, he points out, forms in which there are no branchiæ; they have, however, a specially well-developed vascular system, and in this respect present a contrast to most *Aphroditea.*

The chief circulatory medium in the *Aphroditea* is the perivisceral fluid — the pseudohæmal system being but slightly developed. The circulation of the former is very actively kept up by the energetic action of the numerous long cilia in the cavities of the parapodia. This active circulation would seem to show that in this family the perivisceral fluid serves not only as a passive supporting "connective fluid," but is the chief medium through which the gaseous interchanges involved in respiration are brought about; and this view of its function is strengthened by the fact that gills in the sense of delicate processes of the body-wall supplied by vessels of the pseudohæmal system are, (except perhaps in *Sigalion*), entirely absent. The tubercles which bear the scales, together with certain elevations which occur in some genera in a corresponding position on the segments which do not bear scales, have not uncommonly received the name

* "Ueber das Vorkommen eines schwimmblasenähnlichen Organs bei Anneliden. Mittehilungen aus der Zoologischen Station zu Neapel," Band II., pp. 225-304, pls. xii.-xv., (1881).

† L. c., p. 286.

of "branchiæ." Here the integument is usually rather thinner than in other parts, and is often free from pigment; in *Aphrodita* and *Iphione* it is perfectly transparent. These tubercles are occupied, as already described, by the terminal portions of the dorsal cæca, which curve round above the dorsal muscles, so as to lie in close contact with the integument. The peculiarity of this arrangement was remarked upon long ago by Williams.* He remarks that the perivisceral fluid must be the chief medium for the conveyance of oxygen to the tissues, and expresses the opinion that the object of the peculiar arrangement of the cæca is to bring about more effectually the oxygenation of their contents, which are then, in *Aphrodita*, absorbed by the vessels of the true vascular system. The contents of the cæca in that genus he describes as consisting of a greenish chyle. Quatrefages has put forward a similar theory as to the function of the cæca, and classes the *Aphroditea*, as regards their mode of respiration, with the *Œolidæ* and *Cœlenterata* as "phlebentèriens." In *Polynoë*, in which the relationship of the dorsal portion of the cæca to the integument is by no means so close as in *Aphrodita*, in which the integument of the dorsal tubercles and bases of the parapodia is not in any marked degree thinner than that covering the rest of the body, and in which there is no special arrangement for driving a current of water over the dorsal surface, it is probable that the process of respiration, though taking place in part through the external skin, is also partly carried on by some other means. It seems highly probable in fact that we have here another instance of intestinal respiration, and it is quite possible that the dorsal cæca may act, as the swimming-bladder is supposed to act by Eisig, as a reservoir for oxygen or oxygenated water, or may themselves act as respiratory organs. I have never found these cæca to contain free gas, though bubbles may occasionally be found in the intestine itself, so that it does not seem likely

* British Annelida, Report of the British Association, 1851, p. 200.

that the cæca possess the hydrostatic functions ascribed to the swimming-bladder of *Hesione.*

The Pseudohæmal System.

The principal trunks of a pseudohæmal system were observed by Treviranus in *Aphrodita,* and the vessels in that genus were also noticed or described by Williams, Quatrefages and Selenka. In the *Polynoina,* however, Claparède states that vessels are altogether absent, and this statement is confirmed by Huxley (Anat. of Invert.) as regards *Polynoë squamata.* I have found a pseudohæmal vascular system in five of this family, viz.:—*Antinoë Walii,* Kinberg, *Antinoë præclara,* mihi, *Antinoë ascidiicola,* mihi, *Polynoë ochthæbolepis,* mihi, and *Thormora argus,* Baird. It presents dorsal and ventral contractile trunks, the former, which is rather the larger, running along the middle line close under the dorsal integument as far as the posterior termination of the retracted gizzard; the latter lying close above the nerve-cord and running in the axis of the testicular or ovarian follicles, when these are present.

In *Antinoë præclara* the dorsal vessel turns over to the left, opposite the hinder end of the retracted gizzard and runs forward parallel with the left border of the latter till it reaches the head where it turns in again towards the middle line. The direction of the peristaltic contractions is from behind forwards in the dorsal vessel. Both dorsal and ventral vessels give off lateral transverse branches corresponding in number to the segments. All the vessels, even the principal trunks, have extremly delicate walls and their contents are perfectly colourless, and these characteristics may account in many instances for the failure to detect their presence. In one case I observed in the fluid amorphous, transparent, colourless corpuscles. In *Thormora argus,* which possesses a very opaque integument, through which no trace of vessels can be seen, transverse sections reveal the presence of pseudohæmal trunks; and it is not unlikely that a careful investigation will reveal their presence in most, if not all, members of the family.

B. Classification.*

Fam. APHRODITACEA.

Genus Aphrodita, Linn.

Aphrodita australis.

Aphrodita australis, Baird, P.L.S., vol. viii., p. 176.

Body ovate, oblong, $3\frac{1}{2}$ to 4 inches long, and from $1\frac{3}{4}$ to 2 inches broad, narrower posteriorly, convex on the back, which is covered with a thick felty substance, consisting of a thinnish membrane and numerous fine hairs matted together, concealing the elytra; head-lobe small; tentacle very short; palpi of considerable length, yellowish. Feet-bearing segments of body 42, feet 42 pairs, biramous, ventral branch strong and much corrugated, obtusely rounded at extremity, inferior cirrus rather strong and of considerable size. Bristles of this branch strong, of a bronzed colour, simple, disposed in two fascicles, of which the inferior are short and lighter coloured, the superior much stronger and not numerous. Upper or dorsal branch of feet furnished with two fascicles of bristles: the lower consisting of very numerous, simple and slender hairs, presenting, as in *A. aculeata*, an iridescent fringe along the sides, but not nearly so beautiful as in the European species, being more of a bronzed metallic hue. The upper fascicle of bristles penetrate the felty covering, and lie down on the back. They are very long, each being at least 14 lines in length. They are of a pale colour with a slightly metallic hue, become slender at the extremity and are simple. The dorsal cirri are stout, setaceous and white. The ventral surface of the animal is brownish and rough, with very numerous, small points or projections. [*Baird.*]

Port Lincoln; Port Stephens; Port Jackson; Tasmania.

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* The arrangement followed is that of Kinberg.

This species is, as remarked by Dr. Baird, the representative in Australian seas of the European Sea-Mouse *(Aphrodita aculeata)*. I have only had the opportunity of dissecting one specimen of this species, and that a very old spirit-specimen; but there seems to be little, if any, material difference in the internal structure. The form and arrangement of the intestinal cæca, the enclosure of the dorsal portions in the transparent dorsal tubercles, forming the so-called "branchiæ," and the structure of the nerve cord are precisely similar.

The Australian Sea-Mouse does not seem to be by any means so common as its European congener; but this may be due to the operation of trawling not being carried on by Australian Fishermen, as the majority of the specimens obtained on the English coast are got by this means, or from the stomachs of fishes obtained by deep sea-lines.

Aphrodita Terræ-Reginæ, *sp. n.*

The body of this species presents 38 segments, elytra being present on the first, third and every alternate segment. The head is small and covered by the front pair of scales. The tentacles are about $\frac{1}{4}$ of an inch in length, smooth, tapering. The scales are delicate, semitransparent and covered by a thick matting of felted hairs. The dorsal cirri are very long and slender; the ventral very short, tapering, not reaching to near the extremity of the ventral setæ. The ventral surface is minutely tuberculated. The ventral setæ are about half a dozen in number in each parapodium, brown, short, rather stout, slightly curved at the tip without serrations or teeth. The dorsal setæ are very yellow, stout, rather flexible, about $\frac{1}{4}$ of an inch in length, straight and unarmed.

Dredged near Cape Flinders, Northern Queensland, at a depth of a few fathoms.

Genus Hermione, Blainv.

Hermione brachyceras *sp. n.* (Pl. VII., figs. 1—3.)

In this species the setiferous segments are 32 in number and the elytra 15 pairs. The præstomium is small and the mesial tentacle is a very short and stout process; the buccal tentacles on the other hand are very long, geniculate, cylindrical and tapering; around their bases are a series of short processes. The first body-segment has a small parapodium with short setæ and a long slender ventral (tentacular) cirrus. The neuropodia and notopodia are distinct, the former are long and narrow, the latter much shorter and wider; and the ventral cirri are very short. The notopodia, as in most species of the genus are divisible into two sets in accordance with the arrangement of the setæ; in the second, fourth, and every alternate segment the setæ are few, $\frac{3}{16}$ths of an inch in length, pointed at the extremity and provided with a double row of obscure serrations; in the third, fifth, and every alternate segment the setæ are much more numerous, and are arranged in two series, of which the inner, to the number of six, lie flat on the scales, while the outer, to the number of about a dozen, are directed upwards and backwards, and are quarter of an inch in length; the setæ on the second set of parapodia are pointed and mostly provided with a double series of conspicuous barb-like teeth; a few, however, are simple and very slender. The ventral setæ, which are only three in number in each parapodium, are stout, nearly 1-10th of an inch in length, bifurcate near the extremity, one branch being short and broad, while the longer branch bears a denticle near its apex. The elytra are delicate, colourless and translucent. The ventral surface and the parapodia are papillose. The length is $\frac{7}{8}$ths of an inch, and the breadth $\frac{1}{4}$th of an inch.

One specimen of this species was obtained on a coral reef in Port Molle, Whitsunday Passage, during the surveying cruise of H.M.S. "Alert." Its nearest ally appears to be *H. Mathei* of Quatrefages from the Isle of France.

Hermione Macleari, *sp. n.*

The head of this species is small and entirely concealed by the anterior scales and dorsal setæ. The mesial tentacle is small, very slender, and has a slight enlargement near the extremity, followed by a thin tapering apical portion which again ends in a very slight knob. The buccal tentacles are about twice the length of the mesial, and of similar shape. The body consists of 39 segments, with 14 pairs of elytra. There are no barbed setæ on the parapodia. The dorsal setæ are 15 to 23 in number in each parapodium; they are long, slightly arcuate, trigonous, with a series of denticles on each border, and are arranged in a radiating manner round the apex of the notopodia, the inner ones nearly meeting those of the opposite side across the back. In addition to the setæ the notopodia are provided with a small quantity of flax-like hair. The ventral setæ are four or five in each parapodium, short, bifurcate near the tip, one branch being very short. The ventral cirri are very small, with a scarcely perceptible enlargement a little beyond the middle, followed by a thin terminal portion. The dorsal cirri are larger than the ventral, but of a similar form. The scales are delicate and colourless.

Port Molle, 14 fathoms.

Hermione (Aphrogenia) dolichoceras, *sp. n.* (Pl. VII., figs. 4—7.)

The body contains 35 segments bearing setæ. The head has a very prominent facial tubercle covered with papillæ; the mesial tentacle is broken off near the base, on each side of which is a prominent subspherical eye. The buccal tentacles are extremely long, about a fourth of the length of the body, tapering, non-ciliated. The first pair of parapodia have a few hair-like setæ; the ventral cirri of this segment are longer than the dorsal, about $\frac{1}{5}$th of the length of the lateral tentacles, with a club-like apex; the dorsal cirri are slightly dilated near the apex, which is acute The dorsal cirri of the remaining pairs of parapodia are very long, as long as the breadth of the body, slightly dilated near the apex;

the ventral cirri are very short. The scales are delicate, colourless and semitransparent. The dorsal setæ are partly filiform, partly curved and simple; one or two of them are straight, with harpoon-like teeth near the apex, three on one border and four on the other. The ventral setæ are two in each parapodium, abruptly bent near the apex, with a strong, pointed tooth opposite the bend, and two smaller teeth and a fringe of hairs in the apical portion—the apex acute, slightly hooked. The length is three-quarters of an inch.

Port Molle, 15 fathoms.

This species differs from *Aphrogenia alba* of Kinberg, (Eugenies Resa, p. 6, pl. ii., fig. 6.) which it rather nearly resembles, in the much greater length of the lateral tentacles and of the dorsal cirri, and the presence of harpoon-like dorsal setæ.

Genus Triceratia, (*nov.*)

Similar to *Hermione*, but with three tentacles on the præstomium and without barbed setæ. Scales covered with a layer of felted hairs.

Triceratia aræoceras, *sp. n.* (Pl. VII., figs. 8—13, and Pl. VIII., figs. 1 and 2.)

The body presents 42 segments bearing setæ. The præstomium, which is completely concealed by the scales, is very small and bears three long and extremely slender tentacles, the middle one longer than the lateral, all three with a slight swelling near the extremity. The peristomium is not distinct, but has a pair of long and stout tentacles ornamented with minute papillæ. The first segment of the body has a bunch of flax-like hairs on the rudimentary parapodia, and slender dorsal and ventral cirri. The neuropodia and notopodia of the following segments are distinct; the former have four stout brown setæ, $\frac{1}{16}$th of an inch in length, bifurcate at the extremity, one branch being very short and tooth-like. The dorsal setæ are partly directed upwards and outwards, and partly lie flat on the scales; they are stout, $\frac{1}{100}$th of an inch in breadth, slightly arcuate, pointed, and ornamented with several rows of distant minute tubercles; to the inner aspect of the notopodia is attached the hemp-like hair which covers the scales. The ventral cirri are very small, and consist of a thick proximal, and a slender distal portion. The surface covered with minute papillæ. The scales are very delicate and semitransparent. The total length is about an inch, the breadth about a $\frac{1}{4}$ of an inch.

Two specimens of this species were obtained with the dredge at a depth of 15 fathoms in Port Molle. One of these I dissected, and noted the following peculiarities:—

There are no teeth, but otherwise the œsophagus and the major portion of the muscular gizzard (pl. viii., fig. 1) very much resemble those of *Polynoë*; the epithelium (pl. vii., fig. 11) consists of cells filled with granular material, having a tolerably broad base where they abut on the cuticle, but tapering externally into a slender thread; between those slender external prolongations of the epithelial cells are a number of irregularly arranged nuclei and pigment granules. Towards its posterior end the crop becomes much narrower, and the epithelial lining becomes thrown into a series of regular ridges, presenting the appearance shewn in fig. 12, the ridges being separated by furrows in which the epithelial lining is very thin; the cells constituting those ridges (fig. 13), are much longer than in the epithelium of the anterior portion of the crop, but present the same general characters. The anterior portion of the intestine is very wide, and the hinder portion of the crop is completely embraced by it for a little distance. The rest of the intestine, however, is a narrow tube giving off complex cæcal appendages. The cæca (pl. viii., fig. 2) which are given off from the dorsal aspect of the intestinal tube, and begin in the second or third segment, have a long narrow neck, giving off numerous branches, each of which ends in a slight dilation filled with "hepatic" cells.

Fam. IPHIONEA.

Genus Iphione, Kinberg.

Iphione ovata.

Iphione ovata, Kinberg, Oefvers Vet-Akad Förh., 1855, p. 383, and Fregat. Eugen. Resa, p. 8, tab. iii., figs. 8, 8a—8e; Quatrefages, l. c., p. 269; Baird, l. c., p. 181.

Antennæ and cirri ciliated, cylindrical, with a long attenuated apex; bases of the antennæ longer than the cephalic lobe; antennæ shorter than their bases and the cephalic lobe; elytra free from cilia on the margin. Body 12 mm. in length and 7 in breadth, convex above, robust. Eyes placed in the postero-external part of the cephalic lobe; buccal cirri long, half the length of the palpi. Elytra reticulate, the areolets in turn with hexagonal reticulations, obliquely reniform, the outer part broader, minutely tuberculous. Feet uniramous, the dorsal and ventral setæ of the same length. Dorsal cirri short, scarcely longer than the setæ, cylindrical with a long subulate apex; ventral cirri styliform, reaching the apex of the feet, sparsely ciliated. [*Kinberg.*]

A species of *Iphione* very common on coral reefs on the coast of Queensland is seemingly the *I. ovata* of Kinberg. There are a few points of discrepancy between my specimens and the descriptions and figures in the "Voyage of the Eugènie," but they are not of great importance. Thus the thin terminal portion of the outer peristomial tentacles is not nearly so long in my specimens as in Kinberg's figure, and the reticulations on the scales (which are formed of beaded lines) are not nearly so large. I obtained specimens of this species from Port Curtis, Port Molle, Port Denison, and Thursday Island. It was found at Honolulu during the voyage of the Eugènie.

The dorsal tubercles in this species are transversely elongated, and the integument covering them is thin and transparent. The mouth leads into an eversible œsophagus, the walls of which in the retracted state, are longitudinally folded. Following upon this is the powerful muscular gizzard, which is armed with teeth very much resembling those of *Polynoë*. The intestinal cæca are branched, and though more complex, very much resemble those of *Polynoë* in structure. The ventral ganglionic chain does not present distinct dilatations, but remains, as in many of the order, of tolerably uniform diameter throughout; the cord itself is surrounded by a layer of large ganglion-cells which are not confined in ganglia, but run along the whole length of the cord; here and there they may be seen to give off processes into the interior of the cord.

Iphione fimbriata.

Iphione fimbriata, Quatref., l. c., p. 271.

Head very small, covered. Antennæ long, dilated towards the apex. Inferior tentacula very stout, very long; upper long, only bifurcate towards the apex. Body composed of 28 rings. Elytra 26; first small, rounded; rest moderate, scarcely decussated in the middle of the back, not reniform, fimbriated on their whole external margin. Upper antennæ very long. Cirri with subulate apices. [*Quatrefages.*]

Torres Straits, [Paris Mus.]

Fam. POLYNOINA.

Genus Thormora, Baird.

Thormora Jukesii.

Thormora Jukesii, Baird, l. c., p. 199.

Animal about 1½ inch long, rather more slender at the anterior extremity, elongated, and of a very dark colour. Antennæ and tentacla nearly of the same length, incrassated a little below the apex, where they suddenly become produced to a fine slender point. Palpi longer than antennæ or tentacle, conical at the base, setaceous at the point. Buccal cirri of about the same length as the palpi, and, like the antennæ and tentacle, incrassated below the apex, and terminating suddenly in a sharp slender point. Elytra 12 pairs, but apparently small, and leaving the middle of the back and lower portion of the body uncovered. They are of a rounded form, tuberculated on the surface, and ciliated on the external margin. The feet are stout, biramous. Bristles of ventral branch stout, of a yellow colour, somewhat curved near the apex, and a little below the point strongly serrated and striated across. The fascicle of bristles springing from the dorsal branch is composed of two kinds—one numerous, slender when compared with those of ventral branch, straight, acute at the point, and very finely serrated on both sides; the other, slender hairs, longer than the others, very numerous and quite smooth, appearing like a brush of fine hairs intermixed with the bristles. The dorsal cirri are, like the antennæ, incrassated below the apex, and ringed with black, and terminating suddenly in a fine slender point. Ventral cirri of feet setaceous, and reaching nearly to the apex of the ventral branch of the foot. Anal cirri stout, and of the same structure as the dorsal.—[*Baird.*]

The locality of this species was uncertain but it was supposed probably to have been obtained in New Zealand or Australia.

Thormora argus. (Pl. VIII., figs. 5—12.)

Polynoë argus, Valenciennes; Quatrefages, l. c., p. 247.

Head small, subquadrate, covered. Middle antennæ long, nearly twice the length of the lateral ones. Tentacles very thick, conical, longer than the antennæ. Body composed of 26 thick, broad segments. Elytra (12 pairs) of moderate size, the anterior decussate and imbricate; median and posterior (?) scarcely imbricate, not decussate, rounded, very slightly tuberculated, not fimbriated. Cirri rather long. Appendages, with the exception of the tentacles and inferior cirri, tumid near the acute apex. [*Quatrefages.*]

Port Western.

This species is placed by Quatrefages in his second "tribe" of *Polynoë*, characterised by having the middle of the back not covered by the elytra. He makes the following additional remarks on the species :—"This species is 32-33 mm. in length. Its head is small, nearly square. The median antennæ, long and nearly cylindrical above the basilar portion, is nearly twice as long as the lateral. Both are dilated near the apex. The inferior tentacles are very thick, longer than the median antenna, and simply conical, without terminal dilatation. The body only contains 26 segments, the last being quite rudimentary. The posterior extremity bears four elongated cirri, similar to the median antenna, and proceeding from the two last segments. The other segments of the body are thick and broad. The 2—3 first are entirely covered by the elytra which then become separated behind on the middle of the back, which is naked in all its median portion. It ought to be nearly the same behind to judge from the size of the elytra which remain in the two specimens that I have examined. These elytra are rounded, a little oblong. Their surface is covered in part with small tubercles which are elongated now and then in front into cylindrical mammillæ. There is no trace of fimbriæ."

"The feet are short and thick; the setiferous mammillæ very distinct. The notopodium bears a bundle of numerous, long, curved, smooth, light coloured setæ, directed outwards. The neuropodium has a bundle of less numerous, straight, strong, blackish-brown setæ, of which the extremity is expanded into a curved spatula with strongly denticulated borders and a simple, straight point. The dorsal cirrus is longer than the feet. It is dilated like the antennæ near its extremity. The ventral cirrus, which is very short but thick, is placed near the middle of the ramus."

A species extremely common between tide-marks in Port Jackson is probably the same as that above described.

The ventral setæ in this species (figs. 5 and 6) are 25-30 in number, stout, and of a form very common among the members of this genus; the terminal portion of the seta, namely, is bent back on the rest at a very obtuse angle, and is armed from the bend to near the apex with two rows of slender spines, about a dozen in number in each row, the last being larger than the rest. The dorsal setæ are much more numerous than the ventrals, are about ⅓rd of the thickness of the latter, nearly straight, with an acute apex, and some smooth, while others are ornamented with numerous transverse rows of exceedingly minute spinules. The elytra are dotted here and there on their upper surface with larger and smaller hollow ciliated processes (fig. 8). The præstomial tentacles are nearly always subequal, but vary somewhat in this respect; they and the peristomial tentacles and cirri are ornamented with brown bands.

This is the commonest species of the order in Port Jackson. It is found among beds of mussels both between tide marks and, more rarely, in deeper water. It is of very sluggish habits, and is incapable of voluntarily parting with its elytra, which, when at rest, it habitually holds in an oblique position well off the dorsal surface.

I was at first disposed to identify the species which I here refer to *T. argus*, with *Lepidonotus oculatus* of Baird, but the latter is placed by Baird in the genus *Lepidonotus*, and a distinct genus created for those species which differ, like the above, from the typical species of *Lepidonotus* in having the elytra small and not overlapping across the middle of the back; in other points *L. oculatus* and *T. argus* seem nearly related.

A specimen of what seems to be a variety of this species (figs. 9—11) was dredged by me at Griffiths' Point, Western Port. It differs slightly from the Port Jackson form in the shape of the ventral setæ and other minor points.

Genus Lepidonotus, Leach.

Lepidonotus oculatus.

Lepidonotus oculatus, Baird, l. c., p. 184.

Animal about 1½ inch long, and, including the setæ, about ½ an inch broad, nearly equal in breadth at each extremity. It is of a light yellow colour.

Head rather small; tentacle and antennæ rather short, of nearly equal length, club-shaped near extremity, which terminates suddenly in a slender point. Palpi stout, conical, setaceous, only a little longer than the tentacle and antennæ. Feet stout, biramous. Bristles of dorsal branch few in number, short, straight, sharp-pointed and finely striated across. Those of ventral branch are more numerous, much stronger, slightly curved at the point, but becoming broader near the extremity, where it is serrated, the teeth of the serrations being long and prominent. The elytra are twelve pairs, rather rounded, extending laterally beyond the body; smooth on the edges, roughly tuberculated on the surface, and near the centre marked with a large round black spot, like an eye. Dorsal cirri of considerable length, incrassated or club-shaped beneath the extremity, which is marked by a black ring and, like the tentacle and palpi terminates suddenly in a sharp point. Ventral cirri nearly reaching the extremity of the ventral branch of the foot, slightly incrassated beneath the extremity which terminates in a fine point. Anal cirri of considerable length, and, like the dorsal cirri, club-shaped near the extremity, blackringed and sharp-pointed. [*Baird.*]

Australia, (Brit. Mus.)

Lepidonotus striatus.

Lepidonotus striatus, Kinberg, Öfversigt af K. Vet.-Akad., Förhandl, 1855, p. 381; Baird. l. c., p. 183.

Polynoë striata, Quatrefages, l. c., p. 227.

Antennæ equal to the tentacle, twice as long as the cephalic lobe, reaching half the length of the palpi, like the rest of the appendages and the dorsal cirri, smooth, cylindrical, attenuated at the apex; elytra 13 pairs, broadly striated; inferior setæ bidentate, serrulate below the apex.

Body about 22 mm. in length, and about six in breadth including the setæ. Cephalic lobe rounded at the sides. Tentacle, antennæ, tentacular and buccal cirri almost equal, smooth, attenuated. Palpi very long, attenuated, smooth. Pharynx exsertile with $\frac{9}{9}$ equal papillæ. Notopodia little distinct, with a style and short seta serrulate at the apex. Neuropodia strong, the aciculum rather long, the setæ bidentate, serrulate below the apex, with transverse series of spinules. Dorsal cirri longer than the neuropodia, of similar form to the tentacles. Ventral cirri shorter than the neuropodia, slender, acute. Elytra spotted in striæ, seen under a power of 300 diameters to present large oval and angular cells. Posterior part of the body not known. [*Kinberg.*]

Port Jackson (Kinberg).

Lepidonotus Jacksoni. (Pl. IX., fig. 9.)

Lepidonotus Jacksoni, Kinberg, Övfersigt af K. Vet.-Akad. Förhandl, 1855, p. 383, Eugenies Resa, Annulata, p. 11. pl. iii., fig. 11; Baird, l. c., p. 182.

Polyncë Jacksoni, Quatref., l. c., p. 223.

Antennæ longer than the cephalic lobe; tentacle much longer than the antennæ which are stout, scabrous, and, like the rest of the appendages and the dorsal cirri, inflated below the apex; ventral setæ deeply serrated near the apex; elytra, of twelve pairs, fimbriated at the margin.

Cephalic lobe rounded, the sides obtusely angulated in the middle, eyes small. Palpi inflated below the apex, thick, with minute cilia. Tentacle longer than the palpi, strongly inflated near the long apex, smooth. Tentacular cirri shorter than the antennæ. First pair of parapodia long, armed with a few setæ. Buccal cirri long, scarcely shorter than the tentacular cirri, inflated. Notopodia short, with stout, short, whitish setæ scarcely reaching the extremities of the parapodia, numerous, serrulate. Neuropodia with long yellow setæ, a little curved near the apex, with few stout, profoundly serrated spines. Dorsal cirri swollen below the apex, short, smooth. Elytra twelve pairs, granulose, triangular, the margin ornamented with long fringes, with oval or rounded quadrangulate cells. [*Kinberg.*]

Near Port Jackson (Kinberg).

This species occurs in beds of mussels, between tide-marks in Port Jackson. In the specimens I have examined the inner peristomial tentacles are not papillose as in that figured and described by Kinberg.

Lepidonotus stellatus.

Lepidonotus stellatus, Baird, l. c., p. 185.

The animal is about 8 lines in length and three in breadth. The dorsal surface and elytra are of a somewhat uniform olive-colour. The ventral surface is yellow. Head rather small; tentacle unfortunately destroyed. Antennæ slender rather short; palpi stout, conical, short, about the same height as the antennæ. Feet stout, biramous; bristles of ventral branch longer than those of the dorsal, bidentate at the point and serrated a little below its apex. Bristles of dorsal branch short, straight and serrated throughout their whole length. Dorsal cirri about the length of the feet and bristles, setaceous. Elytra 12 pairs in number, oval, marked across one half with two divaricating rows of pustules. When seen under the microscope each scale is very prettily marked with numerous lucid dots, like stars. The margins are quite smooth, segments of body 26 in number; last segment terminated by two short anal cirri. [*Baird.*]

Australia (Brit. Mus.)

Lepidonotus Bowerbankii.

Lepidonotus Bowerbankii, Baird, l. c., p. 185.

Animal six lines in length and about two broad. The colour is greyish on the back and yellow underneath. Head, antennæ and palpi much the same as in the preceding species (*L. stellatus*). The bristles of the ventral branch are not bidentate at the point, but are more loosely or longly toothed or serrated below the apex. The bristles of the dorsal branch are slender, and finely serrated and striated across. The elytra are 12 pairs in number, the upper ones nearly round, becoming more ovate as they descend. When seen by the microscope the surface is covered with very minute granulations and the external margin is densely ciliated. They are of a light colour, but speckled all over with light fawn-coloured spots. [*Baird.*]

Australia (Brit. Mus.)

Lepidonotus melanogrammus, *sp .n.* (Pl. VIII., fig. 13).)

The body in this species contains 25 segments with 12 pairs of scales. The mesial tentacle is about thrice the length of the head, and is slightly dilated near the apex. The other tentacles are all of about the same length as the mesial, and are all of similar shape, except the inner peristomials, which are stouter than the others. The parapodia are not divided, and there are no dorsal setæ. The ventral setæ are similar to those of *Thomora argus*, with a small tooth near the apex. The anal cirri are situated on a prominent lobe. The elytra, which are situated on the 1st, 3rd, 4th, 6th, and every alternate segment, are rather delicate, smooth, not fringed, marked out into polygonal areæ. The cephalic and peristomial tentacles are black, except the bases and the tips which are colourless ; the cirri are banded with black; the ventral surface is marked with four rows of brown spots. The scales are dark brown on their free portion, light brown on a subcircular space corresponding to the surface of attachment. The length is $1\frac{1}{4}$ inch ; the breadth $\frac{3}{8}$ths of an inch.

A single specimen of this species was obtained with the dredge off Broughton Islands near Port Stephens, at a depth of about 30 fathoms.

Lepidonotus lissolepis, *sp. n.* (Pl. VIII., figs. 3 and 4.)

The body consists of 25 setiferous segments with 12 pairs of elytra. The mesial and lateral præstomial tentacles are subequal, slender, tapering, smooth. The peristomial tentacles are nearly equal in length, the inner much stouter than the outer ; the outer together with the cirri are slightly swollen near the apex, which is attenuated. The scales (which occur on the 1st, 2nd, 3rd, 5th —21st segments) are smooth, rather delicate, not fringed, of a dark slatey-brown colour, the pigment being arranged in minute dense lobed corpuscles instead of separate granules. The parapodia are not divided. The ventral setæ, about 25 in number, are constructed on a type similar to that exhibited by those of *Thormora argus*, but have a small acute tooth near the apex. The dorsal setæ are slender with spinose transverse ridges assuming the appearance of longitudinal lateral rows of teeth. The length is $\frac{7}{8}$th of an inch ; the breadth $\frac{1}{4}$th of an inch.

Nelson's Bay, Port Stephens, 5 fath.

This species seems to be allied to *L. striatus* of Kinberg, but evidently differs from it in the minute structure of the scales, as well as in the greater relative shortness of the inner peristomial tentacles.

Lepidonotus simplicipes, *n. s*, (Pl. IX., figs. 1 and 2.)

The body is composed, like that of the preceding species, of 25 segments bearing 12 pairs of elytra. The præstomial tentacles are subequal, of a shape similar to those of the preceding species and banded, as well as the other tentacle and cirri, with dark brown. The inner peristomial tentacles are very thick, not subulate, brown. The outer peristomial tentacles are equal in length to the præstomials and of similar shape. The anal cirri are very long. The parapodia are undivided and there are no dorsal setæ. The ventral setæ are on a type similar to that presented by those of *Thormora argus*, but near the apex there is a small tooth which has rather the appearance of a step than of a prominent tooth. The elytra are delicate, not fringed, ornamented with a band of very minute processes near the outer border.

Griffiths' Point, Western Port.

This species comes near *L. striatus*, but is distinguished among other points by the form of the ventral setæ, which in the latter species are strongly bidentate.

Lepidonotus æololepis, *sp. n.* (Pl. IX., figs. 3—5.)

There are 25 setiferous segments, with elytra on the 3rd, 4th, 6th, 8th and every alternate segment. The præstomial tentacles are slender, the median nearly twice as long as the lateral; like the other tentacles and the dorsal cirri, they have a slight swelling near the extremity followed by a slender tapering portion. The inner peristomial tentacles are longer than the outer, shorter than the mesial, but longer than the lateral præstomial tentacles, smooth, cylindrical. The outer peristomial tentacles are shorter and more slender than the internal one. The ventral cirri are short and conical, the ventral tubercles conspicuous. The anal cirri are longer than the præstomial tentacles. The parapodia are divided, the neuropodium being much larger than the notopodium. The ventral setæ are about 15-20 in number, $\frac{1}{1000}$th of an inch in breadth and $\frac{1}{30}$th in length, and are of a type similar to that represented by those of *Thormora argus;* the apex is curved and subacute, and the lateral spines are five or six in number in each row. The dorsal setæ are simple and extremely slender, straight, with the exception of a slight bend near the apex—the thickness being slightly increased at the bend. The elytra are delicate, fringed, and marked with numerous subcircular or polygonal figures. The elytra and the dorsal surface below them are marked with spots of dark blue, there are bands of a similar colour on the cephalic tentacles, and two dark blue spots on the ventral surface of each segment. Length about $\frac{3}{8}$ths of an inch; breadth $\frac{1}{8}$th.

I found specimens of this species under stones between tide-marks on Thursday Island.

Lepidonotus torresiensis, *sp. n.* (Pl. IX., fig. 6.)

The body contains 25 segments bearing 12 pairs of scales, which are imbricate and decussate. The mesial præstomial tentacle is about twice the length of the head, with a subapical swelling and filiform extremity, as in most of the preceding species; the lateral præstomials are a little shorter than the middle and of similar shape. The inner peristomials are rather shorter than the outer in one specimen, a little longer in another, thick at the base, acuminate at the apex. The outer peristomials are as long as the præstomials and of similar shape. The scale-tubercles are very prominent. The ventral setæ are very similar to those of *L. simplicipes*; the dorsal setæ are short with two longitudinal rows of short spines. The scales are subreniform, thickly, fringed ornamented on the upper surface with a few conical and clavate processes. The colour is light grey, with a darker spot at the point of attachment of each scale.

Dredged off Thursday Island in 3-5 fathoms.

This species seems to resemble *L. Bowerbankii* in some respects, but the presence of a tooth on the ventral setæ distinguishes it from the latter.

Lepidonotus dictyolepis, *sp.n.* (Pl. IX., figs. 7 and 8.)

There are 25 segments bearing setæ and 12 pairs of elytra. The præstomial tentacles are nearly equal, inserted in a line, the mesial rather longer, twice the length of the head, the basal half rather stout, the distal half slender, rather clavate at the apex and not dilated subapically. The inner peristomial tentacles are very stout, subconical, as long as the præstomials, transversely ringed ; the outer peristomials have the undivided basal portion very long, as long as the head, the distal portions of about the same length, and in shape similar to the præstomials. Dorsal cirri rather short, of shape similar to that of the tentacles, but more distinctly clavate. The scale-tubercles are rather prominent. The elytra have the inner and posterior surface divided by narrow cuticular ribs into very irregular polygonal areæ ; anteriorly and externally the centres of these areæ project as rounded elevations, and round the border these are succeeded by a series of very stout cylindrical "cilia." The ventral tubercles are inconspicuous. The ventral setæ are similar to those of *Thormora argus*, curved at the extremity, and subacute, with four teeth in each lateral row, the last tooth longer than the rest, triangular and acute : the dorsal setæ are very slender, like those of *Iphione ovata*, pinnate with broad lateral teeth. The body is almost colourless ; the head red with black markings near the base of the tentacles.

A male and female of this species full of ripe sexual products were dredged in shallow water near Watson's Bay, Port Jackson, in the beginning of June.

Genus Antinoë, Kinberg.

Antinoë (?) grisea.

Antinoë (?) australis, Baird, l. c., p. 193; *Polynoë grisea*, Quatrefages, l. c., p. 250; *Polynoë australis*, Schmarda, Neue Wirbellose Thiere, I., ii., p. 154.

The body is flat, 14 mm. long, 5 mm. broad, with 27 rings and 13 pairs of elytra. The back is reddish-yellow, the ventral surface yellowish-grey. The seven feelers are smooth, yellowish, and provided towards the end with a transverve black band. The elytra are bluish-grey ; their surface is provided with scanty small elevations, visible only under high power ; the borders smooth. The attachment to the scale-tubercle is excentric; the form of the elytra is oval. The dorsal cirri are smooth; the ventrals small. The teeth of the dorsal setæ are curved, slender, and distant. In the neuropodium the setæ are of two kinds. Of these the one set are straight and have few but pointed teeth, pointed in opposite directions; the others are somewhat waved and broad, bear large three-cornered teeth only on one side, and have the apex divided into two teeth. (*Schmarda*).

Port Jackson (Schmarda).

I have not seen this species. The two forms of ventral setæ described and figured by Schmarda are evidently the same form viewed from two different sides.

Antinoë Wahlii.*

Antinoë Wahlii, Kinberg, l. c., p. 19, pl. vi., fig. 28; pl. x., fig. 55.

The body contains 36 or 37 segments with 14 pairs of elytra. The head is deeply divided, each lobe being slightly produced and pointed anteriorly. The anterior pair of eyes are placed close to the anterior angles. The mesial tentacle is fully twice the length of the head, papillose, with a slight swelling near the apex, and a terminal slender portion. The lateral præstomial tentacles are extremely short, not longer than the head, and slender, springing from below the apex of the cephalic lobes. The inner peristomial tentacles are as long as the mesial præstomial, stouter, pointed. the upper outer peristomials are rather longer than the inner, and of the same shape as the mesial tentacle; the lower are rather shorter. The elytra are delicate, not fringed, black behind, lighter in front with a circular black spot in the centre of the surface of attachment, and with small white dots in the posterior black portion; there is a band of very short papillæ near the outer border. The anal cirri are as long as the last eight segments.

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* I have elsewhere previously referred to this species under the provisional name of *Polynoë myrtilicola*.

The ventral tubercles are not prominent. The ventral setæ are numerous, similar to those of *Thormora argus,* but with a subapical tooth. The dorsal setæ are about half the length of the ventral, stouter, slightly curved, with the appearance of a row of obscure serrations on the convex side produced by a series of transverse ridges. The colour is light reddish-yellow with short transverse grey bands on the dorsal surface; the head is purple; the tentacles are ornamented with blackish bands; the cirri are colourless.

Found among mussels both between tide marks and at a depth of 15 fathoms in Port Jackson.

Antinoë præclara, *sp. n.* (Pl. IX., figs. 10-12.)

The body contains 37 segments with 14 pairs of scales. The head is rather prominent, broadening slightly behind. The mesial tentacle is $2\frac{1}{2}$ times the length of the head, ornamented with scattered cilia, and very slightly dilated near the apex. The outer præstomial tentacles are extremely short, not more than a third of the length of the mesial, and slender. The inner peristomials are as long as the mesial tentacle, stouter, pointed, not dilated near the apex and not ciliated. The outer peristomials are shorter than the inner, slightly dilated near the apex, and with a slender terminal portion. The parapodia are distinctly divided. The dorsal setæ, which are about twenty in number, are very slightly curved, and very slightly recurved at the extremity, which is subacute; on the convex side in the distal half are numerous transverse rows of minute and short spinules, or transverse ridges terminated by spinules, which only extend about half-way round the seta. The ventrals are of two kinds; the one kind are very much longer than the others, slender, subacute and almost imperceptibly arcuate, bidentate; on the concave aspect, in about its distal fifth, each seta is armed with two short longitudinal rows of alternating transverse combs of minute spinules, and on the convex side with a row of strong teeth; the other set of setæ are strongly arcuate near the apex, and in the arched portion are armed with two rows of harpoon-like teeth which vary in size and degree of closeness in different setæ. The scale-tubercles are very prominent. The scales are imbricate and decussate, and are covered with short conical projections which at the border are produced into a few short filiform appendages or "cilia."

This species is found among mussels between tide-marks in Port Jackson. It is usually tolerably transparent; but sometimes the integument of the dorsal surface is rather thickly pigmented. Various points in the anatomy of this and the preceding species have been alluded to in the first part of this paper.

Antinoë ascidiicola, *sp. n.* (Pl. IX., fig. 16.)

The body contains 37 segments bearing setæ. The head is large; the mesial tentacle is four times the length of the head, ciliated, slender, very slightly swollen near the extremity, the swelling being followed by a slender terminal portion. The lateral præstomials are scarcely half the length of the outer, tapering, ciliate; the cilia arranged in rows. Outer peristomials of similar shape to the mesial præstomials, rather longer, densely ciliate. The feet are divided, though not deeply. The setæ are similar to those of the preceding species. The dorsal cirri are long of the same shape as the præstomial tentacles, and, like the latter and the outer peristomials, brown with white tips; they are covered as in *A. præclara* and *A. Wahlii*, with larger and smaller papillæ, mostly about $\frac{1}{1000}$th of an inch in length, but some two or three times that length, consisting of a slender cylindrical peduncle supporting a globular head. The ventral tubercles are distinct. The scale-tubercles are rather prominent; the elytra ovate, covered on the upper surface with minute conical or cylindrical processes, with a few cilia on the margin: along the margin are sometimes a few pear-shaped vesicles. The length is $1\frac{1}{4}$ inch; the breadth $\frac{1}{4}$ inch.

This species is somewhat nearly allied to the preceding, but the differences in the proportions of the tentacles and the number of the segments are constant. Both these species particularly *A. ascidiicola*, are characterised by their very great activity and the astonishing celerity of their movements, as well as the readiness with which, when irritated, they part with their elytra, Very numerous specimens of this species were found among the colonies of an *Ascidian* obtained with the trawl at the mouth of the Parramatta River. Allied to this species, though probably distinct, is one which occurs under stones near high-water mark in Port Jackson, and which is charactarised by the thickness and density of its elytra. The head of this species (*A. pachylepis*) of which I have only seen one specimen, unfortunately mislaid, is represented in plate ix., fig. 17, aud the minute structure of the elytra in plate x., fig. 1.

Genus Polynoë, Savigny.

Polynoë asterolepis, *sp. n.* (Pl. X., figs. 3—7.)

There are 49 setiferous segments in the only specimen of this species which I have found, but several of the posterior segments have been lost. The head is large : the mesial tentacle is more than twice the length of the head, with a thick basal portion and acuminate at the extremity; the lateral præstomial tentacles are shorter than the mesial, and of similar shape. The inner peristomial tentacles are large and thick, extending beyond the extremity of the mesial tentacle, and are subacute; the outer peristomial tentacles are smaller than the inner, and of a shape similar to that of the præstomials. The parapodia are not divided, the notopodium being represented only by an aciculum. The ventral setæ are of two kinds, viz..(1) slender, curved setæ, provided with two rows of serrations (spines) in their distal portion, and (2) stouter setæ with the form of those of *Thormora argus*, but with a tooth near the apex. The scales, of which there are 20 pairs, are imbricate and decussate; they are subcircular in outline, delicate and translucent, and not fringed. The colour is light brown, with the head purple, and a brownish-purple band along the centre of the body; on each scale is a circular brown mark irregularly bordered with black at the point of attachment, and numerous white dots scattered over the surface.

This species I found in the interstices of a specimen of *Tubipora* on Thursday Island, Torres Straits.

Polynoë ochthœbolepis, *sp. n.* (Pl. X, figs. 8—10, and Pl. XI., figs. 1—3.)

This species has an elongated form, there being fifty segments bearing parapodia. The præstomium is produced into two rounded lobes, and behind it on the dorsal surface of the peristomium are two pairs of rounded prominences. The unpaired tentacle is five times as long as the head, stout. and, like the cirri and paired tentacles, slightly swollen near the extremity, with a slender apical portion. The lateral præstomial tentacles are rather shorter and much more slender than the unpaired one; the peristomial tentacles are as long as the mesial. The peristomium has a pair of acicula. The parapodia are not divided, the dorsal branch being represented by a small tubercle with a few short setæ. The ventral setæ are similar somewhat to those of *Thormora argus*, but with a long tooth near the apex, and 15—17 spines in each lateral row. There are no dorsal setæ, the notopodium being only represented by a tubercle. The ventral tubercles are distinct. The scale-tubercles are prominent, with the surface of attachment longitudinally ovate. The elytra are decussate and imbricate throughout the entire length of the animal. They are irregularly ovate, thick-punctate, not fringed, with minute papillæ on the hinder portion, and are marked with oblique lines of dark purple. The length is about 1¼ inch, and the breadth ¼ inch.

Specimens of this species were dredged at a depth of 5 fathoms in Port Denison, and in Port Molle at 15 fathoms, during the cruise of H.M.S. "Alert" on the Queensland Coast.

The peristomium, as in many other species of *Polynoë*, is armed with an aciculum. The œsophagus exhibits, when retracted, a number of narrow longitudinal folds; the epithelium is thickly pigmented, and bears a strong resemblance to the hypoderm. The gizzard is extremely powerful; the teeth large, triangular and subacute. The intestinal walls exhibit a longitudinal folding of the mucous membrane, such as I have not noticed in any other species of *Polynoë*. The cæca are given off from the dorsal aspect of the intestine; a short neck leads into a tolerably spacious sac, which gives off upwards a branch ending under the dorsal integument, then curves towards the base of the parapodium, where it ends in the ventral portion of the cæcum. A pseudohæmal system is evident. In a female young ova were observed to be developing both around the cæca and round the ventral pseudohæmal trunk.

Fam. SIGALIONINA.

Genus Thalenessa, Baird.

Thalenessa microceras, *sp. n.* (Pl. XI., figs. 4—8.)

The only specimen of this species which I have obtained is incomplete, but contains over 70 segments. The head presents in front a very minute process, which seems to represent a mesial tentacle; behind are the two pairs of sessile eyes placed close together. The tentacular cirri consist each of a stout base or peduncle and two rami—a ventral and a dorsal—about equalling the peduncle in length, cylindrical and tapering; the peduncle presents near its base on the dorsal aspect, just in front of the mesial tentacle a minute conical appendage; at its distal extremity are a few fine setæ. Inserted close behind these are the extremely elongated, smooth, tapering buccal tentacles. The first pair of parapodia extend far in front of the head; at their base, representing a tubercle, is a short globular protuberance with five short papillæ. They are biramous, the notopodium however, being very small. The neuropodium ends in a phylloid expansion and possesses a number of short filiform appendages; the compound setæ consist each of a straight peduncle serrated near the extremity, and a curved terminal appendage, articulated with the peduncle, and ending in a bifid cheliform apex. The notopodium has also a few filiform appendages; its setæ are very delicate and obscurely serrated. Just below the dorsal setæ on the dorsal aspect is a little button-like process. The ventral cirrus of the first parapodium is longer than the rest and placed at the base; the rest are very short and situated towards the middle of the ventral surface of the parapodium. The dorsal cirri are short, and the scale-tubercles are usually also slightly produced externally in the form of a cirriform appendage. The elytra are imbricate, but do not nearly meet across the back. They occur on every second segment; they are ovate, and delicate, with a fringe of quadrifid appendages on the outer border; the subcuticular squames are thickly pigmented along the inner border, the pigment being red in the preserved specimens.

Dredged at a depth of 15 fathoms in Port Molle.

Explanation of Plates.*

Plate VI.

Fig. 1.—Intestinal cæcum of *Antinoë præclara*, seen from the dorsal aspect, magnified about 40 diameters. *a*, outline of intestine; *b*, opening of the cæcum into the intestine.

,, 2.—Green cells from the cæca of the *Polynoina*, × 500.

* Through inadvertence, the numbers 6 and 7 have been repeated in the plates of this volume, the plate here numbered 6 being in reality the eighth.

Fig. 3.—Section through the nerve-cord and ventral body-wall of *Antinoë præclara*, magnified, showing the ventral pseudohæmal vessel (*a*), and the testicular follicles (*b*, *b*).

,, 4.—Subcuticular glands from the ventral integument of *Antinoë præclara*, × 300.

,, 5.—Developing ova of *Thormora argus*.

Plate VII.

Fig. 1.—Head and anterior portion of the body of *Hermione brachyceras*, from the dorsal aspect, magnified. *a*, mesial tentacle; *c*, tentacular ventral cirri of the first somatic segment.

,, 2.—The same, from below in front. *a*, mesial tentacle; *b*, buccal tentacles; *c*, ventral cirri of the first somatic segment.

,, 3.—Setæ of the same × 75; *a*, ventral setæ; *b*, *c*, *d*, dorsal setæ.

,, 4.—Head of *Hermione* (*Aphrogenia*) *dolichoceras*, from below magnified. *a*, base of mesial tentacle; *b*, lateral tentacles; *c*, parapodium of first somatic segment.

,, 5.—Extremities of the tentacular cirri of the first segment of the same, more highly magnified; *a*, dorsal; *b*, ventral.

,, 6.—Dorsal setæ of the same, × 200.

,, 7.—Ventral seta of the same.

,, 8.—Head and anterior portion of the body of *Triceratia aræoceras*, from below, magnified. *a*, præstomial tentacles; *b*, peristomial tentacles (buccal cirri); *c*, tentacular cirri.

,, 9.—Ventral seta of the same, × 75.

,, 10.—Dorsal seta of the same, × 75.

,, 11.—Section of the mucous membrane of the gizzard of the same, × 375.

Fig. 12.—Section of the lower end of the gizzard of the same.

,, 13.—A portion of the mucous lining of the same, more highly magnified (× 200).

Plate VIII.

Fig. 1.—Portion of section through the anterior region of the body of *Triceratia arœoceras*, magnified. *a*, nerve cord; *b*, ventral longitudinal muscles; *c*, neuropodium; *e*, dorsal longitudinal muscle; *f*, gizzard; *g*, necks of anterior gastric cæca surrounded by the generative products.

,, 2.—Section of the posterior region of the body of the same, magnified; *a*, nerve-cord; *b*, ventral longitudinal muscles; *c*, neuropodium; *d*, notopodium; *e*, dorsal longitudinal muscles; *f*, intestine; *g*, *g*, cæca.

,, 3.—Head and anterior portion of the body of *Lepidonotus lissolepis*, from above, magnified,

,, 4.—Ventral seta of the same × 200.

,, 5.—Ventral seta of *Thormora argus*.

,, 6.—The same, lateral view; 6*a*, another form of the same.

,, 7.—Portion of dorsal seta of the same, × 375.

,, 8.—One of the larger processes on the surface of the elytra of the same, × 200.

,, 9.—Head of variety of *Thormora argus*. from Victoria, from above, magnified.

,, 10.—Ventral seta of the same, × 200.

,, 11.—Dorsal seta of the same, × 200.

,, 12.—Head and anterior portion of the body of the Port Jackson form of *Thormora argus*, from above magnified.

,, 13.—Head and anterior portion of the body of *Lepidonotus melanogrammus*, from above, magnified.

Plate IX.

Fig. 1.—Head of *Lepidonotus simplicipes*, from above, magnified.

,, 2.—Ventral seta of the same, × 200.

,, 3.—Ventral seta of *Lepidonotus æololepis*, × 375.

,, 4.—Dorsal seta of the same, × 375.

,, 5.—A portion of the subcuticular layer of the elytra of the same, × 500.

,, 6.—A portion of dorsal seta of *Lepidonotus torresiensis*, × 375.

,, 7.—Ventral seta of *Lepidonotus dictyolepis*.

,, 8.—Portion of dorsal seta of the same.

,, 9.—Head of *Lepidonotus Jacksoni*, from above, magnified.

,, 10.—Head of *Antinoë præclara*, from above, magnified.

,, 11.—14.—Various forms of the ventral setæ of the same.

,, 15.—Dorsal seta of the same.

,, 16.—Head of *Antinoë ascidiicola*, from above, magnified.

,, 17.—Head of *A. pachylepis*.

Plate X.

Fig. 1.—Portion of one of the elytra of *Antinoë pachylepis*, × 375.

,, 2.—Papilla from the dorsal cirri of the same, × 500.

,, 3.—Head and anterior region of the body of *Polynoë asterolepis*, from above, magnified.

,, 4.—The same from below; the proboscis partly exserted.

,, 5, and 5*a*.—Ventral setæ of the same, × 200.

,, 6.—Another form of the setæ of the same, × 400.

,, 7.—Portion of one of the elytra of the same, × 375.

,, 8.—Head and anterior portion of the body of *Polynoë ochthœbolepis*, from above, magnified.

,, 9.—The same from below.

,, 10.—Section through the anterior region of the body of the same, shewing the jaws. *a*, nerve-cord; *b*, *b*, ventral longitudinal muscles; *c*, neuropodium; *d*, notopodium; *e*, retracted oesophagus; *f*, *f*, teeth.

Plate XI.

Fig. 1.—Section through the head and peristomium of *Polynoë ochthœbolepis*. *a*. cerebral ganglion; *b*, posterior eye; *c*, *g*, peristomial tentacles; *d*, bases of lateral præstomial tentacles; *e*, peristomial aciculum; *f*, parapodium of first segment; *h*, aperture of mouth.

Fig. 2.—Section of intestine of the same.

,, 3.—Ventral seta of the same, × 400.

,, 4.—Head and anterior portion of the body of *Thalenessa microceras*, from above, × 22.

,, 5.—The same, from below.

,, 6.—Ventral seta of the same.

,, 7.—Outline of elytron of the same, magnified.

,, 8.—Appendage from the border of the same, × 200.

CORRIGENDA.

The correct title of the paper by Dr. Williams, quoted on p. 257, is "Researches on the Structure and Homology of the Reproductive Organs of the Annelids."

Page 251, lines 10 and 11, the word "another" should come in after "affords."

Description of two new Birds from the Solomon Islands.

By E. P. Ramsay, F.L.S., &c.

Phlogænas salamonis.

Total length 11 inches; wing 6·5 inches; tail 4; tarsus 1·3; bill from the forehead 1, from the nostril 0·5, from the angle of the mouth 1·1 inch. Bill brown, legs and feet carmine. The bill is strong and much curved at the tip; the tail rounded, of twelve feathers. General colour reddish chocolate-brown above, slightly tinted with rich metallic violet-purple, which becomes very bright on the wing-coverts, and interscapular region; the primaries and secondaries, and the inner webs of the tail-feathers and their under surfaces, dull dark brown; head chocolate colour without metallic reflections, the sides of the face lighter, the throat of a paler tint; the chest, breast, and foreneck cinnamon-brown, lightest towards the abdomen, a few feathers on the sides of the chest tinted with the same rich metallic hue as the mantle and wing-coverts; the remainder of the under surface dark, dull, reddish chocolate-brown, deeper in tint and inclining to rufous on the under tail-coverts. The feathers of the breast being of a light cinnamon tint contrast greatly with the dark chocolate-red of the remainder of the under surface.

This specimen is said to be a male, and was obtained by Mr. John Stephen in April last, (1882) on San Christoval, one of the Solomon Group. It is probably the species referred to by Canon Tristram under the name of *Phlogænas Johannæ*, of Sclater, which it certainly is not.

DICRURUS *(Chibia)* LONGIROSTRIS, *sp. n.*

All the body black with a steel-bluish tint in certain lights; the wings and tail black above, black with a brownish tint in certain lights below, having the outer webs of the feathers above margined with glossy steel-green; the scapulars and all the upper wing and tail-coverts glossy metallic-green, some of the feathers of the rump and flanks tinged with the same; feathers of the head scale-like, black, conspicuously tipped with metallic-green gloss, those of the neck above and below lanceolate in form, tipped with the same tint, those of the breast with a rounded spot of the same colour at the tip, and with narrow wavy cross lines when seen obliquely. There is no metallic gloss on the ear-coverts or chin, velvet-like plumes cover the nostrils, the rictæ are very short, weak and in some specimens obsolete; the tail is even, the outermost feathers scarcely longer than the rest, but have their tips curved outwards and upwards; of the under wing-coverts, those on the shoulders below, are glossed with green, the remainder black, a few only having a whitish spot at the tip; the plumes of the flanks silky and rather long; the under tail-coverts black, glossed with green. In some specimens apparently immature the under tail and wing-coverts are tipped with fulvous. "Iris dark red-brown" (*J. Stephens*); legs feet and bill black. The bill is strong and laterally compressed, about one-third longer than the head.

Measurements.

Length about	12 inch.	12 inch.	12 inch.
Wing	5·7	5·7	5·75
Tail	5·3	5·5	5·3
Tarsus	1·15	1·1	1·2
Bill from forehead..	1·85	1·7	1·83
Bill from nostril	1·3	1·15	1·25
Bill from gape	1·8	1·6	1·75
Bill, height at nostril	0·5	0·5	0·52
Bill, width below nostril	0·3	0·3	0·3
Sex	♂	♀	♀

Hab. San Christoval.

Several specimens of both sexes obtained at "Wano" San Christoval in April last (1882).

This species comes near *D. læmostictus*, but differs from all other species in the length and laterally compressed form of bill.

Description of a new species of Coris from Lord Howes' Island and New South Wales.

By E. P. Ramsay, F.L.S., &c.

Coris semicincta.

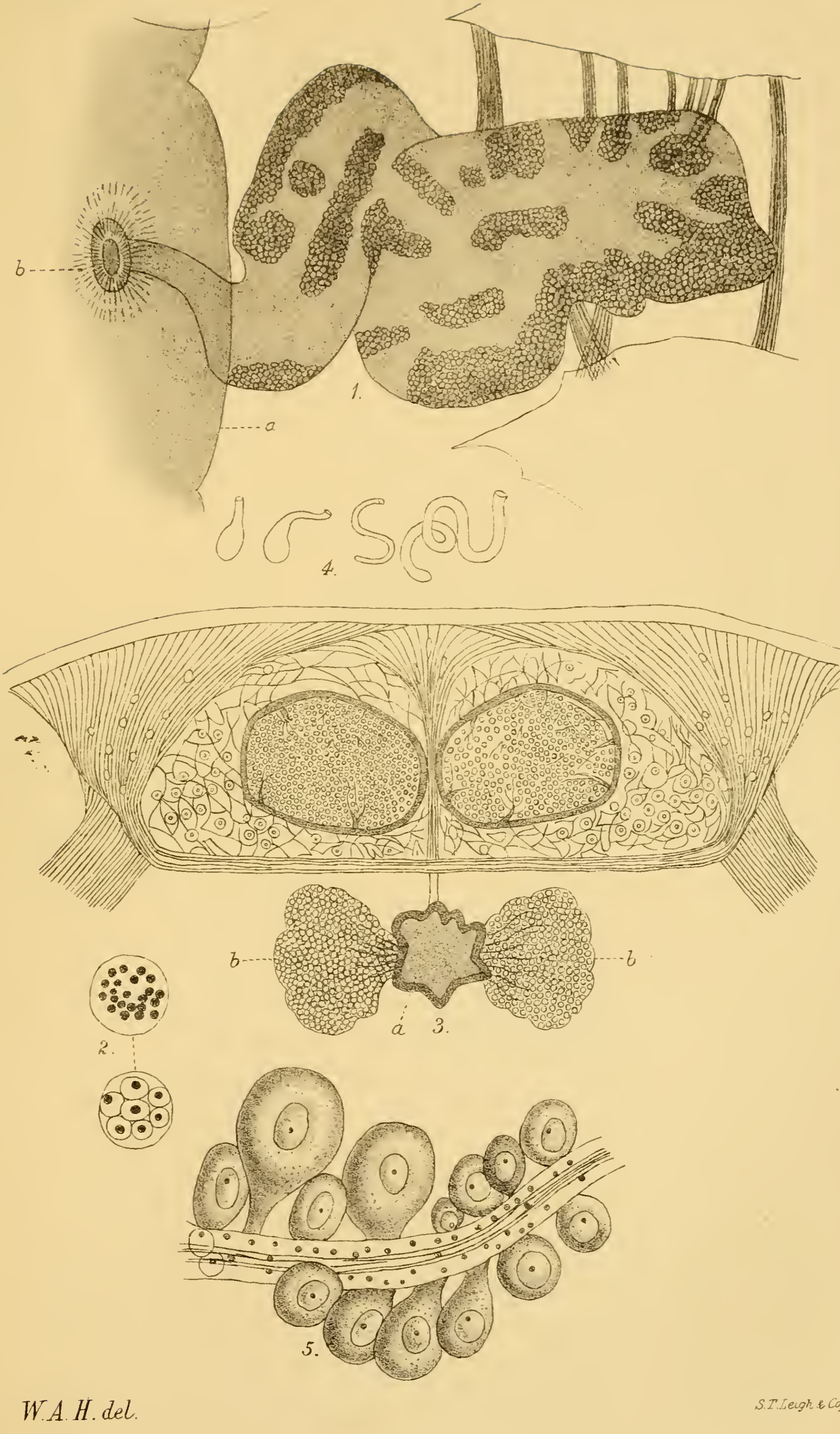
D. 9—12. A. 3—12. L. lat. 80. L. transv. about 4-5.

General form elongated and laterally compressed; the length of the snout is more than twice the long diameter of the eye, which is six times in the length of the head; the head is four times in the length of the body without the caudal. The height of the body at the first anal spine is four times and a half in the length, without caudal, and five and one-fifth in the total length. Coloration—A blackish band along the lower half of the dorsal fin ; commencing on the second dorsal spine is a band of bright canary-yellow, widening out towards the tail and margined above with a narrow line of pale lilac ; an oblong dull longitudinal reddish-yellow spot on the forehead, snont light brown, a broad band on either side extends through the eye along the body on to the tail, with transverse short bars descending down the sides of the body at right angles from it ; these bars are occasionally confluent on the tail ; there is also a broad subterminal band of brown, on the hinder limb of the operculum, the outer margin being lilac, the throat and the sides of the head from below the eye are rich lilac ; pectoral fins yellowish translucent, tipped conspicuously with black, the ventral and anal fins and the belly yellow, the interspaces between the bars on the sides lilac like the cheeks, the caudal fin is bright canary-yellow, narrowly margined with lilac ; the upper half of the broad lateral band is paler than the lower, and is tinged with lilac.

The specimen from which the above description has been taken was caught near Broken Bay, and forwarded to the Museum in a fresh state by Mr. H. Breakwell. I had previously obtained a specimen from Lord Howe's Island, through Capt. Armstrong.

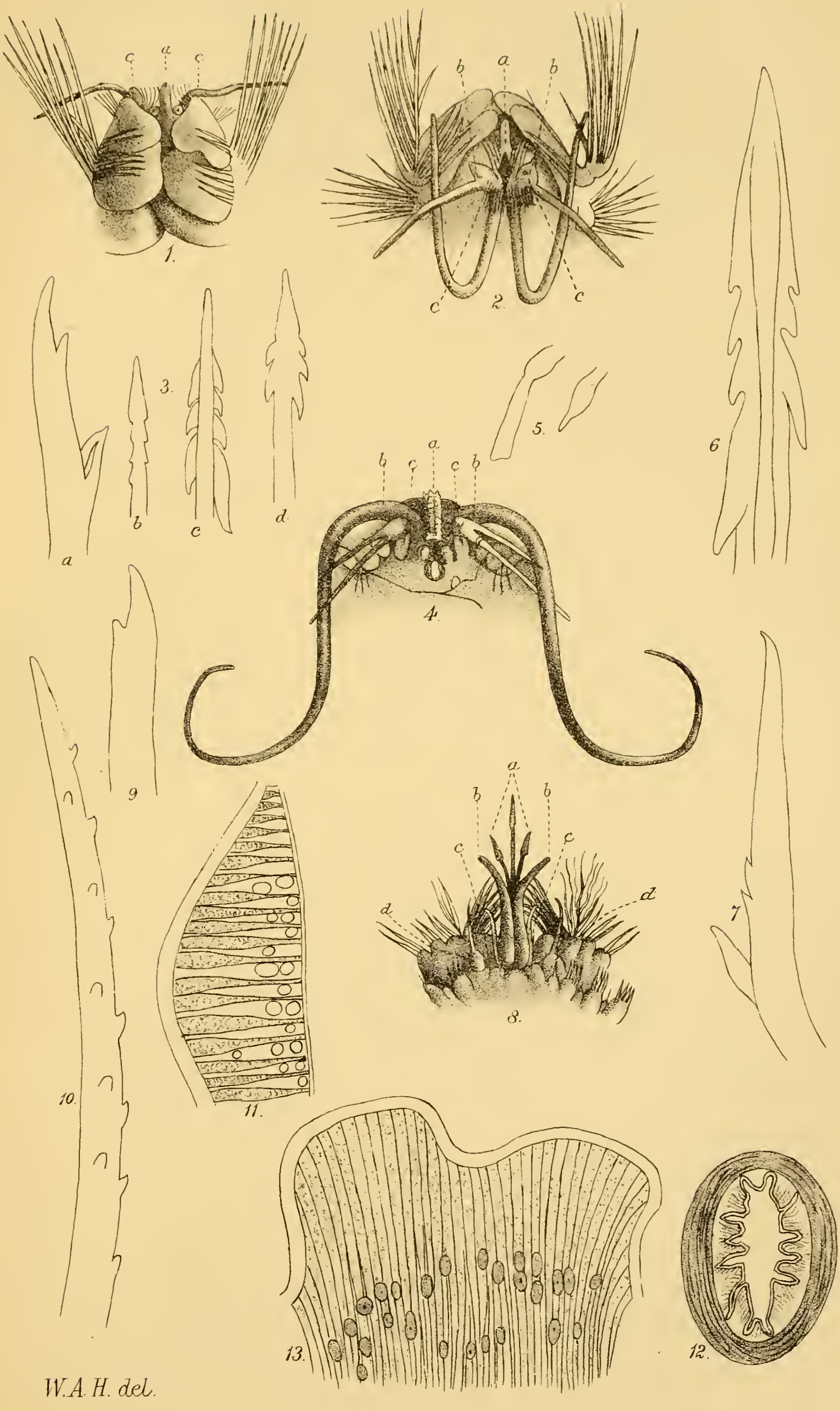
NOTES AND EXHIBITS.

The Hon. W. Macleay exhibited a specimen of *Chersydrus annulatus* of Gray. He said that he was indebted to Mr. De Vis, of the Queensland Museum, for this specimen, which was the first he had ever seen of the kind. It is a freshwater snake, found in the rivers of India, Sumatra, and New Guinea, but never hitherto known as an inhabitant of Australia. The present specimen came from Cairns.



W. A. H. del.

S. T. Leigh & Co, lith.



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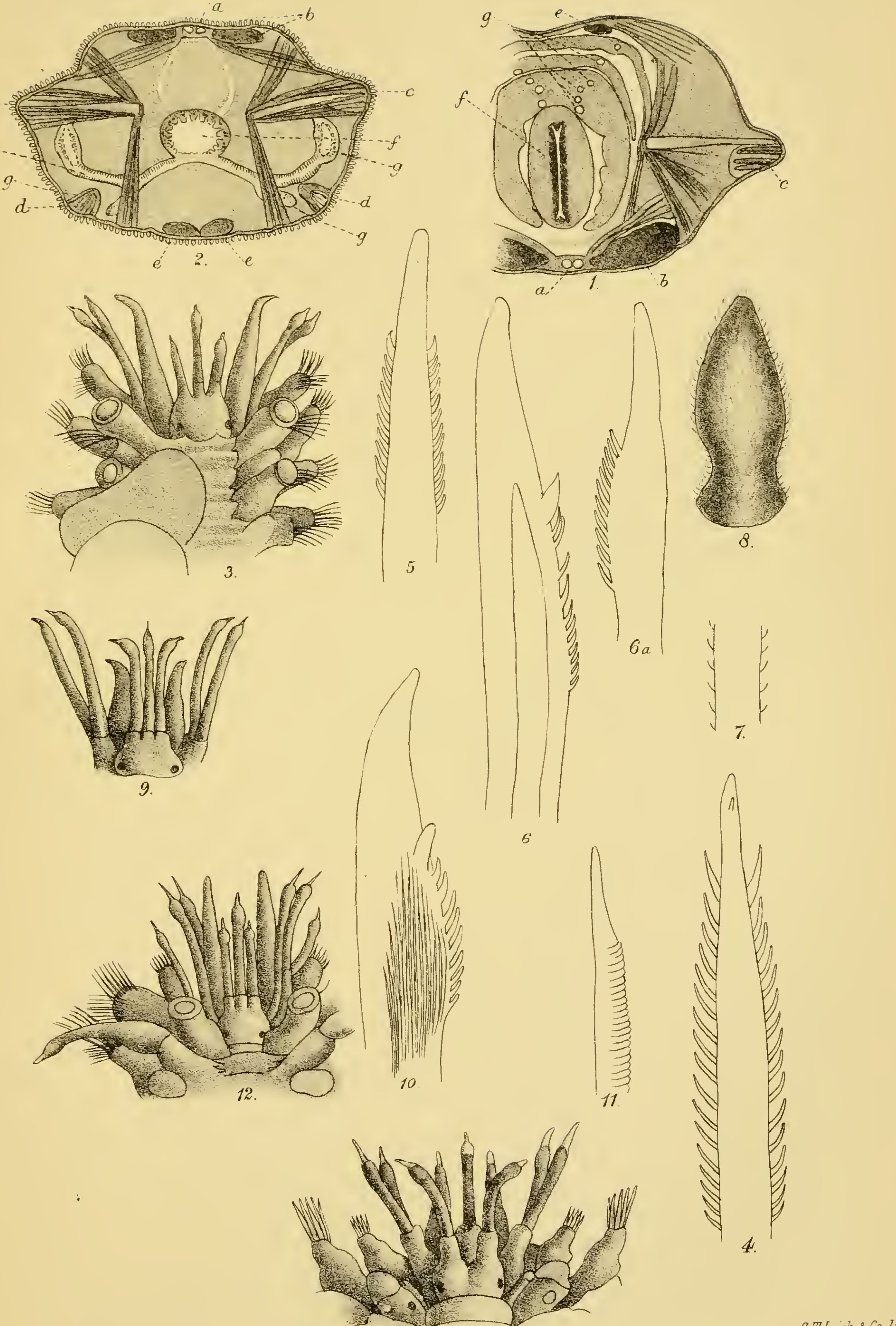

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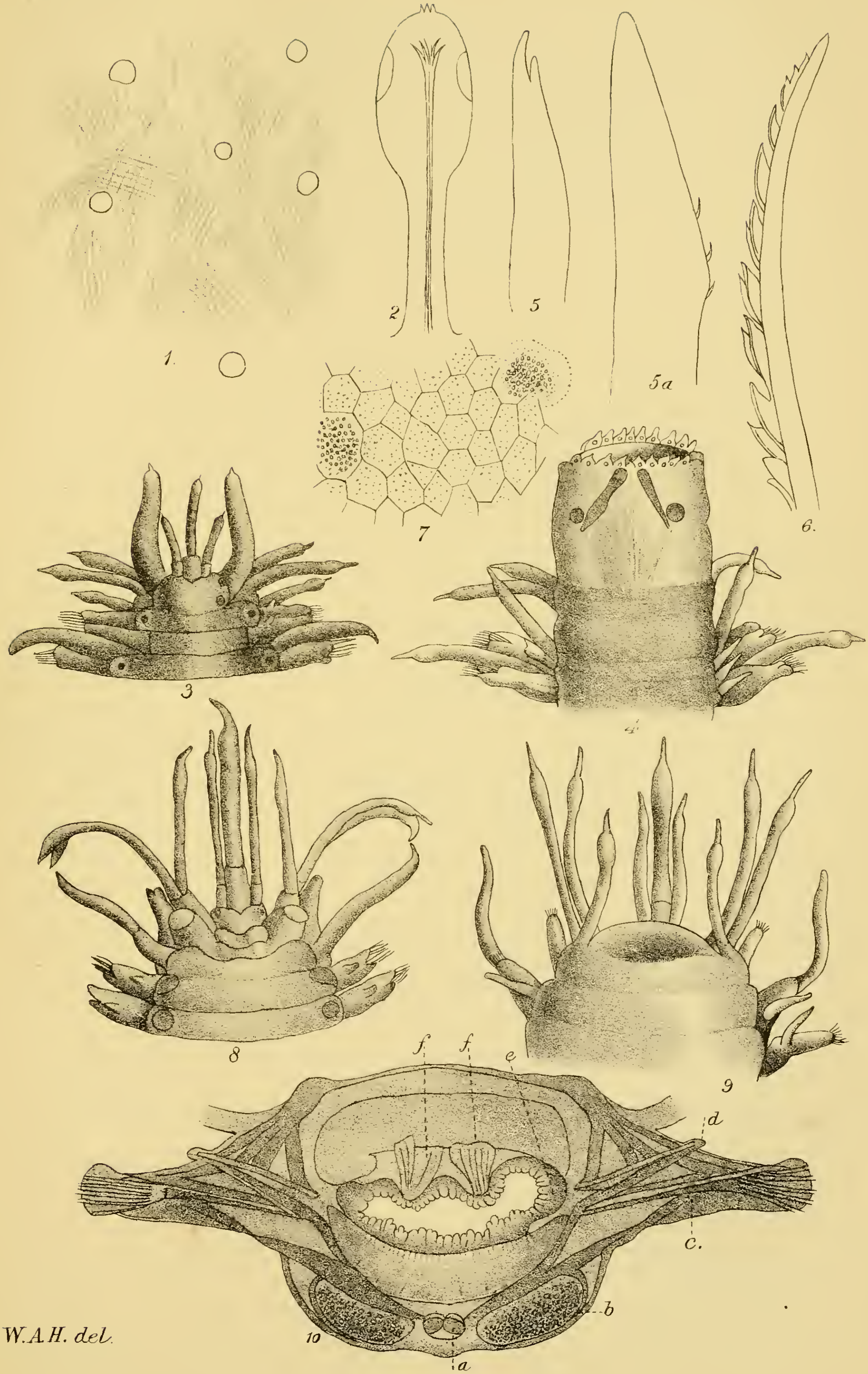
S. T. Leigh & Co, lith.



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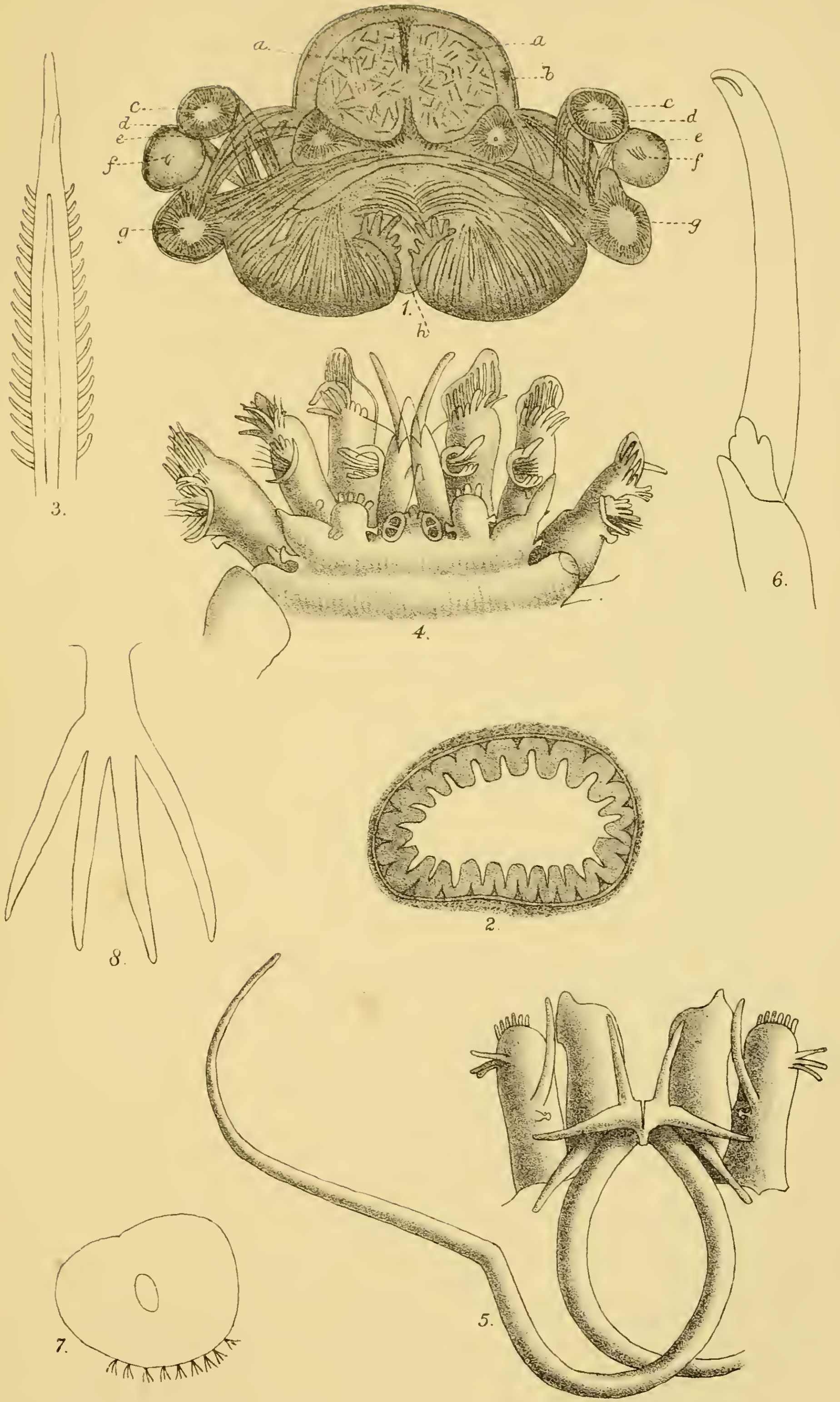

W. A. H. del.

S. T. Leigh & Co. lith.

Dr. Thomas Dixson exhibited, under the Microscope, preparations made by himself of the *Bacillus* described by Ebert as peculiar to typhoid fever. Other preparations were exhibited, showing the occurence of germs, very like typhoid germs, in a cesspit, but the absence of any such in diarrhœa.

Professor W. J. Stephens exhibited a few specimens of a lost *Eucalyptus* which had been lately rediscovered by his brother, Mr. T. Stephens, in the immediate neighbourhood of Hobart. He stated that the plant (*Eucalyptus cordata*) had only once been seen by Botanists since the Expedition of d'Entrecasteaux, and then only in two isolated and remote spots. Perhaps some now present would recollect an old gum tree, near the present entrance from the Botanic Gardens to the Garden Palace, with remarkably glaucous foliage, and papery bark like some *Melaleucas*. This was a specimen of *Eucalyptus cordata*, which must have been brought here, long since, either as a seed or as a young plant, from Tasmania, and which survived until a short time back. At present there was no example of the plant in our collections. In closing his notice Professor Stephens expressed the hope that this re-discovery might be suggestive to collectors that their own immediate neighbourhood may probably furnish facts new or unexpected, remarking how forty years of oblivion had given a curious dignity to the otherwise not very attractive specimens that he now laid before the Society.

Dr. W. D. C. Williams exhibited the *os penis* of the Walrus (*Trichechus rosmarus*), obtained in the Arctic Expedition of Mr. Leigh Smith to Franz-Josef land in 1880. Dr. Williams also exhibited a collection of weapons from the field of Ulundi, in Zulu Land, comprising an oxhide shield of the smaller size, carried by the Zulu riflemen, two nob-kerries, an assegai with iron head spirally twisted, two assegais with lance-shaped heads and iron fore-shafts, two assegais with double concave grooved heads, and a Zulu warrior's bead head dress.

Mr. E. P. Ramsay exhibited the fruit of a small species of cocoanut (*Cocos*), from the Island of Ugi, Solomon Group. He stated that there are only two or three trees of this kind of Cocoanut known in the island, and that these are held in special respect by the natives, who have planted numerous varieties of *Crotons* and *Coleus* round the roots, and fenced each tree in with blocks of coral.

In the conversation which ensued, it was observed that a similar species, if not the same, is common at Malacca, and that it is also found, but not treated with any special regard, in other Melanesian islands. It might therefore represent an ancient and indigenous type of *Cocos*, gradually receding before the larger species in ordinary cultivation, and so appearing only at distant intervals. The reverence paid to the trees in Ugi, might probably be a survival of an ancient worship of the wild or indigenous tree, which had died out under the cultivation of the larger and improved species. It would be more natural to pay religious honour to a plant which owed nothing to human labour than to one which the people had introduced and propagated of themselves.

Mr. Ramsay also exhibited specimens of the birds described in his paper, viz., *Dicrurus* (*Chibia*) *longirostris*, and a new Pigeon *Phlogœnas salamonis*, both from the Solomon Islands, collected by Mr. John Stephen, of Ugi.

WEDNESDAY, 26TH JULY, 1882.

The President J. C. Cox, M.D., F.L.S., &c., in the Chair.

MEMBERS ELECTED.

Edwin Daintrey, Esq., Sydney.

Thomas R. M'Dougall, Esq., Baan Baa, Narrabri.

Edwin Haviland, Esq., Redfern.

Dr. George Hurst, Oxford Street.

It was announced that the Council had elected Mr. Edgar A. Smith, F.Z.S., of the British Museum, and Mr. Chas. W. De Vis, Curator of the Queensland Museum, corresponding members.

DONATIONS.

"Annales de la Société Entomologique de Belgique, Tomes 23, 24, 25."

"Verhandlungen des Vereins für Naturwissenschaftliche Unterhaltung zu Hamburg," Band 4, 1877.

"Verslagen en Mededeelingen der Koninklijke Akademie van Wetenschappen, Amsterdam, Deel 16, Stuk 1, 2, en 3."

"Jaarboek van de Koninklijke Akademie van Wetenschappen Amsterdam, 1880."

"Proceedings of the Royal Society of Edinburgh, Session 1880-81."

"Verhandlungen der Kaiserlich–Koniglichen zoologisch-botanischen Gesellschaft in Wien, Band 31, 1881."

Tenth annual report of the Zoological Society, Philadelphia, 1882."

"Southern Science Record, Vol. 2, No. 5, May, 1882."

"Report of the Trustees of the Australian Museum, for 1881."

"Transactions and Proceedings of the Royal Society, Victoria, Vol. 18, for 1881."

"Journal and Proceedings of the Royal Society of New South Wales, Vol. 15, for 1881.

PAPERS READ.

Botanical Notes in Queensland.—No. III.

By the Rev. J. E. Tenison-Woods, Vice-President, &c.

In this paper I intend to give the result of my collections on the Mulgrave River, about which I believe no botanical notes have hitherto been published. I must premise that the river in question is broad and shallow, taking its rise in the Herberton Ranges, and issuing into the sea at a short distance south of Cape Palmer, or 20 miles south of Cape Grafton, in about Lat. 17·40 S. The river during the whole of its short course, runs through some of the most abrupt and precipitous mountain gorges in Australia. In no part does it ever flow through a broad alluvial valley, but the mountains rise abruptly from the waters, seldom leaving even a narrow terrace between their precipitous sides and the water. The consequence is that the stream is liable to extraordinary inundations. Flood marks are found 70 and 80 feet above the bed, and on these high water-marks enormous trees are stranded. In the more open places the sand and alluvial accumulations form considerable ridges. The formations of rock on the banks vary between granite, paleozoic slates and newer volcanic rock. These occasionally make falls and rapids in the stream. The steep banks are usually volcanic.

As a rule the banks are clothed with dense tropical forest, formed of lofty trees and a dense undergrowth of palms and ferns, amongst which are *Calamis australis*, *Alpinia cœrulia*, *Pteris marginata*, *P. tremula*, *Aspidium confluens*, *Alsophila Leichhardtiana*, and *Blechnum cartalagineum*. It will be observed that in this list but few of the forest trees are mentioned. The reason of this being, that I was making a hurried journey, and unless I was able to recognize the species at a distance, I had no opportunity or time to collect flowers or fruits for identification. The country is very little explored and the natives are extremely savage and fierce. But there are a few places where cedar getters have cut down some of the timber and the trees in falling have given a facility for gathering both flowers and fruits, which would otherwise be out of reach. It is remarkable, that on the banks of the Mulgrave, or rather on the slopes rising from the banks, there are many forests almost made up of pine—*Araucaria Cunninghami*, and though the *Myrtaceæ* are well represented the

Eucalypts almost entirely disappear. In the following list the localities where the plants were gathered, were along the banks of the stream from Alley's crossing, on the road between Cairns and Herberton and the township of the Lower Mulgrave diggings, a distance of about 12 miles. The land is all alluvial and volcanic, until the township is reached, where the surface deposit of trap disappears and vertical paleozoic slates with quartz reef take its place. The vegetation is rich, and the forest in places almost unpenetrable.

Abroma fastuosa, R. Br.
Abroma sp.
Hibiscus manchot, Linn.
H. sp.
Thespizia populnea, Corr.
Abutilon graveolens, Willd.
A. muticum, R. Br.
Urena lobata, Linn.
Bombax malabaricum, DC.
Turræa pubescens, Hellen.
Ionidium suffruticosum, Ging.
Cupania anacardioides, A. Rich.
Alphitonia excelsa, Reissek.
Geijera salicifolia, Schott.
Hypericum gramineum, Forst.
Pomaderris sp.
Colubrina asiatica, Brongn.
Stackhousia viminea, Sm.
Acacia pachystachyia ?
A. binervata, DC.
A. aulicocarpa, A. Cunn.
Acacia, two sp.*
A. Solandri, Benth., or *leptostachya.*
A. julifera, Benth.
Albizzia sp.
Pithecolobiumpruinosum, Benth.
Flemingea lineata, Roxb.
Vigna lutea, Gray.
Cæsalpinia nuga, Ait.
Derris uliginosa, Benth.
Crotalaria striata, DeC.
Drosera indica, Linn.
Eucalyptus tereticornis, Sm.
E. corymbosa ?
Eucalyptus, three sp.
Loranthus dictyophlebus, F.v.M.
L. longiflorus, Desv.
Randia densiflora, Benth.
Dentella repens, Forst.
Ludwidgia parviflora, Roxb.
Melothria Cunninghami, F.v.M.
Melaleuca leucodendron Linn.
M. genistifolia ?

* In this and similar cases where the specific name is not given, the flowers or seeds, or both were not to be obtained, and the other characters were such as could not be referred to any known species.

Leptospermum flavescens, Sm.
Helichrysum sp.
Conyza ægyptiaca, Ait.
Pterocaulon (*Monenteles*) *spacelatus*, Labil.
Polymeria ambigua, R. Br.
Ipomea sp.
Bucknera urticifolia, R. Br.
Jasminum æmulum, R. Br.
Tournfortia sarmentosa, Lam.
Notolæa sp.
Goodenia grandiflora.

Leucopogon sp. This occurred on open granite flats above the banks of the river. The Epacrideæ are very poorly represented in this part of Australia, and none are found except on poor open sandy soil.

Melichrus rotatus, R. Br., on soil derived from granite only
Tabernamontana pubescens, R. B.

Hoya australis, R. Br. In the crevices of granite rocks, far from river scrubs.

Justicia procumbens, Linn.
Mitrasacme polymorpha, R. Br.
Solanum nemophilum, F.v.M.
Solanum, two sp.
Deeringia altissima, F.v.M.
Grevillea chrysodendron, R. Br.
G. gibbosa, Br.
G. sp.
Buckinghamia sp. ?
Plectranthus parviflorus, Willd.
Anisomeles salvifolia, R. Br.
Pisonia aculeata, Linn.
Amaranthus sp.
Bolbophyllum Prenticei, F.v.M.
Poranthera microphylla, Brongn
Caladenia carnea, R. Br.
Dendrobium speciosum, variety *fusiforme*, F.v.M.
D. undulatum, R. Br.
Oberonia palmicola, F.v.M.

Diuris maculata, Sm.
Petalostigma quadriloculare, F.v.M.
Macaranga tanarius, Muell. Arg.
Euphorbia eremophila, A. Cunn.
E. Macgillivrayi, Boiss.
Vallisneria spiralis, Linn.
Colocasia antiquorum, Schott.

Pandanus aquaticus, F.v.M.
P. pedunculata, Br.
Potamogeton tenuicaulis, F.v.M.

Rhaphidophora quinata, Schott. Very abundant with simple and pinnate leaves, in all the dense jungle, where it climbs the stems of the highest trees by stems two inches in diameter and throwing out leaves one and two feet long. It is called here the "Climbing Fern."

Pothos Loureiri, Hook. This is also a very abundant climber on the stems of all the high trees, but not so conspicuous as the last named, as the leaves seldom exceed four inches in diameter and the stem is seldom over half an inch in diameter. It is however a very graceful plant, extends through all the forests up to 3,000 feet above the sea.
Dianella lævis, R. Br.
Eurycles Amboinensis, Loudon.
Eustrephus angustifolius, R. Br.
Flagellaria indica, Linn.
Cordyline terminalis, Kun.
Dracæna angustifolia, Roxb.
Commelyna cyanea, R. Br.
C. ensifolia, R. Br.
Pollia macrophylla. Bur.
Tricoryne anceps, R. Br.
Hæmodorum coccineum, R. Br.
Lepturus repens, R. Br.
Ischæmum triticeum, R. Br.
Selaria glauca, Beauv.
Eriochloa punctata, Hamilt.
Anthistiria ciliata, Linn.
Andropogon sericeus, R. Br.
Xerotes longifolia, R. Br.
Phragmitis communis, Kin.
Cyperus exaltatus, Retz.

FILICES.

Lindsæa ensifolia v. *heterophylla*, Sm.
L. lanuginosa, Wall.
L. flabellulata, Dry.
Angiopteris evecta, Hoffm.
Grammatis Muelleri, Hook.
Adiantum hispidulum, Sw.
A. æthiopicum, Linn.
Davallia elegans, Sw.
D. speluncæ, Baker.
Aspidium confluens, Metten.
A. molle, Sw.
A. unitum, Sw.
A. ramosum, Blume.
Pteris quadriaurita, Retz.
P. ensiformis, Burm.
P. marginata, Bory.
P. tremula, R. Br.
P. aquilina, v. *esculenta*, Forst.
Schizæa dichotoma, Sw.
Hymenophyllum javanicum, Sp.
Cheilanthes tenuifolia, Sw.
C. nudiuscula, R. Br.
Gleichenia dichotoma, Hook.
G. flabellata, Br.
Lygodium japonicum, Sw.
L. scandens, Sw.
Hypolepis tenuifolia, Benth.
Acrostichum aureum, Linn.
A. scandens, Sm.
A. repandum, Bl.
Trichomanes pyxidifera, Linn.
Doodia caudata, Cor.
Polypodium rigidulum, Sw.
P. quercifolium, Linn.
Marattia fraxinea, Sm.

Asplenium ? sylvaticum, Prest.
Asplenium simplicifrons, F.v.M.
Alsophila Leichhardtiana, F.v.M.
A. Rebeccæ, F. Muell.

LYCOPODIACEÆ.

Selaginella flabellata, Spring.
S. concinna, Spring.
Lycopodium phlegmaria, Linn.

ON THE FORAGE-PLANTS INDIGENOUS IN NEW SOUTH WALES.

BY W. WOOLLS, PH. D., F.L.S.

In a country like New South Wales, of which the length is 900 miles, the mean breadth 600 miles, and the superficial area upwards of 300,000 square miles, we may naturally look for great diversity of soil and climate, and hence the forage-plants of some parts of the colony are very different from those of others. Taking, however, a general view of the subject, such plants may be divided into two classes, viz.: those of the coast-districts, and those beyond the Dividing Range, though it will be found that some species are common to both.

1. The coast districts, which have a varying breadth of from 30 to 100 miles, lie to the East of the Dividing Range, and as they constitute the earliest settlements of the colony, they comprehend a greater portion of introduced plants than the wide plains of the interior. In some cases, it is difficult to determine whether certain species are indigenous or not, seeing that they have taken possession of extensive areas, and, if really of foreign origin, have long since become naturalized amongst us. Of these *Cynodon dactylon* (Pers.) or Couch Grass is the most remarkable, as affording excellent pasture and being capable of resisting extreme drought. As this grass (though probably of Asiatic origin) is described in R. Brown's Prodromus (1810), and is enumerated amongst Baron Mueller's "Select Extra-tropical Plants," I cannot but regard it as one of our most useful forage-plants in the Coast Districts, as it contains 4·00 per cent of starch and 3·60 of sugar (F.v.M. and L. Rummel), and is much relished

by sheep and cattle. Owing to the spread of this grass in the Coast District, and the introduction of foreign plants from different parts of the world, many of the native grasses are not so abundant now, as they were in the early days of the Colony. Whenever, however, circumstances are favourable, the following species are valuable as bush grasses, and decidedly nutritious:

Andropogon sericeus, (R. Br.)
A. affinis, (R. Br.)
A. refractus, (R. Br.)
Chrysopogon parviflorus, (Benth.)
Sorghum plumosum, (Beauv.)
Anthistiria ciliata, (Linn.)
Microlæna stipoides, (R. Br.)
Dichelachne crinita, (Hook.)
Deyeuxia Forsteri, (Kunth.)
Deyeuxia quadriseta, (Benth.)
Anisopogon avenaceus, (R. Br.)
Danthonia semiannularis, (R. B.)
Chloris truncata, (R. Br.)
Eragrostis tenella, (Beauv.)
E. Brownii, (Nees.)
Poa cæspitosa, (Forst.)
Festuca bromoides, (Linn.)

These may be regarded as the principal bush-grasses near the coast, and so far as they have been analysed, they contain elements decidedly favourable for the growth and fattening of cattle. *Anthistiria ciliata*, (according to F.v.M. and L. Rummel) does not contain so large a proportion of starch as Couch Grass, but it is said to have 3·06 per. cent. of sugar, whilst the different species of *Andropogon*, *Sorghum*, *Poa*, and *Festuca*, contain gluten, starch, gum, and sugar in varying proportions, being in a greater or less degree adapted to grazing purposes. Whenever the season is not unusually dry, these grasses grow readily and afford abundant pasture; whilst some of them are capable of living under a great amount of heat. The following grasses grow in or near water, and, though not equal to those enumerated in amount of solid nutriment, they are nevertheless relished by horses and cattle:

Panicum flavidum, (Retz.)
P. crus-galli, (Linn.)
P. obseptum, (Trin.)
Chamæraphis paradoxa, (Poir.)
Paspalum scrobiculatum, (Linn.)
Oplismenus compositus, (Beauv.)
Isachne australis, (R. Br.)
Phragmites communis, (Trin.)

Hemarthria compressa, (R. Br.) *Glyceria fluitans*, (R. Br.)
Paspalum distichum, (Linn.)

In seasons of drought, when the bush-grasses fail or are burned up, these species, which flourish in marshes, or near creeks, lagoons, and moist places, afford valuable pasture, for, although they may not have the fattening properties of the harder grasses, they keep the stock in fair condition. *Paspalum distichum* or the Water-Couch, which appears to have been regarded by R. Brown as a sea-coast grass (being called by him *P. littorale)* has established itself on the banks of our rivers, and though troublesome in cultivated ground on account of its rapid growth and spreading roots, is a fine grass for stock. *Panicum obseptum* also flourishes round the margins of lagoons, and floats sometimes on the surface of the water. It is eaten by sheep and cattle, and, in places where it abounds, may be regarded as a substitute for more solid grasses. *Glyceria fluitans* is not so abundant, and occurs for the most part by the side of rivers, creeks, or stagnant water. It is a very sweet grass, and the seeds as well as the foliage are very nutritious. *Phragmites communis* is a coarse species and seldom eaten, excepting in very dry seasons. In addition to these grasses, there are other aquatic plants (such as the species of *Triglochin*, *Potamogeton*, *Typha*, *Heleocharis*, *Cyperus*, and *Carex)*, which are also eaten by cattle when other herbage perishes, but they contain very little nourishment. Amongst dicotyledonous plants, horses and cattle frequently browse on the leaves of *Daviesia umbellata*, (Sm.) and *D. latifolia* (R. Br.), which have a bitter taste, and on those of *Casuarina suberosa* (Ott. et Dietz.), which are subacid. These plants occur for the most part on mountains or Ranges. Branches of *Angophora intermedia* (DC.), *A. subvelutina* (F.v.M.), and *Sterculia diversifolia* (G. Don.), are sometimes cut down to keep cattle alive in dry seasons, as the leaves are relished by them. It is a striking fact in the distribution of plants on this side of the Dividing Range, that so few of the native Leguminosæ can be utilized for pasture. With the exception of the *Daviesias*, which seem to be relished rather for their bitter flavour than for any nutriment, there is scarcely any species of the order available for grazing purposes. *Indigofera australis* (Willd.), and *Lotus corniculatus* (Linn.), are sometimes eaten when grass is scarce, nor do they appear to be injurious near the coast; but *Trifolium repens* (Linn.), *Medicago sativa* (Linn.), *M. denticulata*, (Willd.) and *Vicia sativa* (Linn.), which are of foreign origin, are decidedly superior to any indigenous Leguminosæ for forage, and, in some districts of the colony, they are taking the place of native grasses. In New South Wales, there are about 160 species of indigenous grasses, but many of these are gradually disappearing in the settled districts, and it is only in enclosed spots, such as cemeteries, the sides of Railway lines, &c., to which sheep and cattle have not access, that some of the species, which, in the early days of the colony, flourished in the immediate neighbourhood of Sydney and Parramatta, now spring up in any abundance. Of these *Sorghum plumosum* (Beauv.) and *Anthistiria ciliata* (Linn.), deserve especial mention, as they are highly esteemed in most parts of the colony,—the latter species in particular being one of those grasses which are found capable of supporting horses and cattle when travelling from the interior better than any other native forage.

2. On the other side of the Dividing Range, or in that portion of New South Wales which extends to the Great Western Districts and beyond the Darling, the plants available for forage differ very much from those of the Coast Districts, and, in addition to grasses properly so called, they include many varieties of herbs and shrubs, which in dry seasons supply the place of ordinary forage. Among the grasses, the following may be enumerated:

Panicum divaricatissimum, (R.B.)	*Anthistiria avenacea*, (F.v.M.)
P. effusum, (R. Br.)	*Alopecurus geniculatus*, (Linn.)
P. decompositum, (R. Br.)	*Danthonia racemosa*, (R. Br.)
P. trachyrhachis, (Benth.)	*Astrebla triticoides*, (F.v.M.)

P. spectabile	*Leptochloa subdigitata*, (Trin.)
Neurachne Mitchelliana, (Nees.)	*Diplachne fusca*, (Beauv.)
Andropogon sericeus, (R. Br.)	*Glyceria Fordeana*, (F.v.M.)
A. bombycinus, (R. Br.)	*G. ramigera*, (F.v.M.)
A. refractus, (R. Br.)	*Bromus arenarius*, (Labill.)

In favourable seasons, these grasses spread over the vast plains of the interior, and, although certain species of *Stipa* and *Aristida* are sometimes injurious to sheep by the pungency of their seeds, yet no species of indigenous grass is known to possess any deleterious properties. The uncertainty of the seasons, however, in New South Wales, and the inequality of the rain-fall, render it a matter of great importance to graziers to look beyond the mere grasses for the depasturing of stock. The average rainfall, therefore, and the average temperature also require due consideration in forming any comparison between the forage plants of the coast districts and those of the interior. It appears that, whilst the average annual rain-fall in Sydney may be estimated at 51·521 inches, that of Bourke, on the Darling may be placed 13·653 inches. In the matter of temperature, likewise, the maximum and minimum in Sydney are reckoned at 107·9 and 36·8 Fahr. respectively, whilst at Bourke they are 121·5 and 29·9. Fahr. Owing then to the extreme dryness of the seasons, the great heat of the summer months, or the prevalence of bush-fires, the grasses may fail; and hence, had not nature supplied herbage of other kinds, large tracts of land would be useless as sheep or cattle runs, excepting when the rain-fall is abundant. In most countries, plants of the Salsolaceous kind occur most frequently in salt-marshes or near the sea-coast, but in New South Wales, in addition to species common to such localities, many of the Salt-bush kind are found in the arid interior, and such plants, in conjunction with the hardier grasses afford a plentiful supply of nutriment in all seasons.

The Salsolaceæ of the colony comprise 13 genera and 60 species and of these, *Rhagodia hastata*, (R. Br.), *R. parabolica*, (R. Br.)

Atriplex semibaccata, (R. Br.), and *Kochia villosa*, (Lindl.), are the most esteemed amongst what are called Salt or Cotton Bushes. *Rhagodia nutans* (R. Br.), *R. linifolia* (R. Br.), *Chenopodium auricomum*, (Lindl.), *C. album*, (Linn.), and *C. triangulare* (R. Br.) may be placed in the same category ; but it is to be feared, that, unless more care is exercised in the feeding of sheep and cattle in the interior, same of the Salt Bushes will become as rare as certain indigenous grasses are now near the coast. It is too much the custom to let the stock feed year after year on certain runs, without dividing the same into paddocks and removing the sheep or cattle from one to another ; and hence the older Salt-bushes are eaten down to the very roots, whilst the young plants are consumed almost as soon as they germinate.

In addition to the Salsolaceæ, there are some good forage plants of the Geraniaceæ, Umbelliferæ, Amarantaceæ, Ficoideæ, and Nyctagineæ, which in the absence of grasses are highly useful in the economy of nature. Some of these are popularly called Crowfoots, Wild Carrots, and so on, but perhaps amongst them all, none is more useful than *Boerhaavia diffusa* (Linn.), which, having a long tap-root, can withstand a considerable amount of drought, whilst it affords pasture early in the season ere the grasses are fully developed. Of the Leguminosæ of the interior, some are decidedly injurious to sheep and cattle, especially when in dry seasons they can find no other herbage to feed on. Such are some species of *Swainsona*, *Indigofera*, and *Lotus*, to which very bad effects are attributed. The first of these, in the species *S. Greyana* (Lindl.), and *S. galegifolia* (R. Br.), has been looked upon with much suspicion, and there can be no doubt that, in certain seasons (probably when sheep and cattle feed on such species exclusively,) they produce strange effects on the brain, causing animals to see objects larger than they really are, and giving them a propensity to climb. From observations made near Mudgee, it does not appear that *S. galegifolia* is deleterious when eaten with other herbage, nor indeed have the poisonous properties of *S. Greyana* been detected in cultivation. One of the most useful of the Leguminosæ in the interior is that which is found near the banks, or in the dry-beds of the rivers. It was first noticed by Sir T. Mitchell, in 1835, and called by him "Australian Shamrock." This plant is a species of *Trigonella* (*T. suavissima*, Lindl.), and whilst remarkable for connecting the vegetation of Australia with that of the South of Europe, it has nutritious qualities which render it worthy of cultivation. Sir T. Mitchell (Vol. 1, p. 254) says, "The perfume of this herb, its freshness and flavour, induced me to try it as a vegetable, and we found it to be delicious, tender as spinach, and to preserve a very green colour when boiled." This opinion has been confirmed by subsequent travellers, and recently a gentleman who feels interested in such subjects, has collected and distributed seeds for cultivation. As the species is already known as a useful herb for pasture and is allied to *T. fœnum græcum* (Linn.) —a plant esteemed by the ancients and still cultivated in the South of Europe—it may become more generally utilized. In dry seasons, such plants are of importance, as the grasses are for the most part limited to alluvial flats or scrubs. There, *Sporobolus virginicus* (Kunth.), *Eleusine ægyptiaca* (Pers.), *Glyceria Fordeana* (F.v.M.), and *Leptochloa subdigitata* (Trin.), have been found very serviceable; but perhaps of all the grasses of the interior that most widely diffused and most highly valued for depasturing purposes is *Panicum decompositum*, (R. Br.), in its varying forms. This grass (the seeds of which used to be collected and eaten by the blacks) has been found to yield under cultivation four tons of hay per acre.

During the winter, however, as well as in dry seasons, the stock find more nutriment from various herbs than from grasses, and in addition to those plants already enumerated, there are some species of the Composite family which are eaten by them, particularly of *Helichrysum*, *Helipterum*, and *Craspedia*, but at least one species of the last is reckoned among suspected plants.

The harsh, dry and frequently woolly texture of many composites in the interior is admirably adapted to stand the long droughts which frequently prevail there, though it is certain that they yield only a temporary nutriment in dry seasons. It is remarkable that the large order of the Composites in Australia affords so little fodder available for sheep and cattle, and that of the 30 introduced species, now spreading as weeds in many parts of the colony, scarcely any, with the exception of *Sonchus oeraceus* or the common Sow-thistle can be utilized for that purpose. Rabbits and hares are very fond of this plant, and it is eaten by goats, sheep, and pigs, but not by horses. In Baron Mueller's remarks on Australian Vegetation (1867), he dwells forcibly on the great importance of the storage of water and the dissemination of fodder plants in the interior, and the late drought has given additional weight to his suggestions, for on the runs least improved by art, there has been the greatest loss of sheep and cattle. There can be no doubt that the storage of rain-water, or the raising of water by the process of boring is the great desideratum of the present day, and as the population increases, it will be found more and more necessary to resort to artificial means to supply the wants of man and beast. Could the water so procured be rendered available for the purpose of irrigation, it is easy to foresee a vast increase of native vegetation as well as the possibility of cultivating fodder plants from other parts of the world. The Baron suggests that "the scattering of the common British orach *(Atriplex patula)*, an annual, but autumnal plant, would on the barest ground realize fodder for sheep." It may be added that two of our indigenous salsolaceous plants (*Rhagodia hastata* and *Atriplex semibaccata)* are also admirably adapted for the same purpose, and that they have been cultivated with success even in soils differing very much from that of their native habitat. On the whole then we may reasonably conclude with the Baron that many barren tracts of the interior are capable of vast improvement by the hand of art, and that "patient industry and intelligent judgement" may found many a lordly possession in regions now frequently desolate.

Description of Three New Fishes of Queensland.

By Chas. W. De Vis, B.A.

It is due to the discrimination of Mr. E. Spalding, Taxidermist to the Queensland Museum, that doubts long ago arose as to the identity of a large fish prepared by him, with the *Oligorus terræ-reginæ* described by Mr. Ramsay last year, in the Proceedings of the Linnean Society of New South Wales, vol. v., p. 94. My attention having been directed to it, I could not hesitate to regard it as an entirely distinct form. It is clear that two species at least of these great perches exist together in South Queensland waters. Apart from other characters, the convex nape and deep chest of the one, contrast sufficiently with the flattened anterior profile and lighter girth of the other, to render their distinctiveness obvious. The fish described is a mounted specimen measuring seven feet over all from the upper lip, and two feet in height. It was netted after some pursuit by fishermen in Moreton Bay, and objecting to capture well nigh demolished their net.

Oligorus Goliath, *n. s.*

D. 12/15. A. 3/7.

Height $3\frac{1}{7}$ in the total length. Length of head $2\frac{1}{3}$ in the same. Snout and interorbital width $\frac{1}{4}$ of length of head. Predorsal profile convex, lower profile rather more convex than upper. Lower jaw longer than upper. A single spine before the opercular angle, which is unarmed. Preoperculum serrated on posterior limb, denticulated on lower angle and emarginate above that angle. Uniform brown, except that a narrow premedian, light vertical bar crosses the caudal fin. There is a short weak spine behind the tenth dorsal spine—this may be an individual abnormality—if constant and found to arise from an interneural of its own, the dorsal formula will be 13/15.

Synaptura Fitzroiensis, *n. s.*

D. 53.? A. 55.? C. 13. P. 7.? V.? Lat. 145.

Height barely $2\frac{1}{3}$ in the total length. Head $\frac{1}{6}$ of same. Snout $3\frac{3}{4}$ in length of head. Interorbit $\frac{1}{6}$, and cleft of mouth (equal on both sides) $3\frac{3}{4}$ in the same. Dorsal commences on the occiput, opposite the angle of the upper opercle. Dorsal and anal rays branched, scaly to the tip. Ventrals small, equal, jugular. Anal commencing about their length posteriorly. Pectorals distinct, subrudimentary. Eyes small, lower one contiguous to rictus, upper one a little in advance. On the upper lip three or four short thick tentacles. Lateral line extended on caudal, which is pointed. Eyes on right side. Head on right side scaled, on left naked, anteriorly with numerous skinny filaments. Scales of opercle on left side rudimentary. No visible nostril. Scales strongly ciliated. Dark grey on right side with three short dark bands on the back, and dark blotches on the abdomen, suggesting continuity with the dorsal markings. Flesh-white on left side. Lips white.

For this specimen the Queensland Museum is indebted to Thomas McIlraith Esq., of Rockhampton. It is one of two recently taken at the mouth of of the Fitzroy, by Mr. Marcrow senr., Fisherman of that town.

In the year 1878, Count Castelnau described (Proc. Linn. Soc. of N.S.W., vol. iii., p. 51) among other fishes received from the Norman River his *Engraulis nasutus.* Either there are two species of Anchovy in that river, or there is an error in the locality ascribed to *E. nasutus.* I have before me two species, *E. nasutus* taken at the present time in the Brisbane River, and another undescribed. The colours of a recent *E. nasutus* are a play of iridescent gold-blue and green, gold predominating on the back, blue on the abdomen. The upper part of the dorsal and the caudal are golden-yellow, the lower part of the dorsal is transparent. Behind the preopercle and orbit are blotches of bronze-red, and on the mandibles are streaks of the same; on the base of the pectoral rays are bright red stains. The head from the snout, the shoulder, back, and caudal are punctured with black. The pupil is black, the iris iridescent blue and red. The maxillary does not extend *beyond* the gill-cover—the anal rises opposite the end of the dorsal, and extends to the caudal peduncle. The lower profile of the snout anterior to the mandible is distinctly convex. At this season the fish is plentiful in the Brisbane River. Hearing lately that a graving dock was being pumped dry, I sent for anything there might be left in it—a dozen small fish brought to me included seven of this species. Since then the Chinese Shrimpers hawk them about the streets. The Anchovy from the Norman River will constitute a third species.

E. CARPENTARIÆ.

D. 15. A. 21.

Teeth in both jaws. Maxillary not reaching *beyond* gill-cover. Height and length of head $4\frac{2}{3}$ to 5 in the length, without caudal. Snout $\frac{1}{4}$, and orbit $\frac{1}{3}$ of length of head. Anal rises opposite middle of dorsal. Dorsal rises nearer to caudal than to snout. A strong, longitudinal ridge on the head. Colour of skin, (scales lost) orange, with a rather broad, silvery streak. Head pale, silvery. A large black spot on each side of occiput with a few black dots around it. Black dots along the spine and on each interneural joint of the dorsal and anal. Caudal punctated with black, other fins white, immaculate. Average length $1\frac{1}{2}$.

It is hardly necessary to say that this fish is very different to the *E. Russellii*, Bleek, which Mr. Macleay informs us is "said to have been observed on the northern coast of Australia, but on insufficient evidence."

Description of a species of Squill from Moreton Bay.

By Chas. W. De Vis, B.A.

Lysiosquilla Miersii, *n. s.*

Two species of Australian *Lysiosquilla* are described in Mr. Haswell's Catalogue of our Stalk- and Sessile-eyed Crustacea. *L. acanthocarpus* Gr., and *L. Brazieri*, Miers, both belonging to Mr. Miers' second section of the genus. The occurrence on the Eastern Coast of a third species representing the first group, or that in which the appendages of the antepenultimate joint of the three posterior pairs of thoracic limbs are almost linear, is not without interest. The present species though approaching somewhat near to its natural ally, *L. maculatus*, Miers, has salient characters of its own, which may be recognised in the following diagnosis:

Carapace smooth, in the form of a truncate isosceles triangle, rounded at the posterior lateral angles. Rostrum elongate, cordiform, acuminate, with a median ridge on its produced limb. Exposed segments with irregular longitudinal wrinkles on the dorsum, which is slightly depressed, the wrinkling and depression becoming more pronounced posteriorly. An irregular semi-lunar depression on each segment near the lateral line. Penultimate segment, narrow, deeply sculptured in a grotesque fashion. Telson smooth, with a bold sagittate median ridge and four teeth on the lateral margin, of which the anterior two are strong. Ten long sharp teeth on the dactyli of the raptorial limbs including the terminal one, which near the tip is anteriorly dilated and presents a sharp edge. All the teeth finely serrated on the posterior edge. Four long sharp teeth on the propus, the posterior one moderately recurved. Colour light horn-brown. Exposed thoracic segments with a broad black basal band. Post-abdominal segments with a similar band at each suture. Carapace and penultimate joint of raptorial limbs with three broad, dark bands, appearing beneath the surface, a large black blotch on each side of the telson, and on the rami of the appendages of the sixth segment; a conspicuous white longitudinal band on each side of the dorsum.

Loc. Moreton Bay, on sand banks.

HABITAT OF *Cypræa citrina* OF GRAY.

BY J. BRAZIER, C.M.Z.S., &c.

There appears to be some doubt about the correct habitat of this species. When first described by Gray he gave the locality as Madagascar. Reeve in his Monograph of the genus makes no mention of any locality. Sowerby in his Conchological Illustrations and Thes. Conch. gives Madagascar. Through the kindness of Mr. J. F. Bailey of Victoria, I am enabled to give a true and correct locality of this rare species. In the month of May of this year, Mr. Bailey bought a large quantity of shells from a Chinaman, who obtained them while pearling at the Rowley Shoals, on the North-west Coast of Australia; and in the lot were a large quantity of very fine *Cypræa Mauritiana*, *reticulata*, *cylindrica*, *subcylindrica*, *helvola*, *pantherina*, and one example of *citrina*.

LUPONIA CITRINA.

Cypræa citrina, Gray, (non Kiener) Zoological Journal, vol. i., p. 509, No. 79, (1825), vol. iv., p. 86 (1828); Conch. Illust., pl. 2, sp. 48, fig. 9. Reeve, Conch. Icon. pl. 16, species 78, (1845). Jay's Catalogue of Shells, p. 388, No. 10,111, (1850). Sowerby, Thes. Conch., pl. 25, fig. 218–219 (1870). Pætel, Catalog der Conchylien-Sammlung, p. 7,52, (1873).

Hab. —? *(Reeve)*; Madagascar *(Gray* and *Sowerby)*; Rowley Shoals, North-west Coast of Australia *(Bailey)*.

The specimen described by Gray was from the collection of Mr. Humphrey who had it under the name of the *Small false* *argus of Madagascar.* Gray also mentions it in volume iv., of the Zoological Journal add. Woods Cat. App., pl. 3, f. 9. I have not found any such reference as quoted. The figure given by Kiener in his Monograph Coquilles Vivantes is *C. helvola,* Linné. Paetel appears to make *citrina* and *helvola* identical, it is quite evident he never had *citrina* in his collection when he compiled the catalogue.

New variety of *Ovulum depressum,* found at Lifou.

By R. C. Rossiter, Corr. Mem.

Ovulum depressum, Sowerby, Journ. Proc. Zool. Soc., 1875, p. 128, pl. xxiv., fig. 1. *Volva depressa,* Brazier, Proc. Zool. Soc., N.S.W., 1810, p. 482.

Hab. North-west Coast of Australia, *(Captain Denicke);* Isle Amede or Lighthouse Island near Nouméa, New Caledonia, *(R. C. Rossiter);* Bampton Reef *(Brazier).*

Variety rosea.

Shell rose, or flesh colour, highly polished, very finely striated on the dorsal surface, striæ more distinct near the extremities; outer lip very much thickened, light orange colour round the margin; base on the columella side with a callus deposit, very much thickened in the middle, tapering off and forming a ridge round the margin that extends from end to end, colour bright orange yellow, then white with a tinge of pink on the inner side; interior of the aperture rose pink, extremities tipped with vermillion red above and below. Length 20 millemetres.

Hab. Lifou, Loyalty Islands, found on a block of Coral, *(R. C. Rossiter).*

On the Breeding Place of *Platalea flavipes* and *Ardea pacifica*.

By K. H. Bennett, Esq.

On the plains some 30 miles north of the Lachlan River is situated a large hollow or depression thickly overgrown with box trees; this hollow is about a mile wide, and winding through it in various directions are several deep channels, fringed with Polygonum. The average depth of this depression below the level of the surrounding plain is between four and five feet, but in the channels it is much deeper. For several years prior to 1870, very little water collected in this, and what there was, was confined to the deep channels; but in the year above mentioned, owing to the unusual quantity of rain, and the surrounding country having become harder from stocking, this place assumed the appearance of a lake, and with the exception of seasons of drought, large quantities of water have collected there, increasing or diminishing according to the time of year. It has thus become a favourite resort and breeding place of large numbers of water fowl, and amongst them Spoonbills, *Platalea flavipes*—the only breeding place of these birds I ever met with. During the month of January 1877, I had occasion to pass this place, and my attention was drawn to a large number of Spoonbills constantly flying in and out of a thick patch of trees near the centre of the swamp, where I concluded they were breeding. The water at this time was low, and chiefly confined to the channels.

Wishing greatly to obtain the eggs of this particular bird, never having seen even a description of one of the species, I eagerly made for the clump of trees through a dense growth of "Roley Poley" bushes, that had sprung up as the water receded, riding as far as I could, and leaving my horse, when the ground became too soft. After some difficulty, owing to the boggy nature of the soil, I reached the trees in question, and found that my surmise as to this being a breeding place was correct, but to my intense disgust, I was too late, all the nests (amongst which were a number of those of the White Fronted Heron—*Ardea pacifica*), containing young in various stages, four being the maximum. The nests of the spoonbills were large structures of sticks, loosely interlaced, with a considerable depression lined with the soft fibre of decayed bark. Those of the herons were much more scantily built, and were almost flat, composed of sticks loosely put together and entirely without lining. The eggs as I subsequently found were placed on the bare sticks through the insterstices of which they could be seen from below. Finding there was no chance of obtaining a Spoonbills egg, or even the broken shell of one to give an idea of the colour &c., I turned my attention to the birds, old as well as young, and truly it was an amusing, and from a naturalist's point of view, a most interesting sight. The clump or rather belt was some fifty yards long, the trees composing it being low and gnarled, their crooked and distorted branches crossing one another and forming capital foundations for nests; an advantage the birds had evidently recognized, for every available place was occupied by a nest, either of Spoonbill or Heron. In some cases two or more nests were placed close together, and in these instances it was amusing to watch the conduct of the parent birds as one or other of them returned with food to its insatiable progeny; for in its hurry, and through the close proximity of the nests, it would alight on the wrong nest, an intrusion the others would fiercely resent, and a battle would occur, accompanied by loud angry croakings, which on one occasion resulted in a young one being knocked out of the nest during the struggle: at other times a ravenous youngster in its eagerness to obtain the coveted morsel brought by his unwearying parent, would overstretch himself and topple out of the nest, his descent being sometimes stopped by head, leg, or wing being caught in some forked branch, where he would hang feebly fluttering until death ended his sufferings. I saw many dead ones suspended in this way; in other cases the young one falling on the soft ground or in the water, quickly became the prey of the crows and hawks of various kinds, which were having a "good time of it," whilst now and again a hawk apparently preferring game of his own capture, would swoop down on a nest and clutching a struggling, croaking victim, bear him off to some adjacent tree, there to be devoured at leisure. Meanwhile the flapping noise of the birds' wings as they flew to and fro, the hoarse croaking sounds emitted by both adults and young, the cries of the herons, the cawing of innumerable crows, and the shrill whistle of the eagle—*Haliaster sphenurus*—made up a Babel of sounds not soon forgotten, and altogether formed one of the most animated scenes in nature that it has been my fortune to witness. I have said these birds hatched four young ones, but judging from the mortality I saw amongst them, I should think that scarcely half that number arrived at maturity. I took a couple of the young Spoonbills home, and although not confined they became thoroughly domesticated.

Having occasion about two years subsequently to revisit my father's station, "Yandeenbah," from which this swamp is distant only a few miles, I availed myself of the opportunity to pay another visit to the breeding places of the Spoonbills ; and as I felt sure in the event of the heronry being still occupied, I should this time be successful in obtaining eggs, I took a small bag in which to stow my spoil. On arrival at the place I found that owing to the recent and heavy rains the whole swamp was converted into a lake, but to my great satisfaction I saw that the clump of trees was still tenanted by the Spoonbills. To tie up my horse and strip off my clothes was but the work of a few minutes and taking my bag I started. For some distance the water was shallow, reaching to my waist, but this was decidedly the worst of the trip, for the ground was covered with a dense growth of the terrible thorny plant, known in the district as "Roley Poley" bushes, which it was impossible to avoid, and of which I still retain a lively recollection. As the water deepened, I took to swimming, and thus got clear of the "Roley Poleys," and with the exception of encountering a few snags and stumps made a rapid and uneventful voyage to within a short distance of my destination. Here again troubles commenced; the water shallowed and the dreaded "Roley Poleys" were as thick as ever. My naturalist's spirit, however triumphed, and I made my way to the nearest tree; which contained three nests, from each of which a Spoonbill flew as I approached. Eager to secure my prize I commenced climbing the tree; but numbers of the large "Bull-dog" ant had taken refuge in the branches, and of their presence I was soon painfully aware by numerous stings; but the Spoonbill's egg I was determined to have in spite of the ants, and with an occasional muttered imprecation at each additional sting, I at last had the gratification of beholding my first Spoonbill's eggs, which were rather long, and pointed, the colour white. Each of the three nests contained four eggs, and from where I stood, I could see into several other nests; none of which contained more than four. The Herons I noticed, were also breeding, their nests containing the same number of eggs.

Having any quantity to choose from, I contented myself with some half dozen of the best looking eggs of both Heron and Spoonbill, taken from various nests. Whilst taking these eggs I discovered the nest of a Whistling Eagle in a tree a short distance away, and on which the female bird was sitting, doubtless with the idea of reaping a rich harvest for herself and young, in the not far distant future. In this—so far as her present embryo family were concerned, she was mistaken, for I soon had her fine pair of eggs transferred to my bag, and as there was nothing else to be obtained just there, I continued my exploration by visiting other parts of the lake, which resulted in discovering several additional species of nests and eggs, amongst which were two nests of the Nankeen Heron—*(Nycticorax Caledonicus)*, each containing four eggs, about the same size and colour as those of *Ardea pacifica,* but of a paler tint. The nests were similar in construction and position to those of *A. pacifica.* By this time my bag was pretty well full, so I made my way shorewards and returned home well pleased with the result of my day's labours, though smarting dreadfully from the combined effects of "Roley Poley" thorns, and the stings of ants, to say nothing of sunburned shoulders.

NOTES AND EXHIBITS.

Dr. Ewan exhibited a sample of nitrate of uranium, a most powerful irritant, also of caffeine. He gave an account of the preparation and characters of this drug, and remarked on its physiological action, it first producing spasm and then paralysis in dogs, rabbits, cats, birds, and fish; one grain injected into the vein of a small dog being sufficient to destroy life. He said that the peculiar effects produced by taking strong coffee were attributable to the presence of a certain percentage of caffeine. Dr. Ewan also exhibited specimens of citrate of caffeine, and a large specimen of the gum resin of *Eucalyptus globulus,* from near Launceston, Tasmania.

Dr. Cox, exhibited a specimen of *Latirus Strangei*, of A. Adams, collected from the sea shore at Bulli. This species had been so briefly recorded by Mr. Adams that it was difficult to identify; no measurement or figures being given. The length of this rare specimen was one inch and a-quarter. Mr. Strange was the first to find the species, but one specimen has since been collected by Mr. John Brazier, at the Bottle and Glass rocks, and one at Shark Island in Port Jackson. Dr. Cox also exhibited a number of fossil nuts and seeds which had been presented to him by Mr. William Newton, junr., who had obtained them at a depth of 210 feet in washdirt found under the basaltic rock in the shaft of the Great Extended claim, Forest Reefs, Orange. The specimens shown represented the species *Rhytidocaryon*

Wilkinsoni, *Phymatocaryon Mackayi*, *P. angulare*, *Penteune Clarkei*, *Spondylostrobus Smithii*, &c. Mr. Wilkinson explained by a rough section the geological structure of the locality: An old valley in the Silurian rocks, with its bottom of auriferous drift, in which the specimens were found, had been filled up by a flow of basalt from the neighbourhood of the Canobola Mountain, through which the shaft above mentioned is sunk to the bed rock.

Dr. Cox exhibited in addition, a stone hatchet, obtained from Kane's Paddocks by Mr. Newton, jun. This hatchet differs from those usually found in not being made from a smooth waterworn pebble, but from a piece of metamorphic rock, which has been split and chipped so as to resemble the ordinary waterworn stone hatchets.

Mr. T. Tenison-Woods exhibited a drawing of impressions of the "red hands," made by the aborigines in a rocky recess in the Mudgee district. This peculiar symbol, the exact meaning of which was unknown, existed among all the tribes throughout the whole of Australia. The speciality of this exhibit was that the impression consisted of both hands, left and right, the right hand impression being usually the only one made. Mr. Tenison-Woods stated that he hoped to furnish the Society at a future date with further observations on this practice of the aborigines. Dr. Cox described the manner in which the impressions were made.

The Hon. W. Macleay, F.L.S., exhibited some grape vine cuttings much eaten by the larva of a weevil. He said that he had received these cuttings from Mr. A. T. Holroyd, whose gardener had discovered, in pruning his vines, that a large number of them had been attacked in this way. The larva is a small white, fleshy, curved, apod grub, evidently of the weevil tribe, which commences its ravages at or near the extremities of the young shoots of the vine, and works its way towards and even into the old timber and roots of the plant, eating away the entire pith of the branch, but never giving any external evidence of its presence. The larvæ of many of these Curculionidæ were so alike, that until specimens of the perfect insect were procured he could not possibly tell the species or even genus of the beetle. Mr. Macleay also exhibited two large wall diagrams representing highly magnified coloured figures of *Phylloxera vastatrix*, in all stages of growth. He stated that Mr. Augustus Morris had lately received these plates from France, and had kindly presented them to the library of the Society.

Mr. E. P. Ramsay, Curator of the Australian Museum, exhibited: 1, a flint nodule, from a chalk formation in the Solomon Islands; 2, seeds of a supposed new species of *Cocos* from the Island of Ugi, Solomon Islands; 3, branches of a *Eucalyptus*, said to be punctured by the ovipositor of a *Cicada*, sent from Pennant Hills by Mr. H. A. Richardson, of Parramatta; and 4, a photograph of a large specimen of the John Dory, *Zeus australis* which weighed about 5 lbs., and was caught in Port Jackson.

Mr. Brazier exhibited, on behalf of Mr. Bailey, the specimen of *Cypræa citrina* mentioned in his paper, and on behalf of Mr. R. C. Rossiter a specimen of *Ovulum depressum*, and the variety *rosea*. Mr. Brazier also exhibited parts 37 and 38 of Sowerby's "Thesaurus Conchyliorum."

WEDNESDAY, 30TH AUGUST, 1882.

The President J. C. Cox, M.D., F.L.S., &c., in the Chair.

DONATIONS.

"Transactions and Proceedings of the New Zealand Institute," Vol. 14, for 1881.

"Papers, Proceedings, and Report of the Royal Society of Tasmania," for 1881.

"Annales de la Société Malacologique de Belgique," tome 13, 1878.

"Proces verbaux de la Société Malacologique de Belgique," Oct. à Dec., 1880, Juin à Dec., 1881, et Janvier, 1882.

"Proceedings of the Zoological Society of London," part 4, 1881.

"Report of the progress of the Geological and Natural History Survey of Canada," during 1879–80, with four maps.

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PAPERS READ.

BOTANICAL NOTES ON QUEENSLAND.—No. IV.

By the Rev. J. E. Tenison-Woods, Vice-President, &c.

MYRTACEÆ.

Eucalyptus tereticornis, Sm. This is called the red gum in Queensland, and is similar in habit to *E. rostrata* of which it may only be a variety. It grows near running water or in the beds of streams. It is found on both sides of the Dividing Range, and even on the very borders of mangrove swamps. In well watered open forests it may be said to be the prevailing gum tree. In the tropics, where the soil is rich, the banks of the streams are so thickly clothed with scrub, that one begins to lose sight of it, especially north of Cardwell, I remember seeing it on the Herbert River and on the Barron. But at Herberton and on the tableland it is not uncommon.

E. platyphylla, F.v.M. This gum tree begins to appear about Rockhampton and soon is the prevailing tree, on the poor dry sandy land of the tropics. Its distinguishing character is the great width of the leaves and the conspicuous cream-coloured, smooth bark. Unlike most of the gum trees the bark of which does not split, the deciduous portions soon fall off, so that there are none of those strips and ribbons or dark crests of bark which are so characteristic of the Australian bush. The bark is smooth or slightly wrinkled and of bright colour. Thus the tree is always conspicuous, and when the open forest is composed of it as it is between Townsville and the tableland, the effect of the masses of white trunks is very striking. It is never a tall tree, nor is the trunk thick; the branches are usually straggling and not stained with exudations of gum. The size of the young leaves is astonishing, I have measured on young shoots leaves 18 inches long and 15 across. Most Eucalypts have some peculiarity in the young state. In this case the leaves are not placed at right angles to the stem, but are very much larger than in any other Eucalypt of the east coast. It grows on the poorest sandy soil and does not seem to require much moisture, though doubtless, being in the tropics it gets a good deal more than it would be likely to receive in more temperate portions of Australia. The wood is very inferior, and not much used even for burning. As it grows well on very poor soil it would be worth while to try it in cooler colonies for the sake of its shade.

E. hæmastoma, Sm. I do not know whether I am right in my determination of this tree, and I have been exceedingly unfortunate with my specimens, not one of which were preserved for comparison. I wish to specify it, because next to *E. platyphylla* it is the most common in all open forests and poor soils from Moreton Bay to Cape Flattery. It may occur to the south of Moreton Bay, but I have not had an opportunity of examining, It is a poor tree, seldom 30 feet high, wood of no value, bark very white but always rather thickly spotted with deciduous dark brown scales, covering a spotted or variegated trunk. One peculiarity in the species is that the bark does not split so much longitudinally as transversely, so that there are many segments in every scale which remains on the branches.

E. corymbosa, Sm. This tree which is generally known as the Blood-wood, has been observed by me in all the open forests as far as the waters of the Mitchell, and I have little doubt that it is found round the coasts of Carpentaria. One never sees these gum trees growing in a cluster, they are always scattered. The brilliant red colour of the gum which is like fresh blood is perhaps the origin of the local name. The gum occupies the interstices of the wood to such an extent that the timber can always be distinguished by this peculiarity.

E. terminalis, F. v. Muell. Very like the Bloodwood in habit but it is never so fine a tree. The bark is more scaly and of a pale red color and the trees cluster together more. It is, as the bushmen call it, more "patchy." Sometimes you may journey for a day or so without seeing it, and then you may have it in sight all round for many miles. It has a very wide range; I think I first noticed it on the edges of "Brigalow scrubs" near the Comet River, north of that I think I have seen it in places all through Eastern Australia. The natives about the Dawson call it "a-rang-mill." The wood would be of some value were it not always so small.

E. tesselaris, F. v. Muell. This is the Moreton Bay Ash of the colonists. To look at the species it is certainly a graceful ornament to the forest scenery. It grows tall and straight with graceful, pendulous, bright green leaves. The stem for about half-way up the trunk has a rough scaly bark, which splits into small squares like tesselated or mosaic work. Above this the tree is smooth with grey or green bark. This half-barked character is very constant and peculiar, by it the trees can always be known. It grows in open forest and swampy land; around Moreton Bay, Gympie, &c., the wood is not valued for any purpose whatever; about Rockhampton, Mr. O'Shannessy says that the heart-wood is good enough, but the sap-wood soon decays; about Townsville, Charters Towers, the timber is highly esteemed and used for all useful purposes. The only way to account for this is by supposing that the warmer climate is its proper habitat. I have seen this tree in nearly all the open lands of north-east Australia, but more prevalent about Moreton Bay and Maryborough than anywhere.

E. raveretiana, F. v. Mueller. This tree was first described by the eminent Baron von Mueller in 1877, in the tenth volume of the "Fragmenta Phytographiæ Australiæ," (p. 99) and again more fully in the First Decade of the "Eucalyptographia." It escaped the observation of botanists for so long because its habit and appearance is somewhat like *E. tereticornis*. For my own part I had very often passed it by without notice, although, certainly, it is one of the finest of our tropical Australian Eucalypts. My first acquaintance with it was on the Comet River, in Queensland, between Cometville and Springsure. Standing one day at the foot of one of the lofty trees, on what are called the flooded banks of the river, my attention was called to the very small seed vessels which were plentifully strewn on the ground. These were very much smaller than any gum tree with which I was familiar. I soon perceived that the flowers were also small, and the operculum though prolonged is different from either *E. tereticornis* or its congener or variety *E. rostrata*. A little research revealed that it was the Baron's new species, which he named after M. Raveret-Wattel, distinguished by his important essay "l'Eucalyptus, son introduction sa culture &c." After that I became familiar with the species. It is truly a noble tree, towering above every other gum tree on the banks and even in the bed of rivers. I think it is best seen in the bed of the Nogoa River, not far from the town of Emerald. I have never seen it except in the beds or on the banks of important streams. Baron von Mueller has given such a complete description of its characters, that I need add nothing here except the new habitats in which I have observed it. On the Dawson River it is common, and also on the Medway at the foot of the Drummond Range; I saw it also on the Pioneer River under the main range near Mackay. Again, on the Herbert it appears, on the Ross, Haughton, and more rarely on the Burdekin Rivers. I do not remember ever having noticed it on the west side of the Dividing Range. It goes by the local names of Grey Gum, Iron Gum, and Woolly-but, (far removed however, from the New South Wales tree of that name) and it is highly esteemed as a timber tree. It was much valued for sleepers on the central railway, but the plate layers told me that it was so hard that it destroyed their tools. The wood is a dark brown and takes a beautiful polish, besides being close-grained without any interstices filled with gum. It is altogether one of the most valuable timber trees of the tropics, in respect to size and the quality of the wood, only it is not very plentiful.

E. melanophloia, F. v. Muell. On all the barren stony ranges right up to the Mitchell River, and even perhaps beyond, the traveller cannot help noticing a stunted gum tree with deeply furrowed black bark and pale grey-green leaves with a whitish bloom upon them. These leaves are nearly round, opposite, without leaf-stalks and stem clasping, a peculiarity which all observers will have noticed belongs to the young state of many gum trees. But however old the tree, the leaves always have this form. Another peculiarity about it is that the rough deeply furrowed black bark extends to the very small branches. Now in most Eucalypts the bark however rough on the stem becomes smooth on the smaller branches, but it is not so here. The bark is always rough and always black and coarse looking. I used to think that this was a stunted variety of *E. crebra* or the Iron

Bark, to be noticed presently, and I am still not very clear on the subject as the trees are in many respects so very much alike. But they grow side by side, and the opposite leaved character of the present species is always maintained. Still the appearance is that of a Eucalypt not fully developed, especially in that whitish bloom on the leaves, and it never is seen of the size or appearance of a fully grown tree. The only way to settle this will be to sow the seeds of both and watch their growth. The wood of *E. melanophloia* is not valued for any purpose, but mainly because it is so small and stunted. It never grows in good soil and mostly prefers rocky ground. I have seen it abundantly inland as far north as the waters of Carpentaria and it extends into New South Wales. It generally goes by the name of the silver leaved Ironbark, from the whitish bloom on the leaves.

E. crebra, F. v. Muell. No one who travels in the interior of tropical Australia can help being familiar with this tree. It is the prevaling feature of all the open gum forests, and as a rule is to be found on all poor level ground. It has a hard persistent deeply furrowed black bark, and like the last species this character is maintained on the very small branches. It is a good timber tree and attains a fair height in favourable situations. I have seen it everywhere in the interior, and I believe it is common in the northern parts of New South Wales as in Queensland. I should say it is one of the most common gum trees in Eastern Australia, and a very large vocabulary might be made of its numerous local names. On the Peak Downs about Clermont and Copperfield it is especially plentiful, and all around the Hodgkinson diggings. I mention this fact just to show that whatever febrifuge qualities the Eucalypts may possess, the mere presence of some species will not be enough to dissipate malaria. In the places I have mentioned fever and ague were common enough, yet the prevailing winds used to blow through hundreds of miles of these gum trees ere they reached the infected localities.

E. crebra, is a most valuable tree because it will grow almost anywhere, and the wood is much esteemed for nearly every purpose. I am not at all sure that an attentive observation would not show that this species is no more than a slight variety of the Victorian Iron Bark, *E. leucoxylon.* It would be very hard indeed to draw any clear line of distinction between them, except in the anthers, which in *E. crebra* are all fertile, and in the Victorian Iron Bark have the outer row of filaments destitute of anthers. As far as the habits of the two trees are concerned, nothing could be more similar. An attentive study of *E. leucoxylon* has shown that it varies in a most remarkable degree, and especially in that which is usually regarded as a good and permanent specific distinction, that is, the bark. Baron von. Mueller in the "Eucalyptographia," mentions that the Victorian Iron Bark is the same as the White Gum of South Australia. From Western Victoria, that is west of the Grampian and Victorian Ranges, such a thing as an Iron Bark tree is not known, but instead we have, in all the poor soils a miserable tree, useless in its wood and with a ragged deciduous bark, which comes off in long strips. This tree is also found on the clay pans and wet ground of the Murray scrubs, and more or less abundantly it is found throughout the colony of South Australia for at least 100 miles north of Adelaide, that is over about 40,000 square miles of country. Climate and soil we may say are the causes which make the two strongly marked varieties, for as soon as we get into stony quartzose ridges, somewhat above 700 feet over the sea level, at once the white gum becomes Iron Bark; the wood is excellent, nay, one of the best. and the trees could not be more unlike White Gum. This remarkable fact is surely worthy of study and shows how much we have still to learn about the variability of our Eucalypts.

E. gracilis, F. v Muell. This Eucalypt affords a good instance of the local distribution of some of the species. It is nowhere abundant, but it is found in desert portions of the colonies from

West Australia to Queensland. Mr. O'Shannessy in his "Contributions to the Flora of Queensland" was the first to chronicle the prevalence of this species in the tropics of North-east Australia, and he states, that Mr. Thozet discovered it on Expedition Range. Travellers by the Central Railway may notice a small patch of this tree in the desert scrub about half-way between the Comet River and Emerald. When once identified the tree can hardly be mistaken for any other. It is of graceful habit, so that its name is really well applied. The white bark, slender stem, widely spreading branches with small narrow leaves, make it always an elegant, but never a large tree. The stem, says Mr. O'Shannessy, is generally fluted so as to resemble the pipes of an organ, and this is a peculiarity that I have noticed as well. The farthest north that I have observed this tree is on the dry sandy scrubs on the Burdekin River, not far from Charters Towers.

E. maculata, Hook., "Spotted Gum." This tree which is so very common on the east side of the coast range in New South Wales was thought at no very distant date to be almost confined to this colony. But it changes its character, and under another name, *E. citriodora* or Lemon Scented Gum extends right up to the waters of Carpentaria. It is always a fine tree and loves the warm sheltered eastern slopes of the ranges. But in tropical Queensland it becomes a very much finer tree. The peculiar spotted appearance of the stem is exchanged for a uniform greyish blue tint. The tree is tall and stately, with a large sound trunk and in fact there are no Eucalypts which can at all compete with it in size except *E. raveretiana*, and its leaves now send forth a strong perfume which is most grateful at a distance and like roses, but close it is most powerful and pungent and exactly like essential oil of lemon. This most extraordinary change of characters deserves an attentive study, because it shows that there is scarcely any limit to which variation in these trees may not go. In the "Flora," Dr. Bentham thought that *E. citriodora* was very closely allied to *E. corymbosa*, which was clearly an error, but he also saw its resemblance to the Spotted Gum of New South Wales. I have tried to fix the southern limit of the *citriodora* variety. Between Maryborough and the Burnett is the first place where the peculiar smell of rose leaves becomes apparent in the open forests. Mr. C. Moore is quoted as having found it in Wide Bay. On the road between Gympie and Maryborough, or about 120 miles north of Brisbane, the spotted variety of *E. maculata* is very abundant on stony ridges. The spotted character has disappeared somewhat and the trunks of the trees have a uniform reddish hue which is very remarkable. Here too, one notices that the trees exude great quantities of a dark brown resin that ought to be of some commercial value. The strong rose scent in the woods which is indicative of this tree begins about the Burrum River on the overland road between Maryborough and Bundaberg. The tree is however, nowhere abundant and I think places may be found where the two varieties grow side by side on the Burnett. After this the spotted variety disappears and the scented kinds are confined to a few stony spots of the most elevated ridges as one journeys north. The farthest north I have seen it was on the summit of the Slate Range, 2,100 feet above the sea, on Carpentarian waters, in about Lat. 16° S. It extends no great distance inland. Fifty miles from the coast is the farthest I remember to have seen it: The wood is esteemed for dray poles, but the Government will not allow it to be used in the telegraph line. In the young state the shoots are often hispid from an abundance of coarse glandular hairs of red colour. This variety has more the odour of balm than of lemon, and hence was described as a different species. This is *E. mellisiodora*, Lindley, of the Flora which was found by Mitchell and described in "Tropical Australia." The appearance for a young Eucalypt is very remarkable. The foliage is short and rough and quite rusty looking, from the glands which become bristly on the small branches. Altogether *E. maculata* is one of the most interesting as well as the most valuable of the Eucalypts. The oil from the leaves has a most powerful odour of lemons and may be used yet as a substitute for the essential oil. The leaves retain their scent long after they are dry, though it gradually becomes faint. When freshly gathered and bruised it is quite pungent, slightly stinging the eyes and nose. It is said by Mr. O'Shanessy, that a pillow of the dried leaves is a remedy for fever and ague. They are certainly a specific against the cock-roach and "silver fish" insects, which are the great domestic pests of northern Queensland.

E. populifolia, Hooker. About the validity of this species there was some doubt. Bentham regarded it as the same as *E. polyanthema*, Schaur. However, Baron v. Mueller has given very sufficient reasons for regarding them as distinct.* The tree is very abundant about Rockhampton, where it goes by the name of box. The blacks called it Egolla. But for the large leaves which are very much like those of the Poplar, it is exactly similar to the tree which goes by the name of Bastard Box through so large an extent of Victoria and New South Wales. The bark is grey and persistent, not exactly furrowed but finely split so as to show a very fibrous character. It is very much used by settlers to make not only the roofs but also the walls of huts. It strips off easily in sheets and is very suitable for buildings when it has been pressed flat. A remarkable character in this tree is the tendency to enlarge about the root, which often spreads so as to form literally sheets of wood, or rises in huge tumefactions or swellings on the roots and stems. This is also the character of *E. polyanthema* (Bastard Box). As one is hurried across the Liverpool Plains in the railway, it is worth while to notice the number of trees which have these swellings upon their roots or sides. Scarcely one will be found to be exempt. I attribute the cause of this to the compact character of the bark which

* See Eucalyptographiæ, 3rd Decade.

prevents the shoots from emerging. But the subject needs examination and is worth attention.

E. exserta, F. v. Mueller, which Bentham regards as a variety of *E. rostrata*, (which is again perhaps only a variety of *E. tereticornis*,) was noticed by me on the basaltic ridges between Port Mackay and Clermont. This is the most northerly habitat hitherto recorded. It is a fine tree and the wood is excellent. I saw it also at Springsure, and again it has been pointed out by Mr. O'Shanessy as flourishing near Rockhampton in one small patch.

I find in my note book many other remarks about the Eucalypts but unfortunately the specimens which corresponded with these notes, were either lost in an accident which occurred to my pack-horses near Trinity Bay, or the plants are too incomplete for identification. I especially regret this as I had some remarks, which I think were of importance, with reference to the Eucalypts of Herberton and the Hodgkinson ranges.

Tristania exiliflora, F.v.M. I found this species on the summit of Castle Hill or Mount Cutheringa, immediately behind Townsville, at an elevation of nearly 1,000 feet above the sea, Bentham says that the only distinction which can be made between this and *T. laurina*, is that the flowers are small and the seeds not winged. *T. conferta* and *T. suaveolens*, are the prevailing trees in almost all open forests from Moreton Bay right up to the Gulf of Carpentaria. The dense coriaceous foliage of *T. conferta* makes it look like a fig-tree, but for the bark. It is a most agreeable addition to the forest vegetation of all Queensland and gives a refreshing shade.

Backhousia citriodora, F. v. Muell. From this plant, which smells even more strongly of lemon thyme than the Eucalypt already mentioned, Mr. Staiger the Government Analytical Chemist, extracted a powerful essential oil. I noticed the tree on the River Burrum, but nowhere further north.

Lysicarpus ternifolius, F. v. Muell. This is what generally goes by the name of " Stringy Bark " in this part of the continent and as far as the bark is concerned it is very like the tree of that name elsewhere or *Eucalyptus obliqua.* But the leaves are very different and so I need hardly say, are the flowers. It is only quoted from one or two places in the " Flora," but I have found it forming the principal ingredient of some of the scrubs between the Comet, Nogoa, and Belyando Rivers. The fibre is of such a superior quality that it has been sought for by rope and paper makers, but hitherto the price offered has not been sufficient inducement for its collection.

Metrosideros chrysanthus, F. v. Mueller, which Bentham regarded as a distinct genus *(Xanthostemon)* was seen by me in many forests around Trinity Bay, on the Barron and Mulgrave Rivers.

Myrtus gonoclada, F. v. Muell. This tree is found in the sub-tropical forests as far at least as the Burnett River. The wood is called ironwood by the settlers, and is of extraordinary hardness. It would be superior to box for wood engraving. It is seldom above 25 feet in height and the stem is consequently small. Cedar-getters do not like to use their axes upon it. It is very common in shady places.

On a Coal Plant from Queensland.

By the Rev. J. E. Tenison-Woods, F.G.S., F.L.S., &c.

The plant impressions which I exhibit this evening were taken from the Tivoli Mine near Ipswich, Queensland. It will be observed that amongst the fragmentary mass of leaf impressions in the clay, there are certain disk-like forms of rather an ornamental character. They are shaped like toothed wheels with a small central perforation and a radiate ring of pear shaped perforations near the edge. These disks are very abundant in some places and suggest the idea of fruits, but there are no known fruits of this character, either living or fossil. A little attention to the plant impressions by which they are always accompanied will explain their origin. These might easily be mistaken for *Phyllotheca* a closely allied plant, but they are not of that genus. The whorls of leaves at the free ends of the sheaths are never present. Instead of them we have the toothed closely adpressed sheath of *Equisetum*, which shows us that this is the genus with which we have to deal. Now *Equisetum* is a plant in which the stem is fistular and with one or two rings of longitudinal cavities in its circumference. At intervals the stem is divided by transverse disks, which have this single or double ring of cavities. The outside ring is seldom seen as this is the portion where the disks break away. As they contain a good deal of silica they are easily preserved, they are always found abundantly in the soft marshy ground on which *Equisetum* grows. We have no such plants existing in Australia, but they occur in all other portions of the globe except New Zealand. Formerly they played a most important part in the world's vegetation, and many believe that *Calamites*, *Sphenophyllum*, and *Annularia* belonged to the same family of *Equisetaceæ*.

Disks somewhat resembling the present have been found in the Oolitic Coal of England, and in the Upper Trias of France and Germany. At one time they excited some little controversy as to their nature, but there seems now to be no doubt of their cryptogamic character.

Equisetum is not previously recorded from our Australian plant formations. One species is described from the Gondwana beds in India, by Oldham and Feistmantel—*E. rajmahalensis*. This plant somewhat resembles our species, but the differences in the diaphragmata are great.

In a paper I am preparing on the whole of our coal flora in Australia, I shall deal with this species. In the meantime in the absence of any evidence that it is specifically identical with any described *Equisetum*, I distinguish it as *E. rotiferum*.

Nothing approaching the spore-bearing spikes was seen by me, so that the fructification must remain unknown for the present.

True *Phyllotheca* have not been met with by me in these beds.

Observations on an Insect injurious to the Vine.

By William Macleay, F.L.S., &c.

At the last monthly meeting of this Society I exhibited some Coleopterous larvæ which had been found by Mr. Holroyd to have committed very serious havoc among his grape-vines. I also exhibited cuttings of the injured plants, showing the pith or centre of the branch completely eaten away along the entire length of the season's wood, with, in some cases, the devastation extending into the old wood and the roots. I said at the time that the grub was the larva of a Curculionidous beetle, but that until I had seen the perfect insect, I could not possibly tell the species or even genus, so much alike were all the larvæ of that group. I am now, however, able to speak positively on the subject.

A few days ago Mr. Holroyd brought me several specimens of both sexes, some—*in coitu*, of a beetle taken by his gardener out of the injured plants, and which are most undoubtedly the outcome of the grubs which had caused all the injury. I find them to be specimens of *Orthorhinus Klugii*, of Schönherr.

The genus *Orthorhinus* numbers about 20 species, and is found only in Australia and a few of the Polynesian Islands. The description of it, translated from Lacordaire's "Genera des Coleopteres, vol. 6, p. 462," is as follows: "Head subglobulose; rostrum much narrower than the head, rather robust, straight, cylindrical, longer than the head. Antennæ of moderate length, and slight; scape not thicker at the tip; funiculus of seven joints, obconic, first and second elongate, from the third to the seventh of variable length, getting gradually thicker; the club oval, articulated. Eyes large, vertical, sinuated beneath. Thorax scarcely or not transversal, rounded at the sides, slightly bisinuated at the base, bulging out anteriorly, with the anterior border more or less prominent, and profoundly sinuated on the antero-inferior border. Scutellum of a curvilinear-triangle form. Elytra subcylindrical, rather wider than the thorax, and very slightly sinuate at their base. The anterior legs elongated, in the males particularly, slightly separated; tibiæ robust, compressed, bisinuated in front, and strongly pointed at their extremity; tarsi spongy beneath, with the third joint much larger than the first and second, the fourth of medium size, the claws of variable length; the second abdominal segment much larger than the third and fourth united, separated from the first by a strongly arcuated suture. Mesothoracic epimera rather large. Body oblong, unequal, scaly.

The species *O. Klugii* was first described in Schönherr's great work on the Curculionidæ, Vol. 3, p. 246, though it seems to have been known previously to Hope, as Schönherr acknowledges having received the insect from Hope with the name attached. The specific characters given to the species by Schönherr are here translated:

"Oblong, black, clothed above with deep brownish-red scales, and beneath with lighter reddish-brown; rostrum rather slender, rugose-punctate; thorax oblong, remotely and obsoletely tuberculated, in front bifasciculated, with a patch in front of the scutellum of a reddish-brown; the elytra finely striate-punctate, marked with a transverse, oblique, reddish fascia, the alternate interstices rather elevated, and with four rather large fasciculated tubercles." The average length of the species is (female) eight millemetres; and the greatest width three millimetres. The male is about half that size.

My cabinet contains specimens of the species from all the Australian Colonies, from which it may be inferred that it is an insect of wide distribution, I have never however, until now known of its being noticed for its destructive tendencies. This however, may only be an evidence of want of observation, for other better known species of the genus are extremely destructive to fruit and forest trees. The largest species, of the genus—*Orthorhinus cylindrirostris* is very common, and sometimes very injurious. I can well remember more than twenty years ago a number of fine Pine trees at Elizabeth Bay being killed through the agency of this beetle. But in truth all of the genus must be from their habits necessarily destructive, whenever from some cause or another they become more than usually numerous. Their nearest ally in Europe the common *Hylobius abietis* has become more than once for a time so numerous as to threaten with extinction the Fir Forests of Northern Europe. I am not aware what the native trees or plants are which *O. Klugii* feeds on or used to feed on, but it seems more than likely that if it takes kindly to an introduced plant like the Grape Vine, it may develope into a very serious pest. The experience of another season will enable us to judge with more accuracy of the amount of injury which these insects are capable of inflicting, than we possibly can at present.

In the meantime it is most desirable that vignerons and horticulturists generally, should watch for the appearance of the perfect insect, which is *now* issuing from the pupa state, and take particular note of what plants it shows a preference for, as it is possible that the Grape Vine may not be the only product of the Orchard which suits its taste.

The beetle itself does no harm, but it fixes itself upon a plant which its instinct tells it to be suitable for the support of its larva, bores in it a minute hole with its long rostrum and therein introduces an egg. When the larva is full fed, which seems to be at the end of the season, it changes into the pupa state, and in early spring emerges into the perfect beetle, when it bores a hole for its escape. There can, I should say, be very little difficulty under such circumstances, in keeping down the number of these insects, a little care in the pruning season in cutting out all the infected branches, and the immediate burning of them, would almost ensure the complete destruction of the pest, if their ravages were confined to the Grape Vine, but as I mentioned before, there may be other plants or trees liable to their attack, and to ascertain what these are, must necessarily accompany any effort to clear an Orchard of the insects.

NOTES AND EXHIBITS.

The Rev. J. E. Tenison-Woods exhibited the specimens of fossil *Equisetum* referred to in his paper; also a very large specimen of *Aphanaia gigantea*, De Kon., the second which has been discovered; two specimens of *Aphanaia Mitchelli*, M'Coy; *Spirifer glaber*, W. Martin; *Pleurophorus Tenisoni*, De Kon.; and a specimen of fossil coniferous wood. These fossils, with the exception of the *Equisetum*, which was obtained in the Tivoli mine, Ipswich, were found in the lower marine palaeozoic strata at the quarries, Cemetery Hill, West Maitland. Mr. Tenison-Woods also exhibited a beautiful specimen of a Hydroid zoophyte (*Sertularia*), with attached *Eschara*, obtained by an amateur fisherman off Bondi, and forwarded for exhibition by William Cameron, Esq.

Mr. E. P. Ramsay exhibited bracelets from Fiji, the Solomon Group, and Bougainville Island, all cut from large shells. The specimens from the Solomon Islands were cut from a species of *Spondylus*, and the large Fiji specimens were ground down from solid masses of the large *Tridacna;* also a remarkable horned lizard, from America, presented to the Museum by Mr. Webster.

Mr. Ramsay also exhibited a collection of *Coleoptera*, which had recently been received from Mr. Barnard, from the Dawson River. This interesting collection contained a great many rare, and some new, species of *Buprestidæ*, *Cetoniidæ* (*Schizorhina*), *Scaritidæ*, *Cicindelidæ*, and some fine *Longicorns*.

The Hon. W. Macleay exhibited specimens of *Orthorhinus Klugii*, received from Mr. Holroyd, and the subject of the paper previously read; also, specimens of a beetle, a true borer of the family *Scolytidæ*, which had completely destroyed during the past season all the figtrees in a large orchard in the county of Cumberland. He pointed out that while the first of these insects was an instance of injury caused by an indigenous insect to an introduced plant, the other was, he feared, an instance of the introduction to the country of a foreign species belonging to the most destructive family of Xylophagous beetles. He thought that at the next Meeting of the Society, he would be enabled to give some more definite information on the subject.

Mr. T. Tenison-Woods, exhibited a Stone Tomahawk, said to be from Northern Australia, but recognised by its smooth make and general appearance as belonging to the Solomon Islands.

Mr. K. H. Bennett exhibited a nest of three eggs of the ground graucalus (*Pteropodocys phasianella*). The nest is remarkable for its size and compactness; usually the birds build but a scanty shallow structure of grass and cobwebs; the specimen exhibited, on the other hand, was a large structure about 10 inches in diameter, very deep, and composed of a large quantity of wool, cobwebs, and grass closely and neatly interwoven. The eggs were three in number, of a rich asparagus-green, with indistinct dull brownish freckles and spots.

Professor Stephens read the following note from Dr. Woolls relating to a grass *(Panicum spectabile)* on which there had been some discussion at the preceding meeting of the Society:—" It is not generally known that the grass cultivated under that name is not a *Panicum* at all, but *Andropogon Halepensis* (Sibthorp), or *Sorghum Halepense* (Pers.). The grass was figured and described as *P. spectabile* some time back in the "Sydney Illustrated News." But its long roots, a yard in length, and as thick as a little finger, together with the white midrib mark it as *Andropogon Halepensis.* Mr. Bentham seems to doubt whether it is really indigenous. I have found it in an orchard at Parramatta, but believe it to have been introduced from the north. Baron Mueller speaks highly of it as a forage plant, but recommends that it should be kept out of arable land. It is quoted as indigenous in the catalogue of Queensland grasses compiled for the International Exhibition of 1879, but the appropriation is doubtful.

WEDNESDAY, 27TH SEPTEMBER, 1882.

The President J. C. Cox, M.D., F.L.S., &c., in the Chair.

DONATIONS.

It was announced that the List of Donations received during the month, as well as the Donations themselves, had been lost in the fire at the Garden Palace.

PAPERS READ.

ON *Myoporum platycarpum*, A RESIN PRODUCING TREE OF THE INTERIOR OF NEW SOUTH WALES.

BY K. H. BENNETT, ESQR.

This tree known to Bushmen by the name of Sandalwood is widely distributed over the Western portions of New South Wales, being found more or less throughout the Country from the Murray below Moama to Wilcannia on the Darling. It is also found in considerable quantities in some parts of South Australia. It is very plentiful in a strip of arid country situated about mid way between the Lachlan and Darling Rivers, and it was from this locality that I obtained the gum or resin exhibited. Small patches of this tree are to be met with about the "Pine Ridge" on the "Old Man Plain" and also in the vicinity of Hay on the Murrumbidgee River. It nowhere attains a large size, the largest that I have seen were between 30 and 40 feet high, with a diameter of trunk of about a foot or 15 inches, but these dimensions are rare, the average height being about 20 feet. When young it is a handsome tree, the foliage being very dense, and dark glossy green; as the tree becomes old the foliage gets spare, and it loses its handsome appearance. It flowers in September and October, the blossoms are small, white and star-shaped, growing in bunches of six or eight flowers along the thin branchlets, which as a rule are pendulous. These blossoms, evidently contain a large quantity of nectar, as during the flowering period the trees are crowded by several species of honey-eating birds, amongst which may be seen the—at other times rare—*Myzomela nigra*. The timber when dry is hard and somewhat brittle; it has a fine grain, and when worked emits a pleasant perfume; it is also highly inflammable, a splinter of dry wood burning with a clear steady light like a candle, emitting at at the same time a strong but pleasant perfume. This inflammability is caused no doubt from the large quantities of resinous substance contained in the wood; this resin or gum exudes from the trunk and branches in a soft state, and in appearance exactly resembling pitch, and in the form of nodules varying in size from that of a filbert to that of a grain of large shot, which harden by exposure to the air and drop off, the greater quantity of these nodules being found on the ground beneath the trees. This substance was in former times much used by the natives for the same purposes as we use wax; by melting it with fat they produced an excellent wax-like substance, which they used on the thread with which they bound their stone tomahawks to the handles. It was used also in fastening on the heads of their spears, &c., &c. During the hot summer months another and totally different looking substance exudes from the trunks and branches of some of these trees in large quantities. This substance when freshly exuding from the tree resembles a thick froth, either pure white and resembling snow, or of a pink or rose colour. These exudations assume various forms and become solidified by exposure to a certain extent to the air. Sometimes they are in lumps as large as a man's hand, and sometimes in the form of stalactites over a foot long, as large as an ordinary candle, and gradually tapering to a point. This substance is of a highly saccharine nature, with a peculiar sickly sweetness; it melts in the mouth like ordinary sugar; the natives are very fond of it, and either eat it, or by dissolving it in water make a kind of drink.

Contribution to a knowledge of the Fishes of New Guinea.—No. II.

By William Macleay, F.L.S., &c.

Family BERYCIDÆ.

121. Holocentrum violaceum, Bleek.

Gunth., Cat. 1, p. 43.—Bleek., Atl. Ichth. Trachicht. pl. 1, fig. 2.

"Tara" of the natives.

122. Holocentrum spiniferum, Forsk.

Gunth., Cat. 1, p. 39.—Bleek., Atl. Ichth., Trachicht. pl. 3, fig. 3. —*Holocentrum leo*, Cuv. & Val.—Less. Voy. Coq.—Voy. Astrol. pl. 14, f. 3.

"Tara" of the natives.

123. Holocentrum caudimaculatum, Rüpp.

Gunth., Cat. 1, p. 41.—Bleek., Atl. Ichth. Trachicht., pl. 2, fig. 3. —*Holocentrum spiniferum*, Cuv. & Val.—Rüpp., Atlas. taf. 23, f. 1.

124. Holocentrum rubrum, Forsk.

Gunth., Cat. 1, p. 35.—Bleek., Atl. Ichth., Trachicht. pl. 3, fig. 4. —*H. orientale* and *marginatum*, Cuv. & Val.

"Kururu" of the natives.

125. Holocentrum sammara, Forsk.

Gunth., Cat. 1, p. 46.—Bleek., Atl. Ichth. Trachicht, pl. 6 fig. 5, &c.—*H. christianum*, Cuv. & Val., and Rüpp., Atlas. p. 85.

"Kururu" of the natives.

126. Holocentrum diadema.

Gunth., Cat. 1, p. 42.—Less., Voy. Duperr. Zool. 2, p. 220, pl. 25, f. 2.—Bleek., Atl. Ichth. Trachicht, pl. 2, fig. 1.

127. Holocentrum Goldiei.

D. $10/\frac{1}{11}$. A. 4/7. L. lat. 44.

Height of body nearly, and length of head quite four times in the total length. Eye very large, the supraorbital ring forming a slight convexity in the profile, the space between the eyes is flat, channelled, and nearly equal to the diameter of the eye, the distance from the eye to the snout is about half the diameter of the orbit; the maxillary reaches to below the middle of the eye. The armature of the suborbital and the spines of the preoperculum and operculum are unusually small for the genus. The first dorsal spine is not much shorter than the second, the ninth is very short, and the spine of the soft dorsal is also short. The first spine of the anal fin is minute, the third very large and thick. The colour is silvery all over, with a blackish base to each scale, giving a striped appearance to the fish; the scales on the cheek are distinctly marked with groups of from three to five minute black dots, each with a whitish or bluish centre. The fins are immaculate. Iris yellow.

Several specimens about 6 inches long.

This species seems to resemble in some respects *H. stercus museorum* of Cuv. & Val.

128. Myripristis adustus, Bleek.

Atl. Ichth. Trachichth., pl. 2, fig. 2.—Gunth., Cat. 1, p. 22.

"Kururu" of the natives.

Family POLYNEMIDÆ.

129. Polynemus plebejus, Linn.

Gunth., Cat. 2, p. 329.—Journ. Mus. Godef. Heft 9, p. 103, Taf. 77, fig. a.

Syn.—*P. taeniatus*, Gunth., Cat.—*Trigla asiatica*, Forst.

"Areola" of the natives.

Family ACRONURIDÆ.

130. Acanthurus hepatus, Bl.

Gunth., Cat. 3, p. 341.—Journ. Mus. Godef., Heft. 9, p. 115, Taf. 75.

"Tanenaria" of the natives.

131. Acanthurus lineatus, Bl.

Gunth., Cat. 3, p. 333.—Journ. Mus. Godef., Heft. 9, p. 111, Taf. 70.

132. Acanthurus triostegus, L.

Gunth., Cat. 3, p. 327.—Journ. Mus. Godef., Heft. 9, p. 108.

Syn.—*Teuthis australis*, Gray.—*Acanth. subarmatus*, Benn.

"Dara Dara" of the natives.

133. Acanthurus guttatus, Bl.

Gunth., Cat. 3, p. 329.—Journ. Mus. Godef. Heft. 9, p. 109, Taf. 69, fig. a.

"Hegara" of the natives.

134. Acanthurus matoides, Cuv. & Val.

Gunth., Cat. 3. p. 330.—*A. Blochii*, Cuv. & Val., 10, p. 209.—Journ. Mus. Godef., Heft. 9, p. 109, Taf. 69, fig. B.

"Anata" of the natives.

135. Acanthurus gahm, Cuv. & Val.

Gunth., Cat. 3, p. 338.—Journ. Mus. Godef., Heft. 9, p. 113, Taf. 74.

"Vanaka" of the natives.

136. Acanthurus olivaceus, Bl.

Gunth., Cat. 3, p. 336.—Journ. Mus. Godef. Heft. 9, p. 113.

Syn.—*A. eparai*, Less. Voy. Coq. 2, p. 147, pl. 27, fig. 1.—*A. humeralis*, Cuv. & Val.—Voy. Bonite.—Jenyns, Voy. Beagle.

"Vanaki" of the natives.

137. Acanthurus doreensis, Cuv. & Val.

Gunth., Cat. 3, p. 332.

"Vanaki" of the natives.

138. Acanthurus strigosus, Cuv. & Val.

Gunth., Cat. 3, p. 342.—Journ. Mus. Godef., Heft. 9, p. 116, Taf. 79, figs. A. and B.

Syn.—*A. ctenodon*, Cuv. and Val.—Gunth., Cat. 3, p. 342.

139. Acanthurus flavescens, Benn.

Gunth., Journ. Mus. Godef., Heft. 9, p. 116, Taf. 76.

Syn.—*A. rhomboes*, Kittl., Gunth. Cat. 3, p. 342.

140. Naseus lituratus, Cuv. & Val.

Gunth., Cat. 3, p. 353.—Journ. Mus. Godef. Heft. 9, p. 124, Taf. 82.

Syn.—*Aspisurus Carolinarum*, Quoy. & Gaim., Voy. Uran. p. 375, pl. 63, fig. 1.—*Prionurus coume*, Less. Voy. Coq. 2, p. 151:

141. NASEUS TUBEROSUS, Lacep.

Gunth., Cat. 3, p. 353.—Journ. Mus. Godef. Heft. 9, p. 123, Taf. 80.

Syn.—*N. tuber*, Cuv. & Val.—*N. punctulatus*, Steindachner.

"Haha-laha" of the natives.

142. NASEUS MARGINATUS, Cuv. & Val.

Gunth., Journ. Mus. Godef., Heft. 9, p. 122, Taf. 83.

Syn.—*N. annulatus*, Bleek. and Gunth., Cat. 3, p. 352.

"Udulata" of the natives.

143. NASEUS UNICORNIS, Forsk.

Gunth., Cat. 3, p. 348.—Journ. Mus. Godef. Heft. 9, p. 118, Taf. 78.

Syn.—*Monoceros Raii*, Bl.—*M. biaculeatus*, Bl.—*Naseus fronticornis*, Cuv. & Val.—*N. olivaceus*, Gunth.

"Haha-laha" of the natives.

FAMILY CARANGIDÆ.

144. CARANX HIPPOS, L.

Gunth., Cat. 2, p. 449.—Journ. Mus. Godef. Heft. 11, p. 131, Taf. 84.

Syn.—*C. fallax*, *sem*, *Fosteri*, *sexfasciatus*, *Peronii*, *Lessonii*, and *Belengerii*, of Cuv. & Val.—*C. parapistes*, Richards. and *C. caninus*, Gunther.

"Dau-dau" of the natives.

145. CARANX MELAMPYGUS, Cuv. & Val.

Gunth., Cat. 2, p. 446.—Journ. Mus. Godef., Heft. 11, p. 133, Taf. 86.

Syn.—*C. stellatus*, Eyd. and Soul., Voy. Bonite, Poiss., p, 167, pl. 3, fig. 2.—*C. bixanthopterus*, Rüpp. and Klunz.

"Tuialata" of the natives.

146. Caranx speciosus, Lacep.

Gunth., Cat. 2, p. 444.—*Gnathonodon speciosus*, Bleek.—*Caranx pooloosoo*, Richards., Voy. Ereb. and Terr., pl. 58, figs. 4-5.

"Wirimagani" of the natives.

147. Caranx ciliaris, Bl.

Gunth., Cat. 2, p. 454.—Journ. Mus. Godef. Heft. 11, p. 135, Taf. 89.

Syn.—*Blepharis indicus*, Cuv. & Val.—*B. fasciatus*, Rüpp.

"Uinéme" of the natives.

148. Caranx Hasseltii, Bleek.

Gunth., Cat. 2, p. 430.—*Caranx affinis*, Rüpp.

"Keria" of the natives.

149. Caranx carangus, Bl.

Gunth., Cat. 2, p. 448. Syn.—*C. chrysos*, *ekala*, and *xanthopygus* Cuv. & Val.—*C. Lessonii*, Bleek.

"Matacaca" of the natives.

150. Caranx mandibularis, *n. sp.*

D. $8/\frac{1}{21}$. A. $2/\frac{1}{18}$. L. lat. 60/45.

Of very compressed form, with the profile a little concave ; the height of the body is half the length without the caudal fin, the length of the head about one-third ; the eye is moderate, distant quite its diameter from the sharp ridge of the forehead ; the distance from the eye to the extremity of the upper jaw is about equal to the diameter of the orbit ; the maxillary reaches to below the middle of the eye, and is triangular and rather small at its extremity ; the teeth are extremely minute if any ; the mandibulary bones are deep, compressed, and much longer than the maxillaries. The head is perfectly smooth and free from scales. The scales of the body are exceedingly minute ; the breast is scaleless. The lateral line is moderately bent and becomes straight beneath the first fourth of the soft dorsal, the straight portion numbering 45 scales, strongly armed towards the tail, the curved portion about 60. The first dorsal fin consists of very feeble spines, the last two very low and remote from the rest ; the first ray of the second dorsal is almost equal to the height of the body, the following three or four are shorter, the rest very low ; the caudal fin is sharply forked ; the anal has the first ray half the height of the body, the remainder as in the soft dorsal ; the pectorals are long and falcate, reaching to beyond the middle of the anal. The colour is entirely of a silvery yellow without spot or mark of any kind. Length of specimens about 12 inches.

"Cale-cale" of natives.

151. Caranx obtusiceps, *n. sp.*

D. $7/\frac{1}{20}$. A. 2/18.

The height of the body is one half the length without the caudal fin, the length of the head about one-third ; the profile of the head above the mouth is blunt and nearly vertical, below nearly straight. The eyes are rather small, about one and a half diameter from the ridge of the forehead, and two diameters from the extremity of the upper jaw ; the maxillary reaches to below the anterior margin of the eye, the intermaxillary reaches as far back, and is distinct and fleshy throughout. Teeth minute if any, the lower lip is shorter than the upper, and laps over in a distinct fold. The whole body, the opercular bones excepted, is covered with minute scales ; the lateral line becomes straight under the first third of the soft dorsal, and is very slightly armed except on the tail ; the pectorals reach beyond the first third of the anal; the first two or three rays of the vertical fins are longer than the others and falcate, but not elongate as in the last species. General colour silvery-yellow, back darker, fins yellow. Length 14 inches.

"Malacaca" of the natives.

152. Caranx Moresbyensis, *n. sp.*

D. $7/\frac{1}{24}$. A. $2/\frac{1}{17}$.

Height of body one-third of the total length; length of head about one fourth. Upper profile much more convex than lower. The eyes are about their diameter distant from the median ridge of the forehead, on which there is a slight notch in front of the eyes; the distance from the eye to the extremity of the snout is nearly two diameters of the orbit, the maxillary reaches to beneath the anterior third of the eye, and is broadly triangular at the base, the gape of the mouth is small, the teeth are uniserial and distinct, there are teeth on the palatine bones; the whole body, breast, and preoperculum are scaly; the lateral line is well curved anteriorly, becomes straight under the second dorsal ray, and is strongly armed towards the tail; the first rays of the dorsal and anal fins are about half the height of the body, the others are low; the pectorals reach to the third anal ray. The colour is of a silvery-grey, darker on the back and fins. Length 2 inches. No opercular spot.

153. Chorinemus lysan, Forsk.

Gunth., Cat. 2, p. 471.—Proc. Linn. Soc. N.S.W., vol. 1, p. 328.
Syn.—*C. commersonianus*, *lysan*, and *aculeatus*, Cuv. & Val.—*Scomber Forsteri*, *Bl.* and *S. madagascariensis*, Shaw.

154. Chorinemus toloo, Cuv. & Val.

Gunth., Cat. 2, p. 473.—Proc. Linn. Soc. N.S. Wales, vol. 1, p. 328.

"Daragi" of the natives.

155. TRACHYNOTUS OVATUS, L.

Gunth., Cat. 2, p. 481.—Journ. Mus. Godef. Heft. 11, p. 139.

Syn.—*T. mookalee, blochii, affinis, falciger, drepains*, Cuv. & Val.

"Miimera" of the natives.

156. TRACHYNOTUS BAILLONII, Lacep.

Gunth., Cat. 2, p. 484.—Journ. Mus. Godef. Heft. 11, p. 139.

Syn.—*T. quadripunctatus* and *russelii*, Cuv. & Val.

"Wimera" of the natives.

157. PLATAX VESPERTILIO, Bl.

Gunth., Cat. 2, p. 489.—Cuv. R. Anim.—Cant. Mal. Fish. p. 166.

Syn.—*P. orbicularis*, Cuv. & Val. and Gunth., Cat. 2, p. 490. —*P. pentacanthus, gaimardi, guttulatus, blochii.* and *ehrenbergii*, Cuv. & Val.

158. PLATAX TEIRA, L.

Gunth., Cat. 2, p. 492.—Journ. Mus. Godef. Heft. 11, p. 141.

Syn.—*P. leschenaldii, batavianus*, and *arthriticus*, Cuv. & Val.

159. PLATAX PINNATUS, Bleek.

Bleek., Atl. Ichth. Chætod., pl. 20, fig. 2, and pl. 18, fig. 1.

"Boona" of the natives.

160. ZANCLUS CORNUTUS, L.

Gunth., Cat. 2, p. 423.—Journ. Mus. Godef. Heft. 11, p. 142, Taf. 92,—Bleek., Atl. Ichth. Chætod, pl. 4, fig. 1-2.

"Metacutu" of the natives.

FAMILY SCOMBRIDÆ.

161. SCOMBER LOO, Cuv. & Val.

Gunth., Cat. 2, p. 360.—Less. Voy. Coq. p. 166, pl. 33.

"Toro" of the natives.

Family TRACHINIDÆ.

162. Sillago sihama, Forsk.

Gunth., Cat. 2, p. 243.—Bleek., Atl., Ichth. Sillag , pl. 1, fig. 4.

Syn.—*S. acuta* and *erythræa* of Cuv. & Val.—*S. malabarica*, Cant.

"Urea" of the natives. From fresh water.

Family MALACANTHIDÆ.

163. Malacanthus latovittatus, Lacep.

Gunth., Cat. 3, p. 360.—Journ. Mus. Godef. Heft 11, p. 160. —Quoy and Gaim., Voy. Astrol. 3, p. 71, pl. 20, fig. 3.

Syn.—*M. tæniatus*, Cuv. & Val., and Bleek.

Family BATRACHIDÆ.

164. Batrachus grunniens, Bl.

Gunth., Cat. 3, p. 168.—Cant. Cat. Mal. Fishes, p. 305.

"Nohu" of the natives.

Family COTTIDÆ.

165. Platycepalus nematophthalmus, Gunth.

Gunth., Cat. 2, p. 184.—Bleek., Atl. Ichth. Platyc. pl. 3, fig. 3.

"Nabugawoa" of the natives.

166. Platycephalus Quoyi, Bleek.

Gunth., Cat. 2, p. 180.—Bleek., Atl. Ichth. Platyc., pl. 1, fig. 2.

Syn.?—*P. punctatus*, Quoy & Gaim., Voy. Astrol. pl. 10, fig. 2.

167. Synanceia verrucosa, Bl.

Gunth., Cat. 2, p. 146.—Journ. Mus. Godef. Heft. 7, p. 84.—Bleek., Atl. Ichth. Scorp. pl. 7, fig. 5.

Syn.—*S. brachio*, Cuv. & Val.—*S. sanguinolenta*, Ehrenb.

This fish should have been placed among the Scorpænidæ.

Family GOBIIDÆ.

168. Periophthalmus koelreuteri, Bl.

Gunth., Cat. 3, p. 97.—Journ. Mus. Godef. Heft. 14, p. 185.

169. Eleotris macrolepidotus, Bl

Gunth., Journ. Mus. Godef. Heft. 13, p. 186, Taf. 112, figs. B. B′. B″.

Syn.—*E. aporos*, Bleek. and Gunther, Cat. 3, p. 109.

Family BLENNIIDÆ.

170. Salarias atratus, *n. sp.*

D. 12/20. A. 19.

Height of body one-sixth of the total length. Head a little rounded and vertical in front. Eyes prominent, on the forehead, and about half their diameter apart; mouth small, at the inferior angle of the profile; dorsal fin profoundly notched, forming in fact two fins, the second portion extending on to the caudal fin, the anal fin is like the second dorsal but not quite so high; the caudal fin is rounded at the extremity; the colour seems to have been black all over, slightly lighter on the breast. Length three inches.

Family SPHYRÆNIDÆ.

171. Sphyræna Forsteri, Cuv. & Val.

Gunth., Cat. 2, p. 337.—Journ. Mus. Godef. Heft. 13, p. 211, Taf. 119, fig. A.

"Dwa-dwa" of the natives.

172. Sphyræna obtusata, Cuv. & Val.

Gunth., Cat. 2, p. 331.—Journ. Mus. Godef. Heft. 13, p. 212, pl. 119, fig. B.

Syn.—*S. flavicauda*, Rüpp.—Gunth., Cat. 2, p. 340.

Family ATHERINIDÆ.

173. Atherina Forskalii, Rüpp.

Gunth , Cat. 3, p. 397.—*A. hypsetus?* Forsk., p. 69.

Family MUGILIDÆ.

174. Mugil cephalotus, Cuv. & Val.

Gunth., Cat. 3, p. 419.—Kner. Fish, Novara, p. 224.

Syn.—*M. öur*, Forsk.—*M. japonicus*, Schleg —*M. macrolepidotus* Richards.

175. Mugil axillaris, Cuv. & Val.

Gunth., Cat. 3, p. 444.—Journ. Mus. Godef. Heft. 13, p. 116, pl. 220, fig. B.

"Lobo" of the natives.

176. Mugil sundanensis, Bleek.

Gunth., Cat. 3, p. 425.—Bleek., Atl. Ichth, Mugil, pl. 1, f. 1.

"Lobo" of the natives. From fresh water.

177. Mugil Waigiensis, Quoy & Gaim.

Quoy & Gaim., Voy. Freyc. Poiss. p. 337, pl. 59, fig. 2.—Bleek. Atl. Ichth. Mugil, pl. 2, fig. 2.—Gunth., Cat. 3, p. 435.—Gunth., Journ. Mus. Godef. Heft. 13, p. 215, pl. 121, fig. B.

Syn.—*M. macrolepidotus*, Rüpp, Cuv. & Val. and Cantor.

"Toriabala" of the natives.

178. Mugil Troschelii, Bleek.

Gunth., Cat. 3, p. 448.

Family POMACENTRIDÆ.

179. Amphiprion bifasciatus, Bl.

Gunth., Cat. 4, p. 3.—*Prochilus bifasciatus*, Bleek., Atl. Ichth. Pomac., Tab. 1, fig. 4-5-6.

"Latchua" of the natives.

180. Premnas biaculeatus, Bl.

Gunth., Cat. 4, p. 10.—Bleek., Atl. Ichth. Pomac., pl. 3, figs. 7 and 9.

Syn.—*P. leucodesmus, trifasciatus*, and *semicinctus*, Cuv. & Val.

"Dala" of the natives.

181. Dascyllus aruanus, L.

Gunth., Cat. 4, p. 12.—Macl., Cat. Aust. Fishes, sp. 662.

Tetradachnum arcuatum, Cant.—Bleek., Atl. Ichth. Pomac., pl. 10, fig. 3.

"Kururu" of the natives.

182. Dascyllus trimaculatus, Rüpp.

Gunth., Cat. 4, p. 13.—Cuv. & Val., V., p. 441.

Tetradachmum trimaculatum, Bleek., Atl. Ichth. Pomac., pl. 10, fig. 8.

183. Dascyllus reticulatus, Richards.

Heliases reticulatus, Richards., Ichth. China.—Gunth., Cat. 4, p. 14.—*Tetradachmum reticulatum*, Bleek., Atl. Ichth., Pomac., pl. 10, fig. 3.

184. Pomacentrus trimaculatus, Cuv. & Val.

Gunth., Cat. 4, p. 19.—Bleek., Batav., p. 481.

Dischistodus trimaculatus, Bleek., Atl. Ichth., Pomac., pl. 5, f. 5.

"Laheta" of the natives.

185. Pomacentrus prosopotænia, Bleek.

Gunth., Cat. 4, p. 23.—*Dischistodus prosopotænia*, Bleek., Atl. Ichth., Pomac., pl. 8, fig. 8.

186. Pomacentrus amboinensis, Bleek.

Bleek., Atl. Ichth. Pomac., pl. 7, fig. 7.

This species is identified only from Dr. Bleeker's figure. I have never seen any description of it.

187. Pomacentrus cyanomus, Bleek.

Gunth., Cat. 4, p. 21.—Bleek., Atl. Ichth. Pomac., pl. 9, fig. 3.

"Ku" of the natives.

188. Pomacentrus analis, *n. sp.*

D. 13/13. A. 1/14. L. lat. 25.

The height of the body is about one half the length excluding the caudal fin. The head is rounded between the eyes, these are more than a diameter apart; the snout is shorter than the eye; the preorbital has a strong hook-shaped tooth beneath the eye; the preoperculum is distinctly serrated; the dorsal and anal fins are pointed behind. The general colour is greenish yellow, darker on the back; the base of the pectoral and the anterior rays of the anal fin are black, and there seem to have been some blackish markings on the spinous dorsal; the outer rays of the ventrals are also black.

Length three inches. There is only one spine in the anal fin of the only specimen I have, it is strong, sharp, and but little shorter than the rays.

189. Gliphidodon cœlestinus, Cuv. & Val.

Gunth., Cat. 4, p. 38.—Bleek., Atl. Ichth. Pomac., pl. 9, fig. 5.

Syn.—*G. saxatilis*, Rüpp.—*rahti*, Cuv. & Val.—*quadrifasciatus*, Bleek.—*Waigiensis*, Bleek., and *tyrwhitti*, Richards.

"Boboda" of the natives.

190. Gliphidodon trifasciatus, Bleek.

Gunth., Cat. 4, p. 42.—Bleek., Atl. Ichth. Pomac., pl. 11, fig. 3.

Syn.—*G. curassoa*, Cuv. & Val.

"Kibiri" of the natives.

191. GLIPHIDODON PLAGIOMETOPON, Bleek.

Gunth., Cat. 4, p. 51.—Bleek., Atl. Ichth. Pomac., pl. 11, fig. 4.

"Rodu" of the natives.

192. GLIPHIDODON ANABATOIDES, Bleek.

Gunth., Cat. 4, p. 54.—Bleek., Atl. Ichth. Pomac., pl. 9, fig. 7.

193. GLIPHIDODON BANKIERI, Richards.

Gunth., Cat. 4, p. 54.—Bleek., Atl. Ichth. Pomac., pl. 9, fig. 8.

194. GLIPHIDODON BICOLOR, *n. sp.*

D. 12/14. A. 2/11. L. lat. 26.

Height of body one-half of the length, exclusive of caudal fin; snout short and obtuse, teeth regular, but somewhat more conical than usual in *Gliphidodon*, suborbital densely scaled; soft dorsal and anal fins pointed, the middle rays being elongate, caudal fin with each lobe prolonged into a filament. The colour is a deep almost black-purple from the snout to a straight line from the commencement of the soft dorsal fin, to the middle of the anal; all behind that line is white. Length nearly three inches.

195. GLIPHIDODON FILAMENTOSUS, *n. sp.*

D. 13/10. A. 2/10. L. lat. 28.

Height of body a little more than a third of the length, exclusive of the caudal fin. The spinous dorsal is in height about one-third that of the body and increases very gradually and uniformly from the first to the last spine, the soft dorsal as well as the anal has the middle rays very elongate; the lobes of the caudal fin are also much produced. The colour is dark all over, probably in life purplish, the dorsal fin seems to have been variegated and the lobes of the caudal are black externally. Length 3 inches.

196. Heliastes analis, Cuv. & Val.

Gunth., Cat. 4, p. 62.—*Chromis analis*, Bleek., Atl. Ichth., Pomac., pl. 6, fig. 1.

"Ku" of the natives.

Description of two Fishes lately taken in or near Port Jackson.

By W. Macleay, F.L.S.

Chilodactylus Mulhalli, *n. sp.*

D. 15 $\frac{1}{24}$. A. 2/9. L. lat. 46.

Elongate, moderately compressed; the height of the body is one-fifth of the total length and equal to the length of the head; profile of head convex, the space between the eyes much rounded and equal to four diameters of the eye, the distance from the eye to the snout equal to three diameters. The snout is obtuse, the lips thick and fleshy, and the mouth small, the maxillary scarcely reaching midway between the snout and the eye. The opercles are unarmed; there are a few very minute scales on the upper part of the preoperculum, and the operculum is covered except near the edges with minute scales, the rest of the head is naked. The scales of the body are large, cycloid and adherent, excepting the thoracic surface which is naked or clothed with very minute scales. The dorsal fin is deeply notched, the first spine very short, the second about double the length, the third about double that, the fourth still longer, and the fifth, sixth, and seventh the longest; the soft dorsal is in height scarcely so high as the longest spines, and decreases slightly and uniformly to its termination; the caudal fin is deeply forked; the first anal spine is very short, the second is longer and stronger, and only one-fifth the height of the first ray. The six lower rays of the pectoral fin are simple, and of this the second is the longest, but it does not exceed the length of the others by more than one-eighth of its length. The general colour is bluish-grey on the back, becoming whitish on the belly ; the head is variegated with blotches of greenish and olive brown, the dorsal fins are of a clouded greyish tint, the spinous seeming to have the base red ; the caudal fin is almost black, the anal blackish with a white margin and base, the ventrals bluish-grey with an indistinct whitish patch near the base. Length 26 inches.

I name this fine fish after the Assistant Inspector of Fisheries, Mr. Thomas Mulhall. His practised eye detected it at once in the Sydney Fish Market as something unusual, and he brought it to me. It now forms part of the collection of the Commissioners of Fisheries.

Ammotretis zonatus, *n. sp.*

D. 75. A. 53. V. dext. 7, sin. 3. P. 11.

This species differs from *A. rostratus*, the only one of the genus hitherto observed, in many respects, the most evident being the general greyish-black colour, instead of the almost rufous-brown of the other, in having across the body a broad irregular indistinct zone of a whitish hue, in having the vertical fins higher, the tail rather longer, the lower eye more distinctly in advance of the other, and the maxillary flap smaller. The height is considerably more than half the length of the body excluding the caudal fin. Length 7 inches.

Hab. Port Jackson.

The type of this species also belongs to the Fisheries department.

Descriptions of some new Queensland Fishes.

By Charles W. De Vis, B.A.

Fam. BERYCIDÆ.

Cleidopus, *n. g.*

Muzzle rounded, blunt, protruding. Cleft of the mouth oblique. Eye large. Teeth viliform on the jaws, palatines, vomer, and tongue. Suborbital with a longitudinal ridge continued to the angle of preoperculum. Scales large, bony, keeled, forming a partial mail. Two dorsals, the first of partially webbed spines. Ventrals reduced to a spine and a few feeble rays, the spine articulated with a locking action. Eight branchiostegals. Four gills, a slit behind the fourth. Air bladder large. Pyloric cœca $2\frac{1}{2}$.

Cleidopus gloria-maris.

D. 4. 1/11. A. 1/11. L. lat. 16 (from suprascapular) L. tr. 8 (from dorsal to last abdominal keel)—V. 1/4. P. 14.

Height half the length measured to the tips of the median caudal rays. Head one-third of the same. Orbit one-third of the head, snout one-fifth, second dorsal spine two-fifths, and ventral spine four-sevenths of same. Snout gibbous in front of the orbit with a subvertical profile. Intermaxillaries separated by a deep notch. Lower lip with a symphysial groove and a (scarlet) patch of soft skin on the anterior lateral angle. Nostrils contiguous, adjacent to orbit. Three spines on the abdominal keel. Caudal strongly emarginate. All the scales spinosely ctenoid and striated with a large median spinous keel. Bones of the head unarmed. Dorsal spines strong, obliquely divergent, with very low webs, second and third the longest, fourth longer than first. Spine of second dorsal and anal short, feeble. Second dorsal rounded, the rays shortening from the first which is the longest. Ventral spine very strong, rays short, feeble. Lateral line not distinguishable. Scales of hinder part of trunk white, with broad dark edges all round, many of them on the post-abdomen and caudal peduncle orange at the base. Fore parts more or less golden. Three short black diverging bands behind the orbit and a longer horizontal one below them. Lips, chin, and intermandibulary space jet black. Pupil black, iris golden rayed with a dark maltese cross. Operculum golden with a black oblique bar on the lower limb. An elongated subrhombic patch of bright scarlet on the lower lip. The ventral spine is on protraction, fixed in position by a trigger-like articulation. The scales of the abdomen and thorax are pretty firmly compacted, those of the fore part of the back less so, while those of the hind parts are so loosely adjusted as to allow of more than usual freedom of propelling motion.

Loc. Brisbane River. Long. 8″. Type in Queensland Museum.

Homalogrystes luctuosus.

D. 12/14. A. 3/9.

Height three and a half times in the total length, head three and one-third, snout one-fourth; interorbital one-fourth, fourth dorsal spine + $\frac{1}{4}$ of the head, One pair of upper canines, distant. Intermaxillary reaches beyond the orbit. Spinous dorsal rises beyond the angle of the operculum, opposite the anterior third of the pectoral, it is nearly as high as the soft dorsal which rises opposite the anal and ends beyond it. Dark brown, with a purple tinge. Abdomen and chest purplish-red. Soft dorsal, caudal, and anal edged with black. Two obscure light bars across the tail. A very few black spots occur on the fins and trunk.

Long 41″. *Loc.* Brisbane. Type in Queensland Museum.

Scolopsis specularis.

D. 10/8. A. 3/7.

Height two and two-thirds, head three and two-thirds in the length. Orbit one-third of head. Preorbital one-half of orbit. Eye covered by a thick protuberant transparent mucus. Preorbital spine moderate with one precedent denticle. Posterior limb and rounded angle of preoperculum strongly denticulated. Anal spines subequal in length and strength. First ray of pectoral slightly produced. Tail emarginate. Preoperculum not notched. Light brown—a conspicuous pearly line edged with black behind the hinder half of the second dorsal—another, formed of markings on the bases of the scales, along the middle of the posterior half of the body.

Long 6″. *Loc.* Queensland. Type in Queensland Museum.

PORICTHYS QUEENSLANDIÆ.

D. —/20. A. 14.

Head three and three-fourths in the total. A line of pores on each side of the abdomen from the throat to the tail—a line from the nape along the back—pores rather obscure, mostly with short skinny threads. Two or three pores under the eye. A curved line of short filiform appendages on the vertex and occiput, both jaws fringed with the same. Orbital tentacles long, broad, fringed. A group of small canines on each side of the vomer. Brown, lighter beneath. Head striated with dark brown. Throat and abdomen with ill-defined brown spots. Postabdomen with distinct, small, dark spots and two brown fasciæ—both spots and bands extending on to the anal.

Rather than propose a new genus I place this fish in *Poricthys* notwithstanding the multiplication of the vomerine canines. Beneath the skin may be felt a moderately strong dorsal spine, and on examination there are found two rudimentary anterior spines lying side by side. The fish appears to be a coupling link between *Batrachus* and *Poricthys.*

Lon 4½ to 6″. *Loc.* Queensland. Type in Queensland Museum.

PLEURONECTES MORTONIENSIS.

Section with teeth conical, and lateral line strongly curved over pectoral.

D. 70. A. 51. Lat. 75.

Eyes on right side. Jaws and dentition equal. Teeth uniserial. Height twice, and head thrice and two-thirds in the length, without caudal. Depth of the curve of the lateral line equals two-fifths of its width. Maxillary four-ninths of the head, Pectoral nearly two-thirds of same. Distance of dorsal from caudal less than half the depth of the peduncle. Scales moderate, ciliated. Rays of vertical fins and of caudal scaly. Profile of head deeply emarginate over the orbit. Interorbit very narrow, elevated, naked. Caudal cuneiform. Dorsal rises opposite front margin of upper eye. Eyes nearly in the same vertical. Reddish-grey marbled with darker grey. Three large light coloured black-edged spots above and below the lateral line—similar smaller spots on periphery of trunk. Verticals fins spotted.

Long $7\frac{1}{2}''$. *Loc.* Moreton Bay. Type in Queensland Museum.

In development of the jaws and dentition, and size of the scales, this fish diverges considerably from typical forms of *Pleuronectes* to which however it belongs rather than to any other group known to me. In this genus therefore I leave it for the present.

Physical Structure and Geology of Australia.

By the Rev. J. E. Tenison-Woods, F.G.S., F.L.S., &c.

The Physical Geography of Australia gives a key to its Geology. It is an immense table land, with a narrow tract of land sometimes intervening between the edge of this elevated area and the sea. The east side is the highest, averaging about 2,000 feet above the ocean. The west side is not more thon 1,000 feet above the same. The north is a little higher. The south side is either level with the ocean, or abuts in cliffs upon the sea, ranging from 300 to 600 feet in height. The general character of all the seaward side of the table land is precipitous; but on the south-east angle of the continent the tabular form disappears, and there is a true cluster of mountains (the Australian Alps), whose highest elevation is a little over 7,000 feet. This group is near the sea (Bass' Straits), and then after an interval of about

200 miles of ocean, there is another group of almost equally high mountains which forms the island of Tasmania. The inland portion of the table land slopes by a very gradual incline towards the central depression, which is south and east of the true centre of the continent. Thus the incline is greater and shorter for the east side of Australia, and it is on this side alone we find what can properly be termed a river system. The elevation of the west side of Australia being only half that of the east, or even less, and the distance to the central depression being twice as great, we have no drainage towards the interior at all. Whatever water falls from the clouds collects in marshes, which are generally salt. The soil is composed of disintegrated granite rocks which are sterile and dry, forming little better than a sandy desert. All the table land is more or less interrupted with ranges of mountains which do not run for any distance, and are not sufficiently high to give rise to a river system. The general direction is north and south, or east and west. These mountains seem to be quite independent of each other and of the general axis of the Continent. The most conspicuous of them is the Flinders Range, which rises at Cape Jervis on the south coast, and continues without interruption for five or six hundred miles into the salt lake area, where it abruptly terminates. This chain is of an exceptional character. It differs from the other ranges of Australia in many particulars, and is probably older.

The base of all this table land of Australia is granitic. Isolated mountains of granite crop out all through the southern and western deserts. It forms the axis of the Australian Alps, and the summits of a great portion of the table land on the west and east coasts are of the same rock. There are also considerable tracts in which the granite is replaced by upturned Paleozoic strata, mostly in the form of Slates and Schists, with an almost vertical dip. It cannot be said that the granite is the cause of this uplifting, for it has been mostly derived from the same slates, and bears marks in some cases of stratification, inclined at various angles. Instances are common of the granite passing into schists, gneiss and slates.

The inclination of the Paleozoic rocks is of a very ancient origin, and has no connection with the present outline of Australia. The slates show the same foldings and contortions which such rocks display elsewhere.

Above the older Paleozoic rocks and granite, and lying unconformably upon them, are certain basins of coal-bearing rocks, belonging to both the Mesozoic and Paleozoic periods. These are found mostly on the eastern and southern edge of the table land, but there is good reason for believing that they are only thinly covered elsewhere, and that a most extensive coal-bearing area may be looked for on the western slopes of the same part of Australia. Over the coal measures on the edge of the table land all round the Continent there is a horizontal sandstone with oblique laminations. This formation is also seen in the interior, and I regard it as an eolian deposit. In most places there is no other rock above these strata.

The great central depression or basin of Australia is like the Sahara Desert, of cretaceous age. Its limits are unknown; but abundant fossils in blue marl are found on the very summit of the watershed on the east side of Australia north of latitude 28·0 S., nearly to Cape York, and all round the Gulf of Carpentaria. The western limits of this great cretaceous basin are unknown. Fossils belonging to it have been collected considerably west of the overland telegraph line, as also fossils from Oolitic beds.

On the south side of Australia, from the commencement of the Great Australian Bight, the land is, with little interruption, formed by a series of tertiary rocks, representing all the European deposits, from the Eocene upwards. It is not known how far they may extend inland. They extend some 300 or 400 miles at the least, but they are not seen at any height above 600 feet. On the Australian Bight the Miocene beds of limestone, full of fossils, abut on the sea in cliffs of from 300 to 600 feet in height. On other parts of the coast raised beaches with recent shells are common, notably round the sea boundary of the colony of Victoria.

In the interior all these deposits are overlaid by either volcanic tertiary lavas or by sands, clays, and marls which have been derived from the sub-aerial weathering of the granite and other rocks. The highest portions of all the edge of the table land, and consequently the sources of all our rivers, are in recent volcanic emanations. This is true for the whole extent of Australia. These volcanic emanations are tertiary, and they are all near the edge of the table land. They sweep round the eastern side from north to south, curving round the south side. As far as the Australian Alps they maintain a very uniform age, which appears to be Miocene or later. West of Melbourne they change their character, and become much more modern. Distinct ash cones of craters are preserved, and ash beds, with remains of the existing fauna and flora, are found. The extreme western limit of this volcanic activity is about 100 miles south of the mouth of the River Murray, and here it would seem that the volcanic forces in Australia died out. The raised beaches are found near these craters, and have been, doubtless, elevated in connection with the volcanic outbreaks. In this brief sketch no details of the nature of formations have been given, and they will be now considered a little more closely.

Granite.—Two formations of Granite have been recognised in Australia, and there may be more. That which forms the central axis of the table land has a peculiarity which differs from the outer parts of the granitic axis in this, that it is rich in mineral veins. It is in such formations that the valuable deposits of tin are found. They also contain veins of silver, lead, and copper. Gold has also been found in granite, but this metal is more common in a formation to be mentioned presently. The most of the richest Australian tin deposits are stream tin, that is to say, tin washed out of Granite by streams and found in their beds. But veins of tin have also been found in Herberton (Queensland) as rich as any in the world.

Earlier Paleozoic Rocks.—In connection with the Granites, the Slates and Schists of the Cambrian, and probably Laurentian periods, are found. In these are the veins containing gold and other metals. As a rule, the veins consist more of Felspar than any other mineral, and their direction is more often meridional than otherwise. It appears that the auriferous veins in the Cambrian formation of the colony of Victoria are much more nearly north and south than those of the Silurian.*

The gold veins in Cambrian Rocks in the same colony are probably eight times more numerous than the Silurian. As a rule the greater number of veins run parallel with the strata in which they are enclosed, and the greater number of the richest veins strike west of north. In California and Brazil veins run parallel to the mountain chains. In Australia they do so on the eastern side of the Continent, but where the edge of the table land bends round to the north-west the veins still keep their north and south direction. They are therefore independent of the present configuration of the land. East and west veins are usually poorer than the meridional ones, which is not the experience of other countries. It would appear also that, as a rule, gold is not embedded in the quartz, but occurs in a comparatively loose state in the midst of cavities and laminations.

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* The terms used in the Geological Survey of Victoria are those of Murchison and his divisions of upper and lower Silurian are followed in that colony. But this system and nomenclature are not generally adopted, from the injustice it does to Sedgwick's prior investigations. Following the example of many Geologists, I restrict the term Silurian to Murchison's Upper Silurian (Ludlowiks, Wenlock, May Hill, or Upper Llandovery). The Buala or Caradoo are Siluro-Cambrian, and all the rest of Murchison's Lower Silurian are Cambrian, But instead of using the term Siluro-Cambrian I should much prefer that proposed by Prof. Lupworth (Geol. Mag. for 1879) *Ordovecian* which has much to recommend it.

Very rich copper veins have been found in rocks of probably Cambrian age in South Australia. The ore is sulphide. As a rule, deposits of carbonates of copper in Australia have not proved permanent. Manganese, Antimony, Bismuth, and Graphite are also found in the Cambrian Rocks, but are not worked.

Characteristic Cambrian Graptolites are found in connection with gold-bearing veins. The species are identical with those found in Sweden, Bohemia, Wales, Ireland, Scotland, and the United States of America. Rocks which, by their included fossils, are seen to be the equivalents of the Silurian of Europe and America are found in Victoria (Kilmore), New South Wales (Yass, &c.), Queensland (Rockhampton), and Tasmania.

Fossils identical with species of the Wenlock and Ludlow beds and those most abundant forms of Bohemian Silurian life, as *Phacops* (*Portlockia*) *fecundus*, Barrande, are equally abundant in the Yering beds, near Melbourne.

Devonian rocks, with characteristic fossils, often identical with those of Europe, are found very extensively developed in Victoria (North Gippsland), in New South Wales (Mount Lambie, Sofala, Lachlan River), in Queensland (Gympie, Burdekin, Mount Wyatt). In connection with upper Devonian Rocks we have metalliferous veins, gold, and copper. The mines in Gympie are of great richness. Devonian copper veins have not hitherto proved very productive.

True carboniferous plants are found in a few places in New South Wales; not, however, in connection with coal, as at Stroud, Arowa, and in Queensland, the Drummond Range. Marine carboniferous fossils are found in the basin of the Hunter River, generally throughout Tasmania, and in Queensland (Bowen River). It is a remarkable peculiarity of these marine beds that they are interstratified with plants of a character which is considered Lower Mesozoic in Europe and India. They are probably Permian or Triassic.

An entirely different series of plant remains, which seems to have nothing or very little in common with those of the Hunter River, are found in connection with rich coal seams in Queensland, Ipswich, Barrum River, Bundaberg. The characteristic fossils of these beds are *Thinnfeldia odontopteroides*, *Equisetum rotiferum*, and species of *Palmaceæ* and *Cycadaceæ*. These beds are also found in Tasmania. The age to which they can be referred is still a matter of doubt. They cannot be older than the lias, and possibly considerably higher in the secondary series. In many respects they have considerable resemblance to the Indian (Raniganj) coal plants. Some plant remains found at Bacchus Marsh, the Wannon River, and at Bellarine (all at places at considerable distances from one another in the colony of Victoria), are referred to the same age. The evidence of the connection so far is not very strong. There is no coal associated with such remains, whereas it abounds in Queensland if worked profitably.

It is just possible that the Wiannamatta beds of New South Wales may belong to this formation, but if so, it must be under the Hawkesbury Sandstone, which is a different horizon from that hitherto given. This is only a suggestion, which more careful examination may confirm or disprove.

Covering these remains is a sandstone in thick layers with much cross-bedding and oblique lamination, and containing coniferous wood with equisetaceous stems, leaves of cycads or palms and ferns *(Thinnfeldia)*, &c. The species are often the same as those of the Ipswich coal basin. The contained grains of sand are rounded, and the deposit is in my opinion a sub-aerial one, mingled no doubt in places with swampy and fresh water remains. Near Sydney such strata reach in the Blue Mountains a thickness of over 1,000 feet. The same kind of formation is scattered throughout the Continent in isolated masses of various extent. They are generally precipitous, and consist, in my opinion, of hardened cores of aerial accumulations. The stratification is entirely that of wind-blown rocks with ferruginous bands, which are the remains of surface vegetation, from which the carbonized roots of trees may often be seen depending. Unless by the included organic remains, and superposition, we have no means of determining what is the age of these beds. But it would be wrong to attribute them all to one period. Similar conditions would produce the same kind of rock in any epoch.

In New South Wales such beds lie upon the coal beds (Permian and Lias) but not always conformably. In Queensland they lie upon the Cretaceous, and are clearly tertiary. It would be very difficult, indeed, to draw any line of distinction between the Queensland Sandstones, and those of New South Wales or Hawkesbury Sandstones as far as lithological character is concerned, and the included plant remains are common to both. But in portions of the Hawkesbury Sandstone, fossil ganoid fishes of the genera *Cleithrolepis* and *Myriolepis* are found, which have strong resemblances (as far as imperfect specimens would admit of a comparison) to Devoninn forms. In beds above the coal bearing strata termed Wiannamatta, the Permian genus *Palæoniscus* is found. Nevertheless it would be absurd to consider the Hawkesbury Sandstone as of Paleozoic or even lower Mesozoic age. The anomaly of the fish remains, we must explain, by recalling that we have amongst us two species of the Liassic and Triassic genus *Ceratodus*, actually living in Queensland rivers. Throughout Australia, therefore, we may consider that in desert or sandy regions an eolian or aerial deposit has formed or is forming. It hardens into stone in certain portions, and thus gives rise to the precipitous sandstone cliffs and flat-topped mountains which are so characteristic of Australian scenery. These formations are mentioned in this place because there is a complete blank between them and the lower Mesozoic rocks in most places in the colonies. Nevertheless we have some missing links of the secondary deposits now to be specified.

In Western Australia, on the Greenough River, apparently on the margin of the table-land, there are beds containing fossils, which appear to belong to the Upper Lias and the Lower Oolite or Jurassic. Many fossils common in Europe are found there, such as the following from the Upper Lias—*Ammonites salensis*, *A. radians*, *A. walcottii*, *Nautilus semistriatus*, *Gresslya donaciformis*, and *Myacites liassianus*, the last rather referable to the Middle Lias. From the Oolitic beds of the same locality, we have the following fossils, common to European formations—*Ammonites macrocephalus*, *A. brochii*, *Belemnites canaliculatus*, *Cucultæa oblonga*, *pholodomya ovulum*, *Avicula munsteri*, *A. echinata* *Pecten cinctus*, *P. calvus*, *Lima proboscidea*, *L. punctata*, *Ostrea marshii*, *Rhynchonella variabilis*, *Cristellaria cultrata*. The peculiarity of these deposits is that they are lithologically similar to the contemporaneous strata in Europe. Thus the Lias fossils are inclosed in a matrix perfectly identical with a ferruginous or variegated limestone of the Upper Lias occurring near Bath, and the Middle Lias, or marlstone, is not left unrepresented. The matrix of the Oolite fossils was equally characteristic. Mr. Charles Moore in his paper on Mesozoic Australian Geology (Quar. Jour. Geol. Soc., London., 1870, p. 227,) says "that even had no distinctive fossils been present, a geologist acquainted with the secondary rocks of England and Europe would hardly have failed to refer the greater number of the specimens to the horizon of the Lower Oolitic rocks." In this way, lithologically and almost without the evidence of the fossils they contain, the Western Australian specimens might be decided to be contemporaneous with the lower Oolites, and the upper and middle Lias of this country, from which they are so many thousand miles separated. It is probable also that in the same locality Cretaceous rocks are to be found.

On the other side of the Continent, and on the edge of the table, though like Western Australia within the ocean watershed, a number of fossils have been found which may be thus enumerated—lower Oolite, Gordon Downs, containing *Ammonites*, *Pleurotomaria*, *Homomya*, *Pholodomya*, *Myacites*, and *Tancredia*. About 120 miles south of these beds we find strata of a similar or liassic character in the following localities :—Fitzroy Downs, Wollumbilla Creek, Mitchell Downs, the Amba River, the Nive, the Upper Maranoa, Mount Abundance, Blythesdale, and Bungeeworgorai.

A peculiarity in most of these fossils is that they occur in rounded, nodular, or concretionary boulders imbedded in a brittle marl in the creeks. This is also the case with outliers of the Cretaceous rocks when they are found on the highest levels of the watershed on the table-land. Thus, at the Palmer River, in North-east Australia, we find Cretaceous fossils in nodules of blue clay, with septaria, in widely separated localities, but no traces of the original beds. The explanation of this may be that the Oolite and Cretaceous underlie all the interior and that these are fragments of outlines broken up and denuded at the upheaval of the table land.

The species identified with the European Upper and Middle Lias from Western Australia are much fewer in number, but this is partly owing to the fragmentary and imperfect character of the remains. Above these beds and horizontally stratified, with but little disturbance, there is an immense area of the interior of Australia covered with Cretaceous deposits and characteristic Cretaceous fossils—*Ammonites*, *Belemnites*, *Crioceras*, *Cyprina*, *Trigonia*, &c., with reptilian remains of *Ichthyosaurus*. The fossils have been but slightly examined, but of their wide extent there can be no doubt—perhaps covering the whole interior area of the Continent.

The tertiary beds already referred to as covering so large a portion of the south portion of the Continent are apparently divisible into regular horizons similar to those of Europe. The chronological sequence ascertainable by the proportion of existing species, enables us to correlate them as follows:—They are divisible into three basins. 1. The Murray Basin. 2. The Aldinga and Southern Yorke's Peninsula. 3. The Great Australian Bight, or, to use the nomenclature of Professor Tate, the Bunda Plateau. The Murray Basin not only includes the basin of that river, but passes across into the colony of Victoria, extending to the western side of Port Phillip and North Tasmania. The second basin, according to Professor Tate, occupies disconnected areas on the east side of St. Vincent's Gulf, and the strata are found across Yorke's Peninsula, and probably continue round the shores of St. Vincent's Gulf. According to Professor Tate (who has given much attention to the subject, and whose researches I can confirm as far as an extended examination of the fossil corals are concerned), the Lower Aldinga strata are Eocene, and contain scarcely three per cent. of recent forms. Mount Gambier limestones are the equivalents of these in the south-east, and so is the greater portion of the lower beds of the Australian Bight. The Murray basin, including the Hamilton (Muddy Creek), and Geelong beds (Corio Bay), are Miocene. All the beds are rich in fossils; but in the Murray basin, in all places, extremely well preserved. From a careful comparative examination of the Miocene fauna of these rocks, I have come to the conclusion that about 8 per cent. of the organisms are living at the present time.

The Pliocene beds are not so extensively or so richly represented They are found generally as highly ferruginous outliers, with a few fossils not easily identified. The Flemington series, near Melbourne, are the best instances, some of the organic remains of which have been illustrated by Professor M'Coy. The fauna of all these deposits is characterised by its local character, which though almost thoroughly distinct from the present Australian fauna has still certain features in common. It has been stated that the same tertiary fauna was found in New Guinea, as seen in some fossil specimens brought by the Hon. W. Macleay from Hall Sound. I am enabled, however, to state that this is not the case. There is nothing in common with our tertiary rocks amongst any of the New Guinea fossils, all of which I have carefully examined. There is no satisfactory evidence of any former participation in the great ice age by the Continent of Australia. One or two instances of grooves or striations are recorded, but standing alone in so vast a territory the ice origin is very doubtful. On the whole, the evidence afforded by the animal remains is decidedly in favour of a warmer climate for Australia than that which now prevails, and this is borne out by the plant remains.

While the south portion of the Continent was slowly submerging under the tertiary sea, there is every reason to believe that the eastern side of the Continent was raised above the sea level. The period of this elevation must have been subsequent to the Cretaceous, as marine fossils of that period are found on both sides of the watershed, and on the table land. We have no marine tertiary beds on any portion of the eastern side of the Continent, except a few post tertiary marine shells preserved in ash-beds, which are scarcely above the sea level, and are only seen where the shallow sea has been dammed back by a bank of volcanic mud. Such an instance has been observed by me at Cleveland, in Moreton Bay. The volcanic disturbance must have occurred in places where our present fauna existed.

We have on all the east side of Australia, and in many places in Victoria, instances where vegetable remains are found in the old drainage channels covered by lava streams. These have been named and described by the illustrious Baron von Mueller. They show a remarkable series of fruit-bearing trees, different from those which occupy the same areas at the present day. Though fruits were abundant it was not considered in most cases safe to attempt to determine even the order to which the trees belong. The only exceptions were in the case of a coniferous tree, and one belonging probably to the *Sapindaceæ*. No conclusions could be drawn from the remains as to the age of the beds, but as they were identical when found in widely separated places, sometimes 600 miles apart, it was seen that we here meet with a flora, which has disappeared, but which must have occupied all the table-land.

Distinct from these deposits, and imbedded in siliceous rocks, other plant-remains are very abundant on the edge of the table-land. These are mainly distinguished by their resemblance to such trees as Cinnamon and other Lauraceæ and Myrtaceous plants, Palmæ, Cycads, and Ferns. The peculiarity of these remains is that they are not usually accompanied by any carbonaceous matter, but rather impressions in silex, probably derived from thermal springs. There are not wanting proofs that these are portions of the same flora to which the fruits, &c., belong, which are covered by volcanic deposits. They are certainly late tertiary, and may be pliocene, or even later.

The most recent of all our formations are the raised beaches and the various drifts and Eolian formations throughout the Continent. The raised beaches are confined to the south side of Australia, as far as we know, and they are of very limited extent. The drifts are more extensive, and probably deposited at different times and under different conditions. Two are distinguished by Mr. Selwyn for Victoria, and they are of different ages, according to his opinion, namely, Miocene and Pliocene. Such formations are extremely important, as they contain the remains of those strata which denudation, during immense geological periods, has left to us. Thus they also retain the gold which has been derived from the Cambrian and Silurian rocks. Wherever these drifts are found overlying auriferous quartz veins, they are also rich in alluvial gold, and they have proved the richest deposits in the colonies, besides being the source of all those large masses of gold which are called "nuggets," some of which have been of enormous size and weight. The alluvial is shallow, and easily worked, but there are instances where it has been covered with outpourings of lava of 300 and 400 feet thick.

This is the proper place to mention that the surface and some small portion of the upper part of gold veins are usually found to be of much greater richness than the lower parts ; and this is not because gold favours one portion of a vein more than another, but because the surface represents the gradual detrital accumulation from slow weathering in the course of ages.

The drift or sub-aerial deposits belonging to recent geological periods are in Australia very important and extensive. An illustration from one portion of Australia will explain the whole. In the Murray basin, and through much of South Australia on the west side of Spencer's Gulf, and north-west of Port Lincoln, there are many isolated granite hills, which are the outcrops of the basis of the whole continent. All around them is a sandy desert supporting low shrubby thickets or "scrubs" of *Acacia*, *Eucalyptus*, *Cryptandra*, *Melaleuca*, &c. The sand is a mass of rounded grains of true desert character, that is of grains rounded by having been blown about. It frequently lies in ridges and hills like the waves of the sea, but generally covered with vegetation. The hills are interrupted by yellow clay flats, with an open forest and a soil which a very little moisture renders boggy. Both these accumulations arise from the slow subaerial weathering of the granite. The quartz grains resist decomposition, and get carried about by the wind. The felspar and mica decompose rapidly, and form the basis of the clays to which the small portion of iron per-oxides gives the yellow colour. It is remarked that wells sunk into this clay only furnish an almost undrinkable brackish water, doubtless from the salts of soda, potash, and iron which the felspars contain. An analysis of these waters shows them to contain such salts as chloride of sodium, sulphates of soda, lime, magnesia, and potash, with variable proportions of silica and iron. All these can be referred to chemical decomposition from granites, notably felspars and mica. The taste of salt (sodium chloride) by no means predominates in them. The general surface of this kind of country, with the exception of the sand-drifts and isolated granite mountains, is perfectly level, and the sand lies loosely upon it. But in crossing such drift ridges one would often be deceived as to their character. They are like mountain ranges, and the partly consolidated sand, which forms isolated masses of calcareous sandstone, lends a support to this impression. It may safely be stated that the greatest part of Australia is covered by formations such as these.

Referring now to the fertile character of the country according to its physical structure, it may be stated generally that the narrow strip which lies between the table-land and the sea is well watered by mountain streams, and the alluvial land in the neighbourhood of these channels is rich and fertile. This includes the larger portion of such areas. On the table-land, where the mountains are not too rocky and rugged, the soil includes many fertile areas; but that is generally on the volcanic strata, which are fortunately of wide extent. We may feel astonished at the immense scale on which volcanic disturbance existed in Australia in tertiary times, but probably it is less in proportion to the area than that which took place in Miocene times in Britain. Thus in the North of Ireland there is a basaltic flow, 500 miles long by 30 wide, or about 1,200 square miles, which attains in many places a thickness of 900 feet.

The lands of the interior are, as a rule, poor, except in the river valleys. Towards the central basin of the Continent they are in all respects like the Sahara, or the table-lands and prairie lands of America. The colony of Victoria is better situated with regard to its lands than any other. It is well watered, and has a larger share of the fertile areas (basaltic) between the table-land and the sea. The portions of the table-lands themselves which fall to its inheritance are also rich in volcanic tracts.

The colony of South Australia may be said to be, as far as the richness of its lands is concerned, all the valleys and slopes of the Flinders Range. As this is about 500 miles long, and of gentle elevation, the tracts available for agriculture are considerable. Towards the north of a line parallel with the head of St. Vincent's Gulf, the rainfall is small and uncertain, which renders proprietors, both agricultural and pastoral, subject to great losses from drought. The geological age of this range has never been exactly ascertained. It is undoubtedly paleozoic, but so singularly destitute of fossils throughout its whole extent that nothing more definite can be stated.

New South Wales and Queensland are relatively in the same position with reference to the table land. The capitals of the colonies are built on the slopes between the plateau and the sea. The portions of the upper part of the high lands included in both colonies have much of the volcanic areas of great richness. The lower lands are poor and sterile, except, as already stated, in the river valleys. In the southern portions of New South Wales these are very numerous.

It has been noticed that the actual amount of the rainfall on the interior slopes must be largely in excess of the drainage by the rivers, and that therefore a great portion soaks into the ground and drains along the incline towards the interior. On this account the structnre of the central basin must be especially favourable for the formation of artesian wells. This was drawn attention to by me in a paper read for me by Sir Roderick Murchison, at the meeting of the British Association at Newcastle-upon-Tyne, in 1863. In 1866, in a series of papers furnished to the *Australasian*, I have advocated the same view. But it did not receive much attention until recently, when the subject has been revived with most beneficial results to the settlers of the interior. One fact in the physical structure of the continent should have indicated such stores of water in the interior. In the central depression of the Continent there is a line of groups of thermal and cold springs covering several hundred square miles. These send forth water from great depths, and are, no doubt, derived from a central underground reservoir whose sources are on the slopes of the table land. That the waters come from great depth is seen from the fact of the temperature, and the mounds of sinter or travertine around them. This, no doubt, is the silica, &c., once held in solution by the thermal waters under pressure, but liberated on arrival at a level where the pressure was removed.

In these mounds are found deposits of bones, teeth, and other remains of those gigantic marsupials which once roamed over this Continent, but which are now totally extinct. We find also the remains of extinct Crocodiles, even within the limits of New South Wales, as well as a gigantic Lizard, Tortoises, &c. The largest of our extinct Marsupials, the *Diprotodon*, must have been as large as an Elephant, and the abundance of its remains in almost every cave and river bed shows that it was very numerous and wide-spread. Its disappearance from the Continent was in very recent times. In 1866 I found the remains of a Struthious bird, much larger than the Emu, in one of the kitchen-middens of the natives in South Australia. The bones were marked by the scrapings and cuttings of flint knives of the blacks. I then stated that there was evidence that Australia had been formerly occupied by a wingless bird much heavier and larger than the Emu and I proposed for it the name of *Dromaius australis*. It has since been named *Dromornis australis* by Professor Owen, who has found that the bird had formerly a wide range in Australia.

It is generally thought that Australia is a Continent quite recently upheaved from the ocean. There is, however, no evidence of such an origin, at least for the whole. The facts of which we can be certain are these: Since the Miocene period the southern portion of the Continent for its whole extent has been upraised to a height of about 600 feet. Subsequently or contemporaneously there has been a large amount of volcanic disturbance with outpouring of basaltic lavas. After this there has been a subsidence, not very considerable in depth, but extensive. This, is seen, as Professor Tate has pointed out, by the fringe of Eolian

Calcareous Sandstones which for a short distance out to sea, surrounds the south coast. There has then been over a limited area on the south-east side of the Continent a renewal of volcanic activity and slight elevation of the coast. On the east side there is no evidence of upheaval for its whole extent, but there are very decided marks of subsidence in, probably, tertiary times. A long fault occurs at the edge of the Blue Mountains near Penrith, and for many miles north and south, there is a down-throw which brings the Hawkesbury Sandstone nearly to the level of the sea, when it forms the romantic castellated fiords and diversified scenery of Port Jackson, Broken Bay, &c. The existence of the Barrier Reef on the north-east coast is also generally regarded as marking a slow period of subsidence. This view is confirmed by the general conformation of the coast line, mountain system, and islands. The subsidence must have been in tertiary times, because the recent alluvial drifts are disturbed by it.

The upheaval of the coast line of the Australian Bight must have been of a very rapid character. Friable limestone cliffs, 600 feet high, abut upon the sea. Had there been any pause, even of a few months, in the uplifting, there must have been some traces left by erosion, but no such marks are found. It might be an interesting speculation to inquire if the subsidence on the east coast was a compensating phenomenon for the upheaval on the south, since the extent is about the same. The phenomena represented are at any rate out of even extraordinary terrestrial experience. The west coast seems also to have participated in the upheaval. Shells of a recent age were forwarded to me from Fremantle, which showed the existence of raised beaches. The only difference between the marine fauna and that at present existing was that it included tropical species only now found in North Australia.

As to the epoch to which the oldest dry land in Australia may be referred there are no very certain data. The fauna and flora would incline us to believe that we have relics of the later

Mesozoic or earlier tertiary times ; but it would be premature to build any solid theory on these facts.

The above are general outlines of the Geology and Physical structure of Australia. A closer examination of the details may amplify or elucidate the the conclusions ; but the brief exposition of the facts is made on observations which are not likely in future to be disturbed or changed.

On a large Mesozoic *Mytilus* from the Barcoo.

By the Rev. J. E. Tenison-Woods, F.G.S., F.L.S.

The following specimen was given to me for description by the Hon. A. Archer, of Gracemere, Queensland. The locality from which it was taken was uncertain, but he believed that it was found on the rocky banks of the Upper Barcoo at the foot of a sandstone tableland. It is therefore probably from the edge of the Upper or Middle Mesozoic strata in that locality. The fossil was accompanied with *Belemnites* and there were no less than two other specimens in Mr. Archer's possession so that I should conclude that it was abundant. It is a very large species of *Mytilus*, so large in fact that I do not believe any larger has been described. Unfortunately very little of the shelly matter has been preserved and therefore the description refers rather to a very perfect cast of the interior of the valves, but as the form is singularly regular and even and the shelly matter thin the details are well preserved and distinct.

Mytilus ingens, *n. s.*

M. t. oblong, oval, or elliptical, tumid or gibbous in the centre, so as to form an arched broad regularly sloping carina, depressed at the anterior side, thick, but not clumsy at the posterior margin, the whole very equally sulcate with lines of growth, the younger ones deep ridged and with a beautiful curve, the latter less distinct and broad. Umbones terminal small corroded curved. Ligamental fossa somewhat small, broad terminal shallow, with a long narrow slit for the byssus. Pallial impression long and wedge-shaped. Length 30 centimetres, breadth 19, height 17. Length of hinge depression 9.

The size and regular shape should distinguish this species. In the lines of growth the younger ones are deep, broad, regular and distinctly margined. The free portions of shelly matter left on the cast show that in spite of its size the testa was not very thick.

Locality ——? Barcoo, Queensland. Horizon——?

It is impossible to say yet whether the specimen should be referred to the Oolitic or Cretaceous rocks, both of which are known to occur in that locality. Mr. Chas. Moore, F.G.S., describes three species of *Mytilus*,* but none of them resemble this in the remotest degree in regard to size. In form *M. inflatus* approaches it, but it is scarcely an inch in length. The rock mass is like that of Wollumbilla in form. I may state that I have a large mass of materials for description, partly derived from the collections of various explorers and partly derived from my own collections of Mesozoic fossils, made during many journeys and explorations in North Queensland. I prefer however to deal with them in one monograph, so that their relative affinities may be perceived. This magnificent species merits an exception because of its size and beauty of form, which so easily distinguish it from all others. For the information of many continental correspondents I append the following observations in Latin:

Mytilus ingens, *n. s.* M. t. oblongo-ovali vel elliptica; medio tumida vel gibbosa indeque late, regulariter, obscure carinata; antice depressa postice crassa, haud ponderosa;

* Australian Mesozoic Geology and Paleontology, Quart. Jour. Geological Soc. Lond. 1870, p. 252. The species described are *M. rugo-costatus*, *M. planus*, and *M. inflatus*, all from Wollumbilla, where *Mytilus* is said to be abundant on the rocks.

undique regulariter sulcata lineis incrementi, primis profundis, latis, eleganter curvatis, et conspicue marginatis, deinde latis, obsoletis. Umbonibus terminalibus, parvis, curvatis, corrosis. Fossa ligamenti haud magna, lata, profunda; bysso angusto, Impressionibus pallii et musculari longis et cuneiformibus.

Per terras intra-tropicas Australiæ peregrinantes eximias collectiones fossilium reportarunt multi indagatorum et viatorum. Ut taceam cl. Leichhardtii et Mitchelli collectiones in Musæo Sydneyense vel Mus. Geol. Lond. nunc servatas, jam pridem in variis scriptis recensuit Rev. W. B. Clarke collectiones aliorum peregrinatorum. Ultimis annis novæ et spectabiles collectiones cl. Gregorii e colonia Australiæ occidentalis (Greenough River) e Wollumbilla, Gordon Downs, ex Aust. orientali, ab illustrissimo Carolo Moore in Jour. Geol. Soc. Lond. descriptæ sunt. Novissime, collectiones a cl. Daintree sub expeditionibus speculatoriis, variisque partibus Australiæ conquisitæ ab illust. R. Etheridge amplissime descriptæ et illustratæ (in eodem Jour. Geol. Soc. Lond.) in Mus. Brisbanense reperiuntur.

Nuper a me collectiones factæ variis peregrinationibus Australia septentrionali. Additæ his variæ collectiones, quæ meæ determinationi amice demandatæ sunt, commentarii præbuere materiam quibus addidi paucas species nondum publicatas in iisdem terris ab aliis inventas. Cum species sæpe in pluribus eædem adsint, vel affines se invicem illustrantes, aptius mihi visum est reservare et in unico opusculo has symbolas conjunctas recensere quam singulas illustrare. Attamen hoc loco inserui descriptionem hujus magnificæ speciei Mytili, nondum adhuc descriptæ, magnitudine formaque necnon testa tenui ab omnibus aliis mytilorum facillime divellendæ. Certissime mihi dictum non est stratum in quo specimina tria hujus speciei inventa, sed probabiliter mihi videtur e rivulis rupestribus ad pedes plagæ elevatæ juxta fluminis Barcoo partes orientales passim provenientibus. In Collectionibus supra dictis molluscorum, Gasteropoda minorem, lamellibranchiata vero pro more longe majorem numerum præbent.

Ea, exceptis paucis Cephalopodis et Belemnitis, solus collegit Daintree, et loco citato Etheridge specimina illustravit. Etiam ob genera et subgenera incertitudo inter illos feliciter stabilita, quam per characteres magis constantes bivalvatos rite determinare istis completis exemplaribus facilius est quam per descriptiones tantum, longe magis per incompletas et incertas quarum forma maxime fallax est. Cum plurimæ definitiones ad specimina singula Musæorum propositæ sint, facile intelligitur, quam parum ad specierum determinationem et specificam differentiam dijudicandum sufficiant sine amplissima experientia variationis legum inter indigenas. Ex his rationibus ex magna parte pendere fingimus immensum novarum specierum numerum ultimis annis propositarum, quarum dimidium saltem numerum vel synonymas vel jam descriptas sine temeritate enuntiare ausim, quamvis multas, quarum locus et affinitas in generibus tam vastis haud indicata sunt sine ectyporum comparatione numquam determinare liceat. Non satis est speciem ignotam sub nomine novo describere, sed hanc tamdiu in animo volutare donec nexus cum omnibus, ut ait illust. Elias Fries, jam rite cognitis plene eluceat.*

Occasional notes on the Inflorescence and Habits of Plants indigenous in the immediate neighbourhood of Sydney.

By E. Haviland.

The Rev. Dr. Woolls, in his Census of Plants indigenous in the neighbourhood of Sydney, enumerates, under the order Rutaceæ, eleven genera, comprising thirty-one species. It must however, be borne in mind, that this census refers to the whole of the County of Cumberland. Even within a very limited area, that is within a radius of six or seven miles from Sydney, the

* Nov. Sym. Myc. in pereg. terris Dan. coll. prolog.

order is rich in beautiful and interesting genera. Of these I select two—*Philotheca* and *Boronia*, and take an individual member of each—*Philotheca australis* and *Boronia pinnata.*

Philotheca australis, Rudge, is a very beautiful plant, well deserving the attention of florists; easy to cultivate, and delighting even in the poorest of soils. It may be found in abundance on the road side, between Manly and Middle Harbour, in the early spring. The flowers are in groups of three or four, on very short pedicels of not more than one line. The lobes of the calyx are five, broad at the base, about one-fourth of the length of the tube, triangular, imbricate, and somewhat coriaceous. The petals five, lanceolate, about eight lines long, and three broad, spreading and reflexed; having a somewhat deep, longitudinal furrow on the face, forming a ridge on the back, of a deeper rose colour than the rest of the petal. The stamens are ten, shorter than the petals, united in the lower parts of the filaments, in a monadelphous circle, completely enclosing the pistil; the broad filaments being so transparent that the pistil may be seen through them. The upper parts of the filaments are free, and densely hirsute. The styles rising from the five carpels, are immediately united in one, and this too, is densely hirsute. The ovary is five-celled, each cell containing two ovules. The foliage is heath-like, the leaves almost terete, nearly if not quite, sessile, erect, and from three to six lines long; while the width does not exceed half a line.

Upon a cursory examination of this flower, one is inclined to think, that, if in so many cases the most careful provision has been made to prevent self-fertilization, equally careful provision has, in this instance, been made to ensure it. In this *Philotheca* we find the pistil so imprisoned, not merely (as in *Boronia*) by the stamens forming a cage of simple bars round it; but so, by the absence of any interstice, as to prevent any insect likely to carry pollen approaching it. The stamens are continued beyond the anthers; and both these projections and the backs of the anthers are clothed with stiff hairs. Five of the stamens are shorter than the others, and meet over the stigma, quite preventing any approach to it from above. Independently, however, of this, the five longer stamens close over the shorter ones, forming an additional protection. As the anthers are all on the inside of the stamens, of course those of the five shorter stamens are immediately over the stigma. In the course of time, the free portions of the five longer stamens leave their first position, and not only become erect, but to some extent, reflexed; the five shorter ones however, still retaining their guardianship of the stigma. Soon a very narrow passage, caused by the shorter stamens having somewhat separated, will be seen leading to the stigma, and an ordinary pocket-lens will show that the anthers lining the passage have matured and opened, and that the passage contains a considerable quantity of pollen. After this, the five shorter stamens open widely, exposing the stigma.

The close imprisonment of the stigma, till the anthers have opened, and the pollen has lined the passage immediately over it, would lead one to suppose that its purpose was to ensure self-fertilization; but this does not appear to have been the case. Finding, on opening several flowers, that no fertilization had taken place; that in fact, the stigma was not mature, although the pollen had matured and disappeared, I selected ten flowers in all of which both the long and short stamens had opened widely, leaving the stigmas fully exposed. In six I found the anthers open and empty, yet five of the stigmas had not arrived at maturity, one being viscid, but having no pollen on it. In three others the anthers were open and contained a few grains of pollen; but none of the stigmas were mature. In the remaining flower the anthers were open, and appeared to contain all their pollen; the stigma not mature. I then placed some ripe pollen on five of the stigmas of the first lot examined, which were supposed not to have reached maturity. After allowing it to remain in contact for half an hour, it could be blown off, leaving the stigmas dry and clean, proving that, although the pollen from their own flowers had matured and disappeared, they had not arrived at a condition to utilise it, and, that when they should do so, they would be dependent on the pollen of other flowers.

Perhaps there are few plants which vary more in their manner of growth than *Boronia pinnata*, (Smith). Different localities afford it under such various forms as often to cause one to be uncertain of the species. The colour of the flowers too passes through all shades from rose-purple to white. In this paper I speak of a variety of which specimens have been sent to me at various times, from the more distant parts of Lane Cove. It is nearly white, quite glabrous ; the younger branches almost square. The leaves are pinnate and opposite, generally of seven or nine leaflets, but the terminal leaflet often absent. The costa or midrib of the entire leaf is much dilated, and leaf-like ; but contracted where the leaflets join it. The leaflets are small, not exceeding at the most four lines long and one broad, and mucronate. The flowers are both axillary and terminal, each of the smaller branches ending in a group of three to six, on pedicels twice the length of the flowers ; the pedicels having minute bracts half way between their articulation with the peduncles and the flowers. The calyx is of four imbricate lobes shorter than the tube, broadly lanceolate, but ending acutely, and is very small when compared with the corolla. The corolla consists of four petals, very concave on the inside, six lines long ; very broadly lanceolate, attached to the tube of the calyx. The stamens are eight, rising from the outside of a fleshy, hypogynous disk, swelling out at the centre of the filament, but meeting again, and forming a cage round the pistil. The filaments forming the bars of this cage, although densely woolly at their summits, are very slightly so elsewhere ; and while, unlike *Philotheca*, they are sufficiently open to allow insects to enter, it does not appear that even a small insect can come into contact with the stigma. The filaments are suddenly very much enlarged at their summits, bearing the anthers on the inside and rather below the apices, and are so spring-like that they press the anthers down upon the stigma closely, covering it so completely as to prevent any approach to it. The stigma is globular and very large; in some instances quite as large as the ovary. Almost before the pollen is mature, the stamens begin to rise, leaving the stigma exposed; but in no specimen that I have examined, although I have found the pollen fully ripe, have I found the stigma prepared to receive it. On the contrary, it has appeared so far from maturity, that I presume that before that condition is attained, the pollen will have disappeared; which it soon does from various causes, but chiefly by the agitation of the plant by the wind. In fact in several instances, in this plant, also I have found the anthers empty or absent, before the stigma was mature. What the result to be attained is, in the case of the *Philotheca*, by imprisioning the stigma in a close cage until the pollen has matured and dispersed, or, in the *Boronia*, by covering it closely by pressing its own anthers upon it, by the spring-like action of the stamens, till the pollen has all but matured, and then setting it free, still not in a condition to utilise the pollen till after it has dispersed, may be open to question. May it not be, however, that the shielding of the stigma in either case, to a great extent, from the influence of light and heat, retards its attainment of the condition necessary to receive and utilise pollen till after the anthers of the same flower have matured and dispersed it, thus making the stigma dependent on the pollen of some other flower, and ensuring cross-fertilization. These are not isolated cases. In my search for botanical specimens, I meet with so many instances, and the employment of such various and often curious means to ensure cross-fertilisation, that I am inclined to think nature intended it to be the rule even in the Vegetable Kingdom.

The common rose-purple variety, or what I take to be the typical form of *Boronia pinnata*, differs much from the form I have described. The flowers are more crowded, the leaves much larger, the filaments very much less thickened at the summits, and the stigma, instead of being almost or quite as large as the ovary, is so small as scarcely to be distinguished from the short style. The difference in this respect is so great, that, were it not that Bentham mentions that this species is sexually dimorphous, and that I am assured by unquestionable authority that the two forms are identical, I should consider them distinct species.

NOTE ON SOME POINTS IN THE ANATOMY OF THE PIGEONS REFERRED TO BY DR. HANS GADOW IN A RECENT PAPER ON THE ANATOMY OF PTEROCLES.

BY WILLIAM A. HASWELL, M.A., B.Sc. (EDIN.)

In part II. of the Proceedings of the Zoological Society of London for 1882, which has just come to hand, I find in a paper by Dr. Hans Gadow on the Anatomy of *Pterocles* some statements called forth by a paper of mine published in the Proceedings of this Society (Notes on the Anatomy of Birds, III.—The Myological Characters of the Columbidæ, Vol. iv., pp. 306—310 [1880].)

I must first explain that the paper in question was in reality an abstract of a very much longer and more detailed account of the entire system of limb-muscles in the Pigeons, together with comparative studies of many other birds, which was presented to the Society at the time, and this may serve to account for the condensed form in which it appears. At the end of the short abstract I summarise the leading characteristics of the muscular system of the Pigeons in five statements. These I regard, taken all together, as enabling us to give a myological definition of the order. I do not state that all these points are peculiar to the Pigeons , I merely allege that they are characteristic of them as a group—a distinction which appears to me perfectly obvious, but which Dr. Gadow seems not to apprehend. These five characteristics (with a modification to be noticed presently) I have merely to repeat, seem, taken together, to characterise the family, and if Mr. Forbes and Dr. Gadow will take the trouble to make a really careful dissection of the common Pigeon, they will find it necessary to modify some of their statements. The authors alluded to state that of the five points " one is totally incorrect and three others, viz. nos. 3, 4, and 5, are not characteritic of the Columbidæ."

1. The absence of a posterior belly of the latissimus dorsi.

In a short note on *Turacæna* and *Ædirhinus* (Proc. Linn. Soc. N.S.W., Vol. vii., p. 115) I have pointed out that in the fruit-pigeons the arrangement of this muscle is normal. Dr. Gadow says " Mr. Forbes and I, on examining the following birds, which were at hand—*Carphophaga*, *Chalcophaps* and *Columba*—found this muscle consisting of two bellies, the posterior one being just as well developed in these Pigeons as in *Astur*, arising from the anterior margin of the ileum and from the last dorsal vertebræ, and inserted by means of a tendon below that of the anterior belly into the humerus. Throughout their whole length the two bellies were connected by a fascia." This is precisely the arrangement found in *Ædirhinus* and *Ptilopus*, as in birds generally; that it occurs also in *Chalcophaps*, as well as in the fruit-eating *Carphophaga* is a fact new to me—never having had a specimen of the former genus to dissect. But it surprises me greatly to be told that Mr. Forbes and Dr. Gadow found it occurring in *Columba*. The posterior belly is entirely absent in *Columba livia* and *C. œnas*, in *Macropygia* and *Turacæna*. I have carefully verified its absence in so many dozens of specimens, chiefly of the two first-named forms, that I cannot but entertain grave doubts of the correctness either of Dr. Gadow's and Mr. Forbes's observation, or of the determination of the specimen of *Columba* which they say they examined. I must confess to having made a too hasty inference in this particular in regarding as a characteristic of the Pigeons as a group what I afterwards found to be not a universal modification; but the correctness of my observations can be verified by anyone, and it is a point whose importance in the classification of the Columbæ will probably prove to be considerable.

3. The absence of the glutæus externus and the presence of the adductores brevis et longus, the semitendindosus and semimembranosus. With reference to this point Dr. Gadow states:—"Now the m. gluteus externus (=*glut. anterior*) is generally very small, but plainly visible in many birds, such as Pigeons, Passerine birds, &c., and not absent as stated by Mr. Haswell," (i.e. as I take it, "though very small in many birds such as Pigeons, Passerine birds &c., is plainly visible," etc.). That this muscle, though well developed in many families, is extremely small in others is a well-known fact; but in the Pigeon it is entirely absent as a separate muscle, as was long ago pointed out by Garrod.* In regard to the four muscles whose presence is specially noted, Dr. Gadow goes on to say—"The four other muscles are well-developed in most birds as Prof. Garrod has stated over and over again, and as the dissection of any fowl will shew." I may here quote my own words in the paper alluded to. "The *adductor brevis*, *adductor longus*, *semimembranosus*, *semitendinosus* and *accessory semitendinosus* are all present. The significance of these muscles has been pointed out by Mr. A. H. Garrod ("On certain muscles of the Thigh of Bird and their value in classification, P. Z.S., 1873 and 1874)." This surely is plain enough. Prof. Garrod found that the absence or presence of certain muscles of the thigh was characteristic of the various major groups of birds. Indicating each of these muscles by a letter he was able to give a myological formulr for each, and these formulæ he found to be of some value in the determination of affinities. Surely then this formula is of sufficient importance to be quoted in an enumeration of the myological characters of the Pigeons. But Dr. Gadow not

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* Vide his "Collected Scientific Papers," p. 210, or P.Z.S., 1874, p. 258.

only finds fault with this, but insinuates that I was not aware that these muscles "as Prof. Garrod has stated over and over again," are found in other birds. In place of adopting one of Prof. Garrod's views, it is made to appear that I have been altogether overlooking his observations!

4. The special relation of the tendon of the ambiens (when present) to the fibular head of the flexor perforatus secundus tertii digiti. On this Dr. Gadow remarks—"The distal end of the ambiens muscle, when typically developed, always forms the continuation of one of the heads of the m. perforatus dig. ii. et iii.." This is, so far as my observations extend, quite correct. How Dr. Gadow, if he has really read my paper and not merely the summary, persuades himself that it contradicts my statement, I am at a loss to understand.

As a rule the fibres of the distal tendon of the ambiens become broken up when they reach the upper portion of the leg, and become scattered through the fleshy substance of the muscles referred to. In the Pigeons the arrangement is peculiar in this, that the distal tendon maintains its consistency and joins the proximal tendon of the fibular head of the flexor perf. sec. tert. dig., so that the whole might be regarded as an ilio-phalangeal muscle with two bellies and the intermediate tendon united to the fibula by a tendinous band, which is sometimes very slight. It is perhaps a point on which too much weight might be laid, but the myology of the various orders of birds is on the whole so remarkably uniform that such a peculiarity is at least worthy of being noted.

5. The presence of lumbricales in the foot. Dr. Gadow's remark on this point is as follows:—"The muscle which Mr. Haswell takes to be the representative of the lumbricales muscles of mammals has not "hitherto escaped the notice of Anatomists," and it is not "peculiar to the Pigeons," since it is also present in many other birds, e. g. the *Ratitæ*, and has been described by

Meckel, although he gives no name to it, in his "System der vergleich. Anat." iii., p. 388, and in his Archiv für Anat. u. Physiol. pp. 278 and 279." Not having been able to consult the volumes referred to here, I am unable at present to check Dr. Gadow's identification of the muscle which I have ventured to name lumbricalis with a muscle mentioned by Meckel and occurring "in many other birds, e. g. the *Ratitæ*." No mention is made of such a muscle by Owen in his 'Memoir on the Apteryx,' in his article "Aves" in Tod's Cyclopædia, or in his 'Comparative Anatomy and Physiology of Vertebrates,' in all of which frequent reference is made to Meckel's 'Vergleichende Anatomie,' nor by Selenka in the 'Vögel' of Bronn's 'Thierreich' in which Meckel is also constantly quoted, nor by Alix in his 'Appareil locomoteur des Oiseaux;' nor does Garrod mention it in his paper on the Ostrich, in which the flexors of the toes are minutely described (Collected Papers, pp. 101–104).

The muscle referred to, which, if it be not an equivalent of two coalescent lumbricales, has no homologue in Mammals, arises from the under surface of the tendon of the flexor profundus just before it divides, and, becoming bifurcated, is inserted into the sheath containing the flexor tendons of the second and third toes. Against Dr. Gadow's statement that it occurs in many other birds and therefore is not characteristic of the Pigeons, I have to place the fact that it does not occur in any of the numerous birds —swimmers, waders, parrots, kingfishers, cuckoos and others— that I have examined for it, with the single excaption of the rasorial birds in which it is well-developed. Thus though not, as I once regarded it, peculiar to the Pigeons, this muscle is a characteristic one and is probably of some taxonomic value. If it should prove to be common and peculiar to the Columbæ and the Rasores, it would prove an interesting minor link between these groups.

We may then define the *Columbidæ* myologically as birds with an expanded tensor accessorius, with the posterior belly of the latissimus dorsi sometimes absent, with the gluteus externus undeveloped, with the adductores longus et brevis, semitendinosus and accessory semitendinosus all well-developed, with the ambiens sometimes absent, and when present exhibiting a characteristic arrangement, and with "musculi lumbricales" in the foot.

NOTES AND EXHIBITS.

Note on some Seaweeds from Port Jackson and adjacent coast, by E. P. Ramsay, F.L.S.—In a recent letter from our esteemed correspondent, Baron Ferd. von Mueller, that distinguished Botanist has kindly given me the names of the following *Algæ*, which I had sent him for determination, requesting me to bring under the notice of the Society the fact that no fruiting specimens of *Claudia bennettiana* have yet been recorded. This beautiful and delicate *Alga* was dredged near Spectacle Island; where particular search should be made for this rare and interesting plant. And indeed the marine flora of Port Jackson and the adjacent coast is worthy of special attention and research, several new species and a new genus having been recently discovered on our shores. The following species from Bondi have been determined by Professor Agardh, of Lund, the greatest authority on *Algæ*: *Pterocladia lucida*, J. Agardh; *Splachnidium rugosum*, Greville; *Lederstedtia australis*, J. Agardh. (*nov. gen.et sp.)*; *Gelidium corneum*, Greville; *Plocamium angustum*, J. Agardh. Specimens of a *Laurencia* and of a small *Martensia*, probably new, were obtained in deep water. I may also mention that a new species of *Sargassum* was dredged near the North Head.

Professor Stephens exhibited a collection of rocks and fossils illustrating the structure of the Western Coal-fields, as explained by Mr. Wilkinson in his map of Wallerawang (1877). The oldest stratified rocks, quartzites, conglomerates, and sandstones are Devonian, as shewn by characteristic fossils from Mt. Lambie and Mt. Flaherty. These are broken and tilted, often vertically, by more recent porphyries and granites, upon which, as also on the upturned edges of the Devonian strata, there rests an irregular conglomerate of earthy matter, sand and pebbles, of a dark greenish brown, which bleaches to a pale buff for about twenty feet from the surface. The pebbles are derived, as is shown by the fossils which they contain, from the older Devonian rocks, which formed not only the bottom, but also shores and islands in the carboniferous sea of this District. Many bands of shales containing remains of plants, as well as of sandstones containing characteristic marine carboniferous fossils are intercalated in various places with this conglomerate. Above it are aluminous shales which in many places, as near Ben Bullen, have fretted away under atmospheric action, and left the overlying rocks with very insufficient support. These are close-grained massive sandstones cleaving naturally into more or less rectangular blocks, which, owing to the decay of their foundation, are now poised on pedestals or overhanging caverns in a very picturesque way. In these shales are abundance of plant remains, belonging to the Newcastle beds. Above the sandstone, coal-seams appear at Wallerawang and to the northward, while the series is closed by the castellated walls of Hawkesbury sandstone which crest and protect the whole. Indeed, at Blackman's Crown they are seen to rise almost vertically above their deep Devonian foundations, displaying in a landscape of extraordinary singularity and beauty a diagram of perhaps equal interest to the geologist. The limestone two miles N.W. of Piper's Flat varies from a black knotty rock to crystalline or even saccharoid marble. Its surface as exposed in the quarries has been protected from the action of running water, as is usual in limestone river beds, by deposits of gravel (partly also in all probability by various vegetable growths). Underneath, however, the acid waters flowing freely along the joints of the rock have eroded them out into holes and passages. These have subsequently, under a diminished flow, been filled up with a pure white marl full of leaf impressions, but too brittle to allow of any specimen being obtained from the portions now exposed. In this marl are distributed nodules of travertine, encrusting forms which appear to be partially decomposed portions of *Favosites*, but may turn out to be only of mineral origin. A dyke of grey porphyry, with felspar crystals much decomposed, runs through this limestone, and is probably the cause of its bleaching and crystallization. Crinoid stems, Brachiopods, and *Petraia (Petraria)* are seen in a fragment which has been half burnt and subsequently weathered.*

* This Limestone has been described by Professor Liversidge in his 'Minerals of New South Wales,' p. 111.

WEDNESDAY, 25TH OCTOBER, 1882.

The President J. C. Cox, M.D., F.L.S., &c., in the Chair.

MEMBERS ELECTED.

R. W. Graham, Esq., Lillesmere, Lower Burdekin, Queensland.

J. Ahearn, Esq., M.D., Townsville, Queensland.

Archibald Campbell MacMillan, Esq., Airdmillan, Lower Burdekin, Queensland.

Arthur Reisley Johnston, Esq., Lower Burdekin.

William Peter, Esq., Waitemata, Elizabeth Bay.

Dr. J. Wharton Cox, Sydney.

DONATIONS.

"The Minerals of New South Wales," by Prof. Archd. Liversidge, F.R.S., &c.

"Siberian and South American Fungi," by the Rev. Carl Kalchbrenner.

"Fungi in reg. div. Australiæ et Asiæ à Jul. Remy collecti 1863—1866."

"Champignons, Rapportés en 1880 d'une excursion botanique en Egypte et en Palestine," par M. William Barbey.

"The Herring, by Mitchell," presented by John F. Mann, Esq.

"The Phanerogamia of the Mitta Mitta source basin and their habitats," by James Stirling.

"Report of the Trustees of the Public Library, Museums, and National Gallery of Victoria, for 1881."

"Zur Kenntniss der Bauchdecke und der mit ihr verknüpften Organe bei den Beutelthieren von Oscar Katz." From Dr. Schuette.

"Journal of the Royal Microscopical Society of London," August 1882.

"Lecture on the Flora of Australia." By Baron Ferd. von Müller, K.C.M.G., M.D., Ph. D.

PAPERS READ.

Description of a new species of Solea from Port Stephens.

By E. P. Ramsay, F.L.S., Curator, Australian Museum.

Solea lineata, *sp. nov.*

D. 95 to —. A. 80 to —. Lin. lat. 120 (*circa*).

Eyes on the right side; the height of the body three times in the total length without the caudal, the length of the head nearly six times ($5\frac{1}{5}$); lateral line straight, apparently ending at the gill-cover. Colour light ash, with narrow transverse black wavy lines crossing the body; on the head there are six lines, on the body about 25, some continuous, others broken, many extending on to the fins; the pectoral fins ash colour, about twice the length of the head; the blind side ashy with the vertical fins blackish on the margins, the last rays of the dorsal and anal fins produced; eyes small, situated at about one diameter from the upper margin of the head, the upper scarcely in advance of the lower. The caudal fin in this specimen is imperfect. The total length about $2\frac{3}{4}$ inches, head 0·4 in.

A very small specimen not in good state, it is impossible to ascertain the correct number of the rays, the tail is also imperfect.

Hab. Port Stephens, (received from Mrs. Glover).

Contributions to Australian Oology.—Part II.

By E. P. Ramsay, F.L.S., &c.

[*Continued from Vol. VII., p.* 59.]

43. Struthidea cinerea, *Gould.* Pl. 3, figs. 4 and 6.

The nest is a round cup or basin shaped structure composed of mud or clay, about 4 inches inside diameter; it is lined with grasses, and placed on a horizontal bough, often only a few feet from the ground, but occasionally at a height of about 20 to 30 feet, the eggs are from three to four in number, but sometimes five and seven have been taken by Mr. James Ramsay from a single nest. They are of a milky-white, sometimes of a skimmed-milk colour, with spots, and here and there a blotch of blackish umber, and blackish-slate colour—some altogether without markings, or with only one or two blackish specks. A set of four measure as follows, length 1·26 x 0·85 ; 1·18 x 0·85 ; 1·27 x 0·88 ; 1·18 x 0·85.—(*Mus. Dobr.*, *J. R.*)

44. Artamus minor, *Vieill.* Pl. 3, figs. 9 and 10.

Mr. George Barnard informs me that this species builds its nests often in the end of a hollow branch, or in hollows in the tops of stumps and broken trees, and posts, sometimes in old mortice holes in fences, the nest is a very frail and scanty structure, merely a few leaves, sticks, and twigs put together so loosely that it will scarcely bear removal. The eggs two, three, or four for a sitting, are of a dull white or cream colour, blotched with yellowish-brown and obsolete markings of slaty-grey, which in some specimens are almost as well defined as the primary spots ; some specimens are heavily blotched with these colours, others spotted, blotched, freckled or minutely dotted ; all are more or less zoned at the thicker end, in some the spots are confluent, forming ill-shapen figures, in others round or oval and well-defined. Length (1) 0·75 x 0·55 (*average size*); (2) 0·71 x 0·45 ; (3) 0·76 x 0·55 , (4) 0·75 x 0·57.

45. Xerophila leucopsis, *Gould.* Pl. 3, fig. 7.

The eggs of this species have been unfortunately described as being white by Mr. Gould ; that many of our Australian birds lay eggs other than of the normal colour must be well known to all Australian Oologists, who are not unfrequently a little puzzled at getting eggs of the same species totally different from one another, nevertheless I believe the eggs described by Mr. Gould as those of this species, really belong to *Acanthiza (Geobasileus) chrysorrhous.* The eggs of the present species as shown by numerous authentic examples taken by Mr. James Ramsay and Mr. K. H. Bennett, are of a dull white, thickly spotted and freckled all over with reddish-brown, dull chocolate-brown, or dark wood-brown, in some specimens the whole of the ground colour is obscured by reddish-brown freckles, others have a zone of confluent spots of dark blackish-brown on the larger end and only a few dots or freckles on the remaining portion; average length 0·7 in. x 0·53. The nests vary in structure according to the situation chosen, some being neat and compact, placed among the twigs of some low shrub—others which are more commonly placed in the hollow branches of trees or holes in the sides of dead trees or posts, are rather scanty; all are composed of grasses and lined with feathers, wool, hair, &c.

46. Graucalus hypoleucus, *Gould.* Pl. 3, fig. 11.

The nest of this species like all those of the genus is a rather flat structure of wiry grasses and cobwebs securely fastened together, and placed on a horizontal bough usually over a forked branch, it is very shallow having but a slight depression just sufficient to hold the eggs in the centre, round, about four inches in diameter outside; the eggs in the present instance are two in number of a pale, rich and bright asparagus green with a few reddish-brown spots confluent on the thicker end, others sprinkled over the rest of the surface, length 1·1 in. x 0·8; some have no confluent markings, but the spots are more evenly distributed, oval or round, but sometimes closer together on the thicker end. *(From Mr. Barnard's Collection.)*

47. Malurus cruentatus, *Gould.* (*M. dorsalis* of Lewin).

Nest dome-shaped with the entrance at the side slightly protected by a hood, placed among grasses or shrubs near the ground.

Eggs four for a sitting, length (1) 0·6 x 0·45 inches ; (2) 0·68 x 0·46 ; the last (2) is an exceptionally large egg of this species, and has the dots crowded into a brownish-red patch on the thicker end, a few specks of the same colour are sprinkled over the rest of the surface ; the ground colour is white in No. 1, it is sprinkled with reddish dots all over the surface, but forming a zone at the thicker end.—(*From Mr. Barnard's Coll.*)

48. PHAPS HISTRIONICA, *Gould.*

The nest is a scant structure of a few grasses, collected in a slight depression on the ground ; the eggs are two in number for a sitting, pure white. This species is at times very numerous on the Barkoo and Dawson Rivers ; in 1860 it appeared plentifully in the neighbourhood of Port Denison.—(*Mus. Dobr., from Mr. J. B. White's Collection.*)

49. CHLAMYDODERA MACULATA, *Gould.* Pl. 3, fig. 2.

I have received this species of Bower Bird from almost every part of the interior of Queensland, New South Wales, and South Australia, and eggs from the Dawson River in Queensland, the Barkoo, the Clarence River, and from the Cobar district in New South Wales. They differ very little in the tints of the markings, varying in shades, in umber, sienna, and olive-brown, those at present under consideration were taken by Mr. James Ramsay in the Cobar district, they are of a pale greenish-white with numerous thick lines of umber wound round the whole surface, irregular, wavy, crossing and recrossing here and there, forming loops and knots, and occasionally crossed by a line of black or an obsolete line of olive or slaty-brown. The nest is an open structure of sticks and grasses, round, about five inches inside diameter, by three deep, and four inches high ; it is placed between the thick upright forks of a tree. The eggs are two to three in number for a sitting, length 1·53 x 1·07 in diameter.—(*Mus. Dobr., J. R.*)

50. Ocyphaps lophotes, *Temm.*

The eggs are of a delicate dull bluish-white, oval, long diameter 1·16 in.; short diameter 0·85; others measure 1·14 x 0·88; they vary from long to round ovals.—*(From K. H. Bennett's Coll.)*

51. Glareola grallaria, *Temm.*

The home of the Australian Pratincole is the interior of New South Wales and the northern portion of the Province of South Australia, it is also found occasionally during the wet seasons in the neighbourhood of Cape York and Port Darwin. In New South Wales I have received specimens from the Lachlan and Darling Rivers, and Mr. James Ramsay has noticed it at Tyndarie in the Bourke district. Mr. E. G. Vickery has kindly permitted me to describe an egg from his collection, taken near Wilcania on the Darling River, in Sept., 1880. He informs me that the parent bird was seen to fly from the eggs, and before they were taken, to return again and sit on the nest, so I think there can be little doubt of their authenticity. The eggs were three in number, the ground colour is of a creamy-white, dull light stone-brown, or light buff, well covered with irregularly shaped blotches, dots, and spots, and freckles of dull umber and sienna brown, with a few dots and dashes almost black, and obsolete spots here and there of slaty-grey; length 1·3 in. x 1 in.; in shape they are slightly oval, slightly swollen at the thicker end and not pointed. An egg of this species in the collection of Mr. K. H. Bennett, measures 1·24 x 0·95 inches; none differ materially from Mr. Vickery's specimens. Mr. Bennett informs me that they select a bare spot on the ground where the earth or sand assimilates to the colour and markings of the eggs. They breed during October.

52. Endromias australis, *Gould.*

The habitat of the species is the interior portion of the Province of South Australia, and the interior of New South Wales, but as far as is yet known, it is nowhere plentiful; sometimes it is met with in the Melbourne markets during the game season and is considered a rare bird by the dealers. Mr. E. G. Vickery has been fortunate enough to obtain the nest and eggs during a surveying trip in the Darling River District near Wilcannia. The eggs were placed on the ground among a few loose stones near the summit of a small hillock or "rise" in the level country, and placed on a little mound about two inches high, probably an old ant-hill; they were three in number, a pair measure as follows: (A.) length 1·45 x 1·05; (B.) length 1·45 x 1·03. In form they are rather less pointed, than the usual pyriform shape of Plover's eggs; the ground colour is of a deep rich cream or buff, sparingly sprinkled all over with irregular spots and some elongated crooked markings of chocolate-black with a few minute dots and dashes of a lighter tint, the markings look black in certain lights but of a chocolate tint in others. Specimens in Mr. Bennett's Collection were taken during the month of October on the Lachlan River near Mosgeil.

53. Recurvirostra rubricollis, *Temm.*

Mr. K. H. Bennett informs me that this species lays four eggs for a sitting and breeds during the months of September to December, laying its eggs on the bare ground without making any nest, and sometimes close to the waters' edge. The present specimens were found among the herbage usually growing about the sheep tanks in the interior of the country, and were taken in the Lachlan district; the ground colour varies from light stone colour to creamy-yellow, some of the former tint have a faint olive-green shade, some are heavily blotched towards the thicker end, others sparingly covered with spots, dots, and freckles of dark umber brown and black, with a few obsolete spots of slate-grey. A set measures as follows: (1) 2 in. x 1·4; (2) 1·35 x 0·95; (3) 1·4 x 0·95; (4) 1·3 x 0·95.—(*From Mr. Bennett's Coll.*)

54. Erythrogenys cinctus, *Gould.*

This species of upland Plover breeds during October and November, sometimes in December. It is a bird never, as far as I know, met with on the coast, but I have received specimens from the Clarence, even shot near Grafton. Its stronghold seems to be the interior of New South Wales and of South Australia. The eggs are four for a sitting, placed in a slight depression on the ground; in several instances Mr. Bennett informs me, he found them on the mud at the waters' edge of a large inland lagoon or lake in the Lachlan district, and smeared over with mud as if the birds had been shifting them from place to place, or perhaps they were purposely smeared over to prevent them being detected. On the whole they resemble those of *Ægialitis nigrifrons*, varying from light to dark stone colour, thickly covered all over with irregular angular and curved hair lines, and irregular shaped markings of black, which cross and recross each other in various directions, the lines vary in thickness from that of a fine hair to that of coarse thread, on the thicker end here and there they loop and form tangles. Measurements of three from one nest (1) 1·18 x 0·85; (2) 1·15 x 0·85; (3) 1·22 x 0·87.—*(From Mr. Bennett's Coll.)*

55. Herodias pacifica, *Latham.*

This fine Heron was observed by Mr. K. H. Bennett breeding in company with the Spoon-bills (*P. flavipes*) in swamps in the Lachlan district, the nest is composed of sticks laid crossways over some horizontal fork or flat portion of a thick bough, it is a scanty structures, through which the eggs, four for a sitting can be seen. They are of a beautiful pale blue, average specimens measure as follows: (1) 2·12 x 1·55 in.; (2) 2·2 x 1·52 in.; (3) 1·83 x 1·37 in.; (4) 1·83 x 1·35 in.; pairs taken from different nests in the same tree.

56. Aquila morphnoides, *Gould.*

The nest of this Eagle is about the size of that of *Corvus coronoides*, and composed of similar materials, sticks and twigs, and lined with Eucalyptus leaves, sometimes the birds take possession of an old crow's nest of the previous year. The eggs are two in number for a sitting, but not unfrequently only one is found ; the ground colour is dull white with a few smears of buff, length (1) 2·2 in. x 1·8 ; (2) 2·2 in. x 1·83 ; each taken from different nests of one each.—(*From Mr. Bennett's Coll.*)

57. Accipiter cirrhocephalus, *Vieillot.*

Three eggs are laid for a sitting, in rather a small flat nest of sticks placed on a horizontal bough generally over a forked part, it is lined with a few blades of grass and Eucalyptus leaves. Length of the eggs 1·7 x 1·21 in. ; white with a few spots and smears of buff, some are without spots and vary in size.—(*Mus. Dobr.*)

58. Milvus affinis, *Gould.*

Eggs three for a sitting of a dull white ground colour, with reddish irregular spots and dots. No. 1 has rather large spots, rather evenly dispersed over the surface ; No. 2 has only a few spots and smears. (1) 1·84 x 1·48 in. ; (2) 1·75 x 1·5 inches.—(*Mus. Dobr.*)

59. Gypoictinia melanosternon, *Gould.*

The nest of the blackbreasted Buzzard is a coarse bulky structure of sticks and small branches of trees, lined with leaves of the Eucalyptus. It is about the same size as that of the Wedge-tailed Eagle, whose nests it is not at all improbable this species appropriates. Mr. K. H. Bennett has given an interesting account of the habits of this bird in the Proc. Linn. Soc., of N.S.W., Vol. VI., p. 146. The eggs are two in number (1) 2·55 x 1·85 inches is thickly marked all over with light bright red spots, freckles and dots almost obscuring the ground colour which is of a dull white, the larger spots are confluent on the thicker end, this specimen is almost a fac simile of the ordinary variety of the egg of *Ieracidea orientalis.* No. 2, is 2·6 x 1·94 inches, while the thicker end is covered with deep reddish-brown spots, the central portion of the egg and the thin end are almost without spots.—(*From Mr. Bennett's Coll.*)

60. Falco hypoleucus, *Gould.*

This is a rare species not plentiful in any part of Australia, but occasionally obtained in the interior, it appears to be less rare in the northern portion of the interior of Queensland, and Mr. Gould records it from West Australia. I am indebted to Mr. J. B. White for specimens of the eggs taken on the upper Thompson River in Queensland. The nest, from his description is like that of an *Ieracidea*, of sticks and twigs, and placed on a horizontal bough; the eggs were three in number, length (A.) 2·07 in. x 1·51 in.; (B.) 2 inches x 1·52 in.; they are oblong ovals the whole of the ground colour obscured by minute dots and freckles of rusty-red, there is in one an indistinct band on the larger end, the shell is smooth slightly glossy; the bird was seen on the nest.—(*Mus. Dobr., from Mr. J. B. White's Collection.*)

61. Melicophilla picata, *Gould.*

Mr. K. H. Bennett informs me that this species constructs a nest very similar to that of *Meliphaga phrygia* but of much finer materials, and resembles that of a *Rhipidura;* it is placed on a horizontal branch, and cupshaped, composed of strips of fine bark and lined with fur and hair, it is about 1·5 inches high and 3 inches in diameter. The eggs, taken in the Lachlan district, were two in number, of a beautiful pale greenish-blue, with rich reddish dots, which cluster and form irregular patches towards the thicker end, but do not form a zone. Another specimen (2) has only a few faint reddish spots and a black dot here and there, very sparingly sprinkled over the surface, length (1) 0·82 x 0·6 in.; (2) 0·82 x 0·62 in.—(*From Mr. K. H. Bennett's Coll.*)

(*To be continued.*)

DESCRIPTIONS OF AUSTRALIAN MICRO-LEPIDOPTERA.

BY E. MEYRICK, B.A.

VIII. OECOPHORIDÆ.

The *Oecophoridæ* are the most extensive family of *Lepidoptera* in Australia. I have at present about 450 species from this region, but the number increases daily, and the total of those inhabiting Australia alone cannot be less than 2,000. A first instalment of these is here given, and the rest will follow in due order.

In a paper recently communicated to the Entomological Society of London I have explained fully the views which I hold as to the limits and relative classification of this and the allied families, formerly included under the head of the *Gelechidæ*, into which I need therefore not enter here. The internal classification of the family was a task of considerable difficulty, but I believe the results arrived at, though doubtless susceptible of modification in details, will be found in the main satisfactory. From the rest of the world only 13 genera, containing about 120 species, have been described, and only two of these (*Pleurota* and *Oecophora*) have been found to occur here, the great mass of the species belonging to entirely new genera, of which I have been obliged to form 67. These undoubtedly form a closely united group, of which the various members are arranged in numerous divaricating branches on a short stem. From this close interconnection, as well as the great abundance of the group, I infer with confidence that Australia has been their centre of development, and that those genera which are found elsewhere, if not stragglers from this centre, may be regarded as very old.

With the exception of one South American genus (*Gonionota*) nearly allied to the New Zealand *Semiocosma*, the family is hardly known as yet outside Europe and North America. Nearly all the genera of these regions are derivable from *Oecophora* and *Pleurota*, which, on the grounds recently pointed out, may be assumed to be very old. The exceptions are *Anchinia* and *Cacochroa*, allied to *Trachypepla; Hypercallia*, allied to *Peltophora;* and the single European species of *Peltophora;* all these together number only half-a-dozen species, and they may possibly be stragglers, a point which can only be determined by a knowledge of other regions. The relationship between the Australian and New Zealand genera will be discussed elsewhere; it will be sufficient here to remark that the only genus considerably developed in both lands is *Oecophora*, whose antiquity is thus further corroborated.

The special developmental origin of each genus, so far as it can be traced with probability, will be indicated in each case in the general remarks; and anyone can therefore, if he pleases, draw up for himself a genealogical table to express my conclusions, which are offered as probable only. It may, however, be of assistance, if I here sum up briefly the general lines of development of the family. The oldest existing genus is *Oecophora;* immediately connected with this is *Phloeopola;* thence arise collaterally *Eulechria* and *Philobota;* from *Philobota* originates the extensive group including *Peltophora* and *Coesyra;* from *Philobota* also, through *Heliocausta*, is derived *Hoplitica*, and through *Eochroa*, *Palparia*. The remaining genera can be arranged in groups round these centres.

The most valuable structural character for classification is afforded by the termination of vein 7 of the forewings, by which the family is divided into two main natural groups; in the first (genera 1–60) this vein terminates in the hindmargin or apex, in the second (genera 61–70) in the costa. Usually this point is easily discernible, but occasionally the wing is so rounded that it is hard to determine where the apex really is; for this allowance must be made. The important points of neuration can be made out easily in all but the smallest species on the underside without unscaling; I have however denuded for examination specimens of 300 of the species described. Next to this the antennal characters are most important, especially the presence or absence of the basal pecten. This structure is fragile and liable to denudation, so that observation of more than one specimen is needed to ensure accuracy; yet in species which possess this pecten, it is uncommon to find even worn specimens showing no trace of it. The length of the antennal ciliations is also of considerable value. Other important points are the approximation of vein 5 of the hindwings to 4 at base, the scaling and length of the labial palpi, the possession of a thoracic crest, and the form of the hindwings with the relative length of their cilia. The maxillary palpi and ocelli are practically identical throughout the family, and though occasionally obsolete, offer in my opinion no tangible generic characters.

In the following descriptions, a number placed after the description of the antennal ciliations indicates the length of the ciliations in terms of the breadth of the stalk of the antennæ; e. g., 3–5 signifies that the ciliations are from three to five times as long as the breadth of the antennal stalk. Similarly, a number after the cilia of the hindwings denotes the length of the cilia in terms of the breadth of the hindwings. At the request of Prof. Zeller, I have given a Latin diagnosis of each species. The measurements I shall give henceforth in millimétres (roughly, 25 mm. = 1 inch), which are universally understood, and not liable to misinterpretation. At the end of the family an index of the specific names and synonyms will be added, and reference made to such published descriptions of Walker and others as are for any reason unidentifiable. New Zealand species which have been already described are here indicated by a diagnosis only, as they will be fully described in the Transactions of the New Zealand Institute.

OECOPHORIDÆ.

Head with loosely appressed hairs, forming a tuft on each side of crown. Ocelli usually present, sometimes concealed. Tongue well developed. Antennæ moderate, shorter than forewings, filiform, in male regularly ciliated, basal joint frequently with a pecten of long closely-set hair-scales. Maxillary palpi usually distinct, small, simple, transversely appressed to face above tongue, rarely obsolete. Labial palpi well-developed, curved, ascending, acutely pointed. Thorax smooth or sometimes crested. Forewings oblong or elongate. Hindwings not broader (rarely slightly broader) than forewings, sometimes much narrower, elongate-ovate or lanceolate, hindmargin sometimes sinuate, cilia moderate or long (rarely short). Abdomen moderate or broad, often strongly margined. Posterior tibiæ usually clothed with long hairs. Forewings with 12 veins (rarely 11 by coalescence of 7 and 8), 7 and 8 stalked, 7 to costa, hindmargin, or apex, rarely 2 and 3, or 3 and 4 stalked, 2 from angle of cell or not far before it, 1 furcate at base, upper fork rarely partially obsolete. Hindwings with 8 veins, 3 and 4 from a point (very rarely slightly remote or short stalked), 5 sometimes bent, 6 and 7 parallel.

Larva sixteen-legged, rather stout, usually with complex marbled markings in the first group, more simply marked in the second, habits very various.

In general this family may be distinguished from the *Depressaridæ* by the ciliated antennæ, from the *Cryptolechidæ* by the parallel veins 6 and 7 of the hindwings, from the *Gelechidæ* by the ciliated antennæ and regularly-veined normal hindwings, from the *Dasyceridæ* by the naked antennæ, from the *Glyphipterygidæ* by the ciliated antennæ and stalking of veins 7 and 8 of the forewings, from the group of families allied to the *Tineidæ* by the origin of veins 3 and 4 of the hindwings from a point, and from the other more lowly-organised families (*Elachistidæ*, &c.) by the twelve-veined forewings and eight-veined hindwings.

The following is an accurate tabulation of the genera; I have included in it all the European and other genera, to ensure a thorough comprehension of the scheme. The Australian and New Zealand genera are numbered in order of their position; of the rest the position is indicated by letters (a, b, &c.) affixed to the number of the nearest preceding Australian genus. The arrangement of the tabulation will, I think explain itself; succession is denoted by numbers, and collateral relation by letters; thus 1a may be divided into 2a and 2b, each of these into 3a and 3b (or more subdivisions, as 3c, &c), and so on.

1a. Forewings with 11 veins, 7 and 8 being coincident.	
2a. Terminal joint of palpi as long as second	11. Atelosticha.
2b. „ „ „ half as long as second	22. Allodoxa.
1b. Forewings with 12 veins, 7 and 8 stalked.	
2a. Vein 7 of forewings to hindmargin.	
3a. Terminal joint of palpi concealed.	
4a. Second joint of palpi rough above ...	45a. Holoscolia.
4b. „ „ „ not rough above	45c. Protasis.
3b. Terminal joint of palpi apparent.	
4a. Second joint of palpi with a tuft of hairs or with rough projecting scales above or beneath.	
5a. Antennæ of male with long fine cilia (3).	
6a. Basal joint of antennæ without pecten	44. Thalerotricha.
6b. „ „ „ with strong pecten.	
7a. Second joint of palpi evenly rough-haired	45d. Topeutis.
7b. „ „ „ with a more or less projecting tuft beneath	1. Palparia.

5b. Antennæ of male moderately ciliated (1).
6a. Second joint of palpi with projecting scales above.
7a. Second joint of palpi rough above throughout ... ... 46. Pleurota.
7b. Second joint of palpi rough above near apex only.
8a. Veins 3 and 4 of hindwings slenderly remote at base ... ... 39. Thyrsopala.
8b. Veins 3 and 4 of hindwings from a point 43. Protomacha.
6b. Second joint of palpi smooth above.
7a. Second joint of palpi beneath with a long well-defined tuft ... ... 47. Atheropla.
7b. Second joint of palpi beneath with a loose spreading tuft ... ... 45. Saropla.
7c. Second joint of palpi beneath with roughly projecting hair-scales... ... 48. Coeranica.
4b. Second joint of palpi at most loosely scaled.
5a. Anterior tibiæ and tarsi strongly dilated with scales.
6a. Antennæ of male with long fine cilia (4.) 4. Lepidotarsa.
6b. „ „ moderately strongly ciliated (2) ... ... 57. Crepidosceles.
5b. Anterior tibiæ and tarsi not dilated.
6a. Thorax with a crest of scales.
7a. Antennæ of male very shortly ciliated ($\frac{1}{2}$)
8a. Cilia of hindwings $\frac{1}{3}$ ... ... 3. Eclecta.
8b. Cilia of hindwings $\frac{3}{4}$ ... ... 20. Machetis.
7b. Antennæ of male moderately strongly ciliated ($1\frac{1}{2}$) ... ... 52. Epipyrga.
6b. Thorax smooth.

7a. Antennæ of male with long fine cilia ($2\frac{1}{2}$–5).
8a. Vein 5 of hindwings strongly approximated to 4 at base .. .. 9. Euchætis.
8b. Vein 5 of hindwings nearly parallel to 4.
9a. Basal joint of antennæ without pecten.
10a. Hindwings much narrower than forewings, cilia more than 1 ... ... 49. Eulachna.
10b. Hindwings almost or quite as broad as forewings, cilia less than 1.
11a. Terminal joint of palpi not much shorter than second ... ... 37. Compsotropha.
11b. Terminal joint of palpi less than half second.
12a. Palpi very long... ... ... 40a. Hypercallia.
12b. Palpi short ... ... 50. Aristeis.
9b. Basal joint of antennæ with pecten.
10a. Terminal joint of palpi roughened with scales anteriorly ... ... 5. Eochroa.
10b. Terminal joint of palpi slender, smooth.
11a. Terminal joint of palpi as long as second. 23. Petalanthes.
11b. Terminal joint of palpi shorter than second.
12a. Veins 2 and 3 of forewings from considerably before angle of cell ... ... 42. Orophia.
12b. Veins 2 and 3 of forewings rising close to angle ... ... 41. Peltophora.
7b. Antennæ of male moderately ciliated (1-2)
8a. Basal joint of antennæ without pecten, or with one or two fugitive scales.
9a. Second joint of palpi dilated with projecting scales beneath beyond middle... 7. Zonopetala.
9b. Second joint of palpi evenly and almost smoothly scaled.

10a. Basal joint of posterior tarsi excessively long, stout ... ... 18. Leistarcha.
10b. Basal joint of posterior tarsi moderate, slender.
11a. Abdomen broadly dilated and rather flattened ... ... 10. Euryplaca.
11b. Abdomen moderate ... ... 8. Heliocausta.
8b. Basal joint of antennæ with strong pecten.
9a. Head densely tufted, hairs projecting between antennæ ... ... 38. Eriodyta.
9b. Head with loosely rough or appressed hairs, rarely projecting.
10a. Upper fork of vein 1 of forewings partially obsolete ... ... 56. Oxythecta.
10b. Upper fork of vein 1 of forewings distinct.
11a. Hindwings ovate-lanceolate, pointed, cilia exceeding 1.
12a. Hindwings acute ... ... 60. Machæritis.
12b. Hindwings obtusely-pointed ... ... 59. Haplodyta.
11b. Hindwings elongate-ovate, cilia less than 1
12a. Second joint of palpi exceeding base of antennæ.
13a. Antennæ of male biciliated with tufts (2) 34. Antidica.
13b. Antennæ of male evenly ciliated (1-1½).
14a. Middle tibiæ much thickened with rough hairs ... ... 36. Leistomorpha.
14b. Middle tibiæ smoothly scaled.
15a. Second joint of palpi very long ... 40. Philonympha.
15b. Second joint of palpi moderate ... 35. Philobota.
12b. Second joint of palpi not exceeding base of antennæ.
13a. Veins 3 and 4 of forewings short-stalked 55. Heterozyga.

13b. Veins 3 and 4 of forewings separate.
14a. Head loosely haired, hairs projecting over forehead ... ... 33. Nephogenes.
14b. Head smooth, hairs not projecting ... 51. Coesyra.
7c. Antennæ of male very shortly ciliated ($\frac{1}{4}$ to $\frac{1}{2}$).
8a. Palpi short, terminal joint half as long as second ... ... 54. Microbela.
8b. Palpi moderate, terminal joint not much shorter than second ... ... 53. Brachynemata.
2b. Vein 7 of forewings to apex.
3a. Thorax crested.
4a. Anterior tibiæ and tarsi dilated with dense scales ... ... 31. Piloprepes.
4b. Anterior tibiæ and tarsi not dilated.
5a. Basal joint of antennæ without pecten, or with one or two fugitive scales.
6a. Antennæ of male stout, minutely ciliated ($\frac{1}{4}$) ... ... 29. Sphyrelata.
6b. Antennæ of male moderately ciliated (1) 28. Phloeopola.
5b. Basal joint of antennæ with strong pecten.
6a. Second joint of palpi dilated before apex with rough scale beneath ... .. 19. Oenochroa.
6b. Second joint of palpi evenly scaled ... 21. Placocosma.
3b. Thorax smooth.
4a. Forewings with tufts of raised scales.
5a. Second joint of palpi much dilated with scales towards apex ... ... 31a. Anchinia.
5b. Second joint of palpi not dilated.
6a. Ciliations of antennæ in male short, even 32. Trachypepla.
6b. Ciliations of antennæ in male long, fine, fasciculated ... ... 16. Atomotricha.
4b. Forewings smooth.
5a. Antennæ of male with long fine cilia (3-7).

6a. Second joint of palpi with a short angular apical projection beneath ... 26. Ioptera.
6b. Second joint of palpi brush-like beneath towards apex ... ... 17. Brachysara.
6c. Second joint of palpi evenly scaled.
7a. Second joint of palpi exceeding base of antennæ, terminal joint as long ... 24. Linosticha.
7b. Second joint of palpi not reaching base of antennæ, terminal joint shorter ... 27. Macronemata.
5b. Antennæ of male moderately ciliated (1-2).
6a. Second joint of palpi with rough projecting scales beneath towards apex ... 25. Phriconyma.
6b. Second joint of palpi evenly scaled.
7a. Terminal joint of palpi less than half second ... ... 30. Hieropola.
7b. Terminal joint of palpi not much shorter than second.
8a. Basal joint of antennæ without pecten, or with one or two fugitive scales ... 14. Hoplitica.
8b. Basal joint of antennæ with strong pecten ... ... 15. Eulechria.
5c. Antennæ of male very shortly ciliated ($\frac{1}{3}$)
6a. Second joint of palpi shortly tufted beneath ... ... 12. Nymphostola.
6b. Second joint of palpi evenly scaled ... 13. Proteodes.
2c. Vein 7 of forewings to costa.
3a. Terminal joint of palpi with median posterior tooth of scales.
4a. Thorax crested ... ... 62a. Gonionota.
4b. Thorax smooth ... ... 62. Semiocosma.
3b. Terminal joint of palpi smooth.
4a. Second joint of palpi with rough projecting scales beneath.

5a. Terminal joint of palpi as long as second.
6a. Veins 3 and 4 of hindwings stalked ... 61. Aochleta.
6b. Veins 3 and 4 from a point ... ... 6. Euphiltra.
5b. Terminal joint of palpi much shorter than second.
6a. Antennæ of male with long fine ciliations (2-3). ... ... 63a. Harpella.
6b. Antennæ of male very shortly ciliated ($\frac{1}{3}$) 2. Enchocrates.
4b. Second joint of palpi without projecting scales.
5a. Antennæ of male with long fine cilia (3-4).
6a. Hindwings as broad as forewings, palpi rather long ... ... 63. Leptocroca.
6b. Hindwings narrower than forewings, palpi moderately short.
7a. Hindwings ovate-lanceolate, cilia 1–$1\frac{1}{4}$ 66. Crossophora.
7b. Hindwings lanceolate, acute, cilia $2\frac{1}{2}$–3 70. Satrapia.
5b. Antennæ of male moderately ciliated ($\frac{1}{2}$–$1\frac{1}{2}$).
6a. Basal joint of antennæ very elongate and attenuated ... ... 69. Macrobathra.
6b. Basal joint of antennæ moderately short and broad.
7a. Basal joint of antennæ without pecten.
8a. Hindwings narrow ovate-lanceolate ... 67. Ochlogenes.
8b. Hindwings elongate-ovate ... ... 64. Gymnobathra.
7b. Basal joint of antennæ with pecten.
8a. Hindwings with an expanded spherical tuft of hairs at base ... ... 68. Disselia.
8b. Hindwings without basal tuft.
9a. Antennal pecten strong, ciliations 1-$1\frac{1}{2}$ 65. Oecophora.
9b. Antennal pecten fugitive, ciliations $\frac{1}{2}$... 62b. Psecadia.

1. Palparia, Wing.

Head with appressed scales, sometimes projecting somewhat between antennæ, side tufts rather short, more or less loosely appressed. Antennæ moderate, in male with long fine ciliations (3–5); basal joint stout, with strong pecten. Palpi moderately long, second joint often exceeding base of antennæ, densely scaled, with a long or short dense projecting triangular tuft beneath at apex; terminal joint shorter than second, strongly reflexed, somewhat roughened anteriorly. Thorax smooth. Forewings elongate or broad, costa often strongly arched, apex acute or falcate, hindmargin straight or sinuate, oblique. Hindwings as broad as forewings, ovate or elongate-ovate, hindmargin more or less distinctly sinuate beneath apex, cilia $\frac{1}{4}$–$\frac{1}{2}$. Abdomen rather stout. Legs smoothly scaled, posterior tibiæ clothed with long fine hairs. Forewings with vein 7 to hindmargin slightly below apex, 2 from somewhat before angle of cell. Hindwings normal.

The long ciliations of the antennæ, and the definite tuft of the palpi, combined with the termination of vein 7 on hindmargin, and the basal pecten of the antennæ, separate this genus at once from all others. The structure of the palpi is however subject to considerable variation, the tuft being in some species long and acute, in others very short and obtuse, and the relative length of the terminal joint also varies much. The species also differ greatly in the breadth and form of the forewings. All these differences are, notwithstanding, merely specific, and although at first the extreme forms of the genus appear to have little resemblance, yet the whole forms an intimately allied group, very distinct and easily recognisable. The genus, with its allies, is connected with the more ordinary forms of the family through *Eochroa*.

The species are of moderate or large size, always elegant, and often handsomely coloured with orange and rcsy tints. The larvæ are imperfectly known, but appear to feed between spun twigs and leaves. The genus is confined to Australia, and at present contains thirteen species, which may be distinguished as follows :

A. Apex of forewings not projecting, hindmargin slightly rounded ... ... 2. *lambertella.*
B. Apex of forewings more or less projecting, hindmargin sinuate.
  1. Costa of forewings sinuate, bent towards base ... ... 7. *micrastrella.*
  2. Costa of forewings strongly convex.
    a. Forewings deep yellow, with rosy costal patch ... ... 3. *hesperidella.*
    b. Forewings whitish-yellow, rosy-suffused 4. *rectiorella.*
    c. Forewings rosy-grey ... ... 5. *thalamia.*
  3. Costa of forewings moderately or gently arched.
    a. Forewings rosy-ochreous ... ... 6. *conephella.*
    b. Forewings greyish-fuscous ... ... 8. *euryphanella.*
    c. Forewings reddish-fuscous.
      i. Tuft of palpi long ... ...10. *uncinella.*
      ii. Tuft of palpi very short ... ... 9. *semijunctella.*
    d. Forewings dark fuscous lined with white 11. *aulacoïs.*
C. Apex of forewings strongly produced, falcate
  1. Forewings broad, orange-yellow... ... 1. *aurata.*
  2. Forewings narrow, grey.
    a. A black streak from disc to apex ...12. *falcifera.*
    b. No black apical streak... ... ...13. *hirax.*

1. *Palp. aurata*, Walk.

(*Palparia aurata*, Walk., Brit. Mus. Cat. 775).

Magna, alis ant. falcatis, aurantiacis, antice roseo-suffusis, linea longitudinali curva lunulaque media roseis, ciliis roseo-brunneis ; post. flavis.

♂. 34–36 mm. Head deep ochreous-yellow, face rosy-tinged. Palpi with tuft of second joint dense, porrected, as long as terminal joint; second joint and tuft deep ochreous-yellow, paler internally, at base white beneath, tuft towards extremity or wholly carmine-tinged; terminal joint pale ochreous, anterior edge dark carmine-fuscous. Antennæ whitish-ochreous. Thorax varying from ochreous to carmine-pink. Abdomen whitish-ochreous, anal tuft yellowish-ochreous. Legs carmine-pink, anterior and middle tibiæ and tarsi suffused above with dark fuscous except at apex of tarsal joints, posterior tibiæ pale yellow. Forewings broad, costa very strongly arched, especially towards apex, apex very strongly produced and falcate, hindmargin very obliquely rounded beneath; golden-yellow, basal two-thirds generally more or less suffused with carmine-pink; costa and inner margin slenderly carmine-pink throughout; a slender, rather upwardly-convex, fuscous-carmine longitudinal line rather above middle from near base to apex, most distinct beyond middle; an indistinct transverse crescentic carmine-pink mark in disc at $\frac{2}{3}$, its apex meeting the longitudinal line: cilia deep dull carmine-pink, suffused with dark grey round apex. Hindwings elongate-ovate, hindmargin slightly sinuate; pale yellow, rather deeper posteriorly; cilia whitish-yellow, becoming carmine-pink round apex.

A handsome and conspicuous insect, distinguished from the other large yellow species of the genus by the peculiar strongly-falcate apex of the forewings, and the longitudinal line.

Apparently not common, but sluggish in habit, as are most of the genus; occurs at Blackheath on the Blue Mountains (3,500 feet), and near Melbourne, in November; also on Mount Lofty Range, South Australia.

2. *Palp. lambertella*, Wing.

Maxima, alis ant. margine postico rotundato, roseis, nitidis, linea mediana plicaque submediana dilute flavis; post. dilute flavis, apice roseo.

♀. 47 mm. Head golden-yellow, sides of face and back of crown carmine-pink. (Palpi broken.) Antennæ blackish-grey, becoming carmine-pink at base. Thorax carmine-pink. Abdomen whitish-yellow. Legs whitish-yellow, anterior tibiæ and tarsi above carmine-pink suffused with dark grey; middle tibiæ above carmine-pink with a broad suffused pale yellow median band, tarsi carmine-pink. (Posterior legs broken). Forewings broad, costa very strongly and evenly arched, apex bluntly rectangular, hindmargin obliquely rounded; uniform glossy carmine-pink; costal edge from near base almost to apex, and dorsal edge from middle of inner margin to middle of hindmargin very slenderly yellow-whitish; a well-defined slender pale yellow line along fold from base to anal angle; base of wing above this line suffusedly yellow; a straight longitudinal pale yellow line through middle of disc from $\frac{1}{3}$ almost to hindmargin beneath apex: cilia pale carmine-pink, darker at apex, becoming orange along costa; under surface of cilia with a blackish apical spot. Hindwings ovate, hindmargin rounded; whitish-yellow, posteriorly carmine-tinged, apex carmine-pink; cilia whitish-yellow, becoming carmine-pink round apex, with a blackish-grey apical spot.

This very striking and beautiful species is prominently distinguished by its very large size, and shining carmine-pink forewings; the rounded hindmargin is peculiar in the genus.

I only possess one specimen, which I received through the kindness of Dr. J. C. Cox, who believes it to have been taken near Sydney. The British Museum has several specimens, supposed to come from the same place.

I have not been able to refer to Wing's original description, and have had to rely on the identification of Walker, who can however hardly have gone wrong in this case.

3. *Palp. hesperidella*, n. sp.

Magna, alis ant. margine postico sinuato, flavis, spatio costali antice roseo; post. albidis, apice flavido.

♂ ♀. 24–28 mm. Head deep ochreous-yellow, face carmine-tinged. Palpi with tuft of second joint dense, porrected, rather longer than terminal joint; second joint and tuft deep orange-carmine, becoming yellow internally, whitish above; terminal joint blackish-grey in front, whitish behind. Antennæ whitish, suffusedly ringed with fuscous-grey. Thorax orange-carmine, yellower posteriorly. Abdomen ochreous-whitish. Anterior and middle tibiæ and tarsi dark fuscous, beneath ochreous-whitish tinged with carmine; posterior tibiæ and tarsi ochreous-whitish, beneath carmine-tinged and irrorated with grey. Forewings broad, costa strongly and evenly arched, apex acute, not produced, hindmargin slightly sinuate, obliquely rounded; uniform bright deep yellow; extreme costal edge blackish-grey from base to $\frac{1}{4}$, thence to apex whitish-yellow; a tolerably well-defined triangular pale carmine-pink patch extending along costa from near base to $\frac{2}{3}$, in middle reaching nearly half across wing, its lower edge parallel to inner-margin, and its posterior edge parallel to hind-margin: cilia glossy carmine-pink, darkest at apex, costal cilia pale yellow, tips of apical cilia dark grey. Hindwings elongate-ovate, hindmargin rounded; yellow-whitish, apex slightly more yellowish; cilia yellow-whitish, faintly carmine-tinged.

Readily known by the clear deep yellow forewings and well-defined rosy costal patch.

Taken not uncommonly at Blackheath on the Blue Mountains (3,500 feet), and also occasionally near Sydney, in October and November.

Walker described a specimen of this species as var. B. of *Palp. aurigena* (=*P. rectiorella*).

4. *Palp. rectiorella*, Walk.

(*Palparia rectiorella*, Walk., Brit. Mus. Cat. 775; *Palparia aurigena*, ibid. 775; *Palparia confectella*, ibid. 776.)

Magna, alis ant. margine postico sinuato, dilute flavidis, leviter roseo-suffusis; post. albidis, margine postico anguste roseo.

♂. 31 mm. Head whitish-yellow, partially rosy-suffused. Palpi with tuft of second joint dense, porrected, as long as terminal joint; second joint and tuft whitish-yellow, deeper at base, with a suffused dark reddish-fuscous central band, and lower portion of tuft tinged externally with reddish-fuscous; terminal joint ochreous-carmine in front, white behind. Antennæ yellowish-whitish, slightly carmine-tinged towards base. Thorax whitish-yellow, suffused with pale carmine. Abdomen whitish-yellowish. Anterior and middle tibiæ and tarsi dark carmine-fuscous, beneath yellowish-whitish tinged with carmine; posterior tibiæ whitish-yellow, tarsi yellowish-whitish, beneath suffused with pale carmine. Forewings broad, costa strongly and evenly arched, apex acute, not produced, hindmargin slightly sinuate, oblique; whitish-yellow, delicately mixed with pale carmine, more strongly suffused with pale carmine towards basal two-thirds of inner margin; costa and inner margin slenderly clear pale yellow; base of costa brownish: cilia whitish-yellow, becoming pale carmine towards apex of wing. Hindwings elongate-ovate, hindmargin rounded; whitish, hindmarginal edge pale carmine; cilia whitish, more yellowish round apex.

Nearly allied to the preceding, which it resembles in form, but is much paler, slightly rosy throughout, but without the distinct rosy costal patch, and with hindmargin of hindwings rosy.

I have received two specimens, said to have been taken near Sydney. One of Walker's specimens is stated to be from Tasmania. Although not possessing a female for description, I have seen that sex, which does not differ from the male.

Walker's description of *P. rectiorella* is recognisable, and the types are truly this species; they are both females, though described by Walker as male. His *P. aurigena* includes three species; the male is described first, and is *P. rectiorella* (specimen *c.*); the female is *Heliocausta incarnatella*, Walk. (specimen *a.*); and the var. B. is *P. hesperidella* (specimen *b.*). *P. confectella* is represented by an ordinary male of this species.

5. *Palph. thalamia*, n. sp.

Media, alis ant. margine postico sinuato, dilute roseis, postice griseo-suffusis ; post. dilute flavidis.

♂. $19\frac{1}{2}$ mm. Head white. Palpi with tuft of second joint dense, broadly triangular, as long as terminal joint ; white, second joint and tuft externally pale carmine except towards apex of joint. Antennæ dark grey, becoming whitish at base. Thorax whitish-grey, anteriorly white, posteriorly pale carmine-pink. Abdomen ochreous-whitish. Anterior tibiæ carmine-pink, tarsi dark fuscous ; middle tibiæ carmine-pink, tarsi grey-whitish ; posterior tibiæ and tarsi whitish. Forewings moderate, costa very strongly arched, apex somewhat produced, acute, hindmargin rather strongly sinuate beneath apex, thence very obliquely rounded ; pale carmine-pink, faintly and irregularly suffused with whitish-grey, and irrorated with darker grey ; costa suffusedly white towards base, on posterior half slenderly suffused with dark grey ; a broad obscure grey suffusion towards posterior half of inner margin and hindmargin, becoming attenuated towards apex ; apex rather brighter carmine ; an obscure dark grey dot in disc beyond middle : cilia grey-whitish, greyer towards base, costal cilia dark grey. Hindwings with hindmargin faintly sinuate ; whitish-yellowish, cilia whitish.

A distinct, but not conspicuous species, resembling the preceding in the strongly convex costa, and long tuft of palpi, but much smaller, and superficially more like *P. eonephella*, from which it differs in the grey posterior suffusion, the absence of any ochreous tinge, and the much paler hindwings, as well as structurally.

I have one fine specimen, taken by Mr. G. H. Raynor at Blackheath in the Blue Mountains (3,500 feet) in November.

6. *Palp. eonephella*, n. sp.

Minor, alis ant. margine postico sinuato, ochreis, roseo-suffusis, punctis duobus disci minimis maculaque apicis in ciliis nigris ; post. griseis vel flavidis, apice roseo.

♂ ♀. 15½–16½ mm. Head whitish, faintly carmine-tinged. Palpi with tuft of second joint short, obtuse, hardly more than half terminal joint; second joint and tuft ochreous-carmine mixed with grey, apex of joint white, terminal joint white. Antennæ whitish, in female suffused with grey except at base. Thorax whitish-ochreous, with a broad central longitudinal ochreous-orange stripe. Abdomen whitish-ochreous, beneath and on sides carmine-tinged. Anterior and middle tibiæ carmine-pink, tarsi dark fuscous; posterior tibiæ and tarsi ochreous-whitish. Forewings moderate, costa moderately and evenly arched, apex somewhat produced, acute, hindmargin sinuate beneath apex, thence very obliquely rounded; varying from carmine-pink to ochreous-whitish faintly tinged with carmine, generally more ochreous-tinged towards disc and inner margin; a minute dark grey dot in disc before middle, and another beyond middle; towards hindmargin spaces between veins obscurely mixed with dark grey; cilia ochreous-whitish, becoming carmine-pink towards base, with a blackish spot on tips at apex. Hindwings with hindmargin slightly sinuate; grey, suffused towards apex with whitish-ochreous, in male sometimes almost wholly yellowish; apex slightly rosy-tinged; cilia whitish-ochreous.

The smallest species of the genus, distinguished by its rosy-ochreous colouring, discal dots, and dark spot in apical cilia.

Taken near Sydney from November to February, and at Brisbane in September, not commonly.

7. *Palp. micrastrella*, n. sp.

Major, alis ant. margine postico costaque sinuatis, griseo-ochreis, lituris costæ brevissimis nigris, puncto disci cano; post. griseis.

♂. 24 mm. Head whitish-ochreous. Palpi with tuft of second joint very short, angular, about ¼ of terminal joint; whitish-ochreous, second joint mixed with grey on sides, terminal joint thickened with rough scales beneath, anteriorly suffused with dark grey. Antennæ ochreous-whitish, ciliations very long. Thorax ochreous-whitish, mixed with pale ochreous. Abdomen grey. Anterior tibiæ dark fuscous mixed with ochreous; middle tibiæ ochreous with narrow dark fuscous median and terminal rings, extreme apex white; posterior tibiæ grey-whitish; all tarsi dark fuscous with whitish rings at apex of joints, basal joint of posterior tarsi whitish towards base. Forewings moderate, somewhat dilated posteriorly, costa strongly arched near base, thence nearly straight, slightly concave, hardly arched before apex, apex somewhat produced, acute, hindmargin oblique, rather strongly concave; brownish-ochreous, very densely irrorated with ochreous-whitish, especially towards costa; extreme costal edge whitish from $\frac{1}{4}$ to $\frac{3}{4}$; two short oblique waved cloudy dark fuscous lines from costa between base and $\frac{1}{4}$, reaching about $\frac{1}{3}$ across wing; six very small black spots on costa between $\frac{1}{4}$ and apex at nearly equal distances; some irregular dark fuscous scales on inner margin, and one or two in disc; a distinct minute black dot in disc before middle, and a clear white dot in disc beyond middle: cilia brownish-ochreous, mixed with grey-whitish, and chequered with cloudy blackish-fuscous. Hindwings with hindmargin slightly sinuate; pale grey, darker towards apex, with a darker central lunule; cilia whitish-grey, mixed with dark grey.

A very peculiar species, with the tuft of the palpi as short as in *P. hirax* and *P. falcifera*, distinguished from all by the sinuate costa, ochreous-grey colouring, and white discal dot.

The larva feeds amongst spun twigs of *Exocarpus cupressiformis* (*Santalaceæ*), but is undescribed.

I have one specimen, and have seen a second, both bred by Mr. G. H. Raynor in September from larvæ found near Parramatta, New South Wales.

8. *Palp. euryphanella*, n. sp.

Media, alis ant. margine postico sinuato, griseo-fuscis, fasciis duabus angustis lituraque costæ media saturate fuscis; post. dilute flavis.

♀. 19½–22½ mm. Head grey, mixed with darker on crown, face whitish-grey. Palpi with tuft of second joint triangular, pointed, almost as long as terminal joint: second joint and tuft pale grey densely mixed with blackish-grey, terminal joint anteriorly blackish-grey, posteriorly whitish-grey. Antennæ grey ringed with blackish. Thorax greyish-brown, mixed with dark fuscous. Abdomen whitish-yellow, apex rosy-tinged. Legs dark fuscous-grey, finely irrorated with whitish-yellow; posterior tibiæ and basal joint of tarsi whitish-yellow above, other joints with whitish-yellow apical rings. Forewings moderate, strongly dilated posteriorly, costa slightly arched, apex rather produced, hardly acute, hindmargin rather oblique, rather strongly concave; whitish-grey, densely irrorated with dark fuscous, so as to appear brown-grey, slightly ochreous-tinged in disc and towards base of inner margin; extreme costal edge ferruginous-yellow from $\frac{1}{4}$ almost to apex; a slightly curved oblique cloudy dark fuscous transverse streak from $\frac{1}{3}$ of costa to before middle of inner margin, posteriorly suffused into ground-colour, and dilated into a cloudy spot on middle of inner margin; an oblique short cloudy dark fuscous streak from middle of costa, reaching $\frac{1}{3}$ across wing; a small indistinct dark fuscous spot between apex of this and inner margin; a cloudy dark fuscous streak from costa before apex to hindmargin before anal angle, nearly parallel to hindmargin, attenuated and indistinct above; an indistinct dark fuscous suffusion along hindmargin: cilia grey-whitish, becoming ochreous-tinged towards base, mixed with dark fuscous, and with a strong cloudy dark fuscous line before tips throughout, less distinct round anal angle; costal cilia ochreous-yellow, with four short oblique black dashes. Hindwings ovate, hindmargin slightly indented; pale yellow, with five indistinct blackish dots on hindmargin on extremities of veins; cilia grey-whitish, very faintly carmine-tinged, towards inner margin pale yellowish.

Allied to *P. uncinella* and *P. semijunctella*, differing from both in the greyish tinge of the forewings, the two complete dark fuscous fasciæ, and the paler yellow hindwings.

I took one specimen at Launceston, Tasmania, in January, and have a second taken by Mr. G. H. Raynor at Warragul, Gippsland, in December.

9. *Palp. semijunctella*, Walk.

(*Tortricopsis semijunctella*, Walk., Brit. Mus. Cat., 777.)

Media, alis ant. margine postico sinuato, roseo-fuscis, lituris costæ brevissimis nigris; post. flavis, ciliis griseis.

♂ ♀. 21–23 mm. Head ochreous-whitish, tinged on crown with dull carmine. Palpi with tuft of second joint very short, angular, about $\frac{1}{4}$ of terminal joint; second joint and tuft deep reddish-ochreous-brown, whitish at apex of joint, terminal joint whitish, anteriorly slightly carmine-tinged. Antennæ pale greyish-ochreous. Thorax reddish-ochreous-brown, suffused with pale grey. Abdomen whitish-yellow, apex bright crimson; beneath crimson, segments suffused with dark grey towards base. Anterior and middle tibiæ deep crimson-fuscous, tarsi dark fuscous; posterior tibiæ and tarsi whitish-yellow. Forewings moderate, dilated posteriorly, costa very slightly arched, apex somewhat produced, acute, hindmargin oblique, rather concave beneath apex; reddish-ochreous-brown, more or less densely irrorated with grey-whitish and sometimes with grey, especially on disc; extreme costal edge paler; a cloudy dark fuscous mark on costa at $\frac{1}{4}$, tending to be faintly produced obliquely outwards; a blackish dot on costa slightly beyond middle, giving rise to a very faintly indicated oblique outwardly angulated fuscous-grey transverse line, ending in anal angle; between this and apex are two other black costal dots: cilia reddish-ochreous-brown, almost wholly suffused with dark fuscous-grey. Hindwings ovate, hindmargin slightly sinuate ; yellow, apex slightly infuscated ; cilia dark grey, round inner angle pale yellow.

Nearly allied to *P. uncinella*, but readily known by the less dilated forewings, the whitish-grey irroration, the black costal dots, and the absence of the distinct blackish-fuscous costal spot ; the forewings are also less ochreous, the cilia of hindwings darker, and especially the tuft of palpi very much shorter.

I have taken a single specimen near Sydney in December, and have received a second from Mr. G. Barnard, taken at Coomooboolaroo, near Duaringa, Queensland.

Walker's description is recognisable, and the type in fair condition.

10. *Palp. uncinella*, Z.

(*Cryptolechia uncinella*, Z., Linn. Ent. IX., 355, X., 146, T. I., fig. 1 ; *Tortricopsis rosabella*, Newm., Trans. Ent. Soc., Lond., III. N.S., 293.)

Media, alis ant. margine postico sinuato, ochreo-brunneis, costa anguste flava, macula costæ ciliisque externe nigris ; post. flavis, ciliis roseo-suffusis.

♂ ♀. 21–23½ mm. Head grey, mixed with darker on crown, face whitish-grey. Palpi with tuft of second joint triangular, pointed, nearly as long as terminal joint ; second joint and tuft ochreous-brown, at apex of joint grey, terminal joint grey. Antennæ grey. Thorax reddish-ochreous-brown. Abdomen whitish-yellow, beneath and at extremity above bright crimson. Anterior tibiæ and tarsi dark fuscous ; middle tibiæ reddish-ochreous-brown, tarsi dark fuscous ; posterior tibiæ whitish-yellow, tarsi with basal joint whitish-yellow above, dark fuscous beneath, other joints dark fuscous with whitish-yellow apical rings ; middle and posterior coxæ crimson. Forewings moderate, posteriorly dilated, costa very slightly arched, apex somewhat produced, acute, hindmargin oblique, rather strongly concave; reddish-ochreous-brown, slightly paler posteriorly; extreme costal edge yellow from near base almost to apex; an obscure fuscous suffusion towards middle of inner margin, indicating a darker spot; a small oblique somewhat wedge-shaped blackish-fuscous spot on costa at $\frac{3}{5}$, tolerably well-defined; from a little beyond apex of this to anal angle is an indistinctly indicated row of small reddish-fuscous marks: cilia with basal half deep reddish-ochreous, apical half light carmine-pink, with a strong cloudy black line just before tips, extending from above apex nearly to anal angle, thence obsolete. Hindwings ovate, hindmargin slightly indented below apex; light yellow; cilia whitish-grey tinged with carmine-pink, more yellowish towards base.

Characterised by the clear reddish-ochreous-brown ground colour, the yellow costal edge, and the conspicuous dark fuscous spot on costa beyond middle.

Rather common round Sydney and Melbourne in October and November, flying readily during the day; also at Launceston, Tasmania, in January.

Zeller's descriptions and figure undoubtedly refer to this species, which is however widely remote from *Cryptolechia;* his first specimen was without palpi, but it is remarkable that in the second he should have overlooked the conspicuous tuft of the second joint, unless it was worn away. Newman unnecessarily created the genus *Tortricopsis* to receive this species.

11. *Palp. aulacoïs*, n. sp.

Media, alis ant. subfalcatis, canis, leviter ochreo-suffusis, fascia antica nebulosa, litura costæ media, venisque omnibus nigris, fascia marginis postici angusta integra nivea; post. dilute flavis, apice ciliisque griseo-suffusis.

♂ ♀. 19½–20 mm. Head grey, sides of crown whitish. Palpi with tuft of second joint rather broad, about $\frac{3}{4}$ as long as terminal joint; second joint and tuft dark grey, becoming whitish towards base and apex of joint, terminal joint anteriorly dark grey, posteriorly whitish. Antennæ whitish. Thorax rather dark grey. Abdomen whitish-ochreous. Anterior tibiæ and tarsi dark grey; middle tibiæ whitish with a broad dark grey band before apex, tarsi dark grey with whitish rings at apex of joints; posterior tibiæ and tarsi whitish. Forewings moderate, posteriorly dilated, costa very slightly arched, apex strongly produced, acute, hindmargin oblique, strongly concave; snow-white; all the veins marked with thick cloudy dark fuscous lines, coarsely and suffusedly on basal two-thirds, on apical third more sharply defined, reaching costa, but terminating abruptly a little before hindmargin; a cloudy greyish-ochreous suffusion between the veins towards hindmargin, ending abruptly with the veins a little below costa, leaving a narrow clear white marginal streak; space beneath fold suffused with dark fuscous-grey, except towards middle, and along inner margin from $\frac{1}{4}$ to $\frac{3}{4}$; an oblique cloudy ill-defined fuscous-grey streak from costa at $\frac{1}{3}$ to middle of inner margin, and a shorter similar streak from middle of costa to disc at $\frac{2}{3}$ from base; a sharply defined blackish hindmarginal line: cilia grey, mixed with grey-whitish. Hindwings with hindmargin distinctly sinuate beneath apex; pale ochreous-yellow, apex slightly infuscated; cilia yellow-whitish, with a suffused irregular dark grey line near base.

This very distinct and elegant species may be at once known by the white groundcolour and dark veins; in form it approaches *P. uncinella*, but the apex of the forewings is more produced. One of my specimens presents a curious deformity of venation on one forewing only, vein 4 being furcate towards extremity, and all the other veins being present, so that there are strictly 13 veins; the wing is quite normal in form, but it cannot be regarded as a natural variation; the colouring follows the irregularity.

Two specimens beaten from a *Cupressus* on the hills at Murrurundi, New South Wales, in November.

12. *Palp. falcifera*, n. sp.

Media, alis ant. angustis, falcatis, dilute griseis, costa roseo-suffusa, fasciis duabus angustis contortis, lineaque plicæ, altera disci, tertia apicis nigris, supra cano-marginatis; post. griseis.

♂. 21 mm. Head whitish, Palpi with tuft of second joint very short, angular, terminal joint short, about half second joint; second joint and tuft grey, becoming whitish towards base and apex of joint, terminal joint whitish, anterior edge grey. Antennæ grey. Thorax grey. Abdomen grey mixed with whitish, beneath carmine-tinged. Anterior tibiæ and tarsi whitish; all coxæ crimson-tinged. Forewings rather narrow, costa moderately arched, apex very strongly produced, acute, hindmargin very oblique, strongly concave; grey, becoming rather lighter and more ochreous-tinged towards base of inner margin; costa rather broadly suffused with very pale carmine-pink from $\frac{1}{4}$ to apex; a straight rather irregular slender blackish-fuscous streak from base of costa to inner margin at $\frac{2}{3}$, ill-defined beneath, above edged by a suffused slender white streak, which is produced indistinctly to anal angle; a slender blackish-fuscous streak from costa at $\frac{1}{4}$ obliquely outwards, in middle of wing curved sharply inwards and meeting first streak beyond its middle; from angulation of this streak proceeds a slender blackish-fuscous upwardly convex streak through disc to beyond middle, thence curved abruptly downwards and ending in anal angle, discal portion margined above by a strong clear white streak; from a little above inner margin at $\frac{2}{3}$ an irregular blackish-fuscous streak to anal angle, meeting this streak; midway between the central discal streak and costa is a longitudinal row of scattered blackish scales; from the central discal streak beyond middle of disc proceeds a slender blackish-fuscous line towards costa, bent very obliquely outwards a little below costa, not reaching it, margined posteriorly by a suffused white and very pale carmine-pink streak extending downwards to anal angle; an irregular suffused blackish-fuscous spot in disc beyond this, connected with middle of hindmargin by a blackish-fuscous line margined above with white ; from apex of this spot a slightly curved slender blackish-fuscous streak to apex of wing, margined above with white ; hindmargin blackish-fuscous immediately above anal angle : cilia whitish, mixed with pale grey, costal cilia grey. Hindwings elongate, hindmargin sinuate ; light grey ; cilia grey-whitish.

This and the following species differ from all the rest in the much narrower and more elongate wings ; the tuft of the palpi is very short, yet not shorter than in *P. micrastrella* and *P. semijunctella.* This species differs from the following widely in the complex markings of the forewings, and the grey hindwings.

I have one specimen, taken with two others by Mr. G. H. Raynor near Parramatta in August.

13. *Palp. hirax*, n. sp.

Media, alis ant. angustis, falcatis, griseis, costa circa medium cano-suffusa, linea obsoleta punctisque sex disci nigris, linea plicæ alteraque marginis postici nigris, supra cano-marginatis ; post. griseo-ochreis.

♂. 21 mm. Head whitish, mixed with grey on crown. Palpi with tuft of second joint very short, angular, terminal joint extremely short, hardly projecting beyond scales of second joint ; dark grey, apex of second joint whitish. Antennæ whitish. Thorax dark fuscous, anterior margin and shoulders white. Abdomen whitish-ochreous. Legs whitish, anterior tibiæ grey, all coxæ crimson-tinged. Forewings rather narrow, costa moderately arched, apex very strongly produced, acute, hindmargin concave, very oblique ; light grey, very finely irrorated with darker grey and whitish, becoming lighter and more ochreous-tinged towards costa and apex ; a straight slender well-defined clear white streak from costa very near base to anal angle, strongly margined beneath with blackish-fuscous shading into groundcolour ; below this streak the ground colour is clearer grey, without ochreous tinge; a broad white suffusion towards middle of costa; a short longitudinal ill-defined blackish line in middle of disc, and six small ill-defined blackish spots arranged round it; first spot in disc before middle, second obliquly before and above first, third above central line, the other three in a crescentic transverse row beyond middle of disc; a slender white streak from anal angle along lower $\frac{2}{3}$ of hindmargin, margined anteriorly by a suffused blackish-fuscous streak, before which is a narrow whitish suffusion: cilia whitish, mixed with grey, becoming white beneath apex, costal cilia grey, becoming dark fuscous above apex. Hindwings elongate, hindmargin slightly sinuate; greyish-ochreous; cilia ochreous-whitish, mixed with grey round apex.

In form closely approaching the preceding, but the terminal joint of the palpi is remarkably short; well characterised by the single streak on the fold, and six discal spots.

One fine specimen beaten from *Eucalyptus* in November, near Sydney.

2. Enchocrates, *n. g.*

Head with appressed hairs, side tufts large, spreading. Antennæ in male moderate, very shortly ciliated ($\frac{1}{3}$), basal joint rather stout, without pecten. Palpi very long, second joint extremely long, nearly straight, obliquely ascending, dilated with rough projecting scales above and beneath, laterally compressed, terminal joint short, very slender, erect. Thorax smooth. Forewings oblong, moderately broad, apex rounded, hindmargin obliquely rounded. Hindwings as broad as forewings, oblong-ovate, rounded, cilia $\frac{1}{3}$. Abdomen moderate, in female stout. Middle tibiæ thickened with dense loose hairs; posterior tibiæ clothed with dense long hairs. Forewings with vein 7 to costa, 2 before angle of cell. Hindwings with vein 5 bent and somewhat approximated to 4 at base.

The exact position of this curious and peculiar genus is not yet fully apparent, but it certainly belongs to the immediate neighbourhood of *Hoplitica* and *Heliocausta*, as indicated by the absence of the basal pecten of antennæ, the bent vein 5 of hindwings, and the crimson tints, especially of the legs, so characteristic of this group. But the termination of vein 7 of the forewings in the costa is quite exceptional here (though shared by *Euphiltra*), and the palpi are almost unique in character also, though approximating somewhat to some forms of *Palparia*. The very short ciliations of the antennæ ($\frac{1}{3}$) are found again in *Nymphostola* and *Proteodes*.

Only one species is yet knwn, belonging to Australia.

14. *Ench. glaucopis*, n. sp.

Media, alis ant. griseis, costa venisque læte roseis, fascia angusta ante medium saturatiori, macula dorsi media flava, roseo-suffusa, interdum altera nigra; post. griseis.

♂ ♀. 15¼–22 mm. Head and thorax greyish-ochreous-brown, slightly mixed and sometimes suffused with carmine, face whitish. Palpi whitish-ochreous, strongly mixed with dark fuscous, suffused with carmine, especially on upper edge and towards base. Antennæ grey, towards base suffused with carmine. Abdomen grey, anal tuft of male whitish-ochreous. Anterior legs bright deep carmine, beneath white; middle tibiæ ochreous-white suffused above with carmine, tarsi bright carmine, beneath ochreouswhite; posterior legs ochreous-white, tarsi bright carmine towards apex above. Forewings oblong, moderately broad, costa gently arched, strongly bent towards base, apex rounded, hindmargin obliquely rounded; fuscous-grey, margins narrowly dark fuscous; costal edge, hindmarginal edge, and all veins marked by bright carmine lines; a very ill-defined straight oblique cloudy dark grey transverse line from middle of costa to inner margin at $\frac{2}{5}$; a very ill-defined roundish pale yellow spot on middle of inner margin, anteriorly or wholly carmine-tinged, margined anteriorly by the transverse dark grey line; a round suffused blackish-grey spot on inner margin at $\frac{4}{5}$, in some specimens very conspicuous, in others absent; an indistinct dark fuscous dot in disc at $\frac{2}{3}$: cilia carmine, towards anal angle light grey. Hindwings in male grey-whitish, in female grey, paler towards base; cilia in male grey-whitish, in female whitish-grey.

Conspicuously characterised by the grey ground colour, bright rosy veins, and suffused yellow dorsal spot; not variable, except in the appearance of the dorsal blackish spot beyond middle.

Eight specimens taken together in September on a fence near Sydney after a high wind, probably dislodged from *Eucalypti*.

3. Eclecta, *n. g.*

Head loosely haired, sidetufts moderate, rough, meeting, rather projecting between antennæ. Antennæ in male thickened, serrate, closely and shortly ciliated ($\frac{1}{2}$), basal joint stout, without pecten. Palpi moderately long, second joint oblique, somewhat exceeding base of antennæ, densely scaled, somewhat roughened beneath, terminal joint shorter than second, erect, stout, roughened with scales beneath. Thorax with an oblique posterior crest. Forewings elongate, rather broad, apex acute, hindmargin obliquely concave. Hindwings as broad as forewings, elongate-ovate, hindmargin very faintly sinuate beneath apex, cilia $\frac{1}{5}$. Abdomen moderate. Posterior tibiæ with short appressed hairs. Forewings with vein 7 to hindmargin, 2 from before angle of cell. Hindwings with vein 5 bent and approximated to 4 at base.

Also a peculiar genus, related to *Eochra;* characterised amongst the genera with vein 7 to hindmargin, 5 of hindwings bent, and antennæ without basal pecten, by the crested thorax, short ciliations of antennæ, and unusually short cilia of hindwings.

The single species is confined to Australia.

15. *Ecl. aurorella*, n. sp.

Media, alis ant. roseis, vitta plicæ fracta, litura disci obliqua, altera anguli analis, signoque postico magno trilingui saturate fuscis, partim cano-marginatis ; post. dilute ochreo-roseis.

♂ ♀. $18\frac{1}{2}$–$19\frac{1}{2}$ mm. Head whitish, face slightly carmine-tinged. Palpi ochreous-whitish, irregularly suffused with carmine-pink. Antennæ whitish-ochreous. Thorax very pale carmine-pink, towards centre whitish, anterior margin narrowly and apex of crest dark crimson-fuscous. Abdomen ochreous-whitish, faintly crimson-tinged. Legs whitish-ochreous, anterior and middle tibiæ pale crimson. Forewings moderately broad, costa arched towards base and more strongly before apex, apex broadly produced, acute, hindmargin rather deeply concave; rather light crimson-pink; extreme costal edge whitish from near base to $\frac{3}{4}$; a suffused dark fuscous subcostal streak from base to about $\frac{1}{3}$, posteriorly indistinct; a short dark reddish-fuscous dash on inner margin at base, indistinctly margined above with whitish; a dark reddish-fuscous basally attenuated longitudinal streak from base to a little below middle of disc, thence bent obliquely downwards, not reaching inner margin, the angle filled up beneath with whitish-ochreous, the streak margined above from base to angle with white; a dark reddish-fuscous oblique streak from disc slightly above middle at $\frac{2}{5}$ from base to anal angle, posteriorly attenuated, interrupted above angle of discal streak, with which it is almost confluent, margined posteriorly with white, and its discal extremity connected with base of wing by a slender white line; an irregularly triangular dark reddish-fuscous blotch, more ochreous-fuscous beneath, on hindmargin, its apex extending to disc at $\frac{3}{5}$ from base, its base extending from above anal angle to beneath apex, lower side suffused, upper side connected in disc with a dark reddish-fuscous acute diamond-shaped mark beneath costa, beyond the connection margined with white; within this triangle is a slender white twice sharply-toothed line proceeding from middle of upper side to lower angle, and two small indistinct whitish spots on hindmargin; cilia ochreous-whitish, transversely barred with dull carmine-pink and reddish-fuscous. Hindwing ochreous-whitish, crimson-tinged; cilia ochreous-whitish.

At once recognisable by the complex markings on the rosy forewings; a similar complicated pattern only occurs in the grey *Palp. falcifera.* It is a beautiful and striking insect.

I have taken two specimens near Sydney in February, amongst dry bush, and seen a third from the same place; it appears to be retired in habits.

4. Lepidotarsa, *n. g.*

Head loosely haired, sidetufts large, erect, spreading. Antennæ somewhat serrate, in male with very long fine ciliations (4), basal joint stout, with strong pecten. Palpi moderate, second joint not reaching base of antennæ, densely scaled, somewhat loosely beneath, terminal joint slender, much shorter than second. Thorax smooth. Forewings elongate, moderate, apex almost acute, hindmargin very oblique, very slightly concave. Hindwings distinctly narrower than forewings, elongate-ovate, hindmargin faintly sinuate, cilia $\frac{3}{5}$. Abdomen moderate. Anterior tibiæ and tarsi conspicuously thickened with dense scales; middle tibiæ densely scaled; posterior tibiæ clothed with long fine hairs. Forewings with vein 7 to hindmargin, 2 from considerably before angle of cell. Hindwings normal.

Rather nearly allied to *Eochroa*, but distinguished from it and all other neighbouring genera by the strongly dilated anterior tarsi and tibiæ, which in repose are displayed in front; a similar character recurs in *Piloprepes* and *Crepidosceles*, but neither of these genera are at all nearly allied in other respects. The form of the forewings is rather peculiar and elegant, and the long ciliations of the antennæ are noteworthy.

The two species, both Australian, are at once separated by the different groundcolour.

16. *Lep. chrysopoca*, n. sp.

Media, capite albo, alis ant. aurantiacis, puncto disci ciliisque externe griseis; post. griseis.

♂. 20 mm. Head and palpi dull white. Antennæ whitish, obscurely ringed with fuscous. Thorax ochreous-yellow, deeper anteriorly. Abdomen grey, anal tuft whitish-grey. Legs whitish-grey, anterior and middle tibiæ and tarsi dark fuscous above, except at apex of tarsal joints. Forewings unicolorous bright deep orange-yellow; extreme costal edge whitish towards middle; a dark fuscous-grey dot in disc a little beyond middle: cilia with basal half deep orange-yellow, terminal half glossy dark grey. Hindwings grey, cilia whitish-grey.

A handsome species, remarkable for the white head contrasting with the deep yellow forewings.

I took a specimen above the Bulli Pass in October, at about 2,000 feet elevation, and have seen two others from Parramatta.

17. *Lep. alphitella*, n. sp.

Minor, capite albo, alis ant. griseo-ochreis, costa anguste cana, punctis tribus disci obsoletis ciliisque externe griseis; post. albidis.

♀. 16½ mm. Head, palpi, and antennæ dull white. Thorax white, tinged with ochreous, and finely irrorated with grey. Abdomen whitish-grey. Legs whitish, slightly mixed with fuscous-grey. Forewings pale greyish-ochreous, finely irrorated with fuscous, becoming whitish on inner margin near base; costal edge white; a small dark fuscous-grey spot in disc before middle, and another double one in disc beyond middle; a third, partially obsolete, on fold slightly beyond first; cilia with basal half pale greyish-ochreous, terminal half dark fuscous. Hindwings grey-whitish, cilia whitish.

A distinct but inconspicuous insect, nearly allied to the preceding, but superficially somewhat recalling *Eochr. aclea*.

One specimen taken at Parramatta in September, and a second by Mr. G. H. Raynor at Waratah on the Hunter River in October.

5. Eochroa, *n. g.*

Head with appressed scales, sidetufts moderate, spreading, meeting behind. Antennæ in male moderate, with rather long fine ciliations (2–3), basal joint rather stout, with basal pecten. Palpi moderate, second joint reaching or somewhat exceeding base of antennæ, with dense appressed scales, somewhat loose beneath, terminal joint shorter than second, moderate, somewhat roughened with scales anteriorly, recurved. Thorax smooth. Forewings elongate, moderate, apex tolerably acute, hindmargin faintly sinuate below apex, cilia $\frac{1}{2}$. Abdomen rather broad, margined. Posterior tibiæ clothed with long fine hairs. Forewings with vein 7 to hindmargin, 2 from somewhat before angle of cell. Hindwings normal.

Apparently transitional in character between *Palparia* and *Philobota*, differing from the former especially by the entire absence of any tuft or projection on the second joint of the palpi, and from the latter by the rather thick and somewhat roughened terminal joint, and the longer ciliations of the antennæ, which are nevertheless shorter than in *Palparia* and *Lepidotarsa*. The affinity of this group with that of *Hoplitica* and its allies seems to be rather collateral than direct, but it is impossible to show this in a linear arrangement. It seems hardly probable that any derivative genera from that group would have regained the lost basal pecten of the antennæ.

The species are elegant and sometimes handsome, frequently crimson-tinged. They are sluggish in habit, like *Palparia*, but generally common where they occur. Some at least of the larvæ must undoubtedly feed on species of *Leptospermum* (*Myrtaceæ*), but I have searched specially for them in vain.

Nine species are known to me; the genus is exclusively Australian, and no doubt many others will be found. They may be distinguished thus:

A. Forewings white ... ...19. *callianassa.*

B. Forewings ochreous or rosy, sometimes grey.
  1. Hindwings white, apex more or less rosy.
    a. Forewings grey ... ...25. *aclea.*
    b. Forewings ochreous.
      i. Forewings with well-defined rosy costal border... ... ...20. *inclusella.*
      ii. Forewings without well-defined rosy costal border ... ...21. *dejunctella.*
  2. Hindwings yellow, apex more or less grey.
    a. Costal edge of forewings white ... ...22. *matutinella.*
    b. Costal edge of forewings rosy ... ...18. *lætiferana.*
  3. Hindwings grey, base sometimes paler.
    a. Dorsal edge of forewings mostly dark grey.
      i. Head grey-whitish, palpi rosy-tinged...23. *pulverulenta.*
      ii. Head and palpi whitish-ochreous ...24. *acutella.*
    b. Dorsal edge of forewings pale rosy ...26. *protophaës.*

18. *Eochr. lætiferana*, Walk.

(*Lophoderus lætiferanus*, Walk., Brit. Mus. Cat., 336; *Oecophora semifusella*, ibid. 696; *Cryptolechia pudorinella*, ibid. 760.)

Media, alis ant. ochreo-roseis, interdum purpureo-suffusis, macula magna dorsi postica flava, partim roseo-suffusa, punctis disci tribus roseis; post. flavis.

♂. 16½–21 mm. Head reddish-ochreous or reddish-ochreous-brown. Palpi reddish-ochreous, anteriorly suffused with dark fuscous. Antennæ whitish-ochreous. Thorax reddish-ochreous-brown. Abdomen whitish-yellow. Anterior and middle tibiæ and tarsi fuscous-crimson, posterior tibiæ and tarsi whitish-yellow. Forewings moderate, costa somewhat strongly arched, apex acute, hindmargin rather oblique, very slightly sinuate; rosy-ochreous or yellowish-carmine-pink, with a suffused yellow blotch above anal angle, indistinctly produced broadly along inner margin to before middle, very ill-defined; between this blotch and base the whole groundcolour is sometimes suffused with purple-fuscous, extending along costa to apex, and obscurely mixed with whitish towards disc; an ill-defined reddish-fuscous dot in disc before middle, a second in disc beyond middle, and a third perpendicularly below first on fold; between first and second is a longitudinal cloudy whitish streak, a faint transverse whitish line following posterior margin of yellow blotch: cilia whitish-yellow, beneath anal angle carmine-tinged, costal cilia pale carmine. Hindwings with hindmargin distinctly sinuate; whitish-yellow, cilia whitish-yellow.

This and the two following species differ from the rest in the less oblique hindmargin of the forewings; this species is distinctly characterised by the yellow hindwings, and rosy forewings with yellow anal blotch and variable purplish suffusion anteriorly.

Taken occasionally at Melbourne and Sydney, in March; Walker's specimens are said to be from Brisbane.

19. *Eochr. callianassa*, n. sp.

Major, alis ant. niveis, costa anguste ferruginea, dorso, vena subcostali trirami, puncto disci, vittaque marginis postici in ciliis flavis; post. niveis, apicem versus griseis.

♂. 26 mm. Head snow-white. Palpi white, externally and in front somewhat suffused with brownish-rosy. Antennæ grey, basal joint white with a fine ferruginous line above. Thorax white, with a pale yellow spot on middle of anterior margin, and shoulder-flaps pale yellow, with a bright ferruginous spot on each shoulder. Abdomen white. Anterior legs ferruginous; middle legs whitish, suffused with pale ferruginous; posterior legs white. Forewings moderate, costa moderately arched, apex obtuse, hindmargin obligue, almost straight, rounded beneath ; snow-white ; a very slender ferruginous streak along costa, stronger towards base, hardly reaching apex, slenderly margined beneath with pale yellow, extreme costal edge somewhat whitish ; a slender yellow streak along inner margin from near base to anal angle ; a slender yellow streak along inner margin from near base to anal angle ; a slender yellow streak almost from base along subcostal vein, becoming paler beyond middle, and separating into three or four distinct branches to costa along veins 8—11 ; a small ill-defined pale yellow spot in disc beyond middle, and faint indications of pale yellow lines on the other veins : cilia snow-white, basal half pale yellow. Hindwings snow-white, apical third suffused with light grey ; cilia white, somewhat mixed with grey round apex.

A remarkable and beautiful species, exceptionally characterised by the snow-white ground colour with yellow and ferruginous lines.

One fine specimen received from Mr. E. Guest, taken on the Mount Lofty Range, South Australia, where it appears to be not uncommon, frequenting *Banksia.*

20. *Eochr. inclusella,* Walk.

(*Cryptolechia inclusella,* Walk., Brit. Mus. Cat., 767.)

Major, alis ant. dilute ochreis, marginibus roseis ; post. flavo-albidis, apice roseo.

♂. 28 mm. (?). Head and thorax pale ochreous, palpi rosy-tinged. Abdomen yellowish-whitish, anal tuft yellower. Fore-wings moderate, apex nearly rectangular, hindmargin hardly oblique ; pale yellowish-ochreous ; all margins narrowly rosy, costal brighter. Hindwings yellowish-white, apex rosy-tinged.

A very distinct species, of which unfortunately I have no specimen for description. I saw the type in the British Museum, and have no doubt that it belongs to this genus, with which all characters agree that I was able to observe ; but omitted to make a thorough diagnosis, though I think the above, drawn mainly from Walker's description, will be sufficient.

Said to be from Sydney.

21, *Eochr. dejunctella*, Walk.

(*Cryptolechia dejunctella*, Walk., Brit. Mus. Cat., 1036.)

Media, alis ant. ochreis, partim rosea-suffusis, margine postico dorsoque saturate roseis, interdum punctis duobus disci obsoletis roseis, ciliis griseis; post. albidis, apice leviter roseo.

♂ ♀. Head and thorax light ochreous. Palpi light ochreous, second joint suffused with ochreous-reddish externally and beneath Antennæ whitish. Abdomen whitish, anal tuft tinged with ochreous. Anterior and middle tibæ and tarsi dark fuscous-carmine; posterior tibiæ and tarsi whitish. Forewings moderate, costa moderately arched, apex almost acute, hindmargin rather sinuate, oblique; light ochreous; a light reddish-fuscous cloudy suffusion along subcostal vein from base to about $\frac{2}{3}$, very indistinct posteriorly; a darker reddish-fuscous cloudy suffused streak along inner margin from $\frac{1}{4}$ to anal angle; a reddish-fuscous dot in disc before middle, often obsolete; a second more distinct reddish-fuscous dot in disc beyond middle; between the second dot and anal angle is a small indistinct light reddish-fuscous cloudy spot, often connected with base by a very obsolete light reddish-fuscous longitudinal suffusion; a slender rather dark reddish-fuscous cloudy streak along hindmargin from apex to anal angle; in female all these markings are generally rendered obsolete by a light ochreous-reddish suffusion of the ground colour; cilia grey, mixed with dark grey, with a dark grey line near base on upper half of hindmargin, costal cilia ochreous-reddish. Hindwings with hindmargin very slightly sinuate; whitish, apex faintly rosy-tinged; cilia whitish.

Distinguished by its rosy-ochreous forewings and whitish hindwings; the rosy tinge is more pronounced and uniform in the female, which is rather smaller in size.

Tolerably common round Sydney and Melbourne, and occurs also at Blackheath on the Blue Mountains, in December, February, and March; also taken by Mr. E. Guest on Mount Lofty range, South Australia.

22. *Eochr. matutinella*, Walk.

(*Oecophora matutinella*, Walk., Brit. Mus. Cat., 689; *Cryptolechia marginella*, ibid. 761.)

Media, alis, ant. lamella squamea dorsi adversus basim instructis griseis, postice flavo-suffusis, interdum omnino roseo-suffusis, costa peranguste cana, punctis disci tribus saturatioribus, ciliis saturate roseo-griseis; post. dilute flavis, apice ciliisque griseis.

♂ ♀. 19–23 mm. Head ochreous-grey on crown, face whitish. Palpi whitish, anteriorly and on outer side of second joint dark grey. Antennæ whitish. Thorax ochreous-grey, lighter posteriorly. Abdomen whitish-ochreous, anal tuft mixed with brownish-ochreous. Anterior tibiæ and tarsi dull carmine-pink; middle tibiæ grey, tarsi whitish suffused with grey; posterior tibiæ and tarsi ochreous-whitish. Forewings moderate, costa moderately arched, apex tolerably acute, hindmargin obliquely rounded, not sinuate; ochreous-grey, suffused with whitish-ochreous along disc and towards base of inner margin, with a large irregularly oval suffused deep ochreous-yellow patch on hindmargin, very ill-defined, extending from somewhat before anal angle almost to apex; this patch is sometimes also more or less suffused with ochreous-grey and obsolete; disc sometimes broadly suffused with carmine-pink from base to $\frac{2}{3}$, the suffusion extending less distinctly to costa and inner margin; towards base of inner margin is a triangular obliquely projecting plate of ochreous-whitish scales, proceeding from near margin and projecting beyond it; costal edge very narrowly white from base to apex; extreme dorsal margin white from $\frac{1}{3}$ to anal angle; a dark grey cloudy dot in disc before middle, a second in disc beyond middle, a third on fold perpendicularly below first, and sometimes a fourth perpendicularly below second, all very ill-defined and sometimes obsolete; a rosy suffusion along hindmargin from near anal angle to apex: cilia dark grey, on apical half of hindmargin carmine-tinged. Hindwings with hindmargin distinctly sinuate; dull light ochreous-yellow, apex suffused with fuscous-grey; cilia fuscous-grey, towards anal angle becoming whitish-yellow.

A distinct species, specially characterised by the curious flap of scales towards inner-margin, apparently an abnormal development of the usual slight protuberance; it is very noticeable when the wings are closed.

Common at Sydney and Parramatta in October and November, evidently attached to *Leptospermum*; it is very sluggish, and when beaten out, usually fall to the ground.

23. *Eochr. pulverulenta*, n. sp.

Media, alis ant. ochreo-griseis, antice leviter roseo-suffusis, vitta dorsi fusca, punctis disci tribus obscuris saturatioribus, ciliorum basi saturate grisea, apice albo; post. griseis; capite albido.

♂ ♀. 19–21 mm. Head greyish-whitish, mixed on sides of crown with grey, face white. Palpi white, suffused with pale carmine-pink and externally irrorated with grey. Antennæ whitish, towards apex grey. Thorax pale ochreous, shoulders darker. Abdomen grey-whitish. Anterior tibiæ and tarsi dark grey; middle tibiæ and tarsi whitish sprinkled with grey; posterior tibiæ and tarsi white. Forewings moderate, costa moderately arched, apex acute, hindmargin distinctly sinuate, very oblique; light reddish-fuscous, densely irrorated with light ochreous-grey, ground colour clearest towards base of costa; extreme costal edge sometimes whitish from $\frac{1}{4}$ to apex, often obscured through the grey suffusion; extreme edge of inner margin very slenderly white throughout; a dark grey suffused streak, attenuated at both extremities, along inner margin from

$\frac{1}{4}$ almost to anal angle; between this streak and base the inner margin is suffused with whitish-ochreous; a broad obsolete whitish-ochreous suffusion of the ground colour towards hind-margin except near costa, obscured by the grey irroration, most distinct beyond apex of dorsal streak; an indistinct dark grey dot in disc before middle, a second in disc beyond middle, and a third on fold rather beyond first: cilia with basal half dark grey, apical half clear white, the separation sharply marked, with a grey spot at apex of wing. Hindwings with hindmargin slightly sinuate; grey, becoming ochreous-whitish towards base, apex dark grey; cilia grey, tips clear white.

This and the following species are very closely allied; this species may be best distinguished by the rather larger size, the grey-whitish head and rosy-tinged palpi, and the reddish tinge anteriorly towards costa, which is always distinct; the contrast between the whitish head and ochreous thorax is very marked, whereas in *E. acutella* they are concolorous, both whitish-ochreous.

Six specimens taken at Blackheath in the Blue Mountains (3,500 feet) in January, and near Sydney in November, beaten from *Leptospermum*.

24. *Eochr. acutella*, Walk.

(*Cryptolechia acutella*, Walk., Brit. Mus. Cat., 766.)

Media, alis ant. pallide ochreis, partim griseo-suffusis, margine dorsali punctisque disci tribus saturate fuscis, ciliis albis, linea prope basim nigricanti; post. griseis, basim versus ochreo-albidis; capite albido-ochreo.

♂ ♀. 17–20 mm. Head, palpi, antennæ, thorax, and abdomen whitish-ochreous. Anterior tibiæ and tarsi dark grey mixed with whitish-ochreous; middle tibiæ and tarsi clear white, partly irrorated with grey; posterior tibiæ and tarsi white, slightly ochreous-tinged. Forewings moderate, costa moderately arched, apex acute, hindmargin sinuate, very oblique; very light reddish-fuscous, suffusedly irrorated with light grey; extreme costal edge suffusedly whitish-ochreous from about $\frac{1}{3}$ to apex; inner margin broadly whitish ochreous towards base; a more or less distinct suffused dark grey streak along inner margin from $\frac{1}{4}$ to anal angle, attenuated at extremities, suffusedly margined above with whitish-ochreous; an indistinct whitish-ochreous streak beneath costa from base to $\frac{2}{3}$; an indistinct whitish-ochreous streak from middle of disc almost to hindmargin below apex, posteriorly somewhat broader and more suffused; a dark grey dot in disc before middle, a second in disc beyond middle, and a third obliquely beyond first on fold; between the second and anal angle is occasionally a small blackish or dark grey spot, but usually this is not indicated; a faint grey line near and parallel to lower half of hindmargin, often obsolete; sometimes the second dot is connected with anal angle by an oblique suffused dark grey line: cilia with basal half light brownish-ochreous, limited posteriorly by a suffused dark grey line, apical half white. Hindwings with hindmargin distinctly sinuate; grey, suffused with ochreous-whitish towards base, apex and a hindmarginal line suffusedly dark grey; cilia whitish, with an indistinct grey line.

A less elegant insect than the preceding, of which the distinctive points are given above. The dark markings towards anal angle are a curious form of variation.

Commonly beaten from *Leptospermum* near Sydney, in October and November; I also took a specimen in the Shoalhaven district in January.

25, *Eochr. aclea*, n. sp.

Minor, alis ant. ochreo-griseis, punctis disci duobus obscure saturatioribus; post. albis, apice levissime roseo.

♀. 14 mm. Head grey mixed with whitish. Palpi grey, extremity of second joint whitish. Antennæ grey, basal joint white. Thorax grey, suffused with whitish on shoulders. Abdomen whitish. Anterior tibiæ and tarsi grey; middle tibiæ and tarsi grey mixed with whitish; posterior tibiæ and tarsi white. Forewings rather narrow, costa moderately arched, apex acute, hindmargin slightly sinuate, rather strongly oblique; light grey, irregularly irrorated with dark grey, especially towards margins; base of costa suffused with white, and extreme edge very slenderly white throughout; a blackish-grey dot in disc before middle, and another in disc beyond middle; there are other scattered dark scales, but not forming defined markings: cilia whitish, mixed with grey on basal half, with a blackish-grey spot at apex. Hindwings with hindmargin hardly sinuate; white, apex very faintly rosy; cilia white, round apex greyish-tinged.

Easily known by its small size, simple grey forewings and white hindwings.

One specimen taken by Mr. G. H. Raynor near Launceston, Tasmania, in December.

26. *Eochr. protophaës*, n. sp.

Media, alis ant. dilute albido-roseis, punctis disci duobus atris, ciliis griseo-suffusis; post. griseis.

♂ ♀. 20–23 mm. Head, palpi, and thorax ochreous-whitish, very faintly rosy-tinged. Antennæ grey, towards base ochreous-white. Abdomen whitish-grey, anal tuft ochreous-tinged. Anterior and middle legs dark grey, middle tarsi with apex of joints whitish; posterior legs ochreous-whitish, first joint of tarsi partially greyish-suffused. Forewings moderate, costa moderately arched, apex obtuse, hindmargin oblique, slightly rounded; whitish-ochreous, tinged with brownish-rosy; extreme costal edge black near base, ochreous-white elsewhere; a well-defined conspicuous round black dot in disc before middle, and a second similar dot in disc beyond middle; some scattered grey scales towards hindmargin: cilia whitish-ochreous, rosy-tinged, on hindmargin more rosy and strongly suffused with dark grey. Hindwings and cilia grey.

A very distinct species, in form of wing most approaching *E. aclea*, but easily known from the other species with grey hindwings, by its uniform pale pinkish forewings, and very distinct discal dots.

I took one specimen near Sydney in September, and have received a second from Mr. E. Guest, who states that it is locally not uncommon on the Mount Lofty Range, South Australia, in December, frequenting *Eucalyptus* scrub.

6. Euphiltra, *n. g.*

Head with appressed scales, sidetufts moderate, spreading. Antennæ in male—(?), basal joint rather short, without pecten. Palpi moderate, second joint not reaching base of antennæ, with rough projecting scale beneath, especially in middle, terminal joint as long as second, recurved. Thorax smooth. Forewings elongate, moderate, apex rounded, hindmargin obliquely rounded. Hindwings considerably narrower than forewings, elongate-ovate, hindmargin rounded, cilia $\frac{3}{4}$. Abdomen somewhat dilated, strongly margined. Posterior tibiæ clothed with long hairs. Forewings with vein 7 to costa, 2 from somewhat before angle of cell. Hindwings normal.

The termination of vein 7 of the forewings in the costa renders this genus exceptional in this position ; but the accordance with *Zonopetala* is so marked in all other particulars, especially the somewhat peculiar palpi, that I consider its location here undoubted. I think the difference of venation to have arisen in this instance incidentally from the narrowing of the wings, and regard the genus as a development (with retrograde characters) from *Zonopetala.*

27. *Euph. eroticella*, n. sp.

Minor, nivea, thorace antice nigro, alis ant. fascia lata ante medium, altera angusta post medium, macula postica ciliisque ferrugineis, maculis apicis angulique analis in ciliis nigris ; post. griseis.

♀. 15 mm. Head white, sides of crown with a dark fuscous spot. Palpi white, extreme base of second joint dark fuscous. Antennæ dark fuscous. Thorax black, a posterior spot and a small spot on each side white. Abdomen reddish-brown, lateral margins pale ochreous, posterior margins of segments silvery-grey. Anterior and middle tibiæ dark fuscous-grey, tarsi grey-whitish; posterior tibiæ and tarsi whitish-yellow. Forewings somewhat narrow, costa moderately arched, apex rounded, hindmargin very obliquely rounded; clear white; a small very narrow linear black spot at base of wing, extending from costa to inner margin; a deep reddish-ochreous moderately broad transverse fascia, extending from $\frac{2}{5}$ of costa to middle of inner margin, considerably dilated beneath, anterior edge concave, suffusedly margined with dark fuscous, posterior edge sinuate, well-defined, not margined; a narrow deep reddish-ochreous fascia from $\frac{2}{3}$ of costa to anal angle, on costa and inner margin suffused with dark fuscous, anterior edge nearly straight, suffused, posterior edge well-defined, indented above middle; an ill-defined triangular bright reddish-ochreous patch on upper $\frac{2}{3}$ of hindmargin, very narrowly separated from the second fascia, confluent above with a suffused blackish apical spot: cilia reddish-ochreous on hindmargin and costa, blackish-fuscous at apex and anal angle. Hindwings dark grey, somewhat lighter at base; cilia whitish-ochreous, mixed with grey round apex.

A very handsome species, in markings approaching *Zon. decisana* but (apart from structural differences) much narrower-winged, with the first fascia reddish-ochreous instead of blackish-fuscous and the hindwings wholly grey.

Two specimens taken at Parramatta in October.

7. Zonopetala, *n. g.*

Head with appressed scales, side tufts large, raised, meeting, dilated behind. Antennæ in male slightly serrate, rather strongly and unevenly ciliated ($1\frac{1}{2}$), basal joint moderate, without pecten.

Palpi moderate, second joint hardly reaching base of antennæ, much dilated with dense scales, beneath with loose somewhat projecting scales beyond middle; terminal joint almost as long as second, rather stout, somewhat roughened anteriorly, strongly recurved. Thorax smooth. Forewings elongate, rather broad, apex somewhat rectangular, acute, hindmargin slightly oblique, almost straight or slightly concave beneath apex. Hindwings slightly narrower than forewings, oblong-ovate, hindmargin faintly sinuate, cilia $\frac{2}{3}$ to $\frac{1}{2}$. Abdomen stout, strongly margined. Posterior tibiæ clothed with long fine hairs. Forewings with vein 7 to hindmargin, 2 from somewhat before angle of cell. Hindwings normal.

A small well-marked genus, nearly allied to *Heliocausta*, of which is is probably a development, and also with marked affinity (perhaps collateral) with *Eochroa;* it is well distinguished amongst the group with unpectinated basal joint of antennæ and vein 7 terminating in the hindmargin, by the structure of the palpi. The species are handsome and strikingly marked insects; the six known to me may be thus distinguished:

A. Thorax wholly black anteriorly.
- 1. Posterior fascia straight, dark fuscous...29. *clerota.*
- 2. Posterior fascia irregular, ochreous-brown 31. *decisana.*
- 3. Posterior fascia suffused, grey... ...30. *glauconephela.*

B. Shoulders only black.
- 1. Forewings pinkish-grey, without fasciæ.
  - *a.* Forewings with a blackish costal spot before middle ... ...33. *quadripustulella.*
  - *b.* Forewings without blackish costal spot before middle ... ...32. *melanoma.*
- 2. Forewings white, fasciated ... ...28. *divisella.*

28. *Zon. divisella*, Walk.

(*Oecophora divisella*, Walk., Brit. Mus. Cat. 677, (non 685).

Media, nivea, humeris nigris, alis ant. apicem versus ochreo-suffusis, costæ basi, fascia antica latiore, altera postica angustiore, ciliisque nigris; post. dilute flavis.

♂ ♀. 18–19 mm. Head white, sides of crown with a dark fuscous spot. Palpi white, basal third of second joint dark fuscous. Antennæ blackish-fuscous. Thorax white, shoulders with a dark fuscous spot. Abdomen whitish-yellow. Anterior tibiæ and tarsi dark fuscous, tarsal joints with whitish-yellow apical rings; middle tibiæ dark fuscous externally yellowish above, tarsi dark fuscous with whitish-yellow rings at apex of joints; posterior tibiæ and tarsi whitish-yellow. Forewings moderately broad, costa moderately arched, apex obtuse-angled, hindmargin straight, slightly oblique; clear white, apical third faintly ochreous-tinged; a small blackish-fuscous spot at base of costa; two straight moderately broad blackish-fuscous transverse fasciæ, rather irregularly edged; first from $\frac{1}{3}$ of costa to $\frac{2}{5}$ of inner margin, somewhat dilated on inner margin so that anterior edge appears concave; second from $\frac{2}{3}$ of costa to anal angle, slightly narrower than first, somewhat dilated below middle: a blackish hind-marginal line: cilia blackish-grey, becoming lighter grey towards anal angle, darkest at apex, costal cilia ochreous-yellow. Hind-wings with hindmargin slightly indented; whitish-yellow; cilia whitish-yellow, becoming grey round apex.

A handsome species, differing from *Z. clerota* by the thorax wholly white except on shoulders, the ochreous tinge of the apical third, and the grey cilia of the anal angle.

Two fine specimens at rest on *Eucalyptus* trunks near Sydney, January and February; I have seen several others.

29. *Zon. clerota*, n. sp.

Media, nivea, thorace antice nigro, alis ant. costæ basi, fascia antica angustiore, altera postiea latiore, ciliis nigris, ciliis anguli analis ochreis; post. dilute ochreis, interdum postice griseo-suffusis.

♂ ♀. 16–20 mm. Head white, sides of crown with a dark fuscous spot. Palpi white, basal third of second joint dark fuscous. Antennæ dark fuscous. Thorax white, anterior half dark fuscous. Abdomen whitish-yellow. Anterior tibiæ and tarsi dark fuscous, tarsal joints with whitish-yellow apical rings; middle tibiæ yellowish-grey, with yellow hairs above and below, tarsi grey with whitish-yellow rings at apex of joints; posterior tibiæ and tarsi whitish-yellow. Forewings moderately broad, costa moderately arched, apex acute, hindmargin markedly concave, rather oblique; clear white; a small blackish-fuscous spot at base of costa; two straight moderately broad, rather irregularly-edged, blackish-fuscous transverse fasciæ; first from $\frac{1}{3}$ of costa to slightly before middle of hindmargin, margins almost straight, not dilated; second from about $\frac{2}{3}$ of costa to somewhat before anal angle, somewhat broader than first, not dilated; a slender blackish-fuscous streak along hindmargin from apex to a little above anal angle, sometimes considerably dilated towards lower extremity: cilia on apical $\frac{2}{3}$ of hindmargin blackish-grey, becoming lighter and suffused with yellowish at tips, at anal angle whitish-yellow, beneath it yellowish-grey, costal cilia ochreous-yellow, Hindwings with hindmargin distinctly sinuate; whitish-yellow, in female suffused with grey posteriorly; cilia whitish-yellow, becoming grey round apex.

Readily separated from the preceding species by the black anterior half of thorax, the absence of any ochreous tinge towards apex, the somewhat different form and position of the fasciæ, and the yellow cilia towards anal angle.

Taken not uncommonly near Sydney in October and November, and at Brisbane in September.

30. *Zon. glauconephela*, n. sp.

Parva, nivea, thorace nigro, alis ant. postice griseo-suffusis, basi fasciaque lata ante medium nigris, linea postica transversa saturate grisea, ciliis griseis, sub apicem nigricantibus; post. griseis, basim versus albido-ochreis.

♂ ♀. 12–12$\frac{1}{2}$ mm. Head white, sides of crown with a dark fuscous spot. Palpi white, basal third of second joint dark fuscous. Antennæ dark fuscous. Thorax blackish-fuscous, with a white spot behind. Abdomen whitish-yellow. Anterior tibiæ and tarsi blackish-fuscous; middle tibiæ and tarsi dark fuscous above, yellow beneath; posterior tibiæ whitish-yellow, tarsi yellowish partially suffused with grey. Forewings moderately broad, costa moderately arched, apex acute, hindmargin distinctly sinuate, rather oblique; white, apical $\frac{2}{5}$ suffused with light grey, most strongly towards hindmargin; a small blackish-fuscous basal spot, extending from costa to inner margin, its outer edge straight; a nearly straight moderately broad blackish central fascia, extending from costa a little before middle to inner margin slightly beyond middle, smewhat dilated beneath, its anterior edge slightly concave; a very small ill-defined blackish spot on costa at $\frac{3}{4}$, whence proceeds an irregular suffused dark grey line to anal angle, bent inwards in middle, and obscurely whitish-margined posteriorly; suffused blackish line along hindmargin from apex to a little above anal angle: cilia whitish-grey mixed with yellowish, basal $\frac{2}{3}$ on upper half of hindmargin dark grey, and with a dark grey spot at apex, costal cilia ochreous-yellow. Hindwings with hindmargin markedly sinuate; grey, suffused with whitish-yellow towards anal angle.

Characterised by its small size, the grey posterior suffusion, and the reduction of the second fascia to a suffused dark grey line.

Three specimens taken near Sydney in January and February.

31. *Zon. decisana*, Walk.

(*Conchylis decisana*, Walk., Brit. Mus. Cat. 367; *Oecophora retractella*, ibid. 680; *Oecophora mediella*, ibid. 1033.)

Minor, nivea, thorace antice nigro, alis ant. basi fasciaque lata ante medium nigris, fascia postica maculaque marginis postici brunneis, supra nigricantibus, ciliis griseis; post. dilute ochreis, apicem versus griseis.

♂ ♀. $14\frac{1}{2}$–17 mm. Head white, sides of crown with a dark fuscous spot. Palpi white, basal third of second joint dark fuscous. Antennæ dark fuscous. Thorax blackish-fuscous, a posterior spot and a small spot on each side white. Abdomen whitish-yellow. Anterior tibiæ dark fuscous, middle tibiæ dark fuscous with hairs above yellow, anterior and middle tarsi dark fuscous with yellowish rings at apex of joints; posterior tibiæ and tarsi whitish-yellow. Forewings moderate, costa gently arched, apex acute, hindmargin sinuate, oblique; clear white; a small blackish-fuscous spot on base of costa, just reaching inner margin, outer edge straight; a moderately broad, slightly outwardly curved, blackish-fuscous transverse fascia, extending from costa slightly before middle to inner margin slightly beyond middle, somewhat broader beneath; a short black transverse linear mark in disc at $\frac{3}{5}$, usually connected with central fascia below middle so as to appear an upwardly oblique tooth; a somewhat triangular blackish-fuscous spot on costa about $\frac{3}{4}$, whence proceeds a rather ill-defined, moderately broad, somewhat inwards-curved reddish-brown transverse fascia to anal angle; an ill-defined triangular reddish-brown spot on upper half of hindmargin narrowly separated from the second fascia, connected at upper angle with an oblique blackish-fuscous apical dash: cilia dark grey, mixed with whitish towards base, with a blackish-grey spot at apex, costal cilia white. Hindwings with hindmargin slightly sinuate: whitish-yellow, apex suffused with grey; cilia whitish-yellow, becoming grey round apex.

Very distinct by the reddish-brown posterior markings.

Common round Sydney from October to January, yet I have not found it elsewhere.

32. *Zon. melanoma*, n. sp.

Media, humeris nigis, alis ant. dilute roseo-griseis, basi costæ, punctis disci plerisque, serie punctorum postica angulata alteraque marginis postici nigris; post. griseis, basim versus albidis.

♀. 21 mm. Head white. Palpi pinkish-whitish, basal half of second joint blackish. Antennæ dark grey. Thorax pinkish-whitish, lateral margin of shoulders sharply blackish-fuscous. Abdomen whitish-grey. Anterior and middle legs dark grey, tarsal joints with whitish apical rings; posterior legs whitish. Forewings moderate, posteriorly dilated, costa gently arched, apex obtuse, hindmargin faintly sinuate, slightly oblique; light pinkish-grey, somewhat suffused with pinkish-white at base and towards basal third of costa; a small sharply-defined blackish-fuscous spot at base of costa; a blackish dot on costa at $\frac{2}{5}$, another obliquely before it in disc, and a third midway between them; two very small blackish dots transversely placed in disc beyond middle; a transverse row of tolerably well-defined blackish dots from costa somewhat beyond middle obliquely and irregularly outwards to middle of disc at $\frac{4}{5}$ from base, thence bent and continued to inner margin before anal angle, lower part rather curved; a row of blackish dots along hindmargin and apical fourth of costa: cilia light pinkish-grey, tips paler. Hindwings with hindmargin distinctly sinuate; grey, becoming whitish near base; cilia whitish, near base greyish-tinged.

Entirely different in markings from the preceding species, and reverting to the normal type, as of *Heliocausta;* yet undoubtedly referable to this genus by structure. It is interesting that the sharply-defined black basal band of the second joint of the palpi, and the black spot at base of costa, should be found to persist in this case.

I have described two specimens in the collection of Mr. G. Masters, taken near Sydney.

33. *Zon. quadripustulella*, Walk.

(*Cryptolechia quadripustulella*, Walk., Brit. Mus. Cat., 761.)

Media, humeris nigris, alis ant. roseo-cinereis, basi costæ maculaque costali ante medium nigris; post. griseis.

21 mm. Head white. Thorax pinkish-grey, with a blackish spot on shoulders. Forewings pinkish-grey, base of costa and a larger spot on costa before middle blackish. Hindwings grey.

The above diagnosis is abstracted from Walker's, and is sufficient for identification; I have been unable to obtain a specimen for examination or description, and cannot therefore vouch for its correct location, but it is so obviously nearly allied to *Z. melanoma*, that the uncertainty is small.

Mr. G. H. Raynor took a specimen near Parramatta in March.

8. HELIOCAUSTA, *n. g.*

Head with appressed scales, sidetufts moderate, loosely appressed. Antennæ moderate, in male strongly ciliated ($1\frac{1}{2}$ to 2), basal joint moderate, without pecten, sometimes with two or three fugitive scales. Palpi moderate, second joint hardly reaching or somewhat exceeding base of antennæ, with smooth appressed scales, terminal joint shorter than second, moderate, recurved. Thorax smooth. Forewings elongate, moderate, apex rectangular, hindmargin nearly straight above, rounded beneath. Hindwings slightly narrower than forewings, oblong-ovate, hindmargin slightly rounded, cilia $\frac{1}{3}$. Abdomen moderate or rather stout. Posterior tibiæ with rather short hairs above, loosely scaled beneath. Forewings with vein 7 to hindmargin, 2 from before angle of cell. Hindwings normal.

Differs essentially from *Philobota* only by the absence of the basal pecten of antennæ, which is never represented by more than one or two fugitive hair scales, whilst in *Philobota* it is always perfect. The genus is natural and interesting; it must be regarded as a direct development from *Philobota*, and it further furnishes the origin of *Hoplitica*, so that it forms a valuable transitional link, without which the development of the group would be obscure.

The larvæ known are of the normal type of the family, sixteen-legged, rather stout, with complex mottled markings, feeding gregariously amongst bunches of spun-together leaves of *Eucalyptus*.

I have fifteen species, of which the following is a tabulation:

I. Extreme costal edge of forewings distinctly rosy, at least towards base.
- A. Hindwings more or less wholly yellow.
  - 1. Hindwings with well-defined dark border.
    - *a.* Femora crimson-suffused beneath ...42. *phylarcha.*
    - *b.* Femora white ... ... 43. *triphænatella.*
  - 2. Hindwings without defined border.
    - *a.* Forewings with dark fuscous central fascia. ... ...47. *euselma.*
    - *b.* Forewings not fasciated.
      - i. Forewings broad; apical cilia of hindwings yellow... ... ...46. *parthenopa.*
      - ii. Forewings moderate; apical cilia of hindwings grey ... ...45. *protoxantha.*
- B. Hindwings not yellow.
  - 1. Forewings broad, costa much arched ...48. *rufogrisea.*
  - 2. Forewings moderate, oblong
    - *a.* Forewings whitish-ochreous ... ...39. *pelosticta.*
    - *b.* Forewings grey-whitish ... ...35. *inceptella.*
    - *c.* Forewings grey ... ...34. *incarnatella.*

II. Costa of forewings not rosy.
- A. Forewings white ... ...38. *hemiscia.*
- B. Forewings yellow.
  - 1. Hindwings yellow ... ...44. *paralyrgis.*
  - 2. Hindwings grey ... ...41. *hemiteles.*

C. Forewings fuscous or grey.
  1. Costa of forewings ochreous-yellow ...40. *elæodes.*
  2. Costa of forewings fuscous-grey.
    a. Hindwings yellow ... ...37. *limbata.*
    b. Hindwings grey ... ...36. *severa.*

34. *Hel. incarnatella,* Walk.

(*Cryptolechia incarnatella,* Walk., Brit. Mus. Cat. 754.)

Media, alis ant. griseis, purpureo-sparsis, margine costali roseo, fascia antica angusta obliqua punctoque disci purpureis; post. dilute griseis.

♂. 23 mm. Head grey, on crown slightly fuscous-tinged. Palpi grey-whitish, second joint irrorated with grey, especially towards apex, and with an irregular longitudinal deep carmine streak on outer side, terminal joint anteriorly dark fuscous. Antennæ grey. Thorax brownish-grey, with a few scattered dull carmine-pink scales. Abdomen whitish-ochreous. Anterior legs deep carmine, beneath whitish; middle and posterior legs ochreous-whitish, the four apical joints of tarsi suffused with grey at base. Forewings moderate, oblong, costa more strongly arched towards base, apex bluntly rectangular, hindmargin straight, hardly oblique; grey, coarsely and irregularly irrorated with dull light purplish-carmine scales, the coalescence of which tends to form suffused fuscous-purple markings; costal edge slenderly bright crimson throughout, extreme tips of scales whitish except near base; a small deep carmine spot on inner margin near base; a cloudy fuscous-purplish slender oblique transverse fascia from $\frac{1}{3}$ of costa to middle of inner margin, slightly curved outwards, tolerably distinct on upper half, but very suffused and indistinct beneath; a small cloudy fuscous-purplish spot on costa rather beyond middle; a very small fuscous-purplish spot in disc beyond middle, between which anal angle is a cloudy suffusion; an irregular fuscous-purplish hindmarginal line: cilia carmine-pink, becoming whitish-grey towards anal angle. Hindwings with hindmargin not sinuate; grey, becoming whitish-grey towards base; cilia grey, at anal angle whitish-grey, with an indistinct darker line near base.

A richly-coloured species, closely allied to *H. inceptella*, but considerably darker, and rather broader-winged, with the anterior fascia distinct, but the posterior line obliterated.

One fine specimen taken at Sydney in September.

35. *Hel. inceptella*, Walk.

(*Cryptolechia inceptella*, Walk, Brit. Mus. Cat., 759.)

Media, alis ant. argillaceis, purpureo-sparsis, margine costali roseo, linea antica obliqua, altera postica flexuosa, macula costæ ante apicem, punctisque disci tribus purpureis; post. albido-griseis.

♂ ♀. 20–25 mm. Head, palpi, antennæ, and thorax pale greyish-ochreous, second joint of palpi somewhat mixed with carmine externally. Abdomen whitish-ochreous. Anterior tibiæ and tarsi deep fuscous-carmine, tarsal joints with obscure whitish apical rings; middle and posterior tibiæ and tarsi ochreous-whitish. Forewings moderate, oblong, costa moderately arched towards base, posteriorly straight, apex obtusely rectangular, hindmargin straight, not oblique; ochreous-grey-whitish, thinly and coarsely strewn with fuscous-purple scales; extreme costal edge bright crimson throughout; a very small fuscous-purple spot on inner margin close to base; a narrow cloudy fuscous-purple streak from costa before $\frac{1}{3}$ very obliquely outwards, attenuated posteriorly, not reaching beynd middle of wing, rarely continued very suffusedly to middle of inner margin; two obscure fuscous-purple dots in disc at $\frac{1}{4}$, one above the other, the lower often connected with inner margin before middle by a suffused oblique purplish streak; a dark purple-fuscous dot in disc beyond middle, through which sometimes passes a very faint, generally obsolete strongly curved purplish line from extremity of oblique costal streak to inner margin beyond middle; a small cloudy fuscous-purple spot on costa beyond middle, whence proceeds a cloudy, strongly outwards-curved, somewhat dentate purplish line to anal angle; a small flattened-triangular fuscous-purple spot on costa at $\frac{3}{4}$, almost confluent with this line: cilia on upper half of hindmargin grey-whitish suffused with pale carmine, and with a broad suffused fuscous-purple basal line, on lower half grey-whitish. Hindwings elongate, hindmargin slightly sinuate; ochreous-whitish, in male faintly, in female more strongly suffused with pale grey towards hindmargin, apex more ochreous-tinged; cilia ochreous-whitish, with a faint grey spot at apex, sometimes with a faint grey line.

Slightly narrower-winged than the preceding, much paler and more clay-coloured, with duller markings, and distinct discal dots and posterior line.

Common at Sydney on fences, and also at Blackheath on the Blue Mountains (3,500 feet) in October and November, apparently attached to *Eucalyptus*.

36. *Hel. severa*, n. sp.

Minor, alis ant. griseis, pallido-sparsis, punctis disci tribus maculaque marginis postici sub apice saturatioribus; post. griseis.

♀. 18 mm. Head and palpi whitish-ochreous mixed with greyish-fuscous. Antennæ whitish-ochreous, obscurely annulated with fuscous. Thorax greyish-fuscous, coarsely mixed with whitish-ochreous. Abdomen whitish-ochreous, suffused with grey. Anterior tibiæ and tarsi greyish-fuscous, with whitish rings at apex of joints; middle tibiæ ochreous-whitish mixed with grey, tarsi grey with whitish rings at apex of joints; posterior tibiæ and tarsi whitish. Forewings moderate, costa gently arched, apex rather obtuse, hindmargin slightly concave, rather oblique; greyish-fuscous, coarsely strewn with ochreous-whitish scales, more thickly towards hindmargin; a dark fuscous dot in disc before middle, a larger one in disc beyond middle, and a third on fold rather obliquely beyond first; a small cloudy ill-defined dark fuscous somewhat triangular spot along upper half of hindmargin: cilia pale whitish-fuscous mixed with whitish, with a fuscous spot at apex. Hindwings with hindmargin distinctly sinuate; fuscous-grey, rather darker posteriorly; cilia grey, darker towards base.

This and the three following species resemble one another in their small size and form of wing; the present species differs from all the rest by its dull fuscous-grey colouring on all wings.

One specimen taken at Sydney in November.

37. *Hel. limbata*, n. sp.

Minor, alis ant. fusco-griseis, pallido-sparsis, punctis disci tribus saturatioribus; post. flavis, late nigro-marginatis.

♀. 18 mm. Head and palpi whitish-ochreous, somewhat mixed with fuscous. Antennæ whitish-ochreous, sharply annulated with dark fuscous. Thorax greyish-fuscous, mixed with whitish-ochreous. Abdomen greyish-ochreous. Anterior and middle tibiæ ochreous-whitish mixed with dark fuscous, tarsi dark fuscous becoming whitish towards apex of joints; posterior tibiæ and tarsi ochreous-whitish. Forewings rather elongate, costa gently arched, apex obtuse, hindmargin oblique, slightly rounded; reddish-fuscous, coarsely and irregularly strewn with ochreous-whitish scales; a dark fuscous dot in disc before middle, a second in disc beyond middle, connected with first by a line of ochreous-whitish scales, and a third on fold obliquely beyond first: cilia ochreous-whitish mixed with fuscous, more greyish at anal angle, mixed with reddish at apex. Hindwings with hindmargin rounded; yellow, apex and hindmargin broadly suffused with blackish-grey; cilia dark grey, becoming darker towards base.

Very similar to *H. severa*, but with yellow hindwings.

I have one specimen, taken by Mr. G. H. Raynor near Melbourne.

38. *Hel. hemiscia*, n. sp.

Minor, alis ant. albis, macula dorsi basim versus magna, altera dorsi media, punctis disci duobus, linea postica transversa angulata, fasciaque marginis postici griseo-fuscis ; post. albido-griseis.

♂. 16 mm. Head white, mixed with grey. Palpi white, second joint with a broad suffused dark grey band before apex, terminal joint anteriorly dark grey. Antennæ whitish, annulated with dark grey. Thorax white, mixed with grey, with a grey spot posteriorly. Abdomen with basal third white, rest whitish-ochreous with segments suffused above with brownish-ochreous except on margins. Anterior tibiæ and tarsi grey with whitish rings at apex of joints ; middle and posterior legs whitish. Fore-wings moderate, rather dilated posteriorly, costa gently arched, apex acute, hindmargin rather concave, oblique ; white, towards costa faintly greyish-tinged ; a dark fuscous blotch on inner margin, extending almost from base to $\frac{2}{5}$, terminated above by the fold, posteriorly lighter and ill-defined ; an ill-defined cloudy fuscous subquadrate blotch beyond this, extending on inner margin from before middle to $\frac{3}{4}$, reaching rather more than half across wing ; a dark fuscous dot in disc before middle, confluent with anterior angle of this blotch, and a small dark fuscous spot in disc beyond middle, connected with posterior edge of blotch near inner margin by a curved row of three smaller fuscous spots ; a dark fuscous ill-defined partially interrupted transverse line from just below costa at $\frac{2}{3}$ to before anal angle, angulated outwards in disc ; a straight suffused dark fuscous line from costa a little before apex to hindmargin just above anal angle, beyond which the ground colour is suffused with pale grey, forming a narrow hindmarginal band : cilia grey-whitish, with a faint grey line near base. Hindwings with apex almost acute, hindmargin rather strongly sinuate ; whitish-grey, towards base whitish ; cilia whitish-grey.

A very distinct species, differing from all others in the white ground colour.

I have one specimen taken by Mr. G. H. Raynor near Parramatta in September, and have seen others from the same locality.

39. *Hel. pelosticta*, n. sp.

Minor, alis ant. dilute ochreis, partim rufo-sparsis, basi, fascia antica angusta, alteraque marginis postici supra magnopere dilatata purpureo-fuscis; post. albidis.

♂. 15 mm. Head whitish-ochreous, more ochreous on crown. Palpi whitish-ochreous, mixed with dark fuscous. Antennæ whitish-ochreous. Thorax dark purplish-fuscous. Abdomen whitish-ochreous. Anterior tibiæ and tarsi dark purplish-fuscous, with obscure whitish-ochreous rings at apex of tarsal joints; middle and posterior legs whitish, middle tarsi somewhat suffused with greyish. Forewings moderate, costa moderately arched, apex tolerably acute, hindmargin straight, rather oblique; whitish-ochreous, irregularly suffused with whitish-yellow, towards inner margin mixed with fuscous-reddish; a small dark purple-fuscous spot at base of wing; an irregular cloudy purplish-fuscous spot on costa before middle, connected with inner margin near base by a straight narrow ill-defined purplish-fuscous streak; a small cloudy purplish-fuscous spot on middle of inner margin; a dark fuscous-purple well-defined hindmarginal band from apex to anal angle, darkest on costa, where it is broad and extends from $\frac{3}{5}$ to apex, attenuated thence to anal angle, its anterior edge rather strongly concave, and margined with dark fuscous: cilia purple, becoming dark grey at anal angle. Hindwings with hindmargin slightly sinuate; ochreous-whitish, extreme apex grey; cilia ochreous-whitish, with a very faint grey line.

Distinctly characterised by its small size, light ochreous forewings with purplish-fuscous markings, and ochreous-whitish hindwings.

Two specimens taken at Murrurundi, New South Wales, in November.

40. *Hel. elæodes*, n. sp.

Media, alis ant. griseis, margine costali ochrea, litura transversa dorsi media, altera anguli analis, tertia marginis postici, punctisque disci tribus purpureis ; post. griseis.

♀. 25 mm. Head ochreous-yellow, face and crown paler. Palpi whitish-yellowish, second joint with a suffused grey sub-apical ring, becoming whitish towards base, terminal joint anteriorly grey. Antennæ dark grey. Thorax rather light grey, anterior margin suffusedly ochreous-yellow. Abdomen ochreous-whitish. Anterior and middle tarsi and tibiæ dark grey, apex of all joints and an indistinct median ring of tibiæ whitish ; posterior tibiæ whitish, tarsi grey with whitish rings at apex of joints ; femora beneath white. Forewings moderate, costa moderately and evenly arched, apex obtusely rectangular, hindmargin somewhat sinuate, rather oblique : rather light grey ; costal edge ochreous-yellow ; a purple dot in disc before middle, a second in disc beyond middle, and a third on fold obliquely beyond first ; a small ill-defined purplish spot on inner margin at $\frac{1}{4}$; a narrow oblique cloudy purple streak from middle of inner margin, extending to second discal dot, and touching third dot with anterior margin, attenuated to extremity ; a few scattered purple scales beyond this ; an irregular dark purple line from a little before hindmargin in middle to anal angle, strongest beneath ; hindmargin narrowly suffused with dark fuscous-purple from apex to below middle : cilia ochreous-grey-whitish, with a dark purple-fuscous spot at apex, and suffused with dark purple at base on upper half of hindmargin. Hindwings pale dull greyish-ochreous, posteriorly suffused with dark grey ; cilia grey, with a darker spot above apex.

A very distinct species, separated from all others by the yellow costa contrasted with the grey ground colour of the forewings.

Larva feeding gregariously on *Eucalyptus sp.*—("White Gum") in a large nest of leaves and silk; pupa in the same position. Imago emerges at intervals during November.

I received a specimen of this species from Mr. E. Guest, who informs me that it is very common in the larva state on Mount Lofty range, near Adelaide, and very easy to rear, but never found at large in the imago state; in these particulars, as well as in the larval habits communicated by him, it agrees precisely with *H. hemiteles*.

41. *Hel. hemiteles*,, n. sp.

Media, alis ant. flavis, macula dorsi, fascia marginis postici utrimque attenuata, interdum macula costæ media suffusa angulum analem versus producta purpureis, puncto disci nigro; post. griseis.

♂ ♀. 19–23 mm. Head deep yellow, face paler. Palpi ochreous-white at base, second joint dark fuscous mixed with whitish, apex yellow, terminal joint yellow, apex dark fuscous anteriorly. Antennæ dark fuscous. Thorax deep yellow, anterior margin and a square spot on anterior half of back dark purplish-fuscous. Abdomen ochreous-whitish. Anterior and middle tibiæ and all tarsi dark fuscous, apex of joints very narrowly ochreous-whitish; posterior tibiæ whitish-ochreous; femora beneath white. Forewings moderate, costa gently and evenly arched, apex round-pointed, hindmargin sinuate, moderately oblique; deep yellow; costal edge paler, at base dark fuscous; a dark fuscous-purple quadrilateral blotch on inner margin beyond middle, upper anterior angle on fold, upper posterior angle reaching half across wing, terminating in a dark fuscous dot, posterior side rather suffused; a moderate dark fuscous-purple hindmarginal band, attenuated to a point at apex and anal angle, anterior edge rounded, apical extremity dark fuscous; sometimes a very irregularly quadrilateral suffused dark fuscous-purple blotch on middle of costa, sometimes connected with inner margin by a fuscous-purple suffusion between dorsal blotch and hindmarginal band, but this blotch and suffusion are often wholly absent; rarely a minute dark fuscous dot in disc before middle: cilia on hindmargin fuscous-purple, with an indistinct dark grey line, towards tips yellowish, at apex and anal angle wholly grey, on costa yellow. Hindwings rather dark grey, lighter towards base, cilia grey.

The bright yellow forewings distinguish this species from all but *H. paralyrgis*, which has also yellow hindwings.

Larva stout, slightly tapering at both ends; rather light purplish-grey or reddish-grey, spots minute, blackish; dorsal, sub-dorsal, and interrupted spiracular lines very irregular, slender, grey-whitish; other irregular scattered grey-whitish marblings on sides; second, third, and anal segments sprinkled with blackish dots; head greyish-ochreous, marbled with ochreous-whitish. Feeds amongst spun together leaves of *Eucalyptus tereticornis*, several larvæ together forming an irregular nest of web and discoloured leaves; pupa in same position. These larvæ are found in August, and are extremely easy to rear; the imagos appear to emerge irregularly from August to November.

Common round Sydney and Melbourne, but hardly ever met with in the perfect state.

Types of this species stand in the British Museum as *Oecophora semiruptella*, Walk., 684, but the description is obviously not drawn from this species, the ground colour being stated to be between brick-red and rose-colour, and all the details inconsistent; some error must exist, and Walker's name must be wholly rejected as unidentifiable.

42. *Hel. phylarcha*, n. sp.

Magna, alis ant. griseis, angulum analem versus late purpureo-suffusis, margine costali roseo, puncto disci saturatiore; post. læte flavis, latius nigro-marginatis.

♀. 31 mm. Head brownish-grey, face more yellowish, on sides fuscous. Palpi pale greyish-ochreous, second joint suffused with dark grey anteriorly and externally except at base and apex, and crimson-tinged internally, terminal joint dark grey anteriorly. Antennæ grey, towards base crimson-tinged. Thorax brownish-grey, posterior extremity crimson-tinged. Abdomen yellowish. Anterior and middle legs dark fuscous-crimson, apex of tarsal joints lighter crimson; posterior tibiæ yellow, tarsi crimson, suffused with grey towards base of joints; all legs beneath yellowish, suffused with crimson. Forewings moderately broad, costa anteriorly rather strongly arched, posteriorly nearly straight, apex obtuse, hindmargin sinuate beneath apex, slightly oblique; brownish-grey, with a broad ill-defined purplish suffusion extending from $\frac{1}{4}$ along inner margin and hindmargin to apex, attenuated to extremities; costal edge crimson; a very ill-defined dark grey dot on fold before middle, and a second in disc beyond middle; indications of a very suffused cloudy fuscous-purplish angulated transverse fascia in disc at about $\frac{5}{6}$; a hindmarginal row of obscure dark fuscous dots: cilia fuscous-purplish. Hindwings golden-yellow, with a well-defined rather narrow blackish-fuscous hindmarginal border, considerably dilated at apex; cilia dark grey, more blackish at apex.

Closely allied to *H. triphænatella*, from which the most reliable point of distinction is probably the well-marked crimson suffusion of the legs beneath; other characters (which may be liable to variation) are the larger size, the much greyer, darker, and glossier forewings, the purple cilia, the deeper yellow hindwings, with much more sharply-defined border.

Two specimens taken on a fence near Sydney in September, during a high wind.

43. *Hel. triphænatella*, Walk.

(*Cryptolechia triphænatella*, Walk., Brit. Mus. Cat., 753; *Cryptolechia oecophorella*, ibid. 760.)

Media, alis ant. ochreis, angulum analem versus plus minusve purpureo-suffusis, margine costali roseo, punctis disci tribus, serie punctorum postica transversa, alteraque marginis postici saturate fuscis, interdum partim obsoletis ; post. flavis, margine postico nigro-suffuso.

♂ ♀. 24½–25 mm. Head ochreous, face lighter. Palpi light ochreous, more greyish anteriorly, slightly reddish-tinged on sides. Antennæ greyish-ochreous. Thorax light greyish-brown-ochreous, posterior extremity sometimes dark fuscous. Abdomen whitish-ochreous, towards base whitish-yellow. Anterior tibiæ and tarsi dark fuscous, slightly carmine-tinged, tarsal joints with apical whitish rings ; middle and posterior legs ochreous-whitish, middle tarsi suffused with grey towards base of joints ; all legs ochreous-white beneath. Forewings moderate, costa moderately arched, rather more strongly towards base, apex obtuse, hindmargin almost straight, slightly oblique ; greyish-ochreous, slightly mixed with brownish-ochreous ; costal edge light crimson throughout ; a purplish suffusion, mixed with dark fuscous, forming a cloudy blotch on middle of inner margin, sometimes broadly produced over anal angle and hindmargin to apex as a suffused band ; a dark fuscous dot in disc before middle, and a second obliquely beyond it on fold ; a small dark fuscous spot in disc beyond middle, and a similar more cloudy spot obliquely beyond and beneath it ; a nearly straight row of about six dark fuscous rather crescentic dots from disc at $\frac{4}{5}$ to inner margin at $\frac{4}{5}$, its upper extremity tending to be connected with costa beyond middle by one or two dark scales ; a hindmarginal row of blackish dots ; these rows of dots are sometimes obscured by the hindmarginal suffusion : cilia grey-whitish suffused with light purplish except towards anal angle. Hindwings with hindmargin scarcely sinuate ; light yellow, in male very narrowly, in female more broadly suffused with dark fuscous-grey along hindmargin ; cilia grey, towards base blackish-grey.

Smaller than the preceding, with the legs nearly white beneath, without crimson suffusion; the ground colour more ochreous and the markings much more distinct, the hindwings lighter and less sharply margined.

Rather common at Melbourne, whence I have received specimens taken by Mr. G. H. Raynor.

44. *Hel. paralyrgis*, n. sp.

Media, alis ant. flavis, macula postica magna purpurea a medio dorso usque ad apicem perducta, puncto disci, altero plicæ, serieque punctorum postica transversa in macula saturate fuscis; post. flavis, apice ciliisque saturate griseis.

♂. 25 mm. Head yellow, face paler. Palpi pale yellowish, second joint anteriorly suffused with light grey, apex of terminal joint grey. Antennæ dark fuscous. Thorax dark purplish-fuscous, tegulæ yellow. Abdomen grey, anal tuft mixed with yellowish. Anterior and middle legs dark fuscous; posterior tibiæ whitish-yellow, tarsi dark grey with whitish-yellow rings at apex of joints; all femora pearly white beneath. Forewings moderate, costa moderately and evenly arched, apex obtuse, hindmargin straight, rather oblique; light yellow; costal edge dark grey towards base; base of inner margin grey; an irregular rather broad fuscous-purple blotch extending along inner margin from before middle up hindmargin to apex, extremities blunt, hardly attenuated, upper edge irregular, reaching costa before apex; a cloudy dark grey dot on fold below middle, resting on edge of blotch, and a second in disc beyond middle, connected with edge of blotch by a triangular tooth of the latter; an ill-defined irregular dentate dark grey transverse line running from upper edge of blotch a little below costa to anal angle: cilia light crimson-purplish, posteriorly becoming grey-whitish, above apex and on anal angle grey, on costa yellow. Hindwings light golden-yellow, somewhat deeper posteriorly, apex and hindmargin very slenderly suffused with dark grey; basal hairs suffused with grey; cilia dark grey.

Specially characterised by having both forewings and hindwings yellow.

Larva stated by Mr. E. Guest to form a curious flat case by joining two gum-leaves (*Eucalyptus sp.*) together edgewise, something in the form of a boat. This singular habit seems to require further investigation.

I received a specimen from Mr. E. Guest, who informs me that it is one of the commonest insects on the Mount Lofty Range, Adelaide, in November and December.

45. *Hel. protoxantha*, n. sp.

Media, alis ant. dilute griseo-carneis, punctis disci tribus serieque punctorum postica angulata saturate griseis; post. dilute flavis, ciliis apicis griseis.

♂. 23 mm. Head, palpi, and thorax whitish-ochreous mixed with light greyish-brown, palpi anteriorly whitish towards base. Antennæ whitish-ochreous. Abdomen whitish-ochreous. Anterior legs light dull ochreous, slightly crimson-tinged; middle and posterior legs ochreous-whitish, middle tarsi more ochreous towards base of joints; legs beneath ochreous-white. Forewings moderate, oblong, costa strongly arched anteriorly, very slightly posteriorly, apex obtuse, hindmargin sinuate, slightly oblique; light greyish-pink, thickly strewn with whitish-ochreous scales, costal edge very narrowly whitish-ochreous, near base suffused with light crimson; a greyish-fuscous dot in disc before middle, a second in disc beyond middle, and a third very obliquely beyond first on fold; a cloudy greyish-fuscous transverse line, obscurely interrupted between veins, from middle of costa very obliquely outwards, in middle of disc bent obtusely inwards, and continued to inner margin before anal angle; a row of obscure dark greyish-fuscous dots on hindmargin: cilia very pale pinkish, mixed with grey, tips ochreous-whitish. Hindwings light ochreous-yellow, paler towards base; cilia pale ochreous-yellow, becoming grey round apex.

Differs from all the preceding allied species by the pale yellow cilia of the hindwings; the succeeding species have much broader forewings, with more strongly arched costa, and more rosy colouring.

One specimen received from Mr. G. Barnard, taken at Coomooboolaroo, near Duaringa, Queensland.

46. *Hel. parthenopa*, n. sp.

Major, alis ant. carneis, margine costali ciliisque roseis, punctis disci tribus minimis, serieque punctorum postica angulata saturate fuscis; post. dilute flavis.

♂. 26 mm. Head and thorax light ochreous-fuscous, pinkish-tinged, face and collar whitish-ochreous. Palpi dull pink, becoming whitish towards base. Antennæ grey, basal joint reddish-fuscous. Abdomen whitish-ochreous. Anterior tibiæ and tarsi dull light crimson; middle legs ochreous-whitish, tarsal joints greyish towards base, tarsi and base of tibiæ faintly crimson-tinged; posterior legs yellowish-whitish; all femora beneath yellowish-whitish. Forewings rather broad, costa strongly and evenly arched, apex obtuse, hindmargin slightly sinuate, hardly oblique; light fuscous-pinkish; costal edge pale crimson; a minute dark fuscous dot in disc before middle, a second in disc beyond middle, and a third on fold obliquely beyond first; a faintly indicated transverse row of minute dark fuscous dots proceeding from about middle of costa very obliquely outwards, bent obtusely in middle, and continued to inner margin before anal angle; a row of very faintly indicated dark fuscous dots on hindmargin: cilia pale crimson, tips more whitish. Hindwings and cilia very pale ochreous-yellowish.

This and the two following species are broader-winged than the rest of the genus, resembling in form the typical species of *Hoplitica.* In simplicity of marking this species approaches *H. protoxantha*, but is rosier, and the apical cilia of hindwings are not greyish-tinged.

One specimen received from Mr. E. Guest, who states that it is a common autumnal species on the Mount Lofty Range, Adelaide.

47. *Hel. euselma*, n. sp.

Major, alis ant. dilute rufis, margine costali ciliisgue roseis, fascia media nebulosa serieque punctorum postica angulata saturate fuscis; post. dilute flavis, ♀ postice griseo-suffusis, ciliis apicis leviter roseis.

♂ ♀. 29 mm. Head whitish-ochreous, on crown suffused with light reddish-fuscous. Palpi light brownish-rosy. Antennæ grey, basal joint brown. Thorax light reddish-fuscous, slightly mixed with whitish-ochreous. Abdomen pale whitish-ochreous. Anterior and middle tibiæ and tarsi light fuscous-crimson; posterior legs very pale whitish-ochreous, tarsi faintly crimson-tinged; all femora beneath whitish. Forewings rather broad, costa rather strongly and evenly rounded, apex obtuse, hindmargin slightly sinuate, not oblique; rather light ochreous-brown; costal edge light crimson; a moderately broad very ill-defined straight rather oblique dark purple-fuscous fascia from before middle of costa to beyond middle of inner margin, narrowed and almost obsolete on costa, abruptly dilated in middle into a blunt projecting tooth on both edges; a transverse row of somewhat triangular cloudy dark fuscous dots from middle of costa very obliquely outwards, obtusely angulated in middle, and continued to inner margin before anal angle; cilia light crimson, tips rosy-whitish. Hindwings pale whitish-yellow, slightly darker posteriorly, in female somewhat greyish-suffused towards hindmargin; cilia whitish-yellow, round apex rosy-tinged.

Easily known by the central cloudy fascia.

One specimen taken at Launceston, Tasmania, at the end of January, and a second received from Mr. E. Guest, who states that it is very common during the autumn on the Mount Lofty Range, Adelaide.

48. *Hel. rufogrisea*, n. sp.

Media, alis ant. albido-griseis, fere omnino rufo-suffusis, margine costali ciliisque roseis, basi, fasciis duabus angustis obliquis, tertia marginis postici, punctisque plerisque sparsis purpureis; post. griseis, basim versus pallidioribus.

♂ ♀. $21\frac{1}{2}$–24 mm. Head light grey, suffused with reddish-fuscous on crown. Palpi with second joint whitish-rosy, terminal joint whitish, anteriorly dark fuscous tinged with carmine. Antennæ grey, basal joint rosy. Thorax reddish-fuscous mixed with whitish-grey, suffusedly darker fuscous towards middle of anterior margin. Abdomen pale whitish-ochreous. Anterior tibiæ and tarsi deep carmine; middle tibiæ and tarsi ochreous-whitish, base of all joints suffused with carmine; posterior tibiæ and tarsi ochreous-whitish. Forewings broad, costa strongly and evenly arched, apex rectangular, blunt, hindmargin straight, hardly oblique; rather light reddish-ochreous-fuscous, with scattered grey-whitish scales; base of wing narrowly dark purple-fuscous; costal edge bright carmine throughout; two slender suffused fuscous-purple transverse fasciæ; first from $\frac{1}{3}$ of costa to middle of inner margin, very slightly curved outwards; second from $\frac{2}{3}$ of costa to anal angle, attenuated on lower half so as to form a strongly dentate line; before first fascia the ground colour is more or less suffused with grey-whitish towards disc, and also between second fascia and apex; some small transverse ill-defined fuscous-purple marks arranged in an obliquely transverse row between first fascia and base, and a similar row midway between first and second fasciæ; a suffused fuscous-purple streak along hindmargin from apex nearly to anal angle, dilated above middle, attenuated at lower extremity; cilia rosy, with a fuscous-purple apical spot. Hindwings with hindmargin slightly indented; in male light grey suffused with whitish-ochreous towards costa and base, in female darker grey; cilia grey, suffused with rosy beneath apex, at anal angle becoming ochreous-whitish.

Very distinct through the two parallel fasciæ.

Two specimens taken near Sydney in February and March, beaten from *Eucalyptus*.

9. EUCHÆTIS, *n. g.*

Head with appressed scales, side-tufts moderate, spreading. Antennæ in male moderate, with fine very long ciliations (5), basal joint short, stout, with pecten of one or two fugitive scales. Palpi moderately long, second joint somewhat exceeding base of antennæ, clothed with appressed scales, almost smooth, terminal joint shorter than second, slender, recurved. Thorax smooth. Forewings elongate-oblong, apex rounded, hindmargin oblique, slightly sinuate. Hindwings as broad as forewings, ovate, hindmargin faintly sinuate beneath apex, cilia $\frac{1}{3}$. Abdomen moderate. Middle tibiæ thickened with dense loose hairs; posterior tibiæ clothed with dense hairs above. Forewings with vein 7 to hindmargin, 2 from somewhat before angle of cell. Hindwings with vein 5 bent and strongly approximated to 4 at base.

The basal approximation of veins 4 and 5 of the hindwings, and the absence of a complete basal pecten of the antennæ, clearly refer this genus to the group of *Hoplitica*, amongst which it is characterised by the very long antennal ciliations; but its immediate affinities are not clear. Further evidence is required to ascertain its origin; meanwhile I place it between *Heliocausta* and *Euryplaca*, to both of which it seems to have some relationship.

49. *Euch. habrocosma*, n. sp.

Media, alis ant. albido-ochreis, costam versus roseo-griseis, costa rosea, linea antica obliqua alteraque subterminali saturate ferrugineis, spatio incluso præter costam ferrugineo, ad medium saepe nigro commixto, punctis disci quattuor longitudinaliter positis ac margine postico niveis ; post. ochreo-albidis.

♂. 17–23 mm. Head and thorax grey-whitish, middle of back ferruginous. Palpi dull pink, second joint more whitish towards base and at extreme apex, suffusedly fuscous before apex. Antennæ grey, towards base pinkish. Abdomen whitish, anal tuft ochreous-tinged. Anterior legs bright carmine ; middle and posterior legs whitish, more or less carmine-tinged, especially on tarsi. Forewings moderate, costa gently arched, more strongly at base, apex rounded, hindmargin oblique, slightly sinuate ; whitish-ochreous ; costa broadly suffused with pale crimson-grey, costal edge crimson : a short dark ferruginous linear mark at base beneath costa ; a short oblique dark ferruginous mark from costa at $\frac{2}{5}$, and an oblique transverse dark ferruginous line from inner margin near base, meeting costal mark beneath costa ; a row of four or five irregular dark ferruginous spots, extending beneath costa from costal mark nearly to apex, connecting with a curved subdentate dark ferruginous line very near and parallel to hindmargin, extending from beneath apex to inner margin before anal angle ; the whole space included between the anterior and posterior transverse lines, and the subcostal row of spots and inner margin, is strongly suffused with ochreous and ferruginous, sometimes mixed with whitish below middle ; disc sometimes irrorated with black, more thickly in centre, so as to form a darker blotch ; two small transverse snow-white spots longitudinally placed in disc at $\frac{1}{3}$, separated by a small bright ochreous spot, anterior one posteriorly concave ; two other small transverse snow-white spots longitudinally placed in disc at $\frac{2}{3}$, separated by a small bright ochreous spot, posterior one suffusedly produced towards inner margin before anal angle as a short ochreous-whitish streak ; hindmargin beyond subterminal line rosy-white ; a small cloudy ferruginous spot immediately before apex, mixed with grey: cilia light pink, mixed with whitish-grey. Hindwings and cilia yellowish-whitish.

A singular and very elegant insect.

Three specimens taken on a fence near Sydney in September, during a high wind.

50. *Euch. metallota*, n. sp.

Major, alis ant. rufis, albo-sparsis, margine costali dilute roseo, maculis disci duabus flavis, tertia dorsi ad basim, signorum serie triangularium ante marginem posticum, quattuor etiam sub costa niveis; post. flavis.

♀. 29 mm. Head whitish, mixed on crown with dark reddish-fuscous. Palpi whitish, second joint with a rather suffused dark reddish-fuscous subapical band. Antennæ light fuscous. Thorax ochreous-whitish, on back and posteriorly reddish-fuscous mixed with whitish. Abdomen whitish-ochreous. Anterior legs deep carmine, tarsi with suffused whitish rings at apex of joints; middle and posterior legs ochreous-whitish, middle tarsi slightly carmine-tinged. Forewings moderate, costa moderately arched, more strongly at base, apex obtuse, hindmargin straight, slightly oblique; light reddish-fuscous, coarsely irrorated with dark fuscous and white scales, the dark scales predominating towards costal half and base; extreme costal edge suffused with pale crimson, most distinctly near base; veins slenderly and irregularly lined with white; two very small whitish spots on costa near base; a small rectangular clear white spot on inner margin at base; a small square white spot in disc about $\frac{1}{4}$, anterior and posterior edges somewhat excavated; between its posterior edge and costa rather before middle are three very small roundish white spots, arranged in an outwardly curved line; an obsolete semi-oval patch on inner margin from before middle to $\frac{4}{5}$ is obscurely suffused with whitish, mixed with light reddish-fuscous; a white dot on fold somewhat before middle of wing; a small roundish white spot in disc beyond middle; obliquely above and beyond this is a small more suffused white spot in disc beyond middle; obliquely above and beyond this is a small more suffused white spot, above which are three small subquadrate almost connected white spots, arranged in a very oblique slightly curved row; a row of seven small almost connected triangular white spots along hindmargin, surrounded by dark fuscous scales: cilia reddish-whitish, becoming grey towards anal angle, base dark fuscous. Hindwings with hindmargin very slightly sinuate; pale yellow, towards base whitish-yellow; cilia pale yellow.

Larger than the preceding, with more numerous white spots, the hindmarginal white streak forming a chain of triangular spots, and the hindwings yellow.

I received one specimen through the kindness of Dr. J. C. Cox, of uncertain locality. The male being unknown, its reference is not assured; but it seems to be undoubtedly allied to the preceding species.

10. EURYPLACA, *Meyr.*

Head with appressed scales, sidetufts large, meeting above, loosely appressed. Antennæ moderate, in male moderately ciliated (1), basal joint moderately stout, with a fugitive pecten of two or three hair-scales. Palpi moderate, second joint reaching or exceeding base of antennæ, with smooth appressed scales, terminal joint shorter than second, rather stout, recurved. Thorax smooth. Forewings elongate, rather broad, apex obtusely rectangular, hindmargin slightly oblique. Hindwings hardly narrower than forewings, oblong-ovate, hindmargin faintly sinuate, cilia $\frac{1}{3}$. Abdomen broadly dilated, distinctly flattened, strongly margined. Posterior tibiæ with dense appressed hairs. Forewings with vein 7 to hindmargin, 2 from before angle of cell. Hindwings normal.

Closely allied to *Heliocausta*, from which it is distinguished principally by the broadly dilated and rather flattened abdomen.

The genus is clearly a development from *Heliocausta*, and probably forms a transitional step to *Hoplitica*.

51. *Eur. ocellifera*, n. sp.

Minor, alis ant. dilute ochreis, dorsi basi lineaque postica transversa nigrescentibus, macula maxima media saturate purpureo-grisea, maculas duas glaucas nigro-cinctas conjunctas includente ; post. griseis, basi albido-ochrea.

♂. 14½–17 mm. Head light ochreous, face whitish-ochreous. Palpi whitish-ochreous, second joint white beneath. Antennæ whitish-ochreous, sharply annulated with dark fuscous. Thorax dark purplish-fuscous, anterior margin broadly pale ochreous. Abdomen whitish-yellow. Legs white, anterior and middle tibiæ mixed with grey, tarsal joints dark grey towards base, posterior tibiæ and tarsi yellowish-tinged above. Forewings moderate, costa moderately arched, apex obtuse, hindmargin rather oblique, rounded; pale ochreous ; a small cloudy dark purplish-fuscous semi-oval spot on inner margin near base ; a large roundish well-defined dark purplish-fuscous blotch in middle of disc, occupying central third of wing, above almost touching costa in middle, beneath extending on inner margin from beyond middle to above anal angle; within this blotch in disc are two rather large roundish spots of whitish-blue scales mixed with blackish, each surrounded with a suffused blackish ring, one before, the other beyond middle, partially confluent in middle, posterior rather larger and more strongly margined ; midway between this blotch and apex is an outwardly-curved cloudy dark fuscous transverse line, most distinct in middle, its extremities directed towards costa beyond middle and anal angle, but not distinctly reaching either ; two or three dark fuscous-grey scales on hindmargin round apex: cilia pale ochreous, tips whitish, cilia beneath anal angle dark grey. Hindwings with hindmargin slightly sinuate ; rather dark fuscous-grey, towards base and costa whitish-ochreous ; cilia whitish-ochreous, becoming grey along lower margin, sometimes wholly grey except on costa and inner margin, with base round apex ochreous.

A very peculiarly marked and distinct species.

Not uncommon round Sydney from October to December, frequenting *Acacia decurrens*, and also at Hobart, Tasmania, in January.

52. *Eur. demotica*, n. sp.

Major, alis ant. griseo-fuscis, punctis disci tribus minimis serieque punctorum postica angulata obscuris saturatioribus; post. griseis, apicem versus latius albidis.

♂ ♀. 23–33 mm. Head and thorax fuscous-grey or reddish-grey-fuscous. Palpi grey-whitish, sometimes reddish-tinged, second joint greyer towards apex, white at base. Antennæ whitish-grey, semi-annulated with dark fuscous. Abdomen whitish-grey, sometimes ochreous-tinged. Anterior and middle legs dark grey, tarsi with obscure whitish rings at apex of joints; posterior legs whitish-grey; all legs white beneath. Forewings large, moderately broad, somewhat dilated posteriorly, costa moderately arched, apex obtuse, hindmargin somewhat oblique, straight above, rounded beneath; greyish-fuscous, sometimes slightly reddish-tinged; extreme costal edge very slenderly whitish towards middle; a dark fuscous dot in disc before middle, a second in disc beyond middle, and a third obliquely beyond first on fold; a very indistinct row of small dark fuscous crescentic marks from costa about middle very obliquely outwards to disc at $\frac{4}{5}$, thence bent sharply inwards and continued to inner margin a little before anal angle; a row of faint dark fuscous dots along hindmargin and apical third of costa: cilia light greyish-fuscous, often reddish-tinged, extremities more whitish. Hindwings trapezoidal, hindmargin markedly indented; ochreous-whitish, towards inner margin broadly suffused with light grey, apex and hindmargin very slenderly suffused with light grey; cilia pale whitish-grey.

In general appearance recalling the larger species of *Hoplitica*, from which it may be superficially distinguished by the reversed colouring of the hindwings.

Not uncommon at Blackheath in the Blue Mountains (3,500 feet) in January, beaten from *Eucalyptus;* also at Melbourne.

11. Atelosticha, *n. g.*

Head loosely haired, sidetufts large, dilated posteriorly. Antennæ in male moderate, somewhat serrate, moderately and evenly ciliated (1), basal joint rather stout, without pecten. Palpi moderate, second joint not reaching base of antennæ, thickened with dense scales, rather rough beneath, terminal joint as long as second, moderately stout, strongly reflexed. Thorax smooth. Forewings somewhat oblong, broad, apex obtuse-angled, hindmargin straight, not oblique. Hindwings distinctly narrower than forewings, oblong-ovate, hindmargin slightly indented beneath apex, cilia $\frac{1}{3}$. Abdomen broadly dilated, somewhat flattened, strongly margined. Posterior tibiæ clothed with short rough hairs. Forewings with 11 separate veins (normal veins 7 and 8 being coincident), 7 to costa, 2 from before angle of cell. Hindwings normal.

This genus and *Allodoxa* are distinguished from all the rest of the family by the peculiarity of having only 11 veins in the forewings, and in each case the change has been brought about by the coincidence of the normal veins 7 and 8, but they are not specially allied in other respects, and there can be little doubt that the variation has arisen independently in each instance, and is no indication of affinity. There is no difficulty in locating these genera by their other points of structure. *Atelosticha* is undoubtedly a direct development of *Hoplitica*, from which it only differs by this peculiarity of venation.

53. *Atel. phædrella*, n. sp.

Parva, capite niveo, alis ant. saturate ochreo-flavis, ad costam postice griseo-suffusis, costa nivea. puncto disci postico nigro ; post. griseis.

♂ ♀. 12½–14 mm. Head and palpi snow-white, basal half of second joint externally reddish-ochreous. Antennæ white. Thorax deep yellow, posteriorly lighter. Abdomen whitish-ochreous. Legs white, anterior and middle tibiæ and tarsi yellowish-brown above, posterior tibiæ and tarsi yellowish-tinged. Forewings rather broad, costa moderately arched, apex obtuse-angled, hindmargin straight, not oblique ; deep yellow, deepest towards base of costa, greyish-tinged towards costa posteriorly ; costal edge very narrowly snow-white almost from base to near apex, less distinct posteriorly ; a fuscous dot in disc before middle, often obsolete ; a more conspicuous dark fuscous dot in disc beyond middle: cilia yellow, becoming whitish towards extremities. Hindwings grey, darker grey in female, towards base somewhat lighter and yellowish-tinged ; cilia grey.

A very distinct and pretty species.

Not uncommon at Sydney and Newcastle, in November, and from January to March, seeming to frequent *Kunzea*.

12. NYMPHOSTOLA, *n. g.*

Head loosely haired, sidetufts large, dilated posteriorly ; in male an expansible pencil of long hairs on side of face beneath eye. Antennæ in male stout, somewhat serrate, very shortly ciliated ($\frac{1}{3}$), basal joint rather stout, without pecten. Palpi moderately long, second joint reaching base of antennæ, clothed with dense rather loose scales, with a short projecting triangular tuft of scales beneath towards apex, terminal joint as long as second, stout, strongly reflexed. Thorax smooth. Forewings somewhat oblong, broad, apex obtusely rounded, hindmargin evenly rounded, cilia $\frac{1}{6}$. Abdomen moderate. Middle tibiæ roughly haired beneath; posterior tibiæ clothed with rather short rough hairs. Forewings with vein 7 to apex, 2 from distinctly before angle of cell. Hindwings with vein 5 bent and approximated to 4 at base.

This and the following genus are closely allied, and are both restricted to New Zealand, where there can be no doubt that both have developed from a common ancestor, which must itself have been very nearly allied to *Hoplitica*, of which both genera preserve the exact neuration and other essential characters; both differ from *Hoplitica* and its allies in the very short ciliations of the antennæ, and *Nymphostola* also in the loose tuft of the palpi, as well as other minor characters. The cilia of the hindwings are unusually short, and the abdomen is not dilated.

54. *Nymph. galactina*, Feld.

(*Cryptolechia galactina*, Feld., Reis. Nov. Pl. cxl., 34.)

Media, alis ant. niveis, puncto disci postico nigro, venis omnibus punctis minimis griseis notatis; post. niveis.

Conspicuously distinct by its white colour; when fresh, faintly tinged with greenish.

Hamilton and Dunedin, New Zealand, in January; rather common.

13. PROTEODES, *n. g.*

Head with appressed scales, sidetufts large, spreading. Antennæ in male moderate, somewhat serrate towards apex, very shortly ciliated ($\frac{1}{3}$), basal joint moderate, without pecten. Palpi moderately long, second joint reaching base of antennæ, thickened with appressed scales, rather rough beneath, terminal joint much shorter than second, rather stout, slightly rough anteriorly. Thorax smooth. Forewings somewhat oblong, moderately broad, apex obtusely rounded, hindmargin not oblique. Hindwings as broad as forewings, ovate, rounded, cilia $\frac{1}{3}$. Abdomen moderate.

Posterior tibiæ clothed with rather short rough hairs. Forewings with vein 7 to apex, 2 from before angle of cell. Hindwings with vein 5 bent and approximated to 4 at base.

Nearly allied to *Nymphostola*, from which it is distinguished by the structure of the palpi, of which the second joint is untufted, and the terminal joint considerably shorter than the second.

55. *Prot. carnifex*, Butl.

(*Cryptolechia carnifex*, Butl., Proc. Zool. Soc. Lond. 1877, 406; *Cryptolechia rufosparsa*, ibid. 406.)

Media, alis ant. griseo-ochreis vel flavis, interdum ferrugineis, costa ferruginea, linea perobliqua punctoque disci obscuris griseis, venis omnibus punctis crebris griseis notatis; post. albis, apice leviter griseo.

Very variable in colouring and intensity.

Christchurch and Mount Hutt, New Zealand, in March and April; a common autumnal species.

14. Hoplitica, *n. g.*

Head with appressed scales, sidetufts moderately large, closely appressed. Antennæ in male moderately stout, moderately and evenly ciliated (1), basal joint rather stout, without pecten or with two or three fugitive hair-scales. Palpi rather long, second joint exceeding base of antennæ, thickened with appressed scales, terminal joint hardly shorter than second, rather stout, strongly recurved. Thorax smooth. Forewings somewhat oblong, moderately broad, apex obtusely or acutely angled, hindmargin perpendicular or oblique. Hindwings somewhat narrower than forewings, oblong-ovate, hindmargin sinuate beneath apex, cilia $\frac{1}{3}$. Abdomen broadly dilated, somewhat flattened, strongly margined. Middle tibiæ with dense loose hairs; posterior tibiæ clothed with rather short loose hairs. Forewings with vein 7 to apex, 2 from rather before angle of cell, fork of 1 strongly dilated. Hindwings with vein 5 bent and strongly approximated to 4 at base.

Differs from *Eulechria* (to which it is not in fact immediately related) through the absence of a complete basal pecten of antennæ, the dilated abdomen, and the approximation of veins 4 and 5 of the hindwings at base. It must be considered as developed directly from *Heliocausta* through *Euryplaca*, its relationship with *Eulechria* being merely collateral. The genus is of some extent, and has given rise to several offshoots, which have been already discussed.

The perfect insects are inactive, and seem attached to species of *Eucalyptus*. I have thirteen species, some of which are closely allied; the following is a tabulation of them:

A. Forewings ochreous-rosy or reddish-ochreous.
  1. With two or three transverse strigæ.
    a. With two inwardly oblique cloudy fasciæ 65. *rufa.*
    b. Without inwardly oblique fasciæ ... 64. *costimacula.*
  2. With a series of dots only.
    a. Apex of hindwings rosy ... . 62. *pudica.*
    b. Apex of hindwings grey. ... ... 63. *leucerythra.*

B. Forewings greyish-pink or pinkish-grey.
  1. Without transverse lines ... ... 59. *sericata.*
  2. With transverse lines.
    a. Forewings broad.
      i. Hindwings towards base whitish ... 60. *carnea.*
      ii. Hindwings towards base ochreous .. 61. *repandula.*
    b. Forewings elongate.
      i. Hindwings dark grey, ochreous-tinged... 66. *absumptella.*
      ii. Hindwings rather light grey ... ... 67. *coenosa.*
      iii. Hindwings whitish towards base, apex grey ... ... 68. *cholodella.*

C. Forewings pure grey.
1. Whitish-grey, posterior line separated into minute scales ... ... 58. *myodes.*
2. Grey, posterior line forming distinct dots... 57. *sobriella.*
D. Forewings whitish-ochreous ... ... 56. *neochlora.*

56. *Hopl. neochlora*, n. sp.

Parva, alis ant. albido-ochreis, punctis disci quattuor serieque punctorum marginis postici nigris ; post. griseis.

♂. $13\frac{1}{2}$ mm. Head and thorax whitish-ochreous. Palpi whitish, with a dark fuscous band before apex of second joint, terminal joint ochreous-tinged. Antennæ grey. Abdomen whitish-grey (?). Anterior tibiæ dark fuscous, apex and two bands white, beneath white, tarsi dark fuscous, two basal joints with apical white rings ; middle tibiæ and tarsi whitish-ochreous mixed with grey ; posterior tibiæ and tarsi whitish. Forewings moderately broad, hardly dilated, costa moderately arched, apex obtuse, hindmargin rather oblique ; whitish-ochreous ; a black dot at base of costa ; a conspicuous black dot in disc before middle, a second in disc beyond middle, a third on fold beyond first, and a fourth below and rather beyond second ; a row of black dots on hindmargin : cilia whitish-ochreous. Hindwings grey, cilia whithish-grey.

Allied to the two following species, but distinguished from all by the whitish-ochreous colour and small size.

One specimen sent by Mr. G. Barnard from Coomooboolaroo, near Duaringa, Queensland.

57. *Hopl. sobriella*, Walk.

(*Depressaria sobriella*, Walk., Brit. Mus. Cat. 565.)

Minor, alis ant. griseis, punctis disci quattuor, serie punctorum postica partim obsoleta alteraque marginis postici nigris ; post. saturate griseis.

♂ ♀. 15–18 mm. Head and thorax grey. Palpi whitish, second joint with a narrow oblique dark fuscous band above middle, extreme base of terminal joint dark fuscous. Antennæ light grey, obsoletely annulated with darker. Abdomen whitish-ochreous-grey. Anterior tibiæ black, beneath white, tarsi black with whitish rings at apex of two basal joints; middle tibiæ ochreous-grey, tarsi dark grey with ochreous-whitish rings at apex of joints; posterior tibiæ and tarsi ochreous-whitish. Forewings moderately broad, rather dilated posteriorly, costa moderately strongly arched, apex obtuse-angled, hindmargin straight, slightly oblique; uniform grey, rather glossy; extreme edge very slenderly ochreous-whitish; a black dot at base of costa; a black dot in disc before middle, a second in disc beyond middle, a third obliquely beyond first on fold, and a fourth obliquely beyond and below second, all generally conspicuous; sometimes a fifth smaller obsolete dot between and rather beyond second and fourth; an outwardly curved row of incomplete black dots from disc above middle at $\frac{4}{5}$ to slightly before anal angle, lower portion more or less obsolete; a row of conspicuous black dots along hindmargin and apical fifth of costa: cilia whitish-grey. Hindwings grey, rather darker posteriorly; cilia whitish-grey, with an indistinct darker line near base.

This and the following species are very closely allied; *H. sobriella* is considerably smaller and darker, the band of the palpi narrower, the black dots more conspicuous, and the posterior line composed of tolerably distinct moderate-sized dots, wholly obsolete towards costa and partially towards inner margin.

Not uncommon round Sydney in January and February, and at Toowoomba, Queensland, in September.

58. *Hopl. myodes*, n. sp.

Media, alis ant. albido-griseis, puncto ad dorsi basim, aliis disci quattuor serieque marginis postici nigris, linea squamarum postica tenui angulata grisea; post. saturate griseis.

♂. 22-24½ mm. Head and thorax whitish-grey, slightly ochreous-tinged. Palpi whitish, second joint with a blackish median band, base of terminal joint blackish. Antennæ grey. Abdomen whitish-grey. Anterior tibiæ dark fuscous mixed with ochreous, tarsi dark fuscous, two basal joints with whitish apical rings ; middle tibiæ greyish-ochreous, tarsi dark grey with whitish rings at apex of joints ; posterior tibiæ and tarsi ochreous-whitish. Forewings moderately broad, somewhat dilated posteriorly, costa moderately strongly arched, apex obtuse, hindmargin rather oblique ; uniform whitish-grey, faintly ochreous-tinged ; costal edge whitish ; a minute black dot at base of costa ; a black dot on inner margin near base, and sometimes one or two others in disc towards base ; a black dot in disc before middle, a second in disc beyond middle, a third on fold obliquely beyond first, and a fourth, minute or obsolete, below and beyond second ; a very fine transverse row of dark grey scales, not forming distinct dots, from middle of costa to inner margin before anal angle, irregularly sinuate on upper half and strongly angulated in middle ; a row of conspicuous black dots on hindmargin and apical fifth of costa : cilia ochreous-grey-whitish. Hindwings grey, darker towards apex ; cilia whitish-grey, with a suffused dark grey line near base.

Very near the preceding, but larger and lighter, the band of palpi broader, a distinct blackish dot near base of inner margin, which is not found in *H. sobriella*, the discal dots less distinct, the posterior line composed of numerous minute scales arranged in a fine line and not collected into dots, distinct throughout. The species also has considerable superficial resemblance with *Eul. griseola*, but may be immediately distinguished by the dark band of the palpi.

Two specimens taken at Murrurundi, New South Wales, in November.

59. *Hopl. sericata*, n. sp.

Minor, alis ant. griseo-carneis, sericeis, punctis disci tribus saturate griseis ; post. griseis.

♀. 16½ mm. Head grey-whitish, above pinkish-tinged. Palpi whitish, pinkish-tinged, terminal joint and apex of second anteriorly grey. Antennæ ochreous-whitish, annulated with dark fuscous. Thorax pinkish-grey. Abdomen ochreous-whitish, segments suffused with ochreous-grey except on margins. Anterior tibiæ and tarsi dark grey, reddish-tinged, apex of tarsal joints with whitish rings; (middle legs broken;) posterior legs ochreous-whitish. Forewings moderately broad, rather dilated, costa moderately arched, apex obtuse, hindmargin almost straight, slightly oblique; glossy pinkish-grey; costa narrowly dull pink, tips of scales whitish; a dark fuscous dot in disc before middle, a second in disc beyond middle, and a third obliquely beyond first on fold; cilia whitish, towards base pinkish-tinged. Hindwings grey, slightly ochreous-tinged, lighter towards base; cilia whitish-grey, with an indistinct grey line near base.

Distinguished from all the other pinkish-grey species by the total absence of the posterior and other transverse lines, which are distinct in all of them; in its glossy appearance it resembles *H. cholodella*, but is smaller.

One specimen taken near Sydney in December, and a second at Brisbane in September.

60. *Hopl. carnea*, Z.

(*Cryptolechia carnea*, Z., Linn. Ent. X,, 148.)

Media, alis ant. carneo-griseis, punctis disci tribus, serie punctorum postica angulata alteraque marginis postici saturate griseis; post. griseis, basim versus albidis.

♂ ♀. Head and thorax pinkish-grey, face whitish. Palpi grey, second joint whitish towards base, terminal joint whitish posteriorly. Antennæ whitish-grey. Abdomen whitish-grey, anal tuft ochreous-tinged. Anterior tibiæ and tarsi dark fuscous, tarsi with obscure whitish rings at apex of two basal joints; middle tibiæ whitish, slightly reddish-tinged, tarsi dark grey with whitish rings at apex of joints; posterior tibiæ and tarsi whitish. Forewings moderately broad, rather dilated posteriorly, costa moderately arched, more strongly at base, apex obtuse, hindmargin straight or faintly sinuate, slightly oblique; light pinkish-grey; costal edge pale pinkish, tips of scales whitish; a dark grey dot in disc before middle, a rather larger and sometimes partially double one in disc beyond middle, and a third obliquely beyond first on fold; an irregular often obsolete, twice strongly dentate, ill-defined dark grey transverse line from $\frac{1}{3}$ of costa to middle of inner margin; between this line and base is sometimes another similar line; a well-defined transverse row of dark grey crescentic dots from middle of costa very obliquely outwards to disc at $\frac{5}{6}$ from base, thence sharply bent and nearly parallel to hindmargin, ending on inner margin before anal angle; a row of well-defined dark grey dots along hindmargin and apical third of costa: cilia pale pinkish-grey, towards tips whitish. Hindwings grey, becoming whitish towards base; cilia whitish-grey, with a faint darker line near base.

Closely allied to *H. repandula*, from which it is best distinguished by the hindwings, which are whitish towards base, without any ochreous tinge; it is also duller and less mottled in appearance, and the antennæ are not distinctly annulated.

Common round Sydney and Mittagong, New South Wales, in March, beaten from *Eucalyptus;* also received from the neighbourhood of Duaringa, Queensland.

61. *Hopl. repandula*, Z.

(*Cryptolechia repandula*, Z., Linn. Ent. X., 150, fig. 3.)

Media, alis ant. griseo-carneis, punctis disci tribus, serie punctorum postica angulata alteraque marginis postici saturate griseis; post. griseis, basim versus albido-ochreis.

♂ ♀. 22–25 mm. Head and thorax fuscous-grey, pinkish-tinged, face whitish. Palpi grey, slightly pinkish externally, second joint whitish towards base, terminal joint whitish posteriorly. Antennæ ochreous-whitish, sharply annulated above with dark fuscous. Abdomen whitish-ochreous. Anterior tibiæ and tarsi rather light reddish-fuscous, tarsal joints obscurely whitish at apex, dark grey at base; middle and posterior legs ochreous-whitish, middle tarsi grey with whitish rings at apex of joints; femora white beneath. Forewings moderately broad, rather dilated posteriorly, costa moderately arched, more strongly at base, apex obtuse, hindmargin straight or faintly sinuate, hardly oblique; light pinkish-grey, somewhat ochreous-tinged; costal edge pale pinkish, tips of scales whitish; a dark grey dot in disc before middle, a distinctly double one in disc beyond middle, and a third obliquely beyond first on fold; a very irregularly dentate ill-defined cloudy dark grey transverse line from $\frac{1}{3}$ of costa to middle of inner margin, a second between this and base, and a third more obsolete near base, all sometimes partially obsolete; a tolerably well-defined transverse row of dark grey crescentic marks, almost connected, from middle of costa very obliquely outwards to disc at $\frac{5}{6}$, thence sharply bent and nearly parallel to hindmargin, ending on inner margin before anal angle; a row of cloudy dark grey dots along hindmargin and apical third of costa: cilia pinkish mixed with whitish-grey, towards tips whitish. Hindwings ochreous-grey, darker grey posteriorly, becoming whitish-grey-ochreous towards base; cilia whitish-grey, towards anal angle whitish-ochreous.

Very near the preceding, yet easily separated by the distinct ochreous suffusion of the hindwings, the brighter forewings with more distinct transverse lines, and the antennæ sharply annulated.

Rather common round Melbourne, and on the Mount Lofty Range, South Australia; also once taken near Sydney in November.

62. *Hopl. pudica*, Z.

(*Cryptolechia pudica*, Z., Linn. Ent. X., 152.)

Media, alis ant. ochreo-carneis, punctis disci duobus anticis, tertio postico majusculo glauco-mixto, serieque punctorum postica angulata saturate griseis; post. albidis, apicem versus roseo-suffusis.

♂. 21–25 mm. Head and thorax pinkish-ochreous, face lighter, whitish beneath. Palpi carmine-pink, second joint towards base whitish, terminal joint posteriorly whitish. Antennæ whitish-grey, near base suffused with rosy. Abdomen ochreous-whitish, anal tuft more ochreous. Anterior tibiæ and tarsi carmine-pink; middle tibiæ rosy-whitish, tarsi carmine-pink with obscure whitish rings at apex of joints; posterior tibiæ and tarsi whitish. Forewings moderately broad, rather dilated posteriorly, costa moderately arched, more strongly towards base, apex obtuse, hindmargin almost straight, hardly oblique; light pinkish-ochreous sometimes strongly pinkish-tinged; costa narrowly carmine-pink, extreme tips of scales whitish; a dark fuscous dot in disc before middle, and another very obliquely beyond it on fold; a small round dark fuscous spot in disc beyond middle, variable in size, its centre suffused with whitish-blue scales; a tolerably distinct transverse row of dark fuscous somewhat crescentic dots, from middle of costa very obliquely outwards to disc at $\frac{5}{6}$, thence sharply bent and nearly parallel to hindmargin, ending on inner margin before anal angle, sometimes partially obsolete; cilia pink, towards tips white. Hindwings whitish, towards apex and hindmargin rather strongly rosy-suffused; cilia whitish.

A beautiful species, differing from all in the rosy suffusion of the hindwings, and the enlargement of the posterior discal dot.

Not uncommon and widely distributed; taken near Sydney, Brisbane, and on the Mount Lofty Range, South Australia, in November and from January to March.

63. *Hopl. leucerythra*, n. sp.

Media, alis ant. ochreo-carneis, punctis disci tribus serieque punctorum postica obscura angulata saturate griseis; post. albidis, apicem versus leviter griseo-suffusis.

♂ ♀. $18\frac{1}{2}$–21 mm. Head and thorax pinkish-ochreous, face whitish. Palpi dull fuscous-carmine, second joint whitish internally and towards base, terminal joint whitish posteriorly. Antennæ grey, suffused with carmine towards base. Abdomen whitish-grey, slightly ochreous-tinged. Anterior tibiæ and tarsi carmine, four apical tarsal joints partially suffused with blackish; middle tibiæ rosy-whitish, tarsi grey, basal joint and apical rings of other joints whitish; posterior tibiæ and tarsi whitish. Forewings moderately broad, somewhat dilated posteriorly, costa moderately arched, rather more strongly at base, apex obtuse, hindmargin almost straight, oblique; pale pinkish-ochreous, sometimes rather strongly pinkish; costa narrowly carmine-pink, tips of scales whitish; a dark fuscous dot in disc before middle, a second, slightly larger, in disc beyond middle, and a third obliquely beyond first on fold; sometimes a short obsolete oblique row of three grey dots from costa at $\frac{2}{5}$, and occasionally two or three ether scattered dark scales towards base; an ill-defined, often almost obsolete, transverse row of irregular dark fuscous dots, from middle of costa very obliquely outwards te disc at $\frac{5}{6}$, thence sharply bent and nearly parallel to hindmargin, ending on inner margin before anal angle; cilia pink, towards tips whitish. Hindwings whitish, posteriorly faintly tinged with ochreous-grey; cilia whitish, round apex greyish-tinged.

Nearly allied to *H. pudica*, but smaller and slightly duller, the posterior discal dot not notably enlarged, and the hindwings posteriorly tinged with greyish instead of rosy.

Common at Sydney and Mittagong (2,000 feet), New South Wales, and at Launceston, Tasmania, in December, January, March, and April.

64. *Hopl. costimacula*, n. sp.

Media, alis ant. saturate ochreo-carneis, punctis disci tribus serieque punctorum marginis postici nigris, strigis tribus transversis dentatis maculaque marginis postici saturate griseis ; post. griseis, basim versus albido-ochreis.

♂ ♀. 18–21 mm. Head and thorax light reddish-ochreous brown, face light ochreous. Palpi light rosy-ochreous, second joint internally whitish towards base. Antennæ whitish-ochreous, sharply annulated with dark fuscous, towards base rosy-tinged. Abdomen whitish-ochreous, above partially greyish-suffused. Anterior tibiæ and tarsi ochreous-carmine, apex of tarsal joints ochreous ; middle and posterior legs whitish-ochreous, middle pair partially rosy-tinged ; femora clear white beneath. Forewings moderately broad, somewhat dilated posteriorly, costa gently arched, rather more strongly at base, apex obtuse, hindmargin hardly oblique, slightly rounded ; ochreous-carmine-pink, strewn with whitish-ochreous scales ; costa narrowly deeper pink, tips of scales whitish-ochreous ; a dark fuscous dot in disc before middle, a second, rather larger and sometimes distinctly double, in disc beyond middle, and a third obliquely beyond first on fold ; a very irregular cloudy grey transverse line close to base, darker on costa ; a distinct cloudy strongly and irregularly dentate transverse grey line from $\frac{1}{5}$ of costa to $\frac{1}{4}$ of inner margin, and another more strongly dentate from $\frac{2}{5}$ of costa to middle of inner margin, both forming small dark grey spots on costa ; a slenderer and more distinct dark grey sinuate or dentate line from $\frac{3}{5}$ of costa obliquely outwards, thence curved strongly round to inner margin before anal angle, thickened and darker near costa ; a cloudy grey shade from $\frac{4}{5}$ of costa to inner margin before anal angle, considerably broader towards costa ; a small cloudy grey spot towards middle of hindmargin ; a row of distinct dark grey dots along hindmargin and apical fourth of costa, cilia light carmine-pink, towards tips whitish-ochreous. Hindwings ochreous-grey, costa and base more whitish-ochreous ; cilia whitish-ochreous grey, with a distinct grey line near base.

Deeper-coloured than the preceding, and readily known by the several transverse strigæ forming dark spots on costa.

Common round Sydney and Brisbane, in September, October, January, and February.

65. *Hopl. rufa*, n. sp.

Minor, alis ant. ochreo-rufis, strigis duabus rectis parallelis obscuris lineaque postica curva dentata saturate griseis ; post. griseis, basim versus albido-ochreis.

♂. 15–18 mm. Head reddish-ochreous-brown, face pale ochreous. Palpi light fuscous-reddish, externally mixed with dark fuscous, second joint ochreous-whitish towards base. Antennæ light ochreous, annulated with dark fuscous, towards base reddish-tinged. Thorax reddish-ochreous-brown, suffused on back with dark fuscous. Abdomen whitish-ochreous, segments suffused with grey except on margins. Legs whitish-ochreous, anterior tibiæ and tarsi suffused with pinkish above, middle tarsi greyish towards base of joints. Forewings moderate, slightly dilated, costa gently arched, apex obtuse, hindmargin rounded, oblique ; deep reddish-ochreous, or reddish-ochreous-brown, with scattered lighter ochreous scales ; costa very narrowly carmine-pink, tips of scales ochreous-whitish ; discal dots obsolete ; some blackish-grey scales at base ; a small blackish-grey spot on costa before middle, tending to form a connected streak with a smaller cloudy blackish-grey spot in disc at $\frac{1}{4}$ from base, and another on fold somewhat nearer base ; an elongate cloudy blackish-grey blotch along inner margin from $\frac{1}{3}$ to $\frac{3}{4}$; a blackish-grey cloudy streak from $\frac{4}{5}$ of costa to $\frac{2}{3}$ of inner margin, dilated on costa into a small spot, whence proceeds a transverse slightly curved row of indistinct blackish-grey dots to inner margin before anal angle ; a row of indistinct dark grey dots along hindmargin and apical fifth of costa : cilia reddish-ochreous, towards tips ochreous-whitish. Hindwings ochreous-grey, costa and base more whitish-ochreous : cilia whitish-ochreous-grey, with a faint grey line near base.

Allied to *H. costimacula*, of which I once fancied it might prove an abnormal variety, though the markings are very different; but the wings are distinctly narrower and less dilated, and the ground colour much browner, so that it is probably a perfectly good species.

Two specimens taken near Sydney in December.

66. *Hopl. absumptella*, Walk.

(*Depressaria absumptella*, Walk., Brit. Mus. Cat. 567.)

Minor, alis ant. griseo-carneis, punctis disci tribus, strigis tribus transversis dentatis serieque punctorum marginis postici saturate griseis ; post. saturate ochreo-griseis,

♂ ♀. 15–20 mm. Head and thorax whitish-grey, slightly ochreous-tinged, mixed with dark fuscous, face whitish-ochreous. Palpi ochreous-whitish, terminal joint and apex of second anteriorly suffused with dark grey. Antennæ ochreous-whitish, sharply annulated with dark fuscous. Abdomen whitish-ochreous, segments ochreous-brown except on margins. Anterior tibiæ and tarsi carmine-pink mixed with dark grey, tarsal joints with ochreous-whitish apical rings ; middle tibiæ ochreous, tarsi grey with whitish rings at apex of joints ; posterior legs whitish-ochreous, tarsal joints faintly grey towards base: femora white beneath. Forewings moderate, somewhat dilated posteriorly, costa slightly arched, apex obtuse, hindmargin rounded, oblique ; purple-fuscous thickly overlaid with grey-whitish scales ; costal edge very narrowly carmine-pink, tips of scales whitish ; a dark grey dot in disc before middle, a second in disc beyond middle, and a third obliquely beyond first on fold ; three rather oblique tolerably well-defined dark grey lines, very strongly and irregularly dentate, crossing wing near base, at $\frac{1}{4}$, and about middle, generally thickened on costa and inner margin, sometimes by partial obsolescence and confluence appearing to take different and more oblique directions ; a distinct slender, sometimes interrupted, dentate dark grey line from $\frac{3}{5}$ of costa obliquely outwards to disc, thence sharply bent and continued inwards to inner margin before anal angle, often considerably thickened on costa ; a small cloudy grey spot below second discal dot, sometimes connected with costa at $\frac{3}{5}$ by a cloudy fuscous-grey streak ; sometimes these markings are suffused with reddish-fuscous ; a row of distinct dark grey dots along hindmargin and apical fourth of costa : cilia whitish-grey, with a distinct central carmine-pink line, sometimes basally suffused with pinkish. Hindwings dark grey, ochreous-tinged, especially towards base, costa whitish-ochreous ; cilia grey, with a dark grey line near base.

Var. *a*.—Markings of forewings all obsolete, except discal dots, a small dark grey spot on inner margin before middle, and a larger blackish-grey spot on inner margin beyond middle.

This and the two following species have the forewings more oblong and less dilated than the preceding group, and are duller in colouring. *H. absumptella* differs from the other two by the smaller size, more numerous transverse strigae, and darker hindwings. One variety described above is clearly an abnormal form of this species, in which the dark pigment seems to have been withdrawn from most of the wing to concentrate itself in one place ; I have only a single specimen of it, taken in company with the usual form.

Common round Sydney, especially at rest on fences ; also taken in the Shoalhaven district, New South Wales, at Launceston, Tasmania, and near Melbourne and Brisbane, from September to January.

67. *Hopl. coenosa*, n. sp.

Media, alis. ant. carneo-griseis, punctis disci tribus, strigis duabus transversis dentatis serieque punctorum marginis postici saturate griseis ; post. griseis.

♀. 22 mm. Head grey-whitish, mixed on crown with dark ochreous-fuscous. Palpi whitish, suffused with pinkish except towards base, terminal joint and apex of second anteriorly grey. Antennæ grey. Thorax dark ochreous-fuscous, mixed with grey-whitish. Abdomen whitish-ochreous, segments ochreous-fuscous except on margins. Anterior tibiæ and tarsi dark fuscous, pinkish-tinged, apex of tarsal joints rosy-whitish; middle tibiæ ochreous-whitish mixed with grey, tarsi greyish with whitish rings at apex of joints; posterior legs ochreous-whitish; femora white beneath. Forewings moderate, somewhat dilated posteriorly, costa moderately arched, apex obtuse, hindmargin rather oblique, slightly rounded; pinkish-fuscous, thickly overlaid with grey-whitish scales, appearing pinkish-grey; costal edge more pinkish-tinged, tips of scales whitish; an ill-defined dark grey dot in disc before middle, a second in disc beyond middle, and a third obliquely beyond first on fold; an indistinct cloudy dark grey very strongly and irregularly dentate transverse line from costa before middle to inner margin before middle, rather dilated on margins, passing through the two anterior dots; an indistinct cloudy grey spot below second dot; a more distinct irregular partially interrupted dark grey transverse line from $\frac{3}{5}$ of costa obliquely outwards, rectangularly bent in disc, and continued to inner margin before anal angle; a row of tolerably well-defined dark grey dots along hindmargin and apical fourth of costa; cilia grey-whitish, with a faint pinkish-grey central line. Hindwings grey, faintly ochreous-tinged; cilia grey, with a darker line nearer base.

Nearly allied to the preceding, but larger, with only two transverse strigae, the hindwings lighter, and the antennæ not annulated.

Two specimens taken at Blackheath in the Blue Mountains (3500 feet) in March.

68. *Hopl. cholodella*, n. sp,

Media, alis ant. carneo-griseis, sericeis, punctis disci tribus nigris, striga postica angulata serieque punctorum marginis postici obscuris saturatioribus; post. griseo-albidis, apice griseo.

♂. 18–20 mm. Head and thorax ochreous-brown, face mixed with whitish-ochreous. Palpi fuscous-grey, towards base and posteriorly whitish. Antennæ whitish, sharply annulated with dark fuscous. Abdomen grey-whitish. Anterior tibiæ and tarsi dark fuscous, apex of tarsal joints obscurely whitish; middle tibiæ dark fuscous, beneath white, tarsi dark fuscous with whitish rings at apex of joints; posterior legs whitish. Forewings moderate, somewhat dilated posteriorly, costa moderately arched, apex obtuse, hindmargin oblique, rounded; glossy fuscous, almost wholly overlaid with whitish-ochreous-grey scales, faintly pinkish-tinged; costal edge purple-fuscous, tips of scales whitish; a dark fuscous dot in disc before middle, a second, larger and indistinctly double, in disc beyond middle, and a third rather obliquely beyond first on fold; the purple-fuscous ground colour forms a small spot on costa before $\frac{3}{4}$, its apex tending to be connected with the second discal dot, and also giving rise to an obsolete sinuous-dentate transverse line proceeding obliquely outwards, sharply bent in disc, and continued to inner margin before anal angle, most distinct in disc; a row of purple-fuscous dots along hindmargin and apical fourth of costa; cilia whitish-grey, towards base faintly pinkish-tinged. Hindwings whitish-grey, darker posteriorly; cilia whitish-grey, with a darker line near base.

Characterised by its uniform glossy appearance, the single posterior striga not separated into dots, and the whitish-grey hindwings.

Two specimens taken at Blackheath in November.

15. Eulechria, *n. g.*

Head loosely scaled, sidetufts large, meeting, loose, somewhat projecting between antennæ. Antennæ in male moderate, evenly and moderately or rather strongly ciliated (1 to 2), basal joint moderate, with strong pecten. Palpi moderate, or rather long, second joint hardly reaching or rarely somewhat exceeding base of antennæ, thickened with appressed scales, somewhat loose or slightly rough beneath, terminal joint somewhat shorter than second, moderate, recurved. Thorax smooth. Forewings elongate, moderate, apex rounded more or less strongly, hindmargin obliquely rounded. Hindwings slightly narrower than forewings, elongate-ovate, hindmargin rounded, cilia ½ to 1. Abdomen moderate, generally strongly margined. Posterior tibiæ clothed with long hairs above. Forewings with vein 7 to apex, 2 from or close before angle of cell. Hindwings normal.

An extensive genus, forming the type of one of the principal groups of the family, essentially characterised by the termination of vein 7 in the apex, and the strong basal pecten of the antennæ. None of the genera hitherto given belong to this branch, but a number of the small genera, which immediately succeed, are attached to it. *Eulechria* must be regarded as originating from *Phloeopola*; that is, the species of the latter present the nearest approach amongst known genera to the ancestral form of *Eulechria* which genus differs from *Phloeopola* especially by the absence of the thoracic crest.

Although some of the species are abundant, I have not met with any of the larvæ. I have described here thirty-seven Australian species, and two from New Zealand. The following is the best tabulation which I can contrive; but the species are in general so obscurely coloured and deficient in special characteristics, that a clear analysis is quite impracticable; the principal defect in this is that the character by which the genus is divided into two main groups, viz. the form of the posterior line, although a natural distinction, is sometimes hard to observe accurately from the obsolescence of the line itself.

1*a*. Forewings white with two dark fasciæ.

2*a*. Fasciæ dark fuscous ... ... 82. *triferella.*
2*b*. Fasciæ ochreous-brown.
3*a*. Hindwings grey ... ... 84. *epicausta.*
3*b*. Hindwings whitish-grey ... ... 83. *brachypepla.*
1*b*. Forewings not white, or if so, without two fasciæ.
2*a*. Posterior line not angulated beneath costa, leaving costa near middle; usually three discal dots.
3*a*. Forewings narrow, blackish ... ...107. *perdita.*
3*b*. Forewings moderate, ochreous, fuscous, or grey.
4*a*. With a longitudinal interrupted blackish median streak ... ...103. *zylopterella.*
4b. Without median blackish streak.
5*a*. With a short black subcostal strigula at base.
6*a*. Discal strigulæ thick, irregular ... ...105. *grammatica.*
6*b*. Discal strigulæ slender, uniform... ...106. *scopariella.*
5*b*. Without black subcostal strigula.
6*a*. Hindwings dark grey ... ... 72. *zophoëssa.*
6*b*. Hindwings grey or whitish-grey.
7*a*. With a black transverse fascia near base. 74. *episema.*
7*b*. With a dark fuscous rather oblique dorsal streak near base ... ... 70. *nephelopa.*
7*c*. Without basal markings.
8*a*. Head whitish-ochreous.
9*a*. Posterior line running to middle of inner margin ... ... 73. *melesella.*
9*b*. Posterior line to before anal angle.
10*a*. Cilia of forewings whitish-ochreous ... 78. *pantelella.*
10*b*. Cilia of forewings whitish-fuscous ... 75. *convictella.*
8*b*. Head whitish.
9*a*. Forewings rosy-tinged ... ... 80. *puellaris.*

9*b*. Forewings not rosy.
10*a*. Shoulders blackish ... ... 76. *exanimis.*
10*b*. Shoulders ochreous-brown ... ... 77. *pallidella.*
8*c*. Head grey or whitish-grey.
9*a*. Forewings whitish-ochreous, sometimes rosy or greyish-tinged ... ... 81. *achalinella.*
9*b*. Forewings grey.
10*a*. Forewings uniform ... ... 79. *leptobela.*
10*b*. Forewings irrorated with blackish or dark grey.
11*a*. Forewings elongate ... . 104. *siccella.*
11*b*. Forewings dilated.
12*a*. Forewings pale grey, slightly ochreous-tinged ... ... 69. *griseola.*
12*b*. Forewings rather dark grey ... ... 71. *cremnodes.*
2*b*. Posterior line sharply angulated beneath costa, leaving costa near apex; usually five discal dots.
3*a*. Hindwings yellow.
4*a*. Hindwings margined with dark fuscous. 93. *philotherma.*
4*b*. Hindwings not margined... ... ... 89. *leucopelta.*
3*b*. Hindwings not yellow.
4*a*. Forewings with ground colour white.
5*a*. With a black transverse fascia near base 86. *transversella.*
5*b*. Without basal fascia.
6*a*. Discal dots obscured ... ... 91. *habrophanes.*
6*b*. Discal dots clearly defined.
7*a*. Markings fuscous... ... ... 87. *variegata.*
7*b*. Markings grey ... ... 88. *hemiphanes.*
4*b*. Forewings with ground colour ochreous-yellow or whitish-ochreous.
5*a*. With a strong dark fuscous costal streak 90. *poecilella.*
5*b*. Without costal streak ... ... 85. *chlorella.*
4*c*. Forewings dull light pinkish ... ... 92. *lividella.*

4*d*. Forewings grey.
5*a*. Hindwings brownish-ochreous suffused with grey ... ... 94. *brontomorpha.*
5*b*. Hindwings dark fuscous... ... ...102. *cimmeriella.*
5*c*. Hindwings grey.
6*a*. Head white ... ... 95. *calotropha.*
6*b*. Head pale yellow ... ...101. *paurogramma.*
6*c*. Head grey or whitish-grey.
7*a*. Costa with two cloudy darker spots.
8*a*. First spot reaching to fold ... ... 96. *philostaura.*
8*b*. Both spots short ... ...100. *photinella.*
7*b*. Costa without spots.
8*a*. Forewings rather short, without white scales ... ... 97. *amaura.*
8*b*. Forewings elongate, generally with white scales.
9*a*. With a distinct longitudinal whitish streak; spots nearly obsolete .. .. 98. *doloscella.*
9*b*. Without distinct whitish streak; spots distinct ... ... 99. *adoxella.*

69. *Eul. griseola*, Z.

(*Cryptolechia griseola Z.*, Linn. Ent. X, 151.)

Media, alis ant. dilute griseis, fusco-sparsis, punctis disci tribus serieque punctorum postica angulata saturate fuscis; post. dilute griseis.

♂ ♀. 20–22 mm. Head and thorax ochreous-grey, face whitish-ochreous. Palpi grey-whitish. Antennæ whitish-grey. Abdomen ochreous-grey-whitish. Anterior and middle legs fuscous-grey, tarsal joints with ochreous-whitish apical rings; posterior legs ochreous-whitish. Forewings moderately broad, somewhat dilated, costa gently arched, more strongly at base, apex rounded, hindmargin obliquely rounded; whitish-grey, very faintly ochreous-tinged, finely and irregularly sprinkled with dark grey; a dark grey dot in disc before middle, a second, rather larger and indistinctly double, in disc beyond middle, and a third rather obliquely beyond first on fold ; a transverse row of dark grey somewhat crescentic dots, generally well-defined, from middle of costa very obliquely outwards to a little before hindmargin, thence bent sharply and continued, very near and almost parallel to hindmargin, to inner margin before anal angle ; hindmarginal dots sometimes very faintly indicated ; cilia whitish-grey, ochreous-tinged, towards tips whitish. Hindwings grey, rather lighter towards base ; cilia whitish, with an obsolete grey line near base.

Broader-winged than the other grey species of the genus, and therefore seeming to approach *Hoplitica*, but the resemblance is due to analogy only ; it is easily distinguished from the grey species of *Hoplitica* by the absence of the dark band of the palpi, and of the hindmarginal dots.

Common round Sydney and Melbourne, in January and March.

70. *Eul. nephelopa*, n. sp.

Media, alis ant. fusco-ochreis, strigula dorsi prope basim transversa, punctis disci tribus, serieque punctorum postica angulata nigris ; post. dilute griseis.

♂. 19 mm. Head and thorax brownish-ochreous mixed with dark fuscous. Palpi dark fuscous, irrorated with whitish-ochreous. Abdomen bright ochreous, margins of segments ochreous-whitish. Anterior and middle legs dark fuscous, tarsi with whitish rings at apex of joints; posterior legs ochreous-whitish, tarsi somewhat mixed with fuscous. Forewings moderate, costa rather abruptly arched near base, thence slightly arched, apex rounded, hindmargin obliquely rounded ; light brownish-ochreous, irrorated with fuscous towards costa and posteriorly ; costal edge dark fuscous towards base ; a short rather oblique transverse dark fuscous streak from inner margin near base; a conspicuous blackish dot in disc before middle, a second in disc beyond middle, and a third smaller one on fold obliquely beyond first; an indistinct transverse series of cloudy dark fuscous dots from $\frac{2}{3}$ of costa obliquely outwards to near middle of hindmargin, thence bent inwards and continued, very near and parallel to hindmargin, to inner margin before anal angle; cilia whitish-ochreous, somewhat mixed with fuscous. Hindwings pale grey, apex somewhat darker; cilia grey-whitish.

Specially characterised by the abrupt basal arch of costa, the brownish-ochreous ground colour, and the oblique transverse streak from inner margin near base.

One specimen taken near Sydney in November.

71. *Eul. cremnodes*, n. sp.

Media, alis ant. saturatius griseis, nigro-conspersis, punctis disci tribus strigaque postica flexuosa nigris; post. griseis.

♂. 20 mm. Head grey. Palpi light grey, second joint externally mixed with blackish, terminal joint with a blackish anterior spot at base. Antennæ grey, annulated with dark fuscous. Thorax grey, irrorated with blackish. Abdomen grey. Anterior and middle legs dark fuscous-grey, tarsal joints with whitish apical rings; posterior legs grey-whitish. Forewings strongly dilated, costa arched towards apex, apex rounded, hindmargin obliquely rounded; grey, sprinkled with numerous small ill-defined spots of blackish scales; a somewhat larger and more distinct blackish spot in disc before middle, a second in disc beyond middle, and a third almost directly beneath first on fold; a cloudy ill-defined blackish transverse line from costa about $\frac{2}{3}$ very obliquely outwards, beneath apex sharply dentate inwardly, thence bent nearly parallel and very near to hindmargin, ending in an angle; beyond this line the veins are distinctly darker than the groundcolour: cilia grey, towards base mixed with blackish, tips lighter. Hindwings grey, cilia light grey.

A distinct species, in form of wing closely approaching *E. melesella*.

One specimen taken at Blackheath in the Blue Mountains (3500 feet) in November.

72. *Eul. Zophoëssa*, n. sp.

Minor, alis ant. fuscis, punctis disci tribus, macula costae post medium parva, strigaque postica flexuosa saturatioribus; post. saturate griseis.

♂. 15½ mm. Head fuscous, mixed with whitish-ochreous. Palpi dark fuscous, second joint whitish-ochreous internally and at extreme apex, apex of terminal joint whitish-ochreous. Antennæ dark fuscous. Thorax dark fuscous, becoming ochreous posteriorly. Abdomen dark fuscous. Anterior and middle legs dark fuscous, tarsi whitish-ochreous beneath; posterior legs dark grey, apex of tibiæ and tarsal joints whitish-ochreous. Forewings somewhat dilated, costa gently arched, apex rounded, hindmargin obliquely rounded; fuscous, slightly reddish-tinged, basal $\frac{3}{5}$ irregularly mixed and suffused with whitish-ochreous, and thinly irrorated with dark fuscous, hindmargin rather broadly suffused with dark fuscous; a small dark fuscous spot at base of costa, and another at base of inner margin; a small dark fuscous spot in disc before middle, a second in disc beyond middle, and a third almost directly beneath first on fold; first and second connected by a clear whitish-ochreous line, beneath which is a fourth similar spot between them; a small dark fuscous spot on costa at $\frac{3}{5}$, its apex suffusedly confluent with second discal spot; a very indistinct suffused strongly curved dark fuscous line from $\frac{3}{4}$ of costa to anal angle, beneath closely approximating to hindmargin: cilia dark fuscous-grey, mixed with whitish-ochreous. Hindwings dark grey; cilia grey, with a dark grey line near base.

A very distinct species, not approaching near to any other, but in general appearance recalling some species of *Phloeopola*.

One specimen taken at Wellington, New Zealand, in January.

73. *Eul. melesella*, Newm.

(*Depressaria melesella*, Newm., Trans., Ent. Soc. Lond., Vol. iii., N.S., 291.)

Media, alis ant. dilute ochreis, venis obscure fusco-lineatis, punctis disci tribus serieque punctorum postica flexuosa nigris; post. dilute griseis.

♂. 21 mm. Head, palpi, antennæ, thorax, and abdomen whitish-ochreous, slightly suffused with brownish. Legs whitish-ochreous, anterior tibiæ and tarsi suffused above with grey. Forewings strongly dilated posteriorly, costa slightly arched, apex rounded, hindmargin obliquely rounded, whitish-ochreous, all veins indicated by suffused ochreous lines, more or less mixed with dark fuscous scales, especially towards base of subcostal; a dark fuscous dot in disc before middle, a second rather larger in disc beyond middle, and a third almost directly beneath first on fold; a row of tolerably well-defined transversely elongate dark fuscous disconnected dots, proceeding from middle of costa almost parallel and very near to costa, opposite apex sharply indented inwards, almost touching hindmargin beneath apex, thence very close and parallel to hindmargin, continued to middle of inner margin; a suffused dark fuscous hindmarginal line: cilia whitish-ochreous, towards tips whitish, mixed with dark fuscous towards base. Hindwings pale whitish-grey; cilia grey-whitish, with a faint grey line near base.

Markedly characterised by the strongly dilated forewings, and peculiar form of the posterior line.

Common round Melbourne, and also at Hobart, Tasmania, in January. Newman's description is very inadequate, but I do not know any other species to which it could refer.

74. *Eul. episema*, n, sp.

Minor, alis ant. dilute ochreo-griseis, nigro-sparsis, fascia angusta prope basim, macula disci ante medium transversa, altera post medium breviore, maculis costae posticis quattuor serieque marginis postici nigris ; post. griseis.

♂. 18 mm. Head whitish-ochreous, with a dark fuscous spot on forehead. Palpi ochreous-white, second joint suffused with dark fuscous on basal $\frac{2}{3}$ externally. Antennæ ochreous-white, becoming black towards base. Thorax pale ochreous-grey, suffused with blackish towards middle of anterior margin. Abdomen whitish-grey, anal tuft ochreous-tinged. Anterior and middle leg dark fuscous, with whitish rings at apex of joints ; posterior legs ochreous-whitish, tarsal joints greyish towards base. Forewings moderate, rather dilated, costa gently arched, apex rounded, hindmargin obliquely rounded ; pale ochreous-grey, with scattered black scales ; a slender black transverse fascia very near base ; a slender black transverse bar in disc at $\frac{1}{3}$, extending across median third ; a small transverse oblong black spot in disc at $\frac{2}{3}$, connected with anal angle by a dark grey suffused streak; four small inwardly oblique subquadrate blackish spots on costa between middle and apex ; a suffused dark grey roundish spot on disc at $\frac{5}{6}$; a hindmarginal row of large ill-defined blackish dots : cilia with basal half pale ochreous-grey mixed with blackish, apical half ochreous-whitish. Hindwings grey, lighter towards base ; cilia grey-whitish.

Allied to *E. convictella*, but differing widely in the sharply-defined black transverse and marginal markings ; the fusion of the two anterior discal dots into an oblong bar is a striking characteristic.

One specimen received from Mr. E. Guest, taken on the Mount Lofty Range, South Australia, where he states it to be rather common.

75. *Eul. convictella*, Walk.

(*Depressaria convictella*, Walk., Brit. Mus. Cat. 566).

Minor, alis ant. ochreo-griseis, nigro-sparsis, punctis disci tribus (tertio duplici) serieque punctorum postica flexuosa nigris; post. griseis.

♂ ♀. 15–18 mm. Head and palpi ochreous-whitish, base of second joint suffused with dark fuscous, terminal joint anteriorly dark fuscous towards apex. Antennæ dark fuscous. Thorax ochreous-grey, anteriorly suffused with fuscous, anterior margin blackish. Abdomen light ochreous-grey. Anterior and middle legs dark grey, tarsal joints with whitish apical rings; posterior legs grey-whitish. Forewings rather strongly dilated, costa moderately arched, apex rounded, hindmargin oblique, strongly rounded; rather light brownish-grey, with a few scattered blackish scales; extreme costal edge from near base to apex whitish-yellowish; a blackish dot in disc before middle, a second, transverse and obscurely double, in disc beyond middle, and a third almost directly beneath first on fold; the second is sometimes connected with anal angle by a cloudy grey streak; a row of tolerably well-defined disconnected transverse blackish dots from costa about middle, almost parallel and very near to costa, opposite apex indented inwards, almost touching hindmargin beneath apex, and continued thence, very close to hindmargin, to inner margin a little before anal angle: cilia light ochreous-grey, more whitish-grey towards tips. Hindwings grey; cilia grey-whitish, with a faint grey line near base.

This and the three following species are closely allied, and are nearly identical in size and form; *E. convictella* differs from all in its brownish-grey forewings.

Very common round Sydney, and also at Brisbane, frequenting *Kunzea capitata*, from November to January.

76. *Eul. exanimis*, n. sp.

Minor, alis ant. ochreo-albidis, punctis disci tribus, ♀ etiam serie punctorum postica flexuosa saturate fuscis, saepe obsoletis; post. griseis; humeris nigris.

♂ ♀. 15–18 mm. Head and palpi white, second joint suffused with fuscous-grey towards base, terminal joint anteriorly dark fuscous towards apex. Antennæ dark fuscous, more whitish towards apex. Thorax whitish, with a dark fuscous spot on each shoulder, sometimes connected in middle. Abdomen ochreous-whitish. Anterior and middle legs grey, beneath white; posterior legs ochreous-whitish. Forewings rather strongly dilated, in female more elongate, costa moderately arched, apex rounded; hindmargin oblique, strongly rounded; whitish, slightly ochreous-tinged; a dark fuscous dot in disc before middle, often obsolete; a second, larger and generally distinct, sometimes double, in disc beyond middle: a third almost directly beneath first on fold, often obsolete; sometimes a few dark grey scales near hindmargin, faintly indicating the transverse line; in female a distinct row of dark grey dots parallel and very near to hindmargin, and an obscure greyish suffusion between second discal dot and anal angle, sometimes obsolete; cilia white, towards base faintly ochreous-tinged. Hindwings grey, lighter at base; cilia whitish, with a cloudy grey line near base.

This and the following species are readily distinguished from *E. convictella* and *E. pantelella* by their ochreous-whitish forewings and white heads; *E. exanimis* is best separated from *E. pallidella* by the blackish shoulders, but differs also in the usually more distinct discal dots, and the greyer hindwings.

Common round Sydney and Melbourne, from November to January.

77. *Eul. pallidella*, n. sp.

Minor, alis ant. ochreo-albidis, ♀ fusco-sparsis; post. albido-griseis; humeris ochreo-fuscis.

♂ ♀. 15–18 mm. Head and palpi white, second joint and apex of terminal joint suffused with fuscous anteriorly. Antennæ of male white, of female grey. Thorax white, shoulders suffusedly brownish. Abdomen ochreous-white. Anterior and middle legs grey. posterior legs whitish. Forewings moderately dilated, in female more elongate, costa moderately arched, apex rounded, hindmargin obliquely rounded ; ochreous-white ; the three discal dots rarely faintly indicated; in female an obscure greyish suffusion between the veins, more or less distinct; rarely the transverse line indicated by a few dark grey scales near hindmargin: cilia ochreous-white. Hindwings ochreous-whitish, suffused with grey on posterior half; cilia ochreous-white.

Closely allied to *E. exanimis*, from which it differs in having the shoulders marked only with a suffused ochreous-brown spot, the discal dots usually quite absent, even in the female, and the hindwings paler and more whitish towards base.

Common round Brisbane in September.

78. *Eul. pantelella*, n. sp.

Minor, alis ant. ochreo-griseis, sericeis, costa ciliisque dilute ochreis, ♀ interdum punctis disci tribus serieque postica flexuosa saturate fuscis ; post. saturate griseis.

♂ ♀. 15–17 mm. Head whitish-ochreous, more yellowish on crown. Palpi whitish-ochreous, second joint and apex of terminal joint suffused anteriorly with dark fuscous. Antennæ dark fuscous. Thorax grey, sprinkled with whitish-ochreous. Abdomen whitish-ochreous, greyish towards base, more yellowish at apex. Anterior and middle legs dark grey, tarsi with slender obscure whitish rings at apex of joints ; posterior legs whitish-ochreous. Forewings rather strongly dilated, costa slightly arched, apex rounded, hindmargin oblique, strongly rounded ; uniform glossy grey, thickly irrorated with pale ochreous ; costal edge suffusedly pale yellowish-ochreous, extreme costal edge at base dark fuscous;

in female sometimes the usual discal dots and posterior series of dots distinct, dark fuscous, but usually these are wholly absent: cilia pale yellowish-ochreous, somewhat mixed with grey at base, towards tips whitish. Hindwings rather dark grey; cilia whitish-ochreous, with a faint grey line near base.

Nearly allied to *E. convictella*, but separable by the glossy forewings and absence of any fuscous tinge, the clear ochreous cilia, the usual absence of the discal and posterior dots, the darker hindwings and yellower head.

Not uncommon near Parramatta in November and January, certainly frequenting *Acacia decurrens*.

79. *Eul. leptobela*, n. sp.

Minor, alis ant. griseis, margine costali albida, punctis disci tribus serieque punctorum postica flexuosa nigris; post. dilute griseis.

♂. 16 mm. Head, palpi, antennæ, and thorax glossy grey. Abdomen grey-whitish, posteriorly ochreous-tinged. Anterior and middle legs dark grey; posterior legs ochreous-whitish, more ochreous beneath. Forewings rather strongly dilated, costa gently arched, apex rounded, hindmargin oblique, strongly rounded; glossy grey; costal edge slenderly ochreous-whitish from $\frac{1}{4}$ nearly to apex; a conspicuous black dot in disc before middle, a second rather larger in disc beyond middle, and a third almost directly beneath first on fold; a row of irregular somewhat crescentic blackish dots from middle of costa very obliquely outwards to beneath apex, near costa partially obsolete, afterwards conspicuous, dentate inwards opposite apex, thence continued, near and almost parallel to hindmargin, to inner margin at $\frac{3}{4}$: cilia glossy grey, towards tips whitish-grey. Hindwings light grey, rather lighter towards base; cilia grey-whitish.

Recognisable by its uniform glossy grey colour and whitish costal edge; from *E. paurogramma*, which it nearly resembles in superficial appearance, it may be known by the grey head.

One specimen taken at Blackheath in the Blue Mountains (3,500 feet) in February.

80. *Eul. puellaris*, n. sp.

Minor, alis ant. roseo-albidis, postice griseo-sparsis, punctis disci tribus serieque postica obsoleta saturate griseis; post. griseis, basim versus albidis.

♂. 17 mm. Head and antennæ ochreous-whitish. Palpi ochreous-whitish, second joint fuscous-grey externally except towards apex, terminal joint dark fuscous anteriorly. (Thorax defaced.) Abdomen light ochreous, at base whitish. Anterior and middle legs fuscous-grey, posterior legs ochreous-whitish. Forewings oblong, not dilated, costa gently arched near base, apex roundpointed, hindmargin straight, rather strongly oblique; pale whitish-ochreons, irregularly suffused with pale carmine-pink, especially towards disc, and with a few scattered dark grey scales; costal edge narrowly ochreous-white; a dark grey ill-defined dot in disc before middle, a second, rather larger and more conspicuous, in disc beyond middle, and a third slightly beyond first on fold; an indistinct cloudy grey suffusion towards hindmargin and apex, especially between the veins: cilia whitish-ochreous, mixed with pinkish, towards tips more whitish. Hindwings grey, ochreous-tinged, suffused with ochreous-whitish except towards apex; cilia ochreous-whitish.

This and the next species are distinguished from all the preceding by their hardly noticeably dilated forewings and more strongly oblique hindmargin. They are very closely allied; this species may be distinguished by the more pronounced rosy suffusion, the more ochreous-whitish hindwings, and the head not greyish.

One specimen sent by Mr. G. Barnard from Coomooboolaroo, near Duaringa, Queensland.

81. *Eul. achalinella*, n. sp.

Minor, alis ant. albido-ochreis, interdum vix roseis griseisve, punctis disci tribus nigris; post. griseis.

♂ ♀. 15–16½ mm. Head ochreous-whitish, suffused with grey on crown. Palpi dark fuscous, second joint whitish at apex and internally, terminal joint whitish posteriorly. Antennæ grey. Thorax whitish-ochreous, sometimes suffused with grey. Abdomen whitish-ochreous, more ochreous posteriorly. Anterior and middle legs fuscous-grey, posterior legs whitish-ochreous. Forewings somewhat dilated, costa gently arched, apex almost acute, hindmargin straight, very oblique; whitish-ochreous or whitish-yellowish, often faintly and irregularly suffused with pale pinkish or sometimes greyish; a conspicuous blackish dot in disc before middle, a second in disc beyond middle, and a third, smaller and less distinct, rather obliquely beyond first on fold; sometimes a few scattered blackish scales tending to form a bent transverse line midway between second dot and apex, generally obsolete: in female a row of ill-defined dark grey dots on hindmargin; cilia whitish-ochreous, towards tips paler. Hindwings grey; cilia grey-whitish, with a cloudy grey line near base.

Closely allied to the preceding, but hardly perceptibly rosy-tinged, the hindwings nearly uniform fuscous-grey, and the head partially suffused with grey.

Common round Sydney and in the Shoalhaven district, New South Wales, in January and February; also at Melbourne, and in the neighbourhood of Duaringa, Queensland.

82. *Eul. triferella*, Walk.

(*Oecophora triferella*, Walk., Brit. Mus. Cat., 684.)

Parva, alis ant. canis, basi nigra, fascia media alteraque postica arcuata latioribus fuscis; post. griseis.

♂ ♀. 11–14½ mm. Head and palpi white, basal half of second joint dark fuscous. Antennæ whitish. Thorax blackish-fuscous, with a white anterior spot. Abdomen whitish-ochreous, towards base more whitish. Anterior legs dark grey; middle tibiæ ochreous-grey, tarsi whitish-ochreous suffused with grey towards base; posterior legs whitish-ochreous. Forewings moderately dilated, costa moderately arched, apex rounded, hindmargin almost straight, rather oblique; clear white; base narrowly blackish-fuscous; a moderately broad well-defined fuscous transverse fascia from middle of costa to middle of inner-margin, anterior edge straight, posterior edge concave in middle, dilated towards inner margin; a second fuscous transverse fascia, about as broad, from costa before apex to inner margin before anal angle, anterior edge broadly convexly angulated in disc, posterior edge almost straight, leaving a narrow white hindmarginal streak; a row of cloudy rather dark fuscous dots near hindmargin, sometimes suffused and confluent so as to form an irregular line: cilia white, mixed with fuscous, with two indistinct dark fuscous lines round apex. Hindwings grey; cilia grey-whitish, with a faint darker line near base.

This and the two following species are rather nearly allied, being distinguishable by the white bifasciated forewings. *E. triferella* is smaller than either of the other two and relatively broader-winged, with the markings rather dark dull fuscous and comparatively broader.

Not uncommon round Sydney and Melbourne in January and March; also at Brisbane and Rosewood, Queensland, in September.

83. *Eul. brachypepla*, n. sp.

Minor, alis ant. canis, basi nigra, macula apicis, fascia ante medium alteraque postica arcuata angustis ochreo-fuscis; post. albido-griseis.

♂ ♀. 12–15½ mm. Head and palpi white, basal ⅔ of second joint, and extreme apex of terminal joint dark fuscous. Antennæ white, annulated above with fuscous. Thorax white, with a small dark fuscous lateral spot. Abdomen whitish, posteriorly ochreous-tinged. Anterior legs dark fuscous; middle legs grey, yellowish-tinged; posterior legs whitish-ochreous, beneath yellowish. Forewings hardly dilated, costa gently arched, apex rounded, hindmargin obliquely rounded; clear white; base narrowly blackish-fuscous; a narrow brown or ochreous-brown tolerably straight transverse fascia from ⅖ of costa to ⅖ of inner margin, generally abruptly dilated on inner margin, sometimes slender and not distinctly reaching costa; a slightly broader inwardly curved brown or ochreous-brown fascia from ¾ of costa to inner margin slightly before anal angle; an ill-defined ochreous-brown line from upper extremity of this fascia to anal angle, faintest at extremities; a small apical brown spot, produced along upper half of hindmargin, ill-defined: cilia white, towards base slightly ochreous-tinged, mixed with fuscous at apex and anal angle. Hindwings light grey, more whitish-ochreous towards base, cilia ochreous-whitish.

Somewhat larger than *E. triferella*, the fasciæ narrower and more ochreous, a distinct costal spot, and the hindwings lighter.

Common at Brisbane in September, and also taken near Sydney in December and February.

84. *Eul. epicausta*, n. sp.

Minor, alis ant. canis, basi, fascia ante medium alteraque postica arcuata modicis ochreo-fuscis; post. griseis.

♂. 16 mm. Head and palpi white, basal half of second joint dark fuscous. Antennæ white, annulated above with fuscous. Thorax white. Abdomen ochreous. Anterior legs dark fuscous; middle legs yellowish-grey; posterior legs whitish-ochreous, beneath ochreous-yellow. Forewings hardly dilated, costa slightly arched, apex rounded, hindmargin obliquely rounded; clear white; base narrowly dark ochreous-fuscous; a rather narrow brownish-ochreous fascia from $\frac{2}{5}$ of costa to $\frac{2}{5}$ of inner margin, considerably dilated on inner margin, both edges rather concave; an ochreous-brown fascia, about as broad, from costa a little before apex to inner margin just before anal angle, bent inwards in middle, the anterior angle of the bend emitting a cloudy bent brownish-ochreous line towards costa at $\frac{3}{5}$, hardly reaching it; an irregular thick ochreous-fuscous line alond hind-margin from apex to anal angle; cilia whitish, basal half dark fuscous mixed with whitish. Hindwings grey tinged with ochreous; cilia whitish-ochreous, with a cloudy grey line near base.

Allied to *E. brachypepla*, but longer-winged, the thorax wholly white, the basal spot more ochreous, the fasciæ somewhat broader and the position of the second different.

One specimed taken at Helidon, Queensland, in September.

85. *Eul. chlorella*, n. sp.

Minor, alis ant. albido-ochreis flavidisve, costæ basi, punctis disci, quinque, strigulaque ante-apicali obliqua nigris, ciliis ochreo-flavis; post. griseis.

♂ ♀. 15–20 mm. Head ochreous-yellow. Palpi pale ochreous, second joint externally dark fuscous except at apex. Antennæ whitish-ochreous, obscurely annulated with grey. Thorax whitish-ochreous, anteriorly suffused with ochreous-yellow, shoulders blackish-fuscous. Abdomen whitish-ochreous, more yellowish posteriorly. Anterior and middle legs dark fuscous-grey, apex of joints obscurely whitish-ochreous; posterior legs whitish-ochreous. Forewings not dilated, costa moderately arched, apex round-pointed, hindmargin obliquely rounded; whitish-ochreous, costal edge narrowly pale ochreous-yellow, sometimes wholly suffused with ochreous-yellow; costal edge dark fuscous at base;

a blackish dot in disc before middle, a second almost directly beneath it on fold, a third obliquely beyond and above first, a fourth in disc beyond middle, and a fifth immediately beneath fourth; a short inwardly oblique dark fuscous streak from costa a little before apex, from lower extremity of which proceeds a strongly outwards-curved line of dark fuscous scales, sometimes distinct but often obsolete, to innner margin a little before anal angle: cilia pale ochreous-yellow, becoming whitish-ochreous towards tips. Hindwings grey, darker towards apex; cilia ochreous-whitish, with a very faint grey line near base.

Not to be confounded with any other species of the genus.

Common near Sydney from October to December, appearing to frequent *Kunzea capitata*.

86. *Eul. transversella*, Walk.

(*Cryptolechia transversella*, Walk., Brit. Mus. Cat., 763.)

Minor, alis ant. albis, griseo-sparsis, fascia prope basim angusta, triangulo costæ medio, punctis disci quinque, serie punctorum postica e strigula ante-apicali oriente, alteraque marginis postici nigris; post. griseis.

♂. 17–19 mm. Head ochreous-white. Palpi white, second joint dark fuscous except at apex and internally, apical third of terminal joint dark fuscous. Antennæ whitish, annulated with dark grey. Thorax white, mixed with dark fuscous on shoulders. Abdomen ochreous-whitish, anal tuft pale ochreous. Anterior and middle legs dark fuscous-grey, apex of joints obscurely ochreous-whitish; posterior legs ochreous-whitish. Forewings not dilated, costa gently arched, apex round-pointed, hindmargin oblique, slightly rounded; white, towards inner and hindmargins faintly suffused with greyish, and with a few scattered dark fuscous scales; a narrow blackish transverse fascia very close to base, dilated on costa; a flattened triangular blackish-fuscous blotch extending along central third of costa, reaching $\frac{1}{3}$ across wing; a blackish-fuscous dot in disc at $\frac{1}{3}$, a second rather obliquely beyond it on fold, a third confluent with apex of costal blotch, a fourth in disc at $\frac{2}{3}$, and a fifth, indistinctly double, a little below fourth; a short inwardly oblique blackish-fuscous streak from costa a little before apex, from lower extremity of which proceeds a strongly outwards-curved well-defined row of almost confluent blackish-fuscouo dots to inner margin a little before anal angle; a row of dark fuscous dots along hindmargin and apical third of costa: cilia ochreous-whitish, with an indistinct central row of grey dots. Hindwings grey, towards base ochreous-tinged; cilia dull whitish-ochreous.

A very distinct species.

Not uncommon at Sydney and Newcastle, from October to December, generally at rest on fences.

87. *Eul. variegata*, n. sp.

Media, alis ant. canis, vitta costæ antica, altera dorsi media, fascia postica angusta, punctis disci quinque, serie postica suffusa e macula apicis oriente, alteraque marginis postici saturate fuscis; post. saturate griseis.

♂ ♀. 17½–21 mm. Head white. Palpi white, apex of terminal joint, and second joint externally except at apex dark fuscous. Antennæ dark fuscous. beneath whitish. Thorax dark fuscous, with a square white spot on back extending to anterior margin. Abdomen grey, margins of segments ochreous-whitish, anal tuft of male ochreous-yellow. Anterior legs dark fuscous; middle legs dark grey, apex of joints suffusedly ochreous-whitish; posterior legs whitish-yellow. Forewings elongate, not dilated, costa moderately arched, apex round-pointed, hindmargin very oblique, slightly rounded; white, with a few scattered fuscous scales; a broad dark fuscous streak along costa from base to $\frac{2}{5}$, its extremity suffused; a thick cloudy dark fuscous streak along inner margin from $\frac{1}{4}$ to $\frac{3}{4}$, attenuated at extremities, sometimes almost obsolete; a small round dark fuscous spot in disc before middle, a second rather obliquely beyond it on fold, a third in disc below middle, fourth and fifth on posterior fascia; a short thick inwardly oblique dark fuscous streak from costa at $\frac{3}{5}$, from middle of posterior edge of which proceeds a narrow straight rather irregular-edged dark fuscous transverse fascia to anal angle, rather dilated beneath; a small triangular dark fuscous blotch on apical sixth of costa, directed obliquely inwards, lower margin rather suffused, emitting from its apex a strongly outwards-curved dark fuscous line to anal angle, at first thick, beneath more slender and interrupted; a row of dark fuscous dots along hindmargin, sometimes partially confluent: cilia ochreous-whitish, mixed with dark fuscous at apex and anal angle, and with an interrupted cloudy dark fuscous central line, sometimes obsolete. Hindwings rather dark grey, towards base slightly ochreous-tinged: cilia ochreous-whitish, with a faint grey line near base.

A conspicuous species, nearly allied to the following, but easily recognised by the fuscous colour and distinctness of the markings.

Common near Sydney from December to February.

88. *Eul. hemiphanes*, n. sp.

Media, alis ant. albis, griseo-sparsis, vitta costæ antica, altera dorsi media, macula costæ postica obliqua, altera anguli analis, lineaque postica e macula apicis oriente saturate griseis, punctis disci quinque nigris; post. saturate griseis.

♂. 19 mm. Head white. Palpi dark fuscous, terminal joint and apex of second white. Antennæ dark grey. Thorax dark fuscous-grey, with a suffused white central spot. Abdomen grey. Anterior and middle legs dark fuscous, apex of joints very obscurely whitish; posterior legs whitish-grey. Forewings elongate, not dilated, costa moderately arched, apex round-pointed, hindmargin very oblique, slightly rounded; white, irregularly irrorated with grey; costa suffused with dark grey towards base; a suffused dark grey streak along inner margin from $\frac{1}{4}$ to $\frac{3}{4}$; a small round dark fuscous spot in disc before middle, a second directly beneath it on fold, a third in disc above middle, a fourth transversely double in disc beyond middle, and a fifth rather below and before fourth; a cloudy dark grey inwardly oblique spot on costa at $\frac{2}{5}$; a similar spot on anal angle; a tolerably well-defined inwardly oblique dark grey apical spot, emitting a suffused dark grey curved line to anal angle: cilia whitish-grey, tips paler, with a suffused dark grey line near base. Hindwings grey, darker towards apex; cilia grey, with a darker basal line.

Allied to *E. variegata*, but all the markings (except discal dots) are grey instead of fuscous, and much more suffused, the posterior costal and anal spots do not unite to form a complete fascia, and the posterior legs and anal tuft are not yellowish.

One specimen taken at Launceston, Tasmania in January.

89. *Eul. leucopelta*, n. sp.

Media, alis ant. saturate fuscis, triangulo magno ad dorsi basim, macula obscura costæ media, altera postica, tertiaque anguli analis albis; post. ochreo-flavis, ciliis griseis.

♂. 19 mm. Head ochreous-yellow. Palpi dark fuscous, posterior edge obscurely whitish. Antennæ dark fuscous. Thorax dark fuscous. Abdomen yellowish-grey, segmental margins and anal tuft ochreous-yellow. Anterior and middle legs dark fuscous; posterior legs pale ochreous-yellow. Forewings elongate, not dilated, costa moderately arched, apex round-pointed, hindmargin very oblique, slightly rounded; dark fuscous, darkest towards costa; a well-defined triangular white blotch towards base, resting on basal third of inner margin, its apex obtuse, reaching to disc at $\frac{2}{5}$ from base, followed by two small indistinct transversely placed dark fuscous spots, round which the ground-colour is lighter and mixed with whitish, a short cloudy inwardly oblique whitish streak from costa slightly beyond middle, almost connected with apex of basal blotch ; a small irregular ill-defined whitish spot above anal angle, containiug a dark fuscous dot near its anterior margin, and connected with anal angle by a short cloudy whitish streak ; a small inwardly oblique ill-defined white spot on costa at $\frac{3}{4}$; one or two whitish scales near hindmargin in middle, and faint indications of a darker fuscous curved transverse line near hindmargin : cilia dark fuscous-grey, mixed with whitish at base, and with an indistinct central row of darker dots. Hindwings uniform ochreous-yellow ; cilia dark fuscous-grey.

A conspicuously distinct species.

One specimem taken in March in a railway carriage after descending the mountains by night from Mittagong to Sydner ; it may probably have entered the carriage near Mittagong.

90. *Eul. poecilella*, n. sp.

Minor, alis ant. saturate ochreo-flavis, vitta costæ dimidium superante, altera dorsi post medium dilatata, fascia antica augusta, altera postica latiore cum vitta costæ conjuncta saturate fuscis ; post. saturate fuscis.

♂. ♀ 16–19 mm. Head deep yellow. Palpi dark fuscous, above yellow. Antennæ dark fuscous. Thorax dark fuscous, posteriorly paler, with a small yellow lateral spot. Abdomen fuscous-grey, segmental margins and anal tuft deep yellow. Anterior and middle legs dark fuscous, beneath yellowish ; posterior legs ochreous-yellow. Forewings elongate, hardly dilated, costa gently arched, apex round-pointed, hindmargin very oblique, slightly rounded ; deep ochreous-yellow, with well-defined dark fuscous markings ; a moderately broad streak along costa from base to $\frac{2}{3}$, leaving costal edge very narrowly yellow except near base ; a moderately broad streak along inner margin from base to $\frac{2}{3}$, attenuated at base, posterior extremity dilated into an irregular spot; a rather narrow oblique transverse streak from middle of costal to middle of dorsal streak, bent convexly outwards; a straight rather narrow transverse streak from near apex of costal streak to anal angle: a rather broad straight band from costa before apex to lower half of second transverse streak, leaving a narrow yellow streak along hindmargin: cilia dark fuscous. Hindwings dark fuscous-grey; cilia dark grey, extreme base ochreousryellow.

A handsome insect, not to be confused with any other.

Not uncommon round Parramatta, and near Melbourne, frequenting *Acacia decurrens* and flying readily in the sun during March; I have also seen a specimen from Tasmania.

91. *Eul. habrophanes*, n. sp.

Minor, alis ant. ♂ ochreo-fuscis, ♀ saturate fuscis, cano-nebulosis, basi cano-maculata vel omnino cana, maculis costæ duabus angustis obliquis tertiaque dorsi postica suffusis canis; post. griseis.

♂. 16 mm. Head ochreous-yellow, face whitish-ochreous. Palpi whitish-ochreous, anteriorly dark fuscous. Antennæ dark grey. Thorax greyish-fuscous, with a small whitish-yellow anterior spot, posterior extremity whitish. Abdomen ochreous-yellow, paler towards base. Anterior and middle legs dark fuscous; posterior legs whitish-ochreous. Forewings elongate, not dilated, costa gently arched, apex round-pointed, hindmargin oblique, slightly rounded; ochreous-fuscous, with ill-defined white markings; a small spot on costa near base; an irregular oblique streak from middle of costa to base of inner margin, dilated beneath, interrupted in disc and on fold; a small roundish spot above fold beyond this, followed by two or three scattered white scales in disc; an inwardly oblique rather narrow streak from costa at $\frac{3}{4}$, and an inwardly oblique streak from inner margin before anal angle, their extremities only separated in disc by a dark ochreous-fuscous dot; a small spot on middle of hindmargin, and some scattered white scales before it: cilia grey, mixed with whitish-ochreous, with an interrupted dark fuscous line. Hindwings fuscaus-grey; cilia whitish-ochreous-grey, becoming pale yellowish-ochreous at base, and wholly round apex, with a darker grey line near base.

♀. 17 mm. Head white. Palpi white, anteriorly dark fuscous. Thorax dark fuscous, anterior margin and small lateral and posterior spots white. Abdomen whitish-ochreous. Posterior tarsi white, base of joints grey, rest as in male. Forewings as in male, but ground-colour dark fuscous, white markings broader and partially confluent, entire base of wing becoming white, and ground-colour mixed with white scales; cilia white, mixed with dark fuscous at apex and anal angle. Hindwings as in male, but yellowish-ochreous colour in cilia replaced by ochreous-whitish.

Perhaps most allied to *E. leucopelta*, but very different-looking, and with grey hindwings; the sexual differences are curious, and apparently peculiar.

I have a pair taken near Melbourue by Mr. G. H. Raynor.

92. *Eul. lividella*, n. sp.

Minor, alis ant. albido-roseis, marginibus, vitta media birami, fasciis duabus sub costa confluentibus, maculaque apicis obscure ochreo-fuscis, nigro-sparsis; post. griseis.

♂. 14½ mm. Head ochreous-fuscous mixed with fuscous-grey. Palpi dark fuscous, internally and posteriorly ochreous-whitish. Antennæ dark fuscous. Thorax ochreous-fuscous, shoulders and centre of back dark fuscous. Abdomen fuscous-grey, segmental margins and anal tuft whitish-ochreous. Anterior and middle legs fuscous-grey mixed with ochreous-whitish; (posterior legs wanting.) Forewings elongate, hardly dilated, costa gently arched, apex almost acutely pointed, hindmargin very oblique, slightly rounded; dull light pinkish, almost whitish in disc;

markings very suffused, ochreous-fuscous irrorated with black; a slender central longitudinal streak from base, separating before middle into two attenuated branches, upper branch hardly reaching hindmargin, lower to anal angle; a very indistinct streak along costa, and another along inner margin, more distinct towards base; an obscure slender fascia from middle of costa to $\frac{1}{3}$ of inner margin, more distinct beneath; a similar fascia from origin of first on costa to anal angle; an ill-defined suffusion towards apex and hindmargin; a hindmarginal row of cloudy blackish dots: cilia pale pinkish, mixed with fuscous, tips more whitish. Hindwings rather light grey; cilia whitish-grey, faintly ochreous-tinged.

An obscure-looking species, but not at all closely approaching any other.

I have one specimen taken by Mr. G. H. Raynor on Mount Macedon, Victoria, in December.

93. *Eul. philotherma*, n. sp.

Minor, alis ant. saturate fuscis, punctis disci quinque strigaque postica nigricantibus, macula parva costæ postica alteraque marginis postici obscuris glaucis; post. saturate flavis, margine postico ciliisque nigris.

♂. 17 mm. Head ochreous-yellow. Palpi dark fuscous, terminal joint posteriorly, and apex of second joint whitish-yellow. Antennæ dark fuscous, beneath yellowish. Thorax blackish-fuscous. Abdomen fuscous-grey, segmental margins whitish-yellow. Anterior and middle legs dark fuscous; posterior legs pale ochreous-yellow. tarsi with dark fuscous rings. Forewings elongate, not dilated, costa nearly straight, gently arched before apex, apex round-pointed, hindmargin very oblique, rounded; dark fuscous, rather lighter towards disc: a broad longitudinal space above fold extending from base to $\frac{2}{3}$ scantily strewn with bluish-white scales; an indistinct darker fuscous dot in disc before middle. a second obliquely beyond it on fold, a third beyond first near costa, and a fourth, indistinctly double in disc beyond middle; a small cloudy bluish-whitish spot on costa at $\frac{3}{4}$, from which proceeds an indistidct darker fuscous outwardly curved line to anal angle, on its lower portion preceded and followed by scatterec bluish-white scales: cilia dark purplish-grey, mixed with bluish-white scales at base. Hindwings deep orange-yellow, hindmargin very narrowly and apex more broadly suffused with dark fuscous; cilia dark fuscous.

Distinguished from all othor species by the orange-yellow blackish-margined hindwings.

One specimen taken near Sydney in December.

94. *Eul. brontomorpha*, n. sp.

Minor, alis ant. griseis, fusco-sparsis, vitta costæ antica, altera dorsi media, punctis disci quinque, fascia post medium strigaque postica obscuris saturatioribus; post. ochreo-griseis.

♂ ♀. 17–18 mm. Head yellowish-ochreous. Palpi dark fuscous, internally and at apex of second joint ochreous-whitish. Antennæ dark grey. Thorax dark fuscous. Abdomen ochreous-yellowish. Anterior and middle legs dark fuscous; posterior legs ochreous-yellowish. Forewings elongate, not dilated, costa gently arched, apex round-pointed, hindmargin very oblique, rounded; light fuscous-grey, ochreous-tinged, irregularly mixed and suffused with darker; a rather broad cloudy dark fuscous-grey streak along costa from base to middle; a small roundish cloudy dark fuscous-grey spot in disc before middle, a second beneath it on fold, a third very indistinct towards costa in middle, a fourth and fifth close together in disc beyond middle, connected with anal angle by an oblique cloudy streak; a dark fuscous-grey suffusion along inner margin from $\frac{1}{4}$ to $\frac{3}{4}$, confluent with an ill-defined fuscous-grey suffusion of middle of disc; a cloudy dark fuscous-grey spot on costa at $\frac{3}{5}$; a short narrow inwardly oblique streak from costa at $\frac{5}{6}$, emitting a cloudy, indistinctly interrupted, outwardly curved line to anal angle; a row of cloudy dark fuscous dots along hindmargin: cilia fuscous-grey, mixed with paler. Hindwings brownish-ochreous, thickly irrorated with fuscous-grey; cilia grey.

This type of markings approaches nearly to that of *E. variegata* and *E. hemiphanes*, from which however the species differs conspicuously in the ground colour not being white, and in the ochreous hindwings.

Two specimens taken near Sydney in January and March, beaten from *Eucalyptus*.

95. *Eul. calotropha*, n. sp.

Minor, alis ant. dilute griseis, basi, lineis duabus anticis transversis, maculaque postica transversa magna saturate griseis, nigromixtis; post. griseis, basim versus albida-ochreis.

♂ ♀. 14 mm. Head white, on sides mixed with dark fuscous. Palpi with second joint dark fuscous irrorated with white, apex white, terminal joint white with a few dark fuscous scales. Antennæ grey, basal joint white. Thorax anteriorly dark fuscous, posteriorly grey irrorated with white. Abdomen grey, sides whitish-ochreous, anal tuft of male pale ochreous. Anterior legs dark fuscous; middle legs dark fuscous mixed with yellowish, with whitish-yellow rings at apex of joints and in middle of tibiæ; posterior legs whitish-yellow. Forewings moderate, hardly dilated, costa moderately arched, appearing slightly sinuate in middle, apex round-pointed, hindmargin obliquely rounded; grey, densely irrorated with whitish, especially towards middle; extreme costal edge whitish-ochreous from about $\frac{1}{4}$ nearly to apex; base of wing dark fuscous; a cloudy fuscous-grey outwardly bent transverse line near base; a wedge-shaped somewhat oblique dark fuscous streak from inner margin before middle, reaching more than half across wing, its anterior edge irregular, its apex almost meeting a short oblique fuscous-grey line from costa at $\frac{1}{3}$; a cloudy fuscous-grey dot in disc beyond middle, and a dark fuscous dot below it; a broad cloudy dark fuscous transverse fascia from $\frac{3}{4}$ of costa to anal angle, mixed with blackish on upper half, anterior edge irregular and ill-defined, posterior edge bordered by a sinuate whitish line, beyond which the apical area is mixed with dark fuscous: cilia light grey, irrorated with whitish, at apex and anal angle mixed with blackish-fuscous, beneath anal angle whitish-ochreous. Hindwings whitish-ochreous, apical half in male, two-thirds in female suffused with fuscous-grey; cilia whitish-ochreous, with a grey spot at apex.

A rather elegant species, very distinctly marked.

Three specimens taken at rest on fences in Sydney, in December and January.

96. *Eul. philostaura*, n. sp.

Media, alis anticis griseis, cano nigroque sparsis, fascia costæ antica nebulosa plicam non superante, macula costæ media obscura, punctis disci quinque saepe duplicibus, serie punctorum postica sinuata alteraque marginis postici nigrescentibus; post. fusco-griseis.

♂ ♀. 17–27 mm. Head grey, mixed with ochreous-whitish on face and sides. Palpi whitish, externally more or less mixed with grey. Antennæ whitish, annulated with grey. Thorax fuscous-grey, irrorated with whitish. Abdomen whitish-grey-ochreous. Anterior and middle legs dark grey, with whitish rings at middle and apex of tibiæ, and apex of tarsal joints; posterior legs ochreous-whitish, beneath greyish. Forewings rather elongate, oblong, not dilated, costa slightly arched, more strongly near base, apex rounded, hindmargin very obliquely rounded; light fuscous-grey, coarsely and irregularly irrorated with whitish and dark fuscous; a very irregular short oblique cloudy dark fuscous streak from costa very near base; a cloudy dark fuscous-grey fascia-like spot from costa at $\frac{1}{4}$, reaching fold, and a small more suffused spot on costa in middle; five small irregular blackish-fuscous spots in disc, each more or less surrounded with whitish; first in disc before middle, oblique, often double, second on fold beneath first, similar, third roundish, in middle towards costa, fourth transverse, in disc beyond middle, indistinctly double, fifth small, below fourth, sometimes touching it; a suffused short inwardly oblique dark fuscous-grey streak from costa at $\frac{3}{4}$, emitting a suffused strongly outwards-curved line to anal angle, more or less interrupted, before lower extremity sinuate; a row of ill-defined dark fuscous elongate dots along hindmargin and apical fourth of costa: cilia light grey mixed with whitish, basal third with ill-defined alternate whitish and dark grey spots. Hindwings grey, ochreous-tinged, rather paler towards base; cilia whitish-grey-ochreous, with a faint grey line near base, tips faintly grey.

This and the four following species are nearly allied; *E. philostaura* is readily known by the forewings being relatively broader towards base, with the costa basally more strongly arched, the ground colour mixed with whitish throughout and therefore appearing lighter, the two darker costal spots, of which the first is produced as far as the fold, and the more ochreous-tinged hindwings; the size is very variable, some specimens being much larger than any of the other species.

Common in Sydney, where however it seems confined to the neighbourhood of gardens, being found at rest on fences, from November to January; also taken at Kiama, New South Wales, and tolerably common in the bush near Brisbane, in September.

97. *Eul. amaura*, n. sp.

Minor, alis ant. brevioribus, saturate griseis, punctis disci quinque strigaque postica obscuris nigris; post. griseis.

♂ ♀. 16–17½ mm. Head, palpi, antennæ, and thorax dark fuscous-grey. Abdomen ochreous-grey. Legs dark grey, tarsal joints with whitish apical rings, posterior tibiæ ochreous-grey-whitish. Forewings rather short in male, more elongate in female, not dilated, costa moderately arched, apex round-pointed, hindmargin very obliquely rounded ; fuscous-grey, irrorated with light grey and blackish ; an ill-defined dark fuscous dot in disc before middle, a second larger on fold beneath it, a third beneath middle of costa, a fourth and fifth partially confluent transversely placed in disc beyond middle, sometimes a sixth before and beneath fifth, all often obsolete ; a cloudy darker spot on costa beyond middle, generally obsolete ; a short cloudy inwardly oblique dark fuscous-grey streak from costa at $\frac{4}{5}$, emitting an indistinct outwards-curved line to inner margin before anal angle ; sometimes a cloudy dark fuscous-grey streak from fifth discal dot to anal angle ; a row of indistinct dark fuscous-grey dots along hindmargin and apical fifth of costa : cilia grey, mixed with darker and lighter, tips paler. Hindwings fuscous-grey, cilia light fuscous-grey.

Rather shorter and broader-winged than the two following species, to which it is very closely allied, distinguishable by the entire absence of any white scales ; it is also uniformly smaller. I am not however sure that it may not prove to be a summer generation of *E. adoxella.*

Not uncommon round Sydney, from November to February.

98. *Eul. dolosella,* Walk.

(*Psecadia dolosella,* Walk., Brit. Mus. Cat., 539.)

Minor, alis ant. griseis, vitta media angusta obscura alba, punctis disci quinque nigris ; post. dilute griseis.

♂. $16\frac{1}{2}$-$19\frac{1}{2}$ mm. Head, palpi, antennæ, and thorax fuscous-grey. Abdomen whitish-ochreous. Anterior and middle legs dark grey, tarsal joints with ochreous-whitish apical rings ; posterior legs whitish-ochreous. Forewings elongate, not dilated, costa gently arched, apex round-pointed, hindmargin very obliquely rounded; fuscous-grey, finely irrorated with dark fuscous and grey-whitish; a central longitudinal streak of whitish scales from base almost to apex, posteriorly becoming obsolete; an indistinct dark fuscous dot beneath this before middle, a second above it in middle, a third above it beyond middle, a fourth below third, sometimes a fifth on fold before first, all often obsolete; cilia light fuscous-grey mixed with grey-whitish. Hindwings grey; cilia ochreous-grey-whitish.

Distinguished readily by the distinct whitish longitudinal streak, and also rather narrower-winged than *E. adoxella*, lighter and more uniformly coloured, with the discal dots more obsolete; in *E. adoxella* the upper portion of the disc is often suffusedly whitish, but does not form a distinct streak.

Five specimens taken near Sydney in February.

99. *Eul. adoxella*, n. sp.

Media, alis ant. elongatis, saturate griseis, disco saepius cano-sparso, punctis disci sex strigaque postica nigris; post. griseis.

♂ ♀. 19-21 mm. Head, palpi, antennæ and thorax fuscous-grey. Abdomen whitish-grey-ochreous. Anterior and middle legs dark fuscous-grey, tarsal joints with ochreous-whitish apical rings; posterior legs whitish-ochreous. Forewings moderately elongate, not dilated, costa moderately arched, apex round-pointed hindmargin very obliquely rounded; fuscous-grey, finely irrorated with whitish, sometimes longitudinally suffused with whitish towards disc; six clearly-marked blackish dots in disc, irregularly roundish, sometimes partially surrounded with whitish scales; first in disc before middle, second slightly beyond it on fold, third in middle towards costa, fourth and fifth often confluent, transversely placed in disc beyond middle, sixth near before and beneath fifth; a short ill-defined inwardly oblique dark fuscous streak from costa at $\frac{4}{5}$, emitting an outwards-curved cloudy line to inner margin before anal angle, indistinctly interrupted to form dots, beneath more indistinct and often obsolete; a row of very indistinct often obsolete dark fuscous dots along hindmargin and apical fifth of costa: cilia fuscous-grey, slightly mixed with whitish. Hindwings fuscous-grey, slightly paler towards base; cilia whitish-grey, slightly ochreous-tinged, with a very faint grey line near base.

Usually rather larger than *E. amaura* or *E. dolosella*, with the discal dots much more clearly defined than in either. The obscure grey colouring and type of markings of this group recur in some species of *Nephogenes* and *Philobota*, but both those genera have vein 7 of the forewings terminating beneath the apex.

Common round Sydney and Melbourne in March.

100. *Eul. photinella*, n. sp.

Minor, alis ant. albido-griseis, basi, maculis costæ duabus obscuris, tertia dorsi, quarta apicis, punctis disci tribus strigaque postica saturate griseis; post. griseis.

♂. 17 mm. Head fuscous-grey mixed with ochreous-whitish, especially on face. Palpi fuscous-grey, base of terminal joint, and extreme apex of second ochreous-whitish. Antennæ fuscous-grey. Thorax fuscous-grey, irrorated with whitish. Abdomen light ochreous-grey, anal tuft whitish-ochreous. Anterior and middle legs dark fuscous-grey, with ochreous-whitish rings at middle and apex of tibiæ, and apex of tarsal joints; posterior legs ochreous-whitish, tarsal joints grey towards base. Forewings moderately elongate, somewhat dilated, costa moderately strongly arched, apex round-pointed, hindmargin very obliquely rounded; light fuscous-grey, irregularly irrorated and suffused with whitish, especially in disc and posteriorly; base of wing very narrowly suffused with dark fuscous; a very ill-defined small dark fuscous-grey spot on costa at $\frac{2}{5}$, and a similar rather larger one on costa slightly beyond middle; a third on inner margin slightly before middle; a tolerably well-defined small roundish dark fuscous spot in disc before middle, a second obliquely before it on fold, and a third in disc beyond middle ; a short inwardly oblique cloudy dark fuscous-grey streak from costa at $\frac{4}{5}$, emitting an irregular outwards-curved line to inner margin before anal angle; apex dark fuscous-grey; cilia whitish, at and above apex suffused with grey, on basal half irregularly mixed with dark fuscous-grey. Hindwings grey; cilia white, with a dark-grey line near base.

Readily known by the cloudy costal and dorsal spots, and the discal dots being reduced to three. It is questionable whether this species is not more directly allied to *E. variegata,* but it is apparently a generalised type with diverse affinity.

One specimen taken at Wellington, New Zealand, January.

101. *Eul paurogramma,* n. sp.

Minor, alis ant. dilute griseis, nigro-sparsis, margine costali ochreo-albida, ad basim nigricante, punctis disci tribus obscuris nigris ; post. griseis ; capite ochreo-flavo.

♂ ♀ . 14½-17 mm. Head ochreous-yellow. Palpi dark fuscous, whitish internally and towards apex of terminal joint. Antennæ grey. Thorax fuscous-grey. Abdomen slaty-grey, each segment with an ochreous-orange oblong spot above, anal tuft ochreous-grey. Legs dark slaty-grey, tarsal joints with slender whitish apical rings, posterior tibiæ ochreous-whitish above. Forewings elongate, not dilated, costa gently arched, apex round-pointed, hindmargin very obliquely rounded; uniform grey, thinly sprinkled with blackish scales; extreme costal edge ochreous-whitish from $\frac{1}{4}$ to apex, towards base blackish; an indistinct blackish dot in disc before middle, a second in disc beyond middle, and a third on fold directly beneath first; cilia light grey, finely irrorated with ochreous-whitish. Hindwings grey; cilia whitish-grey.

Distinguishable at once by the ochreous-yellow head.

Four specimens taken on Mount Wellington, Tasmania, early in February.

102. *Eul. cimmeriella*, n. sp.

Parva, alis ant. saturate griseis, fasciis duabus angustis perobscuris albidis; post. nigrescentibus.

♂. 12 mm. Head, palpi, and thorax dark fuscous, very finely irrorated with whitish. Antennæ grey. Abdomen dark fuscous. Anterior and middle legs dark fuscous, tarsal joints with whitish apical rings; posterior legs grey-whitish. Forewings elongate, not dilated, costa moderately arched, apex acutely pointed, hindmargin slightly sinuate, very oblique; dark fuscous-grey, minutely irrorated with whitish; a very ill-defined slender cloudy whitish transverse fascia from $\frac{1}{3}$ of costa to $\frac{2}{5}$ of inner margin, sharply angulated outwards above middle, posteriorly suffusedly edged with darker fuscous-grey; an indistinct whitish suffusion on costa at $\frac{2}{3}$, and on inner margin before anal angle, seeming to form a paler transverse fascia, followed by darker fuscous-grey; a faintly indicated paler curved transverse line before hindmargin: cilia light grey, finely irrorated with whitish. Hindwings dark fuscous; cilia grey.

An obscure little species, but very different from any other.

One specimen taken near Bowenfels in the Blue Mountains (2,500 feet) in January.

103. *Eul. xylopterella*, Walk.

(*Gelechia xylopterella*, Walk., Brit. Mus. Cat., 650.)

Media, alis ant. canis, griseo-sparsis, vitta media angusta bis interrupta nigricante; post. dilute griseis.

♂ ♀. 18-20. mm. Head, palpi, and thorax whitish, mixed with fuscous-grey. Antennæ whitish-grey. Abdomen ochreous-whitish. Adterior legs fuscous-grey; middle and posterior legs whitish, slightly mixed with fuscous-grey, middle tibiæ fuscous-grey above. Forewings elongate, not dilated, costa gently arched, apex round-pointed, hindmargin extremely oblique, slightly rounded; white, irregularly mixed with light fuscous-grey; a short linear longitudinal blackish mark at base beneath costa; a narrow central longitudinal blackish streak almost from base to apex, beneath suffusedly fuscous-margined, more or less distinctly broken and interrupted at $\frac{1}{3}$ and $\frac{2}{3}$, the central interrupted portion tending to terminate in an incompletely defined ocellus at each extremity; cilia whitish, tips mixed with fuscous, basal half more or less distinctly chequered with ill-defined dark fuscous spots. Hindwings rather light grey; cilia grey-whitish, with an indistinct grey line near base.

Differs from all others in the central interrupted blackish streak.

One specimen taken at Sydney in November; a second received from Mr. G. H. Raynor, taken near Melbourne.

104. *Eul. siccella*, Walk.

(*Gelechia siccella*, Walk., Brit. Mus. Cat., 643.)

Media, alis ant. dilute griseis, nigro-conspersis, punctis disc tribus, serie punctorum postica angulata alteraque marginis postici nigris; post. griseis.

♂ ♀. 18-20 mm. Head and thorax fuscous-grey. Palpi whitish, apical half of second segment blackish except a narrow apical ring, terminal joint blackish anteriorly. Antennæ grey-whitish, sometimes distinctly annulated with grey. Abdomen whitish-grey, anal tuft ochreous-whitish. Anterior and middle legs dark fuscous-grey; posterior legs ochreous-whitish. Forewings elongate, not dilated, costa gently arched, more strongly near base, apex blunt-pointed, hindmargin very oblique, slightly rounded; very light grey, coarsely and irregularly irrorated with blackish; a very small blackish spot in disc before middle, a second, larger and more conspicuous, in disc beyond middle, and a third on fold slightly beyond first; sometimes a fourth between and slightly above first and second; a transverse row of very ill-defined small blackish spots from costa at $\frac{2}{3}$ very obliquely outwards nearly to apex, thence very sharply bent and continued very near hindmargin to inner margin before anal angle; a row of indistinct elongate blackish spots along hindmargin and apical third of costa: cilia whitish-grey, with a blackish line, sometimes obsolete. Hindwings light grey, in female slightly darker; cilia whitish-grey, with a very faint darker line.

Recognisable by the very coarse black irroration; allied to the two following, but with the discal dots not transformed into strigulæ.

Common near Sydney, and at Blackheath in the Blue Mountains (3,500 feet), in September and October, at rest on the trunks of fibrous-barked *Eucalypti.*

105. *Eul. grammatica*, n. sp.

Media, alis ant. griseo-albidis, nigro-sparsis, strigula ad costæ basim, aliis disci quinque circulatim dispositis, serie punctorum postica angulata alteraque marginis postici nigris; post. dilute griseis.

♂. 23 mm. Head and thorax grey mixed with white. Palpi with second joint blackish, mixed with whitish towards base, with a white apical ring, terminal joint white, extreme apex blackish. Antennæ whitish, slenderly annulated with grey. Abdomen whitish-grey, anal tuft ochreous-whitish. Anterior and middle legs dark fuscous, tarsal joints with whitish-apical rings; posterior legs ochreous-whitish. Forewings elongate, not dilated, costa gently arched towards base and apex, rest nearly straight, apex almost acute, hindmargin very oblique, almost straight; whitish, irregularly mixed with light fuscous-grey, and with scattered dark fuscous-grey scales; a short blackish very oblique curved linear streak from base of costa, almost meeting first discal spot; a blackish irregular spot in disc at $\frac{1}{3}$, and a second on fold obliquely beyond it; an elongate blackish longitudinal mark towards costa in middle ; a crescentic blackish mark in disc at $\frac{2}{3}$, its lower extremity emitting a short blackish streak towards base ; a small blackish spot on costa beyond middle ; a transverse row of small ill-defined dark grey spots from costa at $\frac{3}{4}$ irregularly and obliquely outwards to beneath apex, thence sharply bent and continued very near hindmargin to inner margin before anal angle ; a row of well-defined blackish dots along hindmargin and apical third of costa : cilia whitish, with a dark grey interrupted line. Hindwings pale grey, with dark grey dots on hindmargin on veins ; cilia grey-whitish, with a very indistinct grey line.

Characterised by the strongly marked irregular partially confluent discal strigulæ.

One specimen at rest on a fence near Sydney in July.

106. *Eul. scopariella*, Walk.

(*Cryptolechia scopariella*, Walk., Brit. Mus. Cat., 765.)

Media, alis ant. griseo-albidis, obscure nigro-venosis. strigula ad costæ basim, annulo disci tenui interrupto, serieque punctorum postica angulata nigris ; post. dilute griseis.

♂ ♀. 23-25 mm. Head and thorax whitish, mixed with dark fuscous. Palpi with second joint rather roughly haired above towards apex ; dark fuscous, apex of second joint white, base whitish, terminal joint white posteriorly. Antennæ whitish. Abdomen grey, anal tuft ochreous-whitish. Anterior and middle legs dark grey, apex of tarsal joints white ; posterior legs whitish. Forewings very elongate, not dilated, costa gently arched, apex round-pointed, hindmargin very oblique, rounded ; whitish, irregularly mixed with light fuscous-grey and dark fuscous ; veins obscurely lined with dark fuscous ; a short linear dark fuscous streak from base beneath costa ; a short linear dark fuscous longitudinal streak in disc before middle, a second above middle, a third longer below middle, and two irregular transversely placed dots beyond middle, all nearly confluent to form an elliptical ring; a dark fuscous elongate dot on fold below first discal streak; a transverse row of small somewhat wedge-shaped dark fuscous spots from costa at $\frac{3}{5}$ very obliquely outwards to below apex, thence sharply bent and continued near hindmargin to before anal angle; the streaks on veins form elongate dots on margins: cilia whitish, mixed with dark fuscous. Hindwings rather light grey; cilia grey-whitish, with a faint grey line.

Longer winged than *E. grammatica*, the hindmargin more rounded, the veins marked by obscure lines, the discal strigulæ reduced to lines, and the palpi peculiarly haired.

Three specimens taken on *Eucalyptus* trunks near Sydney in April and August.

107. *Eul. perdita*, n. sp.

Minor, alis ant. angustis, nigricantibus, maculis disci plerisque obscuris nigris; post. saturate fuscis.

♂. 16½ mm. Head and thorax blackish-fuscous. Palpi blackish-fuscous, with scattered whitish scales. Antennæ dark fuscous. Abdomen fuscous-grey. Legs dark fuscous, apex of tarsal joints whitish; posterior tibiæ fuscous-grey. Forewings very elongate, very narrow, slightly dilated posteriorly, costa almost straight, gently bent towards base and apex, apex round-pointed, hindmargin very obliquely rounded; pale grey, very densely and coarsely irrorated with black; two round black spots transversely placed in disc before middle, and a third rather beyond and between them, all three confluent; a fourth below middle of costa, a fifth larger in disc beyond middle, and a sixth, larger and more suffused, towards apex; a short ill-defined pale ochreous longitudinal mark on fold near base: cilia pale grey, irrorated with black. Hindwings dark grey, lighter towards base; cilia fuscous-grey.

Immediately known by its narrow wings and blackish colouring.

One specimen taken at rest on a blackened *Eucalyptus* trunk near Sydney in September.

Notes on the Geology of the Western Coalfield, Part I. Capertee.

By Professor Stephens, M.A.

Crown Ridge forms the watershed between the Upper Turon and the Capertee basin, running in a north-westerly direction. The Turon, whose headwaters are parted from those of Piper's Flat Creek by a low ridge which represents the main Continental Divide north of Mount Lambie, passes at a distance of five or six miles to the S.W. This river and most of its tributaries wind their sinuous course along deep gorges eroded in steeply inclined Devonian Quartzites, Slates and Limestones, associated occasionally with Granite. From these rocks they derive their stores of alluvial gold. They have all, here and there, little fertile flats at corners and junctions, and are fringed throughout by River Oaks (*Casuarina suberosa*) of very rich and umbrageous foliage. They are all so exactly after the same pattern, that many have come to be known under one name, Oaky Creek. On the Turon we have Palmer's Oaky, Tobin's Oaky, Big Oaky, Little Oaky, and Oaky *per se* from Hill End, entered on the County Map. We may assume the existence of a few more. From the latitude of Capertee Railway Station the river turns nearly due west, passing Sofala to meet the Macquarie near Tambaroora.

On the other or seaward slope, we have the Capertee River, which rises about 20 miles north of the Station. It is joined by some more Oaky creeks, the name doubtless indicating that their Geological character is similar to that of their namesakes on the Western falls, and that at least the valleys are Devonian. This is further suggested by the entry 'Limestone Ridge' upon the map alongside one of these 'Oaky Creeks,' and near Vincents Hole. I mention these conjecturally, as the country is coloured for carboniferous in the Geological Map, while I have not been able to obtain more definite information about this portion of the basin. However, the Capertee River, joined first on the left by the Umbiella Creek, and then, about 12 miles N.E. of the Station by the Coco, or Coco Cocai, takes the name of Colo, and enters an impassable ravine, Sir John's Mouth, down which it flows for nearly twenty miles until its junction with the Wolgan, which rises near the head of the Cox.

A small portion of the upper part of the Wolgan is thus described by Darwin—"When cattle are driven into the valley of the Wolgan, by a path (which I descended) partly cut by the colonists, they cannot escape; for this valley is in every other part surrounded by perpendicular cliffs, and eight miles lower down, it contracts, from an average width of half a mile, to a mere chasm impassable to man or beast."* Through a similar chasm, 20 miles further down, the Wolgan joins the Colo, which continues an almost subterranean course, receiving, 12 miles lower, the Wollungambe from Mounts Wilson and Tomah, until, about eight miles further, it at last emerges into more tolerable country, finally joining the Hawkesbury about 10 miles below.

These phenomena are frequently repeated in the Blue Mountains. We see long and wide valleys which suggest the action of erosion on a gigantic scale, but are now drained through gorges which are often absolutely impassable, and through which it is inconceivable—in fact impossible—that such a volume of detritus could have passed as would correspond to the amount of supposed excavation. The friction of innumerable multitudes of travelling pebbles and sands (the chief materials of the rocks which are assumed to have been removed by erosion and denudation) would surely in the long course of ages have worn broad and open channels for their passage. Yet we do not find this to be the case. The Wollondilly and Cox Rivers, leaving the extensive basins which they drain, and passing through contracted and deep ravines, unite to form the Warragamba, the course of which

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* Geological Observations, p. 152, Ed. 1876.

has never been followed by man, so precipitous are its walls, its bed so narrow, and so encumbered by fallen rocks and timber. The Nepean leaves its wide and gently undulating valley for a ravine leading into the heart of the sandstone mountains, there to join the now accessible Warragamba. The united waters, under the name of Nepean receive the Grose through a similar funnel (which is almost impassable) and finally, joined by the Colo as aforesaid, strike once more from the open country into the highest part of the range which separates them from the sea, and carve out for their passage the deep and winding chasm known as the Lower Hawkesbury, and extending from Wilberforce to Broken Bay. Of all these facts a rational explanation is required.

To return to our subject. The Crown Ridge consists of a base of conglomerate, stratified horizontally, though not very definitely the beds not showing out until bleached, as described p. 403. It is variously intercalated with sandstone beds, and is succeeded by (1) fine grained sandstones and shales, with *Vertebraria*, *Glossopteris*, Fossil Wood, Iron Ore, &c.; these are overlaid by (2) massive white sandstones and grits, and these by (3) another series of shales, generally of a warm reddish-yellow tint, and full of waterworn fragments and skeletons of *Glossopteris* and other ferns, *Phyllotheca* &c. all lying flat on the lamination faces, while *Vertebraria* is observed to traverse, as if on the spot where it grew, several inches of shale at various angles.

These three formations are so well marked and so easily examined at Capertee that I propose to call them—1. the Lower Capertee Shales. 2. The Capertee Grits. 3. The Upper Capertee Shales. It would be convenient also to call the underlying conglomerates and sandstones the Marangaroo Beds, as it is at Marangaroo that they are perhaps best exposed, have certainly been most carefully examined, and have yielded to Mr. Wilkinson's persevering search several specimens of Marine Carboniferous fossils. Above the Upper Capertee Shales the

Wallerawang Coal measures come in, but in a very fragmentary manner. Several seams are visible here and there, but are apparently not of much commercial importance. Last of all the Hawkesbury Sandstone tops the series, rising in a lofty and solitary crest over the highest point of the road (at Blackman's Crown) and giving the ridge its picturesque designation. Denudation has in most places so lowered the level of the watershed that only the Marangaroo Beds are left, as at the Station, and generally along the road. In some places we see the Grits appearing as terraces, and the Upper Shales forming peaks at the uneroded extremities of the spurs which branch eastward from the main range. But only at Blackman's Crown do we find the superincumbent coal measures with their Hawkesbury capping preserved.

If at this point we turn to the west, the view sweeps over the dark and monotonous forests of the Turon, stretching away range after range to the horizon. If we turn to the east, we see beneath our feet a continuation of the same rocks, forming with a series of similar though less formidable ridges, the general bottom of the Coco basin. In the distance a level formation may be seen quite beyond and below this rugged country, while the whole landscape is enclosed with an apparently continuous rampart of vertical walls of rosy sandstone, from the foot of which a forest covered slope gradually descends to the floor of the valley. This slope, though sometimes perhaps only a talus, often betrays indications of the beds which compose it, and which appear to correspond to the series above described as occurring beneath the Hawkesbury rocks at Blackman's Crown. The valley is extensive, and appears to widen out to the northward beneath perpendicular cliffs at a distance of from 15 to 20 miles.

Crown ridge is in fact a very narrow causeway formed by Nature's engineering over an impassable labyrinth of rocky gullies. Neither road nor railway can deviate. A few minutes' descent in either direction brings us into impracticable country. If we follow a track which runs southwards from the station, we reach the bottom of the conglomerate in about a quarter of a mile, and at once enter rugged ground. Here the underlying rocks dip at a very high angle towards the east. Following the creek as it winds between the spurs, we reach the Turon at about five miles from, and 300 feet below our starting point. The dip seems to diminish regularly as we proceed southward, until near the river, where it is about 16° S.E. If we take the other slope and follow to the north the road down the Capertee valley, we come upon the same rocks, here traversed by a vein of porphyry. This is about half a mile from, and about 150 feet below the station.* The same rocks appear in the same association about a mile further. But it must be observed that the road never leaves the conglomerate slopes except under strong compulsion, so that we are generally above the Devonian outcrop. The road seems to wriggle right and left, up and down, in its effort to escape the rugged gullies on the right, while on our left gigantic walls of sandstone cut sheer, and showing square built towers and battlements against the sky, rise many hundred feet overhead. At last, at about four miles distance as the crow flies, and good eight as the road runs, we strike a main ridge which leads us by a long and rapid descent down from the conglomerate to the Coco. It is extraordinarily long, narrow and straight, runs at right angles to the strike, and is apparently separated from similar ridges to north and south by equally straight gullies. It consists for the few first miles of the ordinary hard slates and quartzites, succeeded by vertical limestones and softer clay (or chloritic) slates, these latter being intimately associated for some miles. I was not able to find many fossils, but such as I did find, I have laid before you. They are un-

* To the east at about the same distance is the quartzite quarry for road metal referred to at our last meeting, the beds in which are nearly vertical, though a furlong or so nearer the station they dip to the west.

doubtedly what we call Devonian. Upon the summit of this limestone and filling its crevices, we find a kind of secondary deposit of travertine mixed with a greater or less proportion of silicious matter. It frequently includes fragments of the original limestone and of slaty rock which appears to have been the same as the associated slates, but in a less metamorphic condition. I have observed precisely the same phenomenon on limestone summits near Tamworth, Moara Creek, and Attunga. It is quite different from the formation of travertine in a river bed, as at Wallerawang. (See p. 404). I do not doubt that this flinty travertine is a deposit from springs which at one time rose to the surface through joints, fissures or faults of the limestone, being derived from the internal drainage of high silicious rocks in the vicinity. The frequent silicification of corals and other organic remains in these Devonian limestones, together with the more or less complete abstraction of carbonate of lime from the structure of the same fossils, even when not replaced by silica, seem to indicate that the water was warm, and charged moderately both with silica and carbonic acid. It would under such conditions be likely to dissolve the limestone with which it came in contact, and at the same time to deposit both silica, as it cooled, and lime, when exposed to the air. Such waters might be expected to soak down through the silicious and permeable rocks of this formation, which at the time formed mountain masses of great height and extent, and to rise again to the surface where they found an outlet. The outlet in this case can hardly have been submarine, as we cannot suppose that the lime held in solution would be deposited at the bottom of the sea, where the excess of carbonic acid would keep it dissolved. We must therefore suppose this travertine to have been formed on land, or in shallow fresh water. In either case we are driven to the conclusion that the existing ridge was at one time a valley, and that the present gullies on either side were its containing ranges.

Perhaps it was this very superficial deposit, especially where much hardened by silica, that so defended the bed of the ancient valley from atmospheric erosion, that it ultimately came to stand out in relief above the areas over which much harder rocks had been slowly broken down and removed. Soluble as limestone is, it frequently appears in the form of ridges rivalling in height the ranges among which it appears. and which have evidently been formed by erosion.

The Coco where we cross it is bordered on both sides by the Slates, which show caves in their precipitous faces, and the Limestone reappears again beyond it. At Mr. Maclean's, eight miles as the crow flies, and something more like eighteen by the road, these Slates and Limestones disappear, and are succeeded by the Quartzites, dipping to the West. This would seem to indicate a great fold. But the time at my disposal was too limited to allow for more than a cursory glance at the country, or to pursue the road any further.

Mr. Maclean informed me that these quartzites continue for some six miles further, until the level country is reached. The rock there is freestone. To whatever formation it may belong, it has certainly nothing to do with the Hawkesbury sandstones, as it obviously underlies the Marangaroo conglomerate, or its equivalent. It seems probable that it may be some portion of the lower marine carboniferous beds. It is said to contain fossils.

Mr. Maclean further states that the sandstone ranges which separate the main valleys, as of the Capertee and the Wolgan, and their spurs of equal elevation which divide minor basins, are really and truly *walls*, much higher than they are broad, often not more than from one hundred to twenty yards in width, and with sides, as we see, perfectly vertical. Something of this structure may be observed from Crown ridge on a day when the landscape is brought into perspective by the shadows of drifting clouds. But on a bright day the succession of summits shows like a plateau. It is a phenomenon of much importance in connection with the inquiries into the formation of the Hawkesbury rocks, and the excavation of the Blue Mountain valleys.

On the Edible Oysters found on the Australian and Neighbouring Coasts.

By J. C. Cox, M.D., F.L.S., &c.

Some months ago I read before this Society a paper on the Edible Oysters found on the Australian and adjacent Coast, and exhibited specimens to illustrate my remarks. I stated that we had five distinct species of Oysters on the coast of New South Wales proper. First the Mud Oyster—*Ostrea Angasi*, Sowb., secondly the Rock Oyster—*Ostrea glomerata*, Gould, third the Drift Oyster—*Ostrea subtrigona*, Sowb., all of commercial value; fourth *Ostrea circumsuta*, Gould, and fifth *Ostrea virescens*, Angas, only of interest to the Conchologist.

My paper as published attracted the attention of a critic who is not only a successful commercial cultivator of our Oysters, but who is a close and careful observer, and who has the preservation and culture of our Oysters at heart for no selfish purpose but as a public good. Mr. Woodward pointed out in the public press that he thought I was wrong in considering our Rock Oyster and our Drift Oyster distinct species, and founded his conclusions from practical observations made by himself on his Oyster Beds on the Walambi at Cape Hawke two miles above the village of Forster. Mr. Woodward has recently paid a visit to his Oyster Beds and has selected from four of them specimens of Oysters for me to illustrate his reasons for differing with me, and I now exhibit these specimens to you ; but instead of proving to me that I am wrong these specimens have only the more firmly convinced me that my theory of the replenishing of our exhausted Oyster Beds is the correct and only one to be depended on.

There are circumstances connected with these extensive and well conducted fisheries which are not generally known, and which I am desirous with Mr. Woodward's permission of placing on record.

These Oyster Banks are at the mouth of what is known as as Swan Bay. At the entrance of the Wallambi River into Swan Bay, there is a bank across the mouth of the river composed of coarse Cockle Shell sand, through which a narrow channel has been cut by the Government to permit of boats and traffic to pass. The samples of Oysters exhibited are marked Nos. 1, 2, 3, and 4. The Oysters marked No. 3, are says Mr. Woodward in his letter to me "real Bank Oysters, they grow on a bank upon which there is never more than one foot of water at high-water and six inches at low-water at ordinary tides but for four or five tides one after the other at spring tide time the water does not cover them at all. These Oysters are of a good age and if left on the bank where they grow they never improve better than they are now; I have never seen them as good as they are now" (25th August, 1882). The samples exhibited marked No. 2 and 4, are Oysters, says Mr. Woodward, "which were removed from the above mentioned bed about twelve months ago, a few of them two years ago, and placed on other beds; those from one of these newly formed beds lie in water about eighteen inches deep at high, and twelve inches at low tide, and only have six inches of water over them at spring tide; these new beds are about 300 yards from the original bed."

The true Drift Oysters exhibited marked No. 1, are from a bed up the river about 600 yards from the exposed bed first mentioned, the bottom of which is Sandy Mud, it has about two feet of water over it at high water, and eighteen inches over it at low-water, and twelve inches of water over it at spring low-water tides. These large fine Oysters taken from it says Mr. Woodward, "have not been taken from the first mentioned exposed bed and deposited there, but are its natural production, they nevertheless spawn at the same time (25th August) as those do at the first mentioned exposed bed." The difference in size Mr. Woodward believes to be entirely attributable to their being always covered with water, but in this I differ with him.

Some notion of the value of this important fishery may be made when I tell you that Mr. Woodward has during his recent trip to Cape Hawke superintended the laying down of 3,000 sacks or 9,000 bushels of the oysters from the last mentioned exposed bed to the other beds in the vicinity; a sack of oysters at present is valued at £2, so that this last operation represents a value of £6,000.

On the above facts Mr. Woodward thinks that the Rock Oyster and the Drift Oyster are one and the same species, but I feel quite sure that the more this subject is studied the more certain it will be proved that you cannot replenish the Drift Oyster beds with Rock Oysters. No doubt Rock Oysters will improve when placed in a position where they receive more nourishment, such as the position where Mr. Woodward has from watchful care and experience placed them in, but this does not prove that they will live and thrive and alter their character so much if deposited at the bed up the river in deeper water as to be converted into another species.

For many years I have dredged in our Australian Coast waters, and my friend Mr. Brazier has had still larger experience in dredging than I have in these waters, but Mr. Brazier tells me he has never known a Rock Oyster dead or alive from deep beds such as are occupied by our Drift Oysters, and I certainly endorse his opinion. If they were the same would you not expect that at least in some position you would be able to trace the beds of Drift Oysters running direct into the beds of the Rock Oysters. The finest Rock Oysters are found in greatest perfection a few inches below dead low water mark, but you never find them under any circumstances in deeper water attached or unattached unless placed there artificially, and then they will not, I think, thrive well if placed much under a foot deep of water at dead low water. Surely the spat from the extensive beds of the Drift Oyster would sometimes find a resting place on stakes or other objects below the position which Rock Oysters are found, but such is not the case. It is argued that this arises from the fact that the spat when emitted from the Drift Oysters rises instantly to the surface and is then drifted still on the surface to the nearest rocks or other objects and there attaches itself; if this were the case, why is it that the stakes which were driven into the mud so much used in former times to mark the position of Drift Oyster beds were never found to have Oysters attached to them all the way up where they stood in the water, I have myself pulled up many of these stakes on purpose to examine into this point but could never discover an instance in which it occurred.

There are some circumstances connected with the Hawkes Bay Oyster Beds which are well worthy of record, and although contrary to the usual course of tidal events goes far in my opinion to show the difference between the Rock and Drift Oyster. As a rule the Rock Oyster beds are covered deeper with water at high spring tide time than at any other, but in this particular instance, these Rock or "real Bank Oysters" as Mr. Woodward calls them, are absolutely uncovered with water "for four or five tides one after another" at spring tide time, this arises from the very narrow entrance of this bay out to sea: the water from the bay has time to all run out of it, but owing to the intricate nature of the channel up to these beds, and the many small islands just inside the narrow entrance to the sea, the water does not or cannot flow in sufficiently quick to fill the bay—having been previously so thoroughly emptied—to cover this valuable bank of Oysters, hence the unusual occurrence of their being left high and dry for four or five tides at spring tide time.

It is extremely to be regretted that through an unaccountable oversight the framers of our present Fisheries Act have failed to protect our Rock Oyster beds from wilful waste and destruction, the definition of "Natural Oyster beds" is so worded that it only protects Oysters from being removed at any time from beds below low water mark. Such valuable Banks as I have just described, and in fact all our shore Oysters attached to rocks are legislated for under our Fisheries Act only so far as giving persons the right to lease them, which leases it is found impracticable to issue. In Queensland the Oyster beds are divided into two classes—Dredge Oysters and Bank Oysters. The former are leased at auction for a term of seven years, subject to certain restrictions, the latter are worked under license.

The period which an Oyster will live when taken from its natural bed and left out of water, is a proof in the opinion of many who have given much attention to this subject that our Drift Oysters differ from the Rock Oysters, and it certainly appears true from what experiments I have been able to make, that our Rock Oysters will live much longer when so removed from the water than the Drift Oyster, I suspect it is this power of endurance which is favouring at present the active cultivator of the Rock Oyster in preference to the Drift Oyster.

The other specimens of Oysters exhibited are from Townsville, Queensland, they are very fine specimens of the common Queensland Rock Oyster—*Ostrea mordax* of Gould, and which it would be unpardonable for any one to mistake or confuse with the Rock Oyster of our shores: these Oysters extend for fifty miles north of Cardwell, a point much further north than I had known them to extend when I wrote my paper on the Edible Oysters of Australia, published in this Journal some months ago.

I have also ascertained through my friend and able Conchologist Mr. G. Neville of the Calcutta Museum that our Rock Oyster—*Ostrea glomerata* extends as far north as Moreton Bay in Queensland, but only very sparingly so, I believe that that is the absolute northern limit of the species.

NOTES AND EXHIBITS.

Prof. Stephens exhibited specimens of rocks and fossils illustrative of his paper upon the Western Coal-fields, together with examples of Siluro-Devonian Brachiopoda from the Murrumbidgee near Yass, and from the Minjary Ranges near Tumut, apparently identical with those from Mount Lambie and Coco Creek.

Dr. Cox exhibited samples of Oysters from the beds leased by Mr. Woodward at Swan Bay, near Cape Hawke. These were of three distinct types ; first, those designated by Mr. Woodward as the Bank Oysters, secondly those which had been taken from the same bank and which had been improved by being placed in more favourable waters ; and third, large Drift Oysters taken from their natural bed about 600 yards above where the Bank Oysters were taken from. Also a torch from the Duke of York Island, composed of a resinous substance enclosed in large leaves These torches are used by the natives at night to attract fish.

Mr. E. P. Ramsay exhibited specimens of Sandstone, of Shale containing fossil plant impressions, and of Coal, from Nancarrow's new Coal Mines between Dubbo and Wellington. Also specimens of Fire Clay and Burnt Ironstone from the same locality. Also three stone implements from Samoa, which had been dug up in forming a Plantation, at a depth of five feet from the surface. They were found on a sandy bottom supposed to be a raised beach, by Mr. Parkinson of Samoa. One of them was a large flat chopper-like implement with a sharp cutting edge and a thick blunt back—about two feet in length, five inches in breadth, and two inches in thickness. The second was an adze found in the same place of a different material from that at present in use in the island. The other was an adze of recent origin of the kind of stone now used for making axes.

WEDNESDAY, 29TH NOVEMBER, 1882.

The President J. C. Cox, M.D., F.L.S., &c., in the Chair.

DONATIONS.

"Southern Science Record, complete set, Vol. I., Nos. 1 to 13; Vol. II., Nos. 1 to 9. From J. F. Bailey Esq., of Melbourne."

"Southern Science Record, Vol. II., Nos. 9 and 10, Sept. and October, 1882;" from the publishers.

"On Fossil Chilostomatous Bryozoa from Mount Gambier, South Australia. August, 1882." By Arthur Wm. Waters, F.L.S., &c.

"Annual Report of the South Australian Institute, 1881-82."

"Proceedings of the Zoological Society of London, Part 2, 1882."

PAPERS READ.

DESCRIPTION OF TWO NEW BIRDS OF QUEENSLAND.

BY CHARLES W. DE VIS, B.A.

FAM. PARADISEIDÆ.

PRIONODURA, *n. g.*

Beak short, shallow, with a feeble maxillary tooth and a regularly arched culmen compressed over the nostrils. Nostrils oval, sunken, sub-basal, partly hidden by plumes and surrounded by a few weak bristles. Gape wide, feebly fringed with bristles. Wing rather short, obtusely pointed—fourth quill the longest; third and fifth nearly equal. Tail moderate, of twelve feathers which are subspinose at the apex. Tarsi short. Inner and outer toes nearly equal. Two outer toes connected at base.

An aberrant form of the family, approaching *Colluricincla* in structure of bill but exaggerating the exsertion of the tips of the tail feathers in that genus (e. g. *C. rufogaster*).

P. Newtoniana.

Above uniform olive-brown, beneath impure grey. Under surface of wing with the base of the inner webs of the primaries and the entire inner webs of the secondaries broadly edged with pale sulphur-yellow. Under surface of shafts of wing and tail feathers yellow. Gape yellow. Length $8\frac{1}{4}$ in.; wing $4\frac{1}{2}$ in.; tarsus $1\frac{1}{8}$ in.; bill $\frac{5}{8}$ in., its depth and width at the nostrils $\frac{5}{16}$ in.

Sex? Locality, Tully River scrubs; type specimen in Queensland Museum.

In honouring this Bower Bird with the name of Professor Newton, it is hoped that the interest attaching to it will be accepted as an equivalent for its plentiful lack of beauty. Its discoverer, Mr. K. Broadbent, unfortunately met with no other specimen, and can give no item of its life history except that, on the testimony of its stomach, it feeds in the month of September on a fruit determined by Mr. Bailey to be that of *Linociera ramiflora*, a large tree of the Olive family growing in dense scrubs.

Residents near the haunts of the bird have an opportunity of doing a good turn to Science by searching for the bird and studying its habits.

Cracticus rufescens.

General tint rufous, bright on the side of the neck and on the shoulder, paling on the lower surface. Head brownish-black with a spatulate rufous streak on each feather. Back lighter with the streaks broadly linear and indented by the ground-colour. On the rump and upper tail-coverts the rufous markings, interrupted by the ground-colour on the latter, render their tint predominant, and on the wing-coverts spread broadly on the tips of the feathers. Chest with an obscure collar formed of dark intramarginal bands on the feathers. Abdomen and flanks uniform. Thighs rufous-grey with obscure dark cross bars. Wing above rufous-brown; secondaries broadly edged with rufous-grey, beneath brown with the basal third of the inner webs of the primaries and margin of the inner webs of the secondaries pale rufous. Tail rufous-brown above, lighter beneath. Legs and feet dark brown. Beak mealy-blue at the base, horn-brown toward the tip of the upper mandible. Iris red. Length 12 in.; tarsus $1\frac{1}{2}$; wing $6\frac{3}{4}$; bill 2.

The female is considerably lighter in colour and has the streaks on the upper surface pale and narrow, but the markings on the breast conspicuous and extending to the vent, leaving only the middle of the abdomen immaculate.

Locality, Tully and Murray River Scrubs; types in Queensland Museum.

Note.—The female has been recently nestling.

Fungi aliquot Australiæ Orientalis.

Reverendo Carolo Kalchbrenner definiti.

Agaricus megalotheles, Kalchbrenner. (Sectio *Lepiota.)*

Amplus, pileo carnoso campanulato expanso, albo circa umbonem maxime prominentem glabrum squamis adpressis fuscis ornato stipite subcavo gracili cylindrico ad basim dilatato sed vix bulboso nudo ex albo fuscescente, annulo mobili lato persistente, lamellis remotis latis ventricosis subconfertis.

Endeavour River, Persieh.

Pileus 2–3 pollices et ultra latus; stipes 5–6 poll. longus, lævis glaber.

Ab *A. prominente* (Viviani) stipite nudo et labellis latis, ab *A. procero* (Scopoli) et *A. bubalino* (Berk.) umbone mamilliformi et stipite haud bulboso distinctus.

Agaricus Kirtoni, Kalchbrenner. (Sectio *Hebeloma*).

Pileo compacte carnoso convexo-plano obtuso subrepando lævi glabro testaceo praeditus cortina nulla, stipite solido carnoso fibrilloso pallido albo-sericeo, lamellis adnatis confertis angustis carneo-lateritiis, sporis ovatis, carneo-ochraceis.

Illawarra, W. Kirton.

Pileus 2–3 poll. latus; stipes pileo æquilongus, ½ poll. crassus. Statura *A. fastibilis.* Ob sporarum colorem inconsuetum forte ad Entolomata referendus, sed nimis compactus et habitu omnino Tricholomatis.

Agaricus peltastes, Kalchbrenner. (Sectio *Hypholoma.*)

Pileo carnoso viscoso plano scutiformi leviter umbonato margine demum reflexo fuscescente praeditus, stipite solido longo deorsum incrassato nudo albo, lamellis uncinato-adnatis latis ventricosis subdistantibus cinereo-nigricantibus, sporis fusco-purpureis.

Illawarra, W. Kirton.

Pileus 2–3 poll. latus; stipes 4–5 poll. longus, superne 3 lin. inferne 4–5 lin. crassus.

Proximus *A. Buxbamii* (Weinm.), abs quo colore pilei et stipite deorsum incrassato differt. Ab *A. Prescottii* (Weinm.) et *A. Gilleti* (Fries) ob stipitem nudum alienus.

Polyporus lucidus, Fries, var. *exquisitus*, Kalchbr.

(Sectio *Pleuropus.*)

Pileo circinato-reniformi horizontali plano castaneo ad ambitum albido praeditus, zonis pilei dilute rufis, stipite verticali piceo.

Endeavour River, Persieh.

Medius inter *P. lucidum* et *P. Japonicum* (Fr.), qui vero stipite toruloso differunt.

Scleroderma pileolatum, Kalchbrenner.

Peridio globoso opaco umbrino subtus concavo praeditum stipite tenui, subaequali vix in pileum dilatato, basi coma radiculorum acuto, massa sporifera nigra.

Illawarra, W. Kirton.

Peridium nucis avellanæ magnitudine.

Botanical Notes on Queensland.

By the Rev. J. E. Tenison-Woods, F.G.S., F.L.S., &c.

No. V.—The Forests or Scrubs.

The general impression about Australia is that its interior is of a desert character and generally more or less denuded of trees. Whether this is true of any desert region mav be questioned. The most arid regions of the world have trees or shrubs of some kind. Even the shifting sands of the Nefood of Arabia or the African Sahara have their stunted vegetation, and these regions are continually interrupted with finely timbered plains. The stony deserts of Central Australia are rare and exceptional. On these nothing is to be seen but a solitary clump of *Polygonum junceum* or of Mulga (*Acacia aneura*). The vast plains of the interior are however covered with trees, and when these grow in thickets they go by the colonial name of "scrubs." The term is of very varied application. Just as the trees in different localities are of different kinds and different heights, so are the scrubs. There is the greatest possible diversity between what is called a "scrub" in New South Wales, in Victoria, and in Queensland. The trees are different and the whole aspect is different. To describe the distinctive features of each would be a kind of descriptive botany for each colony. A scrub is usually a dense thicket of the trees which happen to be most common in the locality. The term forest would best suit some of these masses of vegetation, and the term thicket others. In reality the word scrub is an incumbrance because it confuses by classing under one term the most diversified features. Still as it is employed everywhere in the colonies I suppose we must put up with it and try to render its ambiguity less misleading by descriptive explanations. This is the object of the present paper, and it proposes to deal with the scrubs of Queensland.

In a former work* I have described at some length what is meant by one kind of scrub in South Australia. This is what is known as Mallee. It covers many thousand square miles of flat country on the low lands between the south bank of the River Murray and the sea. Through all this vast extent the land is thickly and almost exclusively clothed with a dense shrubby growth of *Eucalyptus.* I do not pretend to determine the species since there are three or four and there may be more, *E. oleosa*, F.v.M., is one of the species and *E. dumosa*, A. Cunn. is another, with occasionally trees of *E. gracilis*, F.v.M. But which of the two first predominates I cannot say. They are not trees: instead of a trunk or stem, there rises from each root a cluster of slender stalks scarcely an inch in diameter, which ends at from eight to fourteen feet in height in a cluster of pale olive leaves. All round the stem, small dry withered branches stand out. These represent successive bush fires which sweep over the plains, at intervals of about three years or more, for it takes three years growth to place the bushes in a state of thickness sufficient to feed a fire again. The soil is hard and level, almost indurated, of yellow or brown colour and with abundance of brown polished or glazed rounded pebbles of iron oxides. There is more sand than clay in the ground, but this varies. In many places it is soft and boggy, or again covered with sand and even crystals of selenite of large size. Besides the Mallee as the *Eucalyptus* hicket is called, there is but little in the way of shrubs or trees.

* Geological Observations in South Australia, London, 1863.

On the rising ground one may find clumps of Pine (*Callitris robusta)* and in the clay flats open forests of Box (*E. hemiphloia*) but otherwise the Mallee is a dense thicket of Eucalypts, bushes of the whipstick pattern I have described. The view over one of these areas of Mallee is very peculiar. From the top of any moderate elevation, one looks over an immense undulating sea of yellowish-brown bushes. In the far distance one may observe a blue outline of some solitary hill or granite peak, otherwise the monotonous dun outline of the horizon is unbroken, silent, and motionless except where the scrub hen (*Leipoa ocellata)* raises its mournful note, or the wind stirs the stiff branches near.

Such thickets as these are absolutely impenetrable. The bushes oppose an effectual obstacle to both man and horse. But there is nothing for which they need be penetrated. They are waterless regions and there is no grass. A few of what are called scrub cattle have tracks on the outskirts, where they live and breed much to the annoyance of the settlers near. Horsemen sometimes follow them but any attempt to go off the track is sure to result in the clothes being torn to pieces. As an instance of what a barrier these scrubs are, I may mention that in 1859 I had to ride a distance of 25 miles to skirt a scrub between two stations in the Tatiara country (Victoria and South Australia) that were only six miles apart. This was the usual road between Yarrak and Lowloit the stations in question. In 1860 the blacks were induced by threats and promises to cut a road through the Mallee which is now generally used and has become a good beaten track.

Such scrubs as these are not known in Queensland, but there are others quite as impenetrable. But in order to institute a better comparison, I will describe some other thickets. In South Australia, on the borders between that colony and Victoria it is not uncommon to meet with almost impenetrable thickets of *Banksia marginata* (Honeysuckle) in marshy places. The trees are poor and stunted, but grow with a very straggling virgate habit out of a thick tenacious yellow clay. One remarkable feature in these scrubs is that they are infested with the venomous *Hoplocephalus curtus* to an extraordinary extent when the water has dried and the grass is long.

In Tasmania there are thickets or scrubs of various kinds. On the north side of the Island the dense growth of the Pine *Arthrotaxis cupressioides*, Dom., makes some of the mountains quite inaccessible. On the south-east side the spurs of Mount Adanson and the Hartz Mountains between Port Esperance and Recherche Bay are clothed with a scrub of *Pomaderris elliptica*, or as they term it pear-tree. It grows in close masses of saplings some 15 or 20 feet in height and scarcely any one would make a way through such a thicket unless with an axe. The same kind of scrub is seen on the spurs of the Dandenong Ranges near Melbourne as well as on the south-east coasts of New South Wales. At Cape Otway and in some portions of the above Dandenong Mountains there is a scrub of beech (*Fagus cunninghami)* a lofty tree with most graceful myrtle-like foliage of every variety of colour. Then there are fern tree scrubs in the Western Port, Gipps Land, and other districts where the fern tree is principally *Alsophila excelsa.* There are also fern tree scrubs in Tasmania, but these are principally constituted by the shady *Dicksonia antarctica.*

With a knowledge of this diversity in the composition of what is called a scrub, it will not surprise us to learn that the masses of vegetation which go by that name in Queensland are of a quite peculiar character. I have already in the course of these notes dealt with the river scrubs on the eastern side of the watershed. These are properly speaking forests, tropical forests with the character of the Indian jungles. They comprise very large trees with an undergrowth of ferns, and in the tropics abundance of *Calamus australis* a climbing palm with long thorny tendrils. Without a scrub-knife, an instrument which is a combination of a thin sword-blade and a bill-hook, such forests are absolutely impenetrable, and even then the Lawyers as the *Calamus* is called, form a most irritating and effectual obstacle. To this drawback may be added the Stinging Tree (*Laportea moroides*) the sting of which is fatal to horses. The soil of such scrubs is of the richest description. I think it would be better if the term "scrub" was not applied to these forests. They are so utterly different from what is included under that name in other parts of the colony that jungle would be a far better expression. We find in them a very large proportion of genera and species which are characteristic of the Indian Archipelago and China, while the characteristic Australian genera such as *Eucalyptus*, *Acacia*, and *Banksia* form a comparatively small portion of the vegetation. There is one peculiarity about them to which attention has not been drawn as a mark of distinction. In the true Australian scrub usually one or two species predominate, in fact almost exclude every other. The jungle forests are of a much more mixed character. No one genus or even species gives its character to the forest. If there be any aparent exception to this, it is that in the tropics the climbing palm (*Calamus*) is very abundant and nearly every tree has its stem variegated by the pretty climbing Aroid, *Pothos loureiri*. Another very common Aroid climber is *Rhipidophora quinata*, Schott, called in most places the climbing fern. It clasps the stems of the tallest trees in succulent snake-like smooth vines about two inches in diameter, sending forth at every few inches enormous pinnate leaves a couple of feet in length. In New South Wales, such forests are called "Brushes."

But the characteristic scrub of Northern Queensland is that called Brigalow which covers so much of the tablelands of the colony. Every one who is familiar with the works of the early explorers must remember how frequent are the reference to "Brigalow." In Leichhardt's "Overland Journey to Port Essington," it occurs at almost every page. Before I visited

Queensland I found a great difficulty in finding out what Brigalow signified. The only attempt at an explanation is in the excellent Treasury of Botany, but there the account is given by one who had evidently never seen the scrub referred to, and took his description from others. Yet it is not very difficult to characterize it and it is very uniform in its features wherever it is met with. Brigalow is an Acacia forest where the trees are of good height and size, seldom rising more than about 100 feet above the ground. The species in most places is *A. harpophylla*, F. v. Muell. The name is derived from the sickle-shape of the leaves which moreover are of a peculiar bluish grey colour. This gives the scrub a silky or hoary appearance never to be mistaken, and thus one can tell a clump of Brigalow at some considerable distance. The bark is dark brown, very rough and furrowed and the general habit of the tree is sordid and straggling. In poor soils this is especially so, but in the rich black volcanic soils, it does not so readily become a tree, but rises up in a luxuriant dome of foliage from the ground. The sap-wood is yellow and somewhat soft, but the duramen or heart-wood is of a rich purple-brown colour, emitting a fragrant odour of rosewood when fresh cut. This is a character which it shares with many Acacia trees.

This tree *Acacia harpophylla* is the only one which is recognised as Brigalow. There are two or three other species of Acacia always found near it, but they are never called Brigalow, and this species moreover is so very marked in its characters that it cannot be mistaken for any other. The bluish-grey appearance, the long sickle-shaped rigid leaves and the rough furrowed bark when once seen will always be readily recognised. Near the scrubs of the Expedition Range I remember seeing a large quantity of Brigalow where the leaves from some cause were pale yellowish-brown. This I should say was a variety; but even then there was no mistaking the Brigalow from its other characters. The scrubs formed of these trees are very dense as they grow only close together. Generally speaking there is a tangled undergrowth and over a very large extent of country I observed that this was mainly composed of a thorny bush of the Apocyneæ, named *Carissa ovata.* The leaves are small and bright green and the flowers are white, but quite inconspicuous. Unlike most of the dogbanes, this little bush produces a very pleasant fruit which is both agreeable and wholesome. It is like a Sloe, egg-shaped and about half an inch long. It exudes a viscid milky juice and contains a few woody seeds. Some persons are afraid to indulge in these berries, no doubt owing to the bad character of the order, which contains some of the most poisonous plants known. I can however testify that the fruit of *Carissa ovata* is both agreeable and wholesome, and I never knew an instance of any evil consequences, even when they were partaken of most abundantly. The fruit ripens in April, May, and June. It may serve to allay the fears of some who are suspicious, to remind them that the Cow-tree whose milky juice is so freely partaken of by the natives of British Guiana is one of the Dogbanes (*Tabernæmontana*).*

Side by side with Brigalow we meet with two other species of *Acacia*, but they are not so abundant and never form more than a minor ingredient of the scrubs. One is *A. excelsa* which in the Treasury of Botany is the name given to Brigalow. Its habit is quite different. Its leaves are green, somewhat pendulous and the bark is black, but not furrowed in the manner of true Brigalow. It may be easily confounded with the other *Acacia* which is found in these scrubs, namely *A. salicina.* This is a tree with long pendulous branches along which the rather small ovate-lanceolate leaves hang down somewhat like the weeping willow. The flowers are in little yellow globular heads, and the bark though rough is less so than either of the other two species. It is a pretty tree and forms by its drooping habit an agreeable

* We have three species of this genus in North Queensland, one very common and yielding an abundance of milky juice.

contrast to the Brigalow, but though common it never grows in the form of scrubs.

Both these Acacia trees were described very early in the botanical history of this continent. Neither of them is so common as the Brigalow, and yet strange to say the latter which is found scattered over an enormous extent of country remained undescribed until it was found by Baron von Mueller in his overland journey from the Victoria River with Augustus Gregory in 1854. This is the more remarkable when we remember that Sir Thomas Mitchell was a zealous botanist, and on his journey to the Barcoo made extensive collections which Lindley described for him in the published account of his journey.* He passed through extensive forests of this very tree, but I suppose he must have regarded it as already described as it was so common, or confused it with some species that he had seen elsewhere. This was probably the case with Leichhardt who was the first to introduce the native (?) name of "Brigalow" to the public. There can be no doubt however that the species was never sent to Europe by any of the earlier botanists.

It is somewhat singular that this species of scrub is not confined to the poor light soils and stony ground. In the rich black soils of what are called the downs, dense Brigalow thickets are met with. These soils are derived from volcanic rock, and boulders of vesicular dolerite rock with glazed ironstone pebbles are always scattered amidst the black earth. In such localities there is usually an abundant and luxuriant growth of fodder grasses such as *Andropogon sericeus*, *Anthisteria australis*, *Perotis rara*, *Sporobolus lindleyi*, *Leptochloa subdigitata*, *Stipa micrantha*, *Aristida calycina*, *A. ramosa*, *A. vagans*, *A. arenaria*, and occasionally *Triodia mitchelli* or porcupine. But while such grasses appear in abundance in some parts of the volcanic soils and downs, they quite disappear in places where the Brigalow is

* "Tropical Australia," by Sir Thomas Mitchell, 1 vol., London, 1846.

abundant and the dry, black cracked earth looks singularly arid and desolate. But the Brigalow (I am speaking now only of the species *A. harpophylla*) is here a rich looking and luxuriant tree, and as I have already remarked, rising in a mass of foliage from the very earth. It is said that of late years the Brigalow has considerably increased and that the pastoral qualities of many portions of the downs have much deteriorated in consequence. From the amount of young trees on these downs I have no doubt that Brigalow has spread rapidly, and is spreading. Mr. O'Shannessy the well-known botanist of the Emerald District informs me that he has discovered the cause of this. He finds that the root suckers of the tree which spread a long way from the stem, always send up shoots when they are exposed and bruised. This happens frequently now from the abundance of cattle which keep down the grass. As far as I am aware the pods or seeds are not much eaten so that the explanation above given seems the only feasible one. If some means cannot be found to check the growth of the shoots, the value of the sheep and cattle runs will be reduced in an alarming way.

The black soil downs are also covered by a very beautiful crimson flower which deserves cultivation in our gardens as much as any member of the Australian indigenous flora. It is like a Waratah on a small scale with this difference, that it belongs to a different order *(Thymeleæ)* and is very much more abundant ; I refer to the *Pimelea hæmatostachyia*. When first I saw the plant on the black soil of the Westwood Railway Station, about 30 miles west of Rockhampton, I thought it must be an escape from some garden. The beautiful head of scarlet flowers, variegated with the bright yellow anthers made it a most conspicuous addition to the flora of the plains. But as I travelled west I found the plains to be perfectly crimson from the abundance of these plants. I am told that it has increased very much of late years, and as it appears not to be eaten by stock while the grasses all round are devoured, there is every probability that it will go on increasing. This and the African Marigold (*Tagetes glandulosus*) bid fair to overrun all the open country. They form a thick growth already, the latter sending up stems which are eight and ten feet high.

I may here remark in passing, that the black soil becomes almost impassable in wet weather. It forms a thick and stiff tenacious clay, through which the roots and stems of the grasses interlace, making it as tough almost as gutta percha. It clogs round the feet of cattle and horses so that they stagger about with these enormous clay boots on their feet. Those who have had the misfortune to be overtaken by rain when driving through such soil, will like myself, probably never forget their experiences. Travelling soon becomes an impossibility. The wheels become large, clumsy disks of black clay and grass requiring long and severe work with a hatchet or spade to set them free. When this process has to be repeated every mile or so, and the rate of travelling is about a mile an hour, one can guess what sort of progress is made and what tedious labour entailed.

In the rich soils the vegetation of the Brigalow is more uniform and there are but few other trees noticed besides Brigalow. In the poor soils the scrub is more dense. Interspersed in all such thickets we find four or five trees of small size which are widely distributed throughout Australia, *Eremophila mitchelli* is one of them. This also goes by the name of Sandal Wood from the pleasant odour given off by the wood not only when freshly cut, but also for a long time afterwards. It is said that this wood will keep away that domestic pest of Queensland households the *Blatta* or cockroach. I cannot confirm this statement. I had a good sized billet cut and planed, and the odour from it was so strong as to perfume one of my trunks in which it was placed, but the cockroaches treated it with the utmost disdain. They ran over it and laid their eggs under it just as if it had been put there for their accommodation. This tree has been found throughout the whole extent of Australia. I have seen it on the edge of the salt-lake region north of Adelaide, and all explorers and collectors have recorded it from central Australia. Forrest in his last exploration traced it to the desert regions of North-west Australia not far from Nichol Bay. Thus we see it is a desert tree found all through the arid regions of tropical and sub-tropical Australia. It well deserves its name of *Eremophila* (lover of the desert) as it is found in no other regions. In many places it goes by the name of Dogwood. It has small dark grey-green linear leaves, and has a bushy appearance by no means inelegant. There are two other species generally associated with it, but not so common. One is a bush with very large brownish-red campanulate flowers. This is *E. longifolia.* The other is a small tree with larger leaves.

Occasionally through all the Brigalow one meets with trees of *Alphitonia excelsa* a member of an order (*Rhamnaceæ*) not at all well represented in this part of Australia. It may be easily known at a distance by its dappled aspect, for the oval leaves are a bright shining green on one side and white underneath, and thus it always has a speckled appearance. Like the sandal wood it is very wide spread, and is as common in the dense tropical jungle as in the desert. This feature is quite exceptional, for there is little else common to the two floras.

In all the Brigalow scrubs in the neighbourhood of the Dawson, Nogoa, Comet and Belyando Rivers one meets with occasional patches of the Bottle Tree, or *Sterculia rupestris* and *S. trichosiphon* The two species may be at once distinguished by their foliage. In other respects they are very similar. The stem is somewhat like an elongated soda-water bottle, and has a green, succulent, faintly wrinkled or smooth bark. They always grow in patches, not clusters, and generally in very thick scrub. It is said that the soft juicy tissue of the stem can be eaten and that many a wanderer in the bush has staved off hunger by its means. The young shoots and roots of young trees are agreeable and refreshing. The nuts are also eaten.

Atalaya hemiglauca, a member of the *Sapindaceæ* is another widely spread inhabitant of the desert regions and a constant accompaniment of the Brigalow scrubs. I believe it was found abundantly in Central Australia and is included in Baron von Mueller's list of the plants brought by Forrest from North-western Australia. It is an abnormal member of the Sapindaceous tribe, with emaciated looking pinnate leaves, but the pinnæ are long and so far apart as scarcely to be recognised as such. I have already remarked in a former part of these papers how beautifully fragrant are the graceful clusters of its small white flowers, and how in the desert it is a tree which may be easily known by the multitude of insects it attracts in flowering time. Afterwards it is equally conspicuous from the abundance of small yellow, winged seeds. These are like the sycamore except that they are not in pairs. The wood is very hard but the trees are always too small to be of much use. With it, scattered here and there in the more open plains is another abnormal member of an order which cannot count Australia for its stronghold. This is *Heterodendron oleæfolium* which belongs to the *Boragineæ*. It is a good deal like *Atalaya* at a distance, but a nearer inspection of course shews a vast difference in the foliage &c. It is not at all rough in the leaf. *Ehretia saligna*, R. Br., is another member of the same family found in the Brigalow. It is essentially a small desert tree. Mr. Alexander Forrest found it on Sturt's Creek on the edge of the Central Desert and I have little doubt that it extends through the whole interior. This is also true of a pretty little blue flower of the same order, which is found on all the more open Brigalow downs. This is *Trichodesma zeilanicum* R. Br., easily known by its grey silky leaves and blue flowers. I first noticed it on the granite slopes of Mount Cudtheringa at the back of Townsville, but afterwards found it was a common plant on all grassy plains throughout tropical Queensland. Forrest gathered it in North-west Australia, and in Gregory's Expedition Baron von Mueller brought it from Sturt's Creek.

Three or four species of *Capparis* are very common in all the Brigalow scrubs. *C. lasiantha*, R. Br. is the one most frequently met, and this is dispersed throughout Australia as a true desert plant. In Western Australia it is found as far south as the Gascoyne River, and on the Eastern side of the continent it extends far within the borders of New South Wales, always following the Brigalow. The other species are *C. nobilis* with large globular fruits, *C. hemistriatus* a small but rather pretty shrub seldom more than two feet high, *C. canescens* a small tree reaching 30 feet high; *C. mitchelli*, another shrub about half the height, and finally *C. ornans* a climber which spreads its large white showy flowers over many of the bushes and trees. In the scrubs near the coast one occasionally meets with *Randia densiflora* which I mention here for the sake of calling attention to its great beauty as an ornamental shrub. It is certainly a wonder that it has not been introduced into some of our gardens, where its thick clusters of crimson blossoms ought to make it a general favourite. Two species of Leguminous plants may be mentioned in this place. One is rather rare, *Barklya syringifolia*, with splendid racemes of rich yellow flowers possessing a fragrance far more delicate and rich than the well-known *Acacia farnesiana*. It is a very abnormal member of the Leguminosæ and is quite peculiar to Australia. The other tree is *Cassia brewsteri*, equally conspicuous from its flowers or fruits. The former are in long yellow racemes very like the *Laburnum* of Europe. The pods very long, black and ornamental, the well-marked dissepiments between the seeds adding much to the peculiar appearance. Messrs. Bailey and Scortechini are of opinion that there are two distinct species confounded under this name. I should add that the plant just referred to, *Acacia farnesiana* is not uncommon amid the Brigalow. It is scarcely necessary to remind readers that this species is widely distributed over the earth's surface, being found in Africa as well as India and the Indian Archipelago. It differs from most Australian species in the almost orange hue of the flowers, and the clusters of black swollen pods like bunches of black fingers. *Acacia oswaldi* is a common bush in the scrubs, with small phyllodia not very unlike the Mulga (*A. aneura*) of the central deserts. *Albizza basaltica* is as its name implies common on the rich basaltic downs amongst the Brigalow. This has been already referred to as being so useful for stock-whip handles. It goes by the absurd name of "Dead Finish." The wood is extremely tough and it is of good colour, like pale cedar and takes a beautiful polish. The tree is usually very small, not exceeding 15 feet.

A common tree amongst the more open portions of the scrub where the Brigalow begins to get less abundant, is *Alstonia constricta*, one of the *Apocyneæ*. Like the Indian *Alstonia* it contains a bitter principle which is of great value as a drug. Dr. Bancroft of Brisbane has exported a small quantity of the wood, every portion of which contains an extraordinary quantity of the bitter principle. From experiments at the Brisbane Hospital I have been given to understand that it was found as efficient as quinine. It goes by the name of "Bitter Bark," which is also a common epithet for *Petalostigma quadriloculare* which also occurs in the scrubs. I have noticed both these trees from South Queensland to the Carpentarian waters. The wood of both is used to form drinking cups, which for a long time converts into a bitter infusion the water which is placed in them.

There is an absence of grasses in the poorer soils of the Brigalow, and instead one notices principally a thick growth of *Sida cordifolia*, *Polymeria calycina*, *Evolvulus alsinoides* and *Vittadinia scabra* and *V. australis*, which carpet the ground with an almost constant bloom of yellow, pink, white, and blue flowers. Occasionally we find scattered on the plains amongst Brigalow, bushy clumps of *Apophyllum anomalum*, which looks exactly like the wiry bushes of *Polygonum junceum* such as we find in the interior. We see also a few trees here and there of *Owenia acidula* with its very acid fruits and pendulous branches of bright green broadly pinnate leaves. It is a graceful addition to the scrub. *Grevillea striata* is found at times in all inland scrubs as far as Cape York. It presents a most peculiar appearance with its pendulous ribbon-like leaves a foot or so in length, and half an inch wide. Much of the same habit is *Hakea lorea*, only its long leaves are cylindrical and about an eighth of an inch in diameter. *Canthium buxifolium*, *C. vacciniifolium*, and *Ventilago viminalis* may complete the mention of stragglers amid the Brigalow. To mention all would be a long list.

As a rule, as I have already stated, where Brigalow is thick it almost excludes every other kind of vegetation, except of Salt Bush (*Rhagodia spinescens*) and a few other inconspicuous plants. Brigalow may therefore be understood to mean an almost exclusive scrub of *Acacia harpophylla*, or thickets of a mixed character to which the various trees and shrubs mentioned in this paper contribute in varying proportions. True Brigalow extends from the northern tributaries of the Darling to about Lat. 19 S. It may extend further north, but I have not seen it. Of its western limits I have no means of judging. It is found on the head waters of the Barcoo and Flinders. I have not seen it nearer to the east coast than about 30 miles. The following is a list of a few of the plants noticed by me in the Brigalow scrubs in the northern territory and not referred to in the preceding pages.

Clematis microphylla, DC.
Ranunculus parviflorus, DC.
Hibbertia stricta, R. Br.
Lepidium ruderale, L.
Polanisia viscosa, DC.
Capparis sarmentosa, A. Cunn., *C. canescens*, Lindl., *C. loranthifolia* Lindl.
Hybanthus suffruticosus, Ging., *H. floribundus*, Walp.
Pittosporum phillyræoides, DC.
Bursaria spinosa, Cav. The form found in the Brigalow differs much from that common in South Australia, and it flowers

at a different time—May and June. Bentham had much hesitation in uniting the two species.

Citriobatus parviflorus, A. Cunn.

Cheiranthera linearis, A. Cunn. In some patches of Brigalow on the higher portions of Expedition Range. This is the only record of its occurrence in the tropics. It is not uncommon at Stanthorpe.

Polygala japonica, Houtt.

Frankenia pauciflora, DC.

Cerastium vulgatum, L.

Stellaria media, L.

Polycarpon tetraphyllum, L.

Polycarpæa synandra, F. v. Muell.

Portulaca oleracea, L., and *P. filifolia*, F. v. Muell.

Calandrinia balonensis, Lindl., *C. pusilla*, Lindl.

Hypericum gramineum, Forst.

Sida corrugata, Lindl., *S. virgata*, Hook., *S. pleiantha*, F. Muell., *S. rhombifolia*, L.

Abutilon tubulosum, Hook., *A. mitchelli*, Benth., *A. subviscosum*, Benth., *A. muticum*, G. Don.

Urena lobata, L.

Hibiscus ficulneus, L., *H. trionum*, L., *H. brachysiphonius*, F.v.M., *H. divaricatus*, Grah., *H. sturtii*, Hook., *H. tiliaceus*, L.

Sterculia diversifolia, G. Don.

Erythoxylon australe, F. v. Muell.

Tribulus terrestris, L., and *T. cistoides*, L., especially common on the black soil.

Zygophyllum iodocarpum, Muell.

Erodium cygnorum, Nees.

Oxalis corniculata, L.

Eriostemon difformis, A. Cunn.

Boronia ledifolia, J. Gay.

Phebalium glandulosum, Hook.

Philotheca australis, Rudge.

Geijera salicifolia, Schott, *G. parviflora*, Lindl.
Atalantia glauca, Hook.
Owenia venosa, F. v. Muell.
Flindersia maculosa, F.v.M.
Celastrus australis, Harv., *C. bilocularis*, F.v.M.
Stackhousia monogyna, Labill.
Cryptandra amara, Sm.
Vitis nitens, F. Muell.
Dodonæa peduncularis, Lindl., *D. vestita*, Hook., *D. adenophora*, Miq.
Jacksonia scoparia, R. Br.
Viminaria denudata, Sm. I believe this has not been previously recorded from Queensland.
Aotus mollis, Benth.
Gastrolobium grandiflorum, F. v. M.
Dillwynia floribunda ? Sm.
Hovea longifolia, R. Br., *H. longipes*, Benth.
Crotalaria mitchelli, Benth., *C. dissitifolia*, Benth.
Psoralea eriantha, Benth., *P. tenax*, Lindl.
Indigofera linifolia, Retz., *I. glandulosa*, Willd., *I. trita*, L., *I. australis*, Heyne, *I. brevidens*, Benth.
Sesbania aculeata, Persoon. Generally in old watercourses.
Swainsonia galegifolia, R. Br.
Zornia diphylla, Pers. I have been inclined to think there are two species.
Desmodium sp. Two or three specimens of this genus were mislaid. It is well represented in the poor scrubs, especially in stony ground.
Glycine falcata, Benth., *G. tabacina*, Benth.
Hardenbergia monophylla, Benth. Very common in scrubs.
Erythrina vespertilio, Benth.
Vigna vexillata ? Benth.
Atylosia scarabæoides, Benth.
Barklya syringifolia, F. v. M.

Cassia brewsteri, F. v. M., *C. australis*, Sims, *C. eremophila*, A. Cunn., *C. artemisioides*, *C. sturtii*, F. v. M.

Bauhinia cunninghami, Benth., *B. carronii*, F. v. M.

Neptunia gracilis, Benth.

Acacia triptera, Benth., *A. conferta*, A. Cunn., *A. sentis*, F. Muell., *A. penninervis*, Sieb., *A. neriifolia*, A. Cunn., *A. podalyriæfolia* A. Cunn., *A. stenophylla*, A. Cunn., *A. implexà*, Benth., *A. doratoxylon*, A. Cunn., *A. cunninghami*, Hook., *A. spectabilis*, A. Cunn., *A. bidwilli.*

Rubus parvifolius, L.

Ceratophyllum demersum, L.

Terminalia muelleri, Benth., *T. oblongata*, F. v. M.

Macropteranthes leichhardtii, F. Muell. This was found in the Scrub between Emerald and Neathersfield by Mr. O'Shannessy.

My specimens of Myrtaceæ and Compositæ, were with few exceptions, destroyed in the Garden Palace Fire, together with grasses, ferns, and all but the few remaining specimens to be enumerated.

Dentella repens, Forst.

Canthium lucidum, Hook. and Arn. Rather common in all the Brigalow west of Rockhampton. *C. oleifolium*, Hook. *C. buxifolium*, Benth. *C. coprosmoides*, F. v. M.

Asperula scoparia, Hook.

Cucumis trigonus, Roxb.

Hydrocotyle laxiflora, DC.

Trachymene incisa, Rudge.

Daucus brachiatus, Sieb.

Loranthus longiflorus, Desr., *L. linearifolius*, Hook., *L. pendulus*, Sieb.

Stylidium graminifolium, Swartz.

Velleia paradoxa, R. Br.

Goodenia glabra, R. Br. *G. grandiflora*, Sims.

Scævola spinescens, R. Br.

Wahlenbergia gracilis, A. DC.
Isotoma axillaris, Lindl.
Melichrus rotatus, R. Br.
Maba humilis, R. Br.
Jasminum racemosum, F. v. M., *J. lineare*, R. Br., *J. suavissimum* Lindl.
Parsonsia lanceolata, R. Br.
Lyonsia eucalyptifolia, F. v. M.
Secamone elliptica, R. Br.
Gymnanthera nitida.
Marsdenia leichhardtiana, F. v. M.
Hoya australis, R. Br. Only on rocky places.
Artanema fimbriatum, Don.

The Brigalow is peculiarly rich in species of *Solanum*, but all my examples are destroyed.

Tecoma australis, R. Br.
Ruellia primulacea, F. v. M., *R. corynotheca*, F. v. M., *R. australis* R. Br.
Justicia procumbens, L.
Erianthemum variabile, R. Br.
Myoporum deserti, A. Cunn., *M. debile*, R. Br.
Eremophila latrobei, F. v. M., *E. longifolia*, F. v. M., *E. polyclada* F. v. M., *E. brownii*, F. v. M., *E. maculata*, F. v. M.
Verbena officinalis, L., *V. bonariensis*, L.
Spartothamnus junceus, A. Cunn.
Clerodendron floribundum, R. Br.
Mentha australis, R. Br.
Salvia plebeia, R. Br.
Anisomeles salvifolia, R. Br.
Prostanthera euphrasioides, Benth.
Teucrium integrifolium, F. v. Muell.
Ajuga australis, R. Br.
Plantago varia, Br.
Rhagodia parabolica, R. Br.

Chenopodium auricomum, Lindl.

Atriplex vesicaria, Hew., *A. halimoides*, Lindl.

Kochia lanosa, Lindl.

Salsola kali, Linn.

Amarantus macrocarpus, Benth.

Trichinum obovatum, Gaudich, *T. macrocephalum*, R. Br., *T. exaltatum* Benth.

Alternanthera nodiflora, R. Br., *A. denticulata*, R. Br.

Boerhaavia diffusa, Linn.

Petrophila sessilis, Sieb.

Conospermum sphacelatum, Hook.

Persoonia sericea, A. Cunn., *P. falcata*, R. Br.

Macadamia ternifolia, F. v. Muell.

Xylomelum salicinum, A. Cunn.

Grevillea longistyla, Hook., *G. polystachya*, R. Br., *G. robusta*, A. Cunn.

Hakea saligna, Knight.

Lomatia silaifolia, R. Br.

Banksia integrifolia.

Pimelea glauca, R. Br., *P. collina*, R. Br., *P. linifolia*, Sm., *P. leptostachya*, Benth.

Petalostigma quadriloculare, F. v. M.

Euphorbia mitchelliana, Boiss., *E. drummondii*, Boiss., *E. alsinæflora* Baill.

Poranthera microphylla, Brongn. On clay banks.

Beyeria viscosa, Miq.

Ricinocarpus bowmanni, F. v. M., *R. ledifolius*, F. v. M.

Bertya mitchelli, Mull Arg., *B. olæifolia*, *B. sp.* (*crotonoides*, O'Shan. MS.)

Alchornæa ilicifolia, Muell. Arg.

Tragia novæ-hollandiæ, R. Br.

This little plant stings just like the common house nettle.

Casuarina glauca, Sieb., *C. cunninghamiana*, Miq.

Thesium australe, R. Br.

Santalum lanceolatum, R. Br.

Exocarpus aphylla, R. Br.

Frenela robusta, Cunn. This tree occurs in patches in the Brigalow scrub far within the tropics, but always in the driest and poorest sandy soils. I have noticed that it seems particularly fond of soils derived from granite.

Araucaria bidwilli, Hook. Rare.

Cycas media, R. Br., On poor soils.

Macrozamia perowskiana, Miq. If I am correct in my identification this is very abundant on the edges of scrubs, and in the sandstone and trap ranges between the Comet River and Springsure. It is a noble tree like a palm, about 20 feet high. The ground about this neighbourhood is covered with the large nuts. Mr. Baily and Mr. O'Shannessy both are inclined to regard this as a different species.

The few Orchids I was able to collect were destroyed in the Garden Palace Fire. Brigalow is not rich in them.

Bulbine bulbosa, Haw.

Arunidinella nepalensis, Trin.

Contribution to a knowledge of the Fishes of New Guinea.—No. III.

By William Macleay, F.L.S., &c.

Family LABRIDÆ.

197. Chærops macrodon, Bleek.

Gunth., Cat. 4, p. 94.—Bleek., Atl. Ichth., Labr., p. 162, pl. 47, fig. 1.

Syn.—*Labrus macrodontus*, Lacep.—Cuv. & Val.

"Tarquoya" of the natives.

198. Chærops ommopterus, Richards.

Ichth. China, p. 257.—Gunth., Cat. 4. p. 94.

Syn.—*C. Schœnleinii*, Cuv. & Val.—Bleek., Atl. Ichth. Labr., p. 163, p. 46, fig. 3.

"Dava-Dava" of the natives.

199. Cheilinus oxycephalus, Bleek.

Gunth., Cat. 4, p. 128.—Bleek., Atl. Ichth. p. 65, tab. 28, fig. 5.

"Mami" of the natives. A name given to several of this genus.

200. Cheilinus fasciatus, Bl.

Gunth., Cat. 4, p. 129.—Bleek., Atl. Ichth., p. 68, tab. 26, fig. 3.

201. Cheilinus undulatus, Cuv. & Val.

Gunth., Cat. 4, p. 129.—Bleek., Atl. Ichth., p. 68, tab. 26, fig. 3.

202. Cheilinus radiatus, Bl.

Gunth., Cat. 4, p. 131.—Bleek., Atl. Ichth. p. 68, tab. 25, fig. 1.

Syn.—*C. commersoni*, Benn., *C. coccineus*, Rüpp., and *C. diagramma*, Cuv. & Val.

"Ubaquarumi" of the natives.

203. Cheilinus chlorurus, Bl.

Gunth., Cat. 4, p. 128.—Bleek., Atl. Ichth. p. 65, tab. 27, fig. 3.

Syn.—*C. guttatus*, and *decacanthus*, Bleek.

204. Cheilinus trilobatus, Lacep.

Gunth., Cat. 4, p. 126.—Bleek., Atl. Ichth. p. 66, tab. 27, fig. 2.

Syn.—*C. nebulosus*, Richards.—*C. tetragona*, Bleek.

205. Epibulus insidiator, Bl.

Gunth., Cat. 4, p. 135.—Bleek., Atl. Ichth., p. 74, tab. 22, fig. 3.

"Cabamourna" of the natives.

206. Anampses geographicus, Cuv. & Val.

Gunth., Cat. 4, p. 137.—Bleek., Atl. Ichth. p. 102, tab. 25, fig. 3.

"Humatua" of the natives.

207. Hemigymnus melanopterus, Bl.

Gunth., Cat. 4, p. 139.—Bleek., Atl. Ichth. p. 142, tab. 45, fig. 3.

Syn.—*Tautoga melapterus*, Cuv. & Val., Richards. and Bleek.

"Orlohe" of the natives.

208. Hemigymnus fasciatus, Bl.

Gunth., Cat. 4, p. 138.—Bleek., Atl. Ichth. p. 141, tab. 46, fig. 2.

Syn.—*Tautoga fasciata*, Cuv. & Val.—*Cheilinus Blockii*, Cuv. & Val.

209. Platyglossus chloropterus, Bl.

Gunth., Cat. 4, p. 144.—*Halichœres chloropterus*, Bleek., Atl. Ichth., p. 125, tab. 35, fig. 3.—*Julis semidecorata*, Less., Voy. Coq., pl. 25.

"Gau" of the natives.

210. Platyglossus hortulanus, Lacep.

Gunth., Cat. 4, p. 147.—*Hemitautoga centiquadra*, Bleek., Atl. Ichth., p. 139, tab. 32, fig. 3.—*Julis decussatus*, Cuv. & Val.—*Halichœres eximius*, Rüpp.

211. Platyglossus guttulatus, *n. sp.*

D. 9/11. A. 3/11. L. lat. 27.

The height of the body is one-fourth of the total length; the anterior canine teeth long; the tail truncate. The colour in spirit specimens is of a pale olive-yellow all over, with indistinct traces of two or more darker lines on the sides; every scale on the back and sides has a minute brown dot near its base; there is a coloured band from the mouth to the eye, and a dark spot behind the eye, the pectoral fins have a narrow blue line at their base above. The other fins are yellow and immaculate.

"Gau" of the natives. Length 4 inches.

212. Novacula vanicolensis, Cuv. & Val.

Gunth., Cat. 4, p. 172.—*Julis vanicorensis*, Quoy & Gaim., Voy. Astrol., p. 704, pl. 20, fig. 1.—*Novaculichthys tæniurus*, Bleek., Atl. Ichth., p. 144, tab. 31, fig. 5.

213. Julis lunaris, L.

Gunth., Cat. 4, p. 180.—Bleek., Atl. Ichth , p. 90, tab. 33, fig. 5.

Syn.—*J. Hardwickii*, Gray.—*J. porphyrocephala*, Benn.—*J. Duperrei*, Quoy & Gaim.—*J. viridis*, Cuv. & Val., &c.—*Labrus gallus*, L. Gm.

214. Cheilio inermis, Bl.

Gunth., Cat. 4, p. 194.—Bleek., Atl. Ichth., p. 82, tab. 31, fig. 4.

Syn.—*C. auratus*, *fuscus*, *cyanochloris*, *Forskalii*, *hemichrysos*, *viridis*, and *microstoma*, of Cuv. & Val.

215. Coris annulata, Lacep.

Gunth., Cat. 4, p. 202.—Cuv. and Val., 13, p. 501, pl. 388. *Hologymnosus fasciatus*, Bleek., Atl. Ichth., p. 96, tab. 20.—*Julis rosea*, Quoy & Gaim.—*J. doliatus*, Cuv. & Val.

216. Coris cyanea, *n. sp.*

D. 9/10. A. 3/11. L. lat. 62.

Height of body nearly one-third of the total length, and considerably more than the length of the head. Profile of head concave with a prominent hump above. Eye small, about three diameters from point of snout. Mouth oblique, anterior canine teeth large, lips rather large but not fleshy, the lower with a fold on each side. The first two spines of the dorsal fin longer than, and nearly separated from the others ; the rays of the caudal fin project considerably beyond the connecting membrane ; the ventrals are pointed. The colour in spirits is black all over. Mr. Goldie describes it as " Metallic-blue all over ; tip of tail and lower fins edged with dark green."

" Gira-Gira " of the natives.

217. CORIS PULCHERRIMA, Val.

Gunth., Cat. 4, p. 200.—*C. formosa*, Bleek., Atl. Ichth., p. 99, tab. 19, fig. 3.

"Homatua" of the natives.

218. CORIS CINGULUM, Lacep.

Gunth., Cat. 4, p. 203.—*Julis cingulum*, Cuv. & Val.—*Julis semipimetatus*, Rüpp.—*Labrus aureo-maculatus*, Benn., Fish, Ceyl. p. 20.

219. SCARICHTHYS CÆRULEOPUNCTATUS. Rüpp.

Gunth., Cat. 4, p. 213.—Bleek., Atl. Ichth. p. 16. tab. 1, fig. 2.

"Koko-koko" of the natives.

220. CALLYODON BRACHYSOMA, Bleek.

Gunth., Cat. 4, p. 215.—Bleek., Atl. Ichth. p. 14, tab. 2, fig. 3.

221. PSEUDOSCARUS MICRORHINUS, Bleek.

Gunth., Cat. 4, p. 235.—Bleek., Atl. Ichth., p. 22, fig. 3.

222. PSEUDOSCARUS STRONGYLOCEPHALUS, Bleek.

Gunth., Cat. 4, p. 235.—Bleek., Atl. Ichth., p. 23, tab. 4, fig. 3.

"Cuculedo" of the natives.

223. PSEUDOSCARUS CHRYSOPOMA, Bleek.

Gunth., Cat. 4, p. 221.—*P. viridis*, Bleek., Atl. Ichth., p. 45, tab. 17, fig. 2.

Scarus Quoyi, Cuv. & Val., not Bleek.

224. PSEUDOSCARUS CANTORI, Bleek.

Bleek., Atl. Ichth., p. 43, tab. 9, fig. 2.

225. PSEUDOSCARUS NUCHIPUNCTATUS, Cuv. & Val.

Gunth., Cat. 4, p. 223.—Bleek., Atl. Ichth., p. 31, tab. 10, fig. 3.

Scarus limbatus, Cuv. & Val.

226. PSEUDOSCARUS GYMNOGNATHUS, Cuv. & Val.

Gunth., Cat. 4, p. 239.—Bleek., Atl. Ichth., p. 28, tab. 15, fig. 3.

"Vaciri" of the natives.

227. PSEUDOSCARUS GOLDIEI, *n. sp.*

Upper and lower profile moderately and equally convex; lips very narrow, jaws whitish or rosy; two series of scales on the cheek, the lower composed of six scales, the lower præopercular limb naked. Tail truncate, the three terminal body scales extending far upon it. Fourteen pectoral rays. Colour "Dull purple all over, pinkish under head." Length 7 inches.

"Kukka-kukka" of the natives.

228. PSEUDOSCARUS FRONTALIS, *n. sp.*

Two series of scales on the cheek, the lower of seven scales; one scale beneath on the præopercular limb. Lips narrow, jaws blue, with strong pointed teeth at the angle of the upper. The head is flat and almost horizontal above, until above the mouth, where it becomes suddenly rounded and vertical. The scales are large. L. lat. 22. Fifteen pectoral rays; tail with the outer rays much produced. Mr. Goldie's note of the coloration is, "Green back, dark purple over nose, fins and belly light green, blue and purple streaks under the mouth, eye dark gold, fins and tail purple and blue." The upper half of the pectorals is dark coloured beneath. A large fish over 18 inches in length.

"Naitahe" of the natives.

229. PSEUDOSCARUS PAPUENSIS, *n. sp.*

Three series of scales on the cheek, covering the præopercular limb. Jaws whitish, the upper not half covered by the lip, and with two strong teeth at each angle. The tail is crescent shaped, 13 rays in the pectoral fins; profile moderately convex. L. lat. 21. Colour in spirits uniform yellowish. Mr. Goldie says, "Green with edge of scales bright pink, side fins green and pink, tail green with pink stripe on top and bottom, but edged with green, top and bottom fins pink edged with turquoise blue, orbit hazel." Length 16 inches.

"Niiti" of the natives.

230. PSEUDOSCARUS ZONATUS, *n. sp.*

Three series of scales on the cheek, not covering the præopercular limb; the jaws are whitish, without teeth at the angle, the upper almost entirely covered by the lip; thirteen pectoral rays; tail crescentic, the outer rays considerably produced. The lower profile is much more convex than the upper. Coloration according to Mr. Goldie—" Head dull green fading to light green towards the tail, two yellow patches on each side, pinkish along belly. There seems to be a well defined dark patch covering the head and back from the mouth to near the extremity of the pectoral fin in a line with the lower margin of the eye.

"Dulai" of the natives.

231. PSEUDOSCARUS LABIOSUS, *n. sp.*

Two series of scales on the cheek, the lower of six scales; the præopercular limb entirely naked. Profile more convex below than above. Jaws whitish, the upper with three, the lower with two pointed teeth at each angle of the mouth; the upper lip rather broad, but not covering more than half of the jaw, the lower lip reflected and lobed in the middle. Pectoral rays thirteen; the lateral rays of the caudal fin somewhat produced. L. lat. 24. The colour in spirits is of a brownish-yellow, lighter on the under surface; the fins are yellow, the dorsal and anal having evidently had a coloured submarginal band, there are traces of two broad coloured bands across the chin.

"Bonoheri" of the natives.

232. PSEUDOSCARUS MORESBYENSIS, *n. sp.*

Three series of scales on the cheek, the middle series with five scales, the lower with two, these last just reaching the præopercular limb. Jaws whitish and half covered by the lips which are rather broad and like those of *P. labiosus;* the tail is truncate. Mr. Goldie thus describes the colour in the fresh specimen—" Green and magenta body, top of head brownish, rest green, tail green and magenta with sea-green edges, orbit light hazel."

" Carava " of the natives.

I believe Mr. Goldie's collection contains several other species of this genus, but I am unable to satisfy myself as to their specific differences. I regret to find that Mr. Goldie's descriptions as regards this group of Fishes are not sufficiently detailed.

Family SILURIDÆ.

233. Plotosus macrocephalus, Cuv. & Val.

Cuv. & Val., XV., p. 428, pl. 449.—Bleek., Atl. Ichth., Silur., tab. 47, fig. 1.

" Deteira " of the native.

Family SCOPELIDÆ.

234. Saurus varius, Lacep.

Gunth., Cat. 5, p. 395.—Bleek., Atl. Ichth., Saurid., tab. 2, fig. 5.

Syn.—*S. variegatus*, Quoy & Gaim.—*S synodus*, Cuv. & Val.

Family SCOMBRESOCIDÆ.

235. Belone cancila, Buch.

Gunth., Cat. 6, p. 253.—Cuv. & Val., 18, p. 455.

" Quarrabudda " of the natives. From fresh water.

236. Belone annulata, Cuv. & Val.

Gunth., Cat. 6, p. 240.—Cant. Mal. Fish., p. 244.

Mastacambelus choram, Bleek., Atl. Ichth. Scombres., tab. 10, f. 2.

" Quarabata " of the natives.

237. BELONE LIUROIDES, Bleek.

Gunth., Cat. 6, p. 243.—*Mastacambelus liuroides*, Bleek., Atl. Ichth. Scombres. tab. 9, fig. 1.

238. HEMIRHAMPHUS COMMERSONII, Cuv.

Gunth., Cat. 6, p. 271.—Bleek., Atl. Ichth., Scombres. tab. 6, f. 3.

"Manaria" of the natives.

239. HEMIRHAMPHUS QUOYI, Cuv. & Val.

Gunth., Cat. 6, p. 267.—Bleek., Atl. Ichth., Scombres. tab. 6, fig. 1, and tab. 4, fig. 3.

"Moa" of the natives.

240. HEMIRHAMPHUS DISPAR, Cuv. & Val.

Gunth., Cat. 6, p. 274.—*Zenarchopterus dispar*, Bleek., Atl. Ichth. Scombres. tab. 7, fig. 4.

"Quarapata" of the natives. From fresh water.

241. HEMIRHAMPHUS CANTORI, Bleek.

Gunth., Cat. 6, p. 264.—Bleek., Atl. Ichth. Scombres., tab. 6, f. 2.

Syn.—*H. longirostris* and *Georgii* of Bleeker.

FAMILY CLUPEIDÆ.

242. ENGRAULIS ENCRASICHOLOIDES, Bleek.

Gunth., Cat. 7, p. 387.—Bleek., Atl. Ichth. Clup., tab. 5, f. 4.

243. CHATOËSSUS CHACUNDA, Cuv. & Val.

Gunth., Cat. 7, p. 411.—*Dorosoma chacunda*, Bleek., Atl. Ichth. Clup. tab. 3, fig. 5.

"Rurupete" of the natives.

244. ALBULA CONORHYNCHUS, Bl.

Gunth., Cat. 7, p. 468.—*Conorhynchus glossodon*, Bleek., Atl. Ichth., Clup. tab. 7, fig. 1.

Syn.—*A. macrocephala*, *parræ*, *goreensis*, *bananus*, *neoguineæ*, *seminuda*, *erythrocheilos*, and *forsteri*, of Cu. & Val.

"Quada" of the natives.

245. Elops saurus, L.

Gunth., Cat. 7, p. 470.—Bleek., Atl. Ichth., Clup., tab. 10, f. 3.

Syn.—*Elops machnata*, Richards., Voy. Ereb. and Terr., pl. 36, fig. 3–5.

246. Megalops macropterus, Bleek.

Bleek., Atl. Ichth., Clup., tab. 15, fig. 2.

"U-u-la" of the natives.

Dr. Gunther includes this species among the many synonyms of *Megalops cyprinoides*.

247. Chanos salmoneus, Bl.

Gunth., Cat. 7, p. 473.—Bleek., Atl. Ichth., Clup., tab. 14, f. 4.

Syn.—*C. mento*, *chloropterus*, *nuchalis*, *orientalis*, and *cyprinella* of Cuv. & Val.—*Lutodeira salmonea*, Richards., Voy. Ereb. and Terr., p. 58, pl. 36, fig. 1.

"Orrorobu" of the natives.

248. Chirocentrus dorab, Forsk.

Gunth., Cat. 7, p. 475.—Bleek., Atl. Ichth., Clup., tab. 13, f. 3.

"Harega" of the natives.

Family MURÆNIDÆ.

249. Muræna siderea, Richards.

Voy. Ereb. and Terror, p. 85, pl. 48, figs. 1–5.

"Tagala" of the natives.

Family SCLERODERMI.

250. Balistes flavimarginatus, Rüpp.

Gunth., Cat. 8, p. 223.—Bleek., Atl. Ichth. Balist., p. 113, tab. 4, fig. 3, and tab. 10, fig. 3.

"Dumocicia" of the natives.

251. Balistes viridescens, Bl.

Gunth., Cat. 8, p. 220.—Bleek., Atl. Ichth , Balist., p. 112, tab. 17. fig. 2.

"Baru-Baru" of the natives.

252. Balistes fuscus, Bl.

Gunth., Cat. 8, p. 222.—*B. chrysospilus*, Bleek.. Atl. Ichth., Balist. p. 111, tab. 11, fig. 3.

253. Balistes aculeatus, L.

Gunth., Cat. 8, p. 233.—Bleek., Atl. Ichth. Balist., p. 120, tab. 2, fig. 3.

254. Balistes verrucosus, L.

Gunth., Cat. 8, p. 225.—Bleek., Atl. Ichth. Balist , p. 120, tab. 2, fig. 2.

Syn.—*B. praslinoides*, Less., Voy. Coq.. pl. 9, fig. 3.

255. Balistes rectangulus, Bl.

Gunth., Cat. 8, p. 225.—*B. erythropteron*, Less., Voy. Coq., pl. 10, fig. 3.—*B. cinctus*, Bleek., Atl., Ichth., Balist., p. 119, tab. 34, fig. 1.

256. Balistes armatus, Bleek,

Bleek., Atl. Ichth., Balist., p. 115, tab. 2, fig. 1.

257. Balistes undulatus, Park.

Gunth., Cat. 8, p. 226.—*B. lamourouxii*, Quoy & Gaim., Voy. Uran., pl. 37, fig. 1.—*B. lineatus*, Bleek., Atl. Ichth., Balist., p. 118, tab. 15, fig. 2.

258. Monacanthus scopas, Cuv.

Gunth., Cat. 8, p. 232.—*Amanses scopas*, Bleek., Atl. Ichth. Balist., p. 135, tab. 14, fig. 3.

"Kudima" of the natives.

259. Monacanthus chinensis, Bl.

Gunth., Cat. 8, p. 236.—Bleek., Atl. Ichth., Balist., p. 125, tab. 8, fig. 2.

260. Monacanthus nigricans, *n. sp.*

D. 26. A. 23. P. 13. C. 10.

Height of body half the total length, skin rough; dorsal spine strong and rough, but without rows of spines, situated above the orbit, and about equal in length to the distance between the eye and the mouth; profile from the dorsal spine to the mouth at an angle of 45° and slightly concave; ventral spine strong, prominent, and armed with short strong spines; tail truncate, a tooth brush-looking tuft of spines on each side between the dorsal and anal fins. Colour dull dark brown all over, with traces of numerous darker narrow bands on the body, dorsal, anal and pectoral fins clear and spotless.

261. Monacanthus fuliginosus, *n. sp.*

D. 34. A. 32.

Height of body half the total length; skin like fine sand paper, dorsal spine long, pointed, covered with granulations, rising above the anterior margin of the eye, snout rather long, the profile very slightly concave; the tail is truncate, the ventral spine does not extend beyond the cutaneous ventral expansion. Colour uniform sooty-brown, fins clear.

262. Ostracion cubicus, L.

Gunth., Cat. 8, p, 260.—*O. tetragonus*, Bleek., Atl. Ichth., Ostrac., p. 39, tab. 1, fig. 2, and tab. 3, fig. 2.

"Worra" of the natives.

263. Ostracion arcus, Bleek.

Acanthostracion arcus, Bleek., Atl. Ichth. Ostrac., p. 35, tab. 2, fig. 3, and tab. 4, fig. 4.

"Iduari" of the natives.

Family GYMNODONTES.

264. Tetrodom stellatus, Bl.

Gunth., Cat. 8, p. 295.—*Crayracion lineatus*, Bleek., Atl. Ichth. Gymnod., p. 70, tab. 2, fig. 1, and tab. 8, fig. 1.

"Godu" of the natives.

265. Tetrodon reticularis, Bl.

Gunth., Cat. 8, p. 296.—*Crayracion testudinea*, Bleek., Atl. Ichth. Gymnod., p. 71, tab. 8, fig. 3.

266. Tetrodon mappa, Less.

Gunth., Cat. 8, p. 293.—*Crayracion mappa*, Bleek., Atl. Ichth. Gymnod., p. 72, tab. 6, fig. 3.

267. Tetrodon nigropunctatus, Bl.

Gunth., Cat. 8, p. 293.—*Crayracion nigropunctatus*, Bleek., Atl. Ichth., Gymnod., p. 75, tab. 2, fig. 4.

Family SELACHIDÆ.

268. Chiloscyllium ocellatum, L.

Gunth., Cat. 8, p. 410.—Mull. & Henle, p. 16.

269. Ginglymostoma concolor.

Gunth., Cat. 8, p. 409.—Dum., Elasm., p. 334.

270. Crossorhinus barbatus, L.

Gunth., Cat. 8, p. 414.—Muller & Henle, p. 21, pl. 5.

Family BATIDÆ.

271. Trygon granulata, *n. sp.*

Tail without any cutaneous fold, slender, nearly twice the length of the disk and covered to the extremity with very minute spines. Snout very obtusely angled. Disk about as broad as long. Head and back of body covered with small granules which extend on the ridge of the tail to the spine. Two papillæ at the bottom of the mouth. Colour uniform dirty brown. Diameter of disk 13 inches.

272. Tæniura lymna, Cuv.

Gunth., Cat. 1, p. 483.—Muller & Henle, pp. 171-197.

273. Tæniura atra, *n. sp.*

Tail nearly twice the length of the disk, with a large cutaneous fold below the terminal half. Disk much broader than long, and rounded at the snout. Head and body above densely covered with small nitid granules, within the centre of the ridge of the back three or four rounded depressed nitid tubercles; the granules only extend on to the root of tail. The colour is a jet glossy black over all the upper surface, the under surface is white. Diameter of disk 16 inches.

274. Rhinobatus granulatus, Cuv.

Gunth., Cat. 8, p. 443.—Muller & Henle, p. 117, pl. 38.

Notes on the Geology of the Western Coalfield, Capertee. Part II.

By Professor Stephens, M.A.

The Marangaroo beds show some distinct and sure tokens of at least a partially marine origin. Mr. Wilkinson has observed*

* Geological Map of Hartley, &c., note 17.

that "about 75 feet below the base of the upper Coalmeasures occurs a bed of ferruginous conglomerate of the upper marine series, containing abundance of *Spirifera vespertilio*, *Spirifera*, *Producta*, *Euomphalus*? *Pecten*, *Conularia*, &c. These beds appear to have a slight dip to the north-east, and to be conformable to the overlying *Glossopteris* beds." The fossils here mentioned were obtained from a shaft sunk in the Marangaroo flat, about 40 chains east of the platform. Again, at the head of Piper's flat, where the railway crosses the great dividing range, he notes "Ferruginous conglomerate containing *Conularia*." Now this Ferruginous Conglomerate is the very same stuff as the dark Mulatto conglomerate of which I have previously spoken. The chemical changes by which it has been altered have not been of such a character as to change any of the embedded fossils, and so we have the delicate shell of *Conularia* still discoverable. But, so far as my experience goes, there is no general abundance of these marine forms. Mr. Wilkinson did indeed obtain them in considerable numbers, but only *quite at the base of the conglomerate*. I do not think that they are to be found higher up, except in rare cases.

However, here is evidence enough of at least a partially marine origin for the Marangaroo Conglomerate. Let us consider the character of the stuff more carefully. We see in the Conglomerate proper an extraordinary confusion of large and small pebbles and angular blocks, varying, as Mr. Wilkinson says, from the size of a pea to upwards of two feet in diameter, and sometimes, as I have myself observed, to much more than double, if not treble dimensions. These are embedded in a muddy sand, without, in general, any sorting or sizing; processes which are inseparable from the ordinary action of tidal waters or regular river currents. Here and there, however, we see particular beds which have undergone such a process of subsequent arrangement, and appear as Sandstones or Shales, interbedded with the Conglomerates. The pebbles are sometimes derived from older

Devonian Conglomerates, in which case they are well rounded; sometimes from the fossiliferous beds in the neighbourhood, in which case they are slightly rounded upon the angles, but retain a generally prismatic form; and it is in these that the Rhynchonellas, Spirifers, and Trilobites are found.

Many of these blocks are of very large size, five or six feet in diameter, and are nevertheless mixed up like plums in a pudding with the finer grained matrix in which they lie. Some of these, as notably near 'Stone House,' two miles north of Capertee, are finely polished, (as are also fragments of hard conglomerate near Round Swamp). But there is, so far as I could see, no positive evidence of glacial striation, nor does the character of the polish connect it with glacial action. Nevertheless I feel assured that no other agency than that of great mountain glaciers, feeding strong watercourses, which were also subject to violent but occasional floods, as at the melting of the superficial snows in spring, could ever have piled up, or rather spread out, the coarse alluviums of which I write. The polish of the several blocks I take to have been given by long continued drift of sand, impelled either by wind or water, over them. And the fact that the larger pieces, and therefore the most permanent in position on beach or strath, are the better polished, seems to me to confirm my view.

But in this Conglomerate are also intercalated Shales, of evidently freshwater origin, and full of leaves; while even in the rude mass itself one can recognize portions of woody tissue, partly carbonized, and partly converted into pyrites. All these phenomena point very clearly to such an origin as has been indicated above. Great Straths, Links, and Estuary formations occupied the lower valleys and coasts of an Archipelago or Island Continent (like New Zealand) whose mountain summits were snow clad, whose upper valleys were occupied by great glaciers, and whose enormous waste and detritus was hurried down to near the sea level by streams too impetuous and too irregular to sort out their material. The glacier moraines supplied the stuff;

the glacier streams, laden from time to time with ice rafts, carried it, and the sea at the margin, and the rivers themselves in their autumn beds, separated in patches and layers, sands from pebbles, and mud from sands, but left the larger blocks where they happened to find them.

We may I think safely assert this much; and may regard it as beyond serious question that the Marangaroo Conglomerate was formed, 1. near the sea level; 2. only slightly within the influence of the sea, and that principally in its older portions; 3. that it was formed of mountain waste accumulated in higher valleys by the action of glaciers; and 4. that it was ultimately laid down, partly in broad river valleys or straths debouching on the sea, partly in straits and firths, and partly along the sea margins. From the nature of the deposit, it would never extend outwards more than a few furlongs.

Similar accumulations fill the upper valleys of the Rhone and Rhine in Switzerland, and are familiar enough to the geologist in Scotland, the north of England, and New Zealand. Indeed they are common to all glacier districts. The surface of these formations is never quite level, sloping, as a matter of course, with the rivers to which they owe their origin. And we shall presently see that the N.E. dip spoken of by Mr. Wilkinson indicates in all probability the direction in which the materials were in this case carried. The surface moreover, is sure to be subject to spring floods, bearing with them vast quantities of ice, and consequently to almost annual shifting of the river currents, which are perpetually at work, here to form mounds, there to excavate hollows, but which nevertheless on the whole, tend to sort out and arrange the materials through which they travel, and reduce them by degrees to a fairly graded slope.

Above these plains, which we must imagine as consisting in great measure, of broad tracts of gravel and moraine-stuff, too often shifted to be clothed with vegetation, but diversified with islands and knolls, backwaters and swamps on and in which the characteristic vegetation of Equiseta, Ferns, Cycads, and Conifers formed thick scrubs and savannahs of uniform and perennial green—there rose tier after tier of mountains, forest clad below, but rising behind into snowy peaks, from which numerous glaciers descended. The landscape would probably, to ordinary observers appear much like such a landscape at the present day. The Botanist indeed would think very differently. His astonishment, excitement, and intense gratification can only be faintly imagined from the bewilderment and exultation of Mr. Banks when he first went botanizing with Captain Cook at Kurnel.

These Alps however, have disappeared under the slow wear of time. The lower portions or foundations of the mass alone remain, very little if at all higher, and often much lower than, the terraces which were formed in ancient times upon their flanks, and the straths which once filled their valleys. These lower portions are highly metamorphic quartzites, slates, and limestones, with granites. The upper storeys, which were doubtless far less refractory, have been swept away, mile after mile in depth. It is therefore impossible to determine exactly the Orography of this ancient mountain tract. This however we dare say, that in its greater width and height it lay to the south, west, and northwest of Wallerawang, being continuous with the main Southern Chain, and its two great laterals, the one west of the Bogan, the other south of the Murray. Towards the north it seems to have gradually declined to the broad depression which separated it from the corresponding mountainous island (or continent) which commencing about Tamworth extends far northward into Queensland. Here there were *probably* low tracts of land with scattered volcanoes, broad tracts of gravels, mainly derived from older conglomerates, and washed into the hollow from either island; but *certainly* large areas of shallow seas in which the Marine beds above mentioned were forming. This sea, or archipelago, lapped round the northern end of our mountain system, at least as far as Dubbo, and extended far to the northward, west of the Sister Island. It formed our eastern coastline running nearly north and south as far as Bateman's Bay, where its record is lost.

This sea was not generally deep, but had a very rugged bottom; and there were probably many small islands in it, about which no conglomerate would form, for obvious reasons. Their shores and the general sea floor were formed by corresponding deposits, but composed chiefly of sand, sometimes so full of shells as to become impure limestones. The lime however has by the present time been almost entirely removed by acid percolation, at least in the beds to which we have access. They are known generally as the Upper (Uppermost) Marine Carboniferous series, and are found as evidence of this ancient sea in many parts of our coalfields. They can seldom be traced by their outcrop, because the superincumbent or fresh water beds (including the coal itself, which is of subaerial formation) for the most part overlap them. Consequently they only become visible when disclosed by dislocation and erosion, or when penetrated by miners in sinking for the lower seams. They have thus been proved at Anvil Creek, Greta and Stony Creek near Maitland, at the Australian Agricultural Company's and the Wallsend pits, Newcastle; at Mount Keira, near Wollongong; at Kangaroo River, near its junction with the Shoalhaven, where they are bedded on Granite, and at Jarvis Bay. They have also been proved further to the west at Nattai, Burragorang, Lithgow, and the Wolgan.* I do not doubt that the level country at the bottom of the Capertee Valley is of the same formation, though I was unable to examine it except from a distance. And there are innumerable localities in the basin of the Hunter, and some at least in that of the Namoi, where they are also found.

* See reports by Rev. W. B. Clarke and Mr. J. Mackenzie, Mines and Mineral Statistics, 1875.

I may here repeat, perhaps *ad nauseam*, that this is our last marine formation, so far as the Coalfields are concerned, and that all our subsequent sedimentary rocks are either of fresh-water or subaerial origin. Now wherever the rocky sea-bottom fell steeply from the shore, it would be impossible for this shelly sand to accumulate, except in small patches. And wherever the water was deep enough and far enough from the shore neither sand nor shells would be formed. It would therefore be reasonable to expect that such a formation should have many breaks or gaps in its extent, and that in consequence the subsequent deposits which owe their preservation to the fair level foundation which it provided, should have been chequered with a similar pattern of deep spaces or lakes of fresh water, in which but little sediment could deposit itself. For in lakes there are no great and continuous currents, as in the Ocean, to carry river detritus hundreds of miles away from the place where it was discharged. Sands brought down by rivers into lakes accumulate in deltas and flat banks with their fronts sloping sharply down into the deep water beyond; while even the finest particles of muddy cloud, slowly as they sink, will very soon have fallen through the stream in which they were supported, as it slackens, widens and thins out in the lake, and will then find themselves in dead water through which they can only sink vertically, whatever length of time they may require to reach the bottom. Consequently lacustrine deposits must always be marginal.

After a long period during which the energy of glacial and other erosion seems to have been gradually diminishing, we turn our eye again upon the scene. We observe that the Alps are lower, the plains more level and broad, stretching out as an almost level shallow bottom beneath the waters of tranquil lakes, which have taken place of the sea. There is no sea in sight. The landscape is one of a multitude of fresh-water lakes bordered by level plains through which gentle rivers flow from the hills behind. Vegetation is abundant, though apparently of a rather dwarfish or stunted character. The climate seems to be cold and moist. The mountains are still fringed with pines, and haunted by mists which distil perpetual through not excessive rain. There are no violent floods or torrents. Fine sands are deposited in level strands along the lake margins, and mud-banks further out. Here and there beds of greyish-green Equisetums grow up like reeds through the water.—*(Vertebraria)*. Similar brakes line the shore, while on the dry ground we see a variety of ferns, springing from the earth, climbing growing trees, and clothing drift wood. But the vegetation in general does not differ from that of the last epoch. There must be insects present, but we see none: and there is no sign of any land or fresh-water snail that carries a shell. There are fish to be sure *(Palæoniscus* &c.) in the waters, but no other vertebrates.

This is the period of the Lower Capertee Shales.

After this the waters gradually deepen and gain on the land. There is no question in these fresh-water formations as to whether this is due to sinking of land or rising of water. The latter alone is the cause here. Just as certainly as the variations of sea level depend on slow vertical oscillation of the land, does the encroachment or retirement of a lake result from the increase or decrease of its contents. Accordingly the smaller lakes unite with one another and with the larger, until a large and deep sheet of water with a heavy wash upon the shore, *fluctibus et fremitu surgens marino*, extends to the very foot of the hills. And now great beds of white sands, varying from the finest grain to coarse gravel, the quartz detritus of granitic and metamorphic rocks, intermixed with small pebbles out of the old (Devonian) conglomerates, begin to form over large areas. These are the Capertee Grits. They contain no fossils, as is consistent with the mode of their formation.

At length the waters ceased to rise. Broad islands and banks of the finest clays spread themselves out from the shore upon the sands just described. The lake is again diversified with shoals and fringed with level plains, and these are again covered with vegetation.

This though composed of the same or similar genera as that of the preceding periods is far more luxuriant. Dark humus accumulates during long periods of undisturbed growth, until a river flood, or another rise of the lake covers it with mud. This being again exposed, the process is repeated, until by slow degrees, and after many oscillations of rise and fall, many successive Coal seams one above the other, each with its foot-clay, and roof of shale or sandstone, are buried beneath the waters, and the production of coal in these regions is ended.

For once more, and for the last time, the lake has encroached greatly and rapidly upon the shore, and its waves once again beat directly upon the sloping bases of the hills.

The same vegetation still clothes the land, but there are no levels in which its debris can accumulate, and what woody matter is washed down into the water is soon comminuted by the constant shock of the shore waves. The never ceasing erosion of the land, continued centuries after centuries, perseveres in lowering the mountains into an undulating land, with its eastern and northern slopes dipping below the sandy shores of the lakes. For vast beds of sand formed from the waste of the continent, swept down into the lake by rivers, and transported by the shore wash to right and left of their mouths, have now silted up with a final deposit, (the coping stone as it were of the whole building), all the series of rocks whose formation we have been witnessing in imagination.

This is the commencement of the Hawkesbury Period.

Preliminary note on an Australian species of *Phoronis* (*Gephyrea* '*Tubicola.*')

By William A. Haswell, M.A., B.Sc.

The aberrant genus *Phoronis*, whose remarkable relations to the *Gephyrea* on the one hand, and to the *Entoproct Bryozoa* on the other render it one of the most interesting of the 'Vermes,' has hitherto only been observed in European seas. The present species, which I propose to name *P. australis*, was obtained on two occasions during the dredging work carried on under the auspices of the Trustees of the Australian Museum, at a depth of fifteen fathoms off Ball's Head, in Port Jackson. It differs very widely from its European congener in the nature of its shelter. A number of individuals inhabit a large irregular semi-gelatinous sac, about six inches long and three or four wide, and open at both ends. The walls of the sac, which are about $\frac{1}{4}$ to $\frac{1}{2}$ an inch in thickness, and are tolerably tough, are composed of numerous fine threads closely felted together, and in these walls, in wideish irregular spaces among the felted threads, lie the worms, the head projecting externally; the inner surface of the sac is lined by a dense glistening layer of the same material as the rest. The whole substance of the sac is of a purple colour.

The worm presents a cylindrical body, sometimes as much as two and a half inches in length and an eighth of an inch in thickness, and slightly dilated at the hinder end. The head bears a crown of slender filiform ciliated tentacles two-thirds of an inch in length and some hundreds in number, borne on a lophophore, which is continuous behind, but divided in front, the two limbs each becoming rolled on itself in a series of three and a half spiral turns. The lophophore is vertically ribbed, the ribs being continuous with the tentacles, into which the lophophore is, as it were, frayed out. The front portion of the body, together with the tentacles, is of a dark purple; the hinder portion is reddish, owing to the blood-vessels shining through. Numerous embryos were found enclosed in the spiral of each half of the lophophore. The stages observed do not materially differ from those of the European species, but I have not yet succeeded in finding fully-formed *Actinotrochæ*.

The movements of the animals were exceedingly sluggish, a peculiarity wherein it differs very markedly from the European species, which is described as retracting itself when disturbed with extreme rapidity into its tube.

Note on a curious instance of Symbiosis.

By William A. Haswell, M.A., B.Sc.

In the June before last I obtained with the dredge off Thursday Island, in a depth of four or five fathoms, specimens of a branching species of *Cellepora*, which was dotted over with small red specks. On examining these more minutely, I found each to consist of a minute *Actinid* lodged in a cylindrical pit excavated in the substance of the polyzoarium and projecting, when expanded, about a quarter of an inch from the surface of the latter. Each of the pores is about a twentieth of an inch in diameter; they are cylindrical and tolerably smooth, and in most cases the orifices are furnished with a low projecting rim. When they are traced backwards into the substance of the *Cellepora* two are frequently found to unite, and very often they eventually open into the cavity occupying the centre of the thicker branches. They very often extend in this way through a distance many times greater than the length of the *Actinid* itself, and, as the latter is provided with no means by which it can retract itself into the interior, this long canal must be the result of the simultaneous growth of the little anemone and the *Cellepora* in which it is lodged.

This singular phenomenon is specially interesting on account of the light which it throws on the structure of some very problematical-looking species of Bryozoa, one of which I described not long ago under the name of *Sphæropora fossa*.* In this species the bryozoarium is spherical, slightly compressed, one pole being

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* Mr. Waters, whose authority on the subject of Bryozoa is probably as great as that of any living zoologist, regards the form of the cells as not being sufficiently distinctive to justify the separation of this species from *Cellepora*.

always characterised by the presence of a deep cylindrical pore running in the direction of the axis, but not quite reaching to the opposite pole. This pit is always well-defined and uniformly cylindrical, and it is difficult to explain its nature unless we suppose that it was occupied by a minute *Actinid* similar to those already described. None of the specimens which I have seen exceeded an eighth of an inch in diameter, and most of them, from their worn appearance, must have been dead when dredged, so that there would seem to be a tendency in this species to arrest of growth and death at a certain definite stage of growth. This species, it is to be remarked, differs entirely in the nature of its zoœcia from the branching species already mentioned, which is a normal *Cellepora*.

A species very nearly related in the peculiar form of the cells of *C. fossa* was dredged off Port Stephens, at depths of 20 to 30 fathoms. The form of the bryozoarium in this case is usually that of an elongated cone, a third of an inch to half an inch in length, with a pit, exactly like that occurring in *C. fossa*, in the centre of the base; but sometimes it has the form of a circular plano-convex disk, a third of an inch in diameter, with cells on both sides and without a pit, while in other cases the shape is more irregular, subhemispherical or the like, but never larger than a pea.

It seems very likely that the first-mentioned species starts from an early stage resembling *C. fossa* or its ally, a group of cells surrounding a single young *Actinid;* as the zoarium increases and the cells grow round the mouth of the cavity occupied by the latter, the canal is constantly being elongated as the sea-anemone remains at its orifice, and thus prevents it from being encroached upon by the multiplying cells. Sometimes the sea-anemone* gives off a lateral bud, and at this point the canal is seen to branch,

* I sent specimens of the *Actinid* to Prof. Mosely of Oxford, who will describe them.

and by degrees, by the simultaneous growth of the *Bryozöon* and the Sea-Anemone, such a complex organism as I have described is produced.

NOTE ON THE SEGMENTAL ORGANS OF *Aphrodita*.

BY WILLIAM A. HASWELL, M.A., B.SC.

Having recently, for the first time had the opportunity of examining specimens of *Aphrodita* in the living state, I have been able to study the structure of the segmental organs, which I find to differ in no essential point from those of *Polynoë* as lately described by me.* I have it on the authority of Pagenstecher,† that the external apertures of these organs in *Aphrodita* were known to Treviranus. They have probably been noticed by numerous observers since,‡ but the true arrangement of the organs themselves seems never to have been made out,§ and entirely erroneous descriptions of them have, as I have previously had occasion to notice, been published and accepted. The external apertures are situated, as in *Polynoë*, on the ventral surface close to the bases of the parapodia; but there is no perforated tubercle or cirrus as in the latter genus. The segmental organs themselves consist of small, flattened, somewhat sigmoid, reddish-yellow sacs, situated in contact with the ventral wall of the body a little

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* Proc. Linn. Soc., N.S.W., vol. vii., p. 262, and 'Zoologischer Anzeiger,' 1882.

† Allgemeine Zoologie, Theil iv.

‡ Quatrefages among the number—He says (Hist. Nat. des Annelés, I., p. 109) "Chez une Aphrodite hispide mâle, j'ai vu le sperme sortir, sous la forme d'un filet blanc, de la base de la rame inferieure d'un seul côté du dix-neuvième anneau."

§ Cosmovici in a paper on the segmental organs of Annelides published in the 'Archives de Zoologie Experimentale et Generale' which I have not seen, has (as I learn from an abstract in the Journ. R. Micro. Soc., vol. iii., pp. 635 and 949.) described the segmental organs of the allied genus *Hermione*.

internally to the bases of the parapodia. They are widest in the middle, pointed at either end, the one end opening externally in the position described, and the inner ending blindly, the internal aperture being situated in the middle of the wider central part of the organ.

Postscript.

Since the above was written I have received a copy of the Supplement to Claparèdes "Annélides Chétopodes du Golfe de Naples" (Genève et Bale, 1870), and find that in his description of *Hermadion fragile* he states—"A la base des pieds du côté ventral, non loin du bord postérieur, je trouve une proéminence conique (fig. 2, b.) percée d'une orifice. Cette ouverture conduit dans un canal cilié qu'on peut poursuivre jusque dans l'intérieure des pieds où il est bientôt voilé par la masse des éléments reproducteurs. C'est là evidemment l'ouverture de l'organe segmentaire."* The true position of the external apertures of the segmental organs in the *Polynoina* was, therefore known, as regards this species at least to the distinguished author of the memoir above quoted, but his observations on this point have been overlooked both by Huxley and by Pagenstecher; and he himself seems not to have been aware of the universality of the arrangement he describes, as he makes no mention of the ventral tubercle or its central canal in his account of the other species of the family.

NOTES AND EXHIBITS.

Mr. W. A. Haswell exhibited drawings of the earlier stages in the development of *Phoronis australis*. Mr. Haswell also exhibited a coral which he had recently found in Port Jackson. With reference to this exhibit the Rev. J. E. Tenison-Woods stated that it was a *Plesiastræa*, which he was inclined to regard

* L. c., p. 16.

as a new species. It differed in some respects from *P. Peronii* of the south coast, and *P. Urvillei* of King George's Sound. If it were the former, it was the first record of its being discovered living in Port Jackson. He promised carefully to examine the specimens and communicate the results to the Society. He added that conclusions had been drawn erroneously as to the former existence of reef-building corals and a semi-tropical temperature from the occurrence of a similar fossil in the Miocene beds of Tasmania, but neither the existing nor the fossil species were reef-builders, nor were they confined to warm seas.

Mr. T. A. Tenison-Woods exhibited an idol from Savu, taken from a Taboo House. It was elaborately carved in wood and was about four feet high. As such examples are very rare, the exhibitor promised to give descriptive notes at the next meeting. The specimen was brought from Savu by Capt. Brodie of the 'Ariel.'

WEDNESDAY, 27TH DECEMBER, 1882.

The President J. C. Cox, M.D., F.L.S., &c., in the Chair.

DONATIONS.

"Tijdschrift voor Entomologie uitgegeven door de Nederlandsche Entomologische Vereeniging," Vols. 22 to 25 complete, 8vo, 1878-82.

"Abhandlungen herausgegeben vom naturwissenschaftlichen Vereine zu Bremen," VII. Bd. 2. Heft.

"Fish and Fisheries of New South Wales," by the Rev. J. E. Tenison-Woods, F.G.S., F.L.S., &c., from the Government Printer.

"Nova Acta Regiæ Societatis Scientiarum Upsaliensis," Seriei Tertiæ, Vol. XI., Fasc. I., 4to, 1881.

"Journal of the Linnean Society of London:"
Botany—Nos. 114 to 121, Sept. 1881 to August 1882.
Zoology—Nos. 86 to 94, Sept. 1881 to July 1882.

"Mittheilungen aus der Zoologischen Station zu Neapel," III. Band. IV. Heft. 8vo. 1883.

"Journal of the Royal Microscopical Society," October, 1882.

"Journal of the Microscopical Society of Victoria," Vol. I., Nos. 1 to 4; Vol. II., No. 1.

"Report on the Little River Coalfield near Cooktown," and "Preliminary Report on Stanthorpe Tin Mining District." By R. L. Jack, L.S., Government Geologist, Queensland.

"Mineral Products of New South Wales &c.," from the Department of Mines, Sydney.

"On the female urogenital organs of the Kangaroo," by Messrs. Lister and Fletcher, from Mr. Fletcher.

PAPERS READ.

Occasional notes on plants indigenous in the immediate neighbourhood of Sydney.—No. II.

By E. Haviland.

The unusually dry weather, which obtained for two or three months prior to the middle of October, enabled me to penetrate some of the swamps and marshy ground in the vicinity of Sydney; and afforded me the opportunity of examining several plants, which, during ordinary weather are not easily procurable. Amongst these I found, in abundance, *Utricularia dichotoma* and *U. uniflora*, of the order Lentibularinæ. I confine myself in this paper to *Utricularia dichotoma* (Labill.) and give its generic and specific characters. Stem cylindrical and filiform, leaves radical, obovate, three to four lines long; on very long thread-like petioles. Occasionally upon the same plant, one or two of the leaves attain a length of an inch or more. Root fibrous and very slender; all the fibres proceeding from the same zone: together with filamentary processes bearing small utricles or air vessels. Calyx unequally two lobed. Corolla monopetalous, but deeply divided into two very unequal lips, and ending in a spur at the base. The lower lip bears a convex appendage or palate. Stamens two, attached to the upper section of the tube of the corolla. Style, one. Stigma fan-shaped. Ovary superior; quite globular. Ovules numerous, ovoid; attached to a free central placenta. Flowers usually in one or two pairs at the end of the stem.

The interest attaching to this plant, arises from its singular formation and its adaptation to certain ends. Its usual habitat is either in shallow creeks; where its roots are very slightly attached to the soil, at a depth of six or eight inches below the surface of the water; while the flowers are generally three to six inches above it, or in swamps, in parts where the surface is usually covered by water; although, when the plant has once become established, it does not seem to suffer by the partial drying of the swamp; provided the ground is left tolerably wet and marshy. From the very slight attachment of the root to the soil, (when growing in water) a mere touch will dislodge it. At the time the plant is in flower, the utricles or air vessels, attached to the root are distended, and would, in case of the plant being so dislodged, assist it to float, and so keep its flowers above the surface of the water. I think myself, (but I do not speak positively on this point) that this provision is made to enable the plant to preserve its pollen; which is generally injured by becoming wet. This is necessary in case of an increase in the depth of the stream; which. if the plant were firmly attached to the soil would then submerge it. In case of such an increase in the depth of the water, the plant would be lifted from its very slight hold of the soil, and then the utricles would act as floats, keeping the head of flowers above the surface. In all cases, when I have tried the experiment by carefully drawing the plant out of the ground and then placing it in a deeper part of the stream it has floated erect, with its flowers above the water.

We have an equally efficient provision made in *Vallisneria spiralis*, a diœcious plant growing freely in some of our rivers. In that plant, the pistiline flowers are borne on long spiral peduncles, which stretch out as the water increases in depth; always keeping them on the surface; while the plant bearing the staminate flowers, becomes detached from the soil and floats about on the water, preserving the pollen from contact with it. The construction of the flower of *Utricularia dichotoma* is exceedingly interesting. The corolla is of the richest purple, having a brilliant gold coloured spot or eye at the base of the lower lip. As I have already said, it is monopetalous, but divided down to the spur at its base. The upper lip is exceeding small, perhaps not more than two lines; while the lower lip is broadly semi-circular, spreading like an open fan, and half to three quarters of an inch wide. The narrow portions or claws, of the two lips are long and concave, and lying closely together form a tube enclosing both stamens and pistil. The mouth of this tube is closed by the appendage or palate attached to the lower lip; so that both stamens and pistil are quite imprisoned. The two stamens are attached to the claw of the upper lip, and their filaments are so curved that the broad anthers are brought closely together, edge to edge; and thus form a shield in front of the stigma, but with their backs to it, and opening and shedding their pollen away from it. Upon examining the spur at the base of the corolla, it will be found sweet to the taste, leaving little doubt that its purpose is to secrete or contain nectar.

The rationale of this arrangement, appears to me to be this —But I must crave pardon for a little repetition. The lower lip standing out horizontally as a broad flat stage, offers a landing place to an insect; just as the labellum of an orchid does. The small upper lip projects a very short distance over the surface of the lower one, and is raised above it at just such an angle as to form a small vestibule or antechamber to the tube formed by the claws of the two lips. From the horizontal position of this tube the stamens lie, as it were, on the ceiling; the anthers presenting the pollen downwards and facing the interior of the tube. At the end of the tube is the spur containing nectar. An insect alighting on the stage, offered by the large lower lip, and going on to the centre of the flower, would find itself just within the vestibule or antechamber of the tube, but would also find its way barred by the palate attached to the lower lip, which crosses the entrance to the tube just inside the antechamber. It must be borne in mind that the tube is not perfect, but is split down its whole length. The insect being already in its mouth, the very slightest attempt to go on, or to force its way in, separates the two parts of the tube, and opens a passage to the nectary. The palate, by being attached to the lower lip, is at the same time carried away from the mouth of the tube by the depression of the lip. So easily do the upper and lower parts of the tube separate, that the mere breathing down upon the broad surface of the lower lip accomplishes it. Indeed it is quite possible that the weight of an insect on the lip would depress it, and so open the tube. In either case the insect has a free open way to the nectary; but to reach it, must of necessity, past so closely under the open side of the anthers (attached as I have said to the ceiling) that it cannot avoid brushing off the pollen. It cannot, either in its passage in or out touch the stigma, because it is shielded by the backs of the broad anthers. The pollen is so adhesive that, if the anther is touched with a needle a considerable quantity is taken away, so that the insect can scarcely fail to carry off a large portion.

But independently of this provision to insure the dissemination of the pollen by means of insects; there seems to be a special provision made to prevent the stigma receiving any pollen from the anthers of its own flower. Almost immediately upon the maturing of the pollen, the whole corolla falls off, carrying with it the stamens; leaving the pistil behind on the plant, with the stigma not mature, and of course, the ovules not impregnated. In fact it is a very difficult thing, if the pollen is fully ripe, to keep the corolla on the plant while examining it.

I had visited one of the swamps at Botany, where the flowers of this plant were in great abundance; but to my surprise on a second visit a week later, I could not find a single specimen. As however, there had in the meantime, been heavy rain and wind, and knowing how easily the corollas were detached, I assumed that they had been beaten off by the storm; but at a short distance away, at another swamp, I found a few plants in flower, within a small space. I therefore cut a few rough pegs and marked the ground round them, for it is very difficult to find this plant when it is not in flower. I returned to the spot a few days latter and saw at once that if I had not taken the precaution to mark the ground, I should not have found it again, for the flowers had all disappeared, although there had been no rain or bad weather in the interim. I succeeded, however, in finding several of the plants, but in each of them the peduncle merely bore the calyx and pistil. The corolla with the stamens and pollen had in every case disappeared. In none of them was the stigma mature, or near maturity. I could only then come to the conclusion that if the ovules of these plants were to be fertilized at all it must be by the pollen of other flowers.

The fertilization of Australian plants, so far as I can learn, is a subject that has not received much attention. At all events, it is a subject that has not been written about, if we except what has been said by Mr. Fitzgerald in his valuable and beautiful work on the Australian Orchids. But it is a subject replete with interest, requiring however, great care not to arrive at hasty conclusions. In very many cases, where the most careful provision appears to have been made to ensure self-fertilization, we shall, I think, find upon more careful and searching examination, that the reverse has been intended. The mere fact that both stamens and pistils are found in the same flower, does not prove either one theory or the other. Dr. Asa Gray, Professor of Botany of the Harvard University, in the last edition of his work on "Structural Botany," says,* "Separation of the sexes (in plants) is a direct adaptation to intercrossing, rendering it necessary in diœcious, and largely favouring it in most monœcious and polygamous flowers. Strictly close, or self-fertilization can occur in hermaphrodite flowers only; but it is in these very plants that the most curious adaptations for intercrossing are revealed." Then, after referring to a particular case, he says, "cases like this, and hundreds more, all equally remarkable, serve to show how sedulous, sure, and economical are the adaptations and processes of Nature for the intercrossing of hermaphrodite flowers."

But even if the stigma should be found in a moist state, and covered with pollen from the anthers of its own flower; that is no proof that self-fertilization has or will take place. In some instances the anthers closely envelope the stigma, the cells opening on the inside and shedding their pollen directly upon it; but the stigma rises through them carrying the pollen with it, high above the rest of the flower; not to utilise for itself, but to present it to the visits of insects or to the action of the wind; either of which, or both, soon carry it away and thus disseminate it for the fertilization of other plants. That stigma, however, is then free to receive in its turn, the pollen of other flowers, when it shall have itself matured. If such a stigma, when it first rises above the anthers, is cleared of the pollen by a camel hair pencil it will be found (if moist at all) to be moist from dew or some other cause; not from the viscid secretion from its own substance proper to it when it is mature; and a moderately high microscopic power will exhibit its surface (when it is not clothed with hairs as is often the case) smooth and horny; not spongy as it

* "Structural Botany," Asa Gray, 1880, pp. 217 and 223.

must be, to allow the pollen tubes to penetrate it. Of course, if by accidental circumstances, such as the absence of wind or rain or the visits of insects, the pollen should remain undisturbed on the stigma, till it (the stigma) has matured ; then of a certainty, the plant will be self-fertilised.

In the case before us, (*Utricularia dichotoma*) nothing could, at first sight, appear more evident than that the shutting up both stamens and pistil in a tube, with the mouth of that tube closed by a special provision (*i.e.* a provision not common to plants) was intended to prevent the ingress of any pollen bearing insect. We find however, on closer examination (to recapitulate), that one of the lobes of the corolla is extended as a stage, as though to invite insects to alight—that the very act of an insect so alighting, tends to depress the lobe ; or its least attempt to move forward to push asunder the upper and lower sections of the tube ; carrying away at the same time the bar closing its entrance. That nectar is secreted at the bottom of the tube to lure the insect on, but that in order to reach it, it must pass close under the low ceiling formed by the upper portion of the tube. That a portion of this ceiling is lined by the anthers, full of adhesive pollen, facing downwards, so as to touch the back of the insect in its passage. That the stigma is shielded by the anthers from coming into contact with its own pollen. That the corolla falls off, carrying with it the stamens and pollen, before the stigma is mature. I think, that although it would perhaps be unsafe to say that the plant is never self-fertilised ; we may safely admit little more could have been done to ensure cross fertilization.

Description of a new Belideus from Northern Queensland

By Charles W. De Vis, B.A.

Belideus gracilis.

Length $10\frac{1}{2}$ to 11″, ears $\frac{4}{4}$″, forefoot $1\frac{1}{8}$″, hind $1\frac{1}{2}$″, tail 14″.

Upper surface grey, lighter on the head, base of tail and front of thighs. Beneath buffy-white. Upper surface of parachute, both edges of the arms and front edge of the thighs, a stripe down posterior aspect of the thighs, a dorsal stripe from between the eyes to between the tips, a narrow circle round the eye, a broad semicircle over the ear and a patch below it brownish-black. Under edge of parachute dusky. Hands and feet above buffy-grey. Edge of parachute and hinder angle of ear buff. Tail grey on its basal half passing gradually into black at the tip. The dorsal stripe commences in a point between the eyes and dies out opposite the tips. The black edges of the forelimb meet obscurely over the wrist—that of the hind limb is continuous over the ancle with the broad dusky stripe down the ham. Loc. North of Cardwell.

In size intermediate between *B. australis* and *B. sciureus*, the present species differs from both the others in its markings and in having shorter ears, and a rather more slender and less hairy tail.

Description of two new Queensland Fishes.

By Charles W. De Vis, B.A.

Callionymus achates.

D. 4 0/8. A. 0/7.

Preopercular spine short bifid, one spinule being turned inwards and forwards, the other inwards and upwards. Head triangular, snout narrow, pointed. First dorsal elevated, second much lower. Tail short, rounded. Webs of first dorsal and anal scalloped. Branchial orifice small, nearly in the same vertical with the origin of the dorsal and the preopercular spine. Lateral line slightly wavy. Brown with small blue-edged black spots on the cheeks and jaws. First dorsal with numerous dark angular parallel lines (resembling those in 'fortification agate') enclosing a large dark oval spot contiguous to each of the first three spines. Second dorsal with blotches of dark brown on each ray and adjacent sides of webs. Anal hyaline brown at the base, black near the periphery.

Loc. Queensland.

Mugil nasutus.

D. 4 1/7. A. 2/8. Lat. 28. Tr. 11.

Height $5\frac{3}{4}$, head $4\frac{1}{3}$ in the length. Snout $\frac{1}{5}$, orbit $\frac{1}{6}$, interorbit $\frac{1}{4}$ of the head. Adipose membrane circumferential, narrow. Mouth toothless. Upper profile horizontal on the head and nape, slightly arched on the back ; lower strongly and regularly convex. Head and nape broad and flat. Muzzle rounded, sharp, much produced, the mouth being half-way between its tip and the eye. Lips thin. Rami of jaws forming an obtuse angle—depth of the cleft of the mouth $\frac{2}{7}$ of its breadth. Pectoral as long as the entire head, axillary scale short, lancet-shaped. Spinous dorsal rising over the tenth scale of the lateral line and nearer to the caudal than to the hinder edge of the orbit. Soft dorsal rising over the twentieth scale or middle of the anal. Soft dorsal and caudal scaly. Caudal emarginate. Long. 10″.

Loc. Cardwell.

Possibly the absence of the first anal spine may be an individual peculiarity. The physiognomy of the fish is peculiar, reminding one strongly of *Eleotris aporos* while its mouth is in position like that of a shark.

Species of Eucalypts first known in Europe.

By the Rev. Dr. Woolls, D.D., F.L.S.

When Willdenow published the second volume of his *Species Plantarum* in 1799, only twelve species of Eucalyptus were known in Europe, and these were so inadequately described, that the names have been frequently applied to very different trees. It was not until the publication of the third volume of the *Flora Australiensis*, and still more recently the Decades of the *Eucalyptographia*, that sufficient progress was made in the study of the genus to enable even Botanists of some standing to determine the species to which Willdenow referred. There is yet a great difficulty in identifying some species without reference to the texture of the bark or the shape of the anthers, and this difficulty was considerably greater in the last century, when the mode of grouping the species was limited to the comparative length of the operculum. When therefore, European Botanists had before them merely dried specimens (and those too in some instances without fruit), and when, moreover, they were not aware that the operculum sometimes differs in form and length on the same trees, we need not wonder that the early descriptions are anything but satisfactory, and that some of them might be applied to several species.

The genus *Eucalyptus* was founded by L'Héritier on the species *E. obliqua*, and was so called in allusion to the operculum or lid which covers the flowers before their expansion. Dr. W. Anderson (the Surgeon of Cook's second and third voyages) bestowed on the genus the name *Aromadendrum*, a name which Baron Mueller considers by no means inappropriate, though it must be admitted that the world-wide appellation *Eucalyptus* is in many respects preferable. Of the twelve species given by Willdenow, only one is Tasmanian (though it is now known to occur in South Australia and Victoria), whilst the remaining eleven represent the Eucalypts which once flourished in the immediate vicinity of Sydney Cove, and which still may be seen here and there within the heads of Port Jackson. One of the earliest collectors of Australian Plants was Mr. John White, Surgeon-General to the first Fleet which arrived in 1788, and who, during a residence of seven years in Sydney, collected a considerable number of plants, and made drawings of others, which were sent to Mr. Wilson, Mr. Lambert, and Sir James Smith, and published by the latter Botanist in "*A specimen of the Botany of New Holland*," the "*Exotic Botany &c.*" in White's 'Journal of a Voyage to New South Wales.' To Mr. White, then, we are indebted for some of the first specimens of Eucalyptus sent to Europe, and the descriptions of these preceded the advent of the eminent Robert Brown, who in the years 1801, 1802, and 1803, accompanied Flinders on the Coasts of Australia, and by his labours, inaugurated a new era in the history of Botanical Science.

The species of Eucalypts in Willdenow are divided into two classes, viz., those with a conical, and those with a hemispherical operculum.

1. *E. robusta*, (Smith's Bot. Nov. Holl. 40, t. 13, and in Trans. Linn. Soc. 3, 283) is thus briefly described "*operculo conico medio constricto, umbellis lateralibus terminalibusque, pedunculis pedicellisque compressis.*" So vague a description might well be applied to several of the Port Jackson Eucalypts, and so amongst others it was given to the common Stringy Bark, Bloodwood &c. Indeed as late as 1861, Baron Mueller declined to describe the species, alleging as a reason, "*Icon hujus speciei nullibi ex stat, quare donec specimina authentica herbarii Smithiani cum nostris comparanda sint, nil certi de nomine arboris hinc descriptæ offero.*" It was not, therefore, until Mr. Bentham in 1866 compared the specimens in Smith's herbarium with those collected by R. Brown and Fraser, and more recently by the writer of this paper, that *E. robusta* was found to be the tree known to workmen as "Swamp Mahogany," the original specimens of which were probably collected in low and swampy ground near Sydney. Baron Mueller has figured and described this species in the seventh Decade of his *Eucalyptographia*, in which he states that it has been ascertained to occur here and there from Twofold Bay to the Richmond River, "in low, sour, swampy ground near the sea-coast, where

other Eucalypts look sickly." Of the identity of this species with that described by Smith there can be no doubt whatever.

2. *E. pilularis*, (Sm. Act. Soc. Linn., Lond., 3, p. 384). Of this species, the following was the original description: "*E. operculo conico medio constricto longitudine calycis umbellis lateralibus, fructu globoso, foliis lineari-lanceolatis.*" This tree is now ascertained to be that commonly called "Black-butt," but as the description is applicable to other species, differing altogether in the texture of the bark and the shape of the anther, we need not be surprised that until very lately the specific name has been applied to Stringy Bark and Grey Gum, or that the White Mahogany (*E. acmenoides*, Schau.) has been amalgamated with it. In the writings of Baron Mueller (Fragmenta, Vol. 2, p. 61.) the Black-butt is described under the names of *E. semicorticata* and *E. persicifolia*, whilst, according to Mr. Bentham, De Candolle confounded it with *E. siderophloia*, or the Broad-leaved Ironbark. Since the publication of the third volume of our Flora, *E. pilularis* has been identified as the Black-butt, but as Baron Mueller observes in the third Decade of the *Eucalyptographia*, the name is not happily chosen. There appears to have been some confusion about the specific name, for White's figure and Smith's description apply in some respects to the Peppermint (*E. piperita*), the fruit of the latter being more pilular than that of the Black-butt; but there can be no doubt that the scent of the leaves and the volatile oil made from them by the earliest Colonists induced Dr. White and others to call *E. piperita* the "Peppermint-tree." though, as Baron Mueller observes the popular name is now given to other species especially *E. amygdalina*, a tree unknown in the days of White, and not occurring near Sydney.

3. *E. tereticornis*, (Sm. Act. Soc. Linn., Lond., 3, p. 284). The typical form of this species which has obtained in different districts the names of Grey Gum, Red Gum, Blue Gum, and

Bastard Box, is not inaptly described by Smith: "*E. operculo conico tereti lævissimo membranaceo calyce latiore triploque longiore, umbellis lateralibus solitariis, foliis lanceolatis obliquis.*" The fruit, which is well marked in all the varieties of the species by the valves protruding far beyond the rim, appears to have been unknown. This species, the commonest of the trees in the County of Cumberland, is the ordinary Gum of the bush, but perhaps it varies more in the shape of the leaves, the length of the operculum, and the size of the fruit than any other Eucalypt, and that too in individual trees occurring between Sydney and Parramatta. Mr. Bentham reckons three marked varieties of this species *latifolia*, *brachycorys*, and *brevifolia*, and he remarks, what is strictly true, that the common form with the long operculum resembles the rostrate varieties of *E. siderophloia* and *E. resinifera*. With the same also he unites *E. punctata* (DC.); but Baron Mueller, in the sixth Decade of his *Eucalyptographia*, has restored this tree (popularly known as Leather Jacket or Hickory) to the dignity of a species, differing as it does in the valves of the capsule, the length of the operculum, and the venation of the leaves. Though allied to the Flooded Gum of the interior (*E. rostrata*), the species are perfectly distinct.

4. *E. resinifera*, (Sm. Act. Soc. Linn., Lond., 3, p. 284, and White, itin. 231 cum icon.) is thus described: "*E. operculo conico tereti coriaceo calyce duplo longiore, umbellis lateralibus solitariis.*" The specific name was originally intended to apply to the form of Ironbark which produces the Gum Kino of commerce, but as the original specimens were transmitted to Europe without fruit, some confusion has arisen as to the identification of the species. Before the publication of our Flora, it was usual to apply the term *resinifera* to the Ironbark called *E. siderophloia*; but now that Mr. Bentham in the third volume of the Flora, and subsequently Baron Mueller, in first Decade of his *Eucalyptographia*, have appropriated the specific name to the Red or Forest Mahogany, it map be more convenient to speak of that as *E.*

resinifera. Mr. Bentham, with his usual sagacity, noticed the resemblance which dried specimens of *E. siderophloia* and *E. resinifera* bear to each other, and had he been aware of the fact which I have mentioned, it is probable that the change of names might have been obviated. Near the coast, there is a variety of the Red Mahogany with much larger flowers and fruit than those of the ordinary type, but as these trees agree in the cortical and artificial systems of grouping, as well as in the texture of the wood, it is scarcely necessary to treat of them as distinct species, although when viewed simply from dried specimens, one might be disposed to do so.

5. *E. capitella,* (Sm. &c., and White, itin. 226 c. icone, fig. a.) is doubtless the somewhat stunted form of Stringy Bark which is found about the harbour of Port Jackson, though the same tree occurs in a larger form "in the shore regions or in mountain elevations" from the southern part of New South Wales to Gippsland. Whether this tree is really distinct from *E. eugenioides* or whether they may not be varieties of one species, differing in proportion to their proximity to the coast, seems tc be scarcely determined. Smith's description answers very well to the tree found even now about the North Shore and Manly: "*E. operculo conico obtusiusculo calyceque anguloso subancipiti, capitulis lateralibus solitariis, fructu globoso, foliis ovato-lanceolatis rigidis obliquis.*" This form of Stringy Bark, as found near Sydney, has capitate flowers and hence the name *capitella;* but there are, further inland, intermediate forms which seem to connect it with *E. eugenioides,* whilst, as Baron Mueller shows, there is a marked resemblance in the seedlings, both of them being somewhat scabrous from crowded fascicles of short hairs. This species appears in the older works under the names of *E. scabra,* (Dum. Cours.), *E. eugenioides,* (Sieb.) and *E. penicellata,* (Hort.); and, in the second volume of Baron Mueller's *Fragmenta* (Vol. 2, p. 64), it is described as *E. acervula,* (DC.), though Don describes

the flowers as capitate, whilst the Baron regards them as shortly pedicillate.

6. *E. saligna* (Linnæi Spec. Plant. p. 2, and Sm. Act. Soc. Linn. Lond. 3, p. 285). As the specific name is anything but appropriate, this tree was supposed to be one of the White or Grey Gums, and it was not until very recently that Baron Mueller proved that it is really the Blue or Flooded Gum found on the banks of creeks and rivers and occasionally on good soil on the outskirts of forests. White collected specimens of *E. saligna* (probably on the creeks between Sydney and Parramatta) as early as 1794; but from the short description in Willdenow, it would be difficult to make out the species : "*E. operculo conico acuto calyceque anguloso subancipiti, capitulis lateralibus solitariis fructu turbinato, foliis lineari-lanceolatis.*" As the shape of the operculum and fruit varies considerably in different localities, and as the leaves vary from ovate-lanceolate to narrow lanceolate, Smith's description is rather calculated to mislead, whilst the term *saligna* is not by any means suggestive of the ordinary foliage. In the inland forms, the flowers and capsules sometimes bear a resemblance to those of the Bastard Mahogany, and hence Mr. Bentham, who had no opportunity of comparing the trees in their living state, has given the name of Blue Gum to *E. botryoides*, the anthers of which are not unlike those of *E. saligna.* Though there is some difficulty in arranging all species according to their bark, the smooth bark of the one and the rough bark of the other are in this case a good mark of distinction.

7. *E. botryoides*, (Sm., Act. Soc. Linn., Lond., 3, p. 286), or the Bastard Mahogany of the workmen must have been one of those trees, which, at a very early period, attracted the notice of collectors, as it occurs in sandy places adjacent to the sea near Sydney. It comes under the second division of the older Botanists. As far as the description goes, it is pretty accurate : "*E. operculo hemisphærico submutico, capitulis lateralibus solitariis pedunculis cuneatis compressis, fructu turbinato*"; and also, in

illustration of the name *botryoides*, "*flores coarcti et fasciculo baccarum haud absimiles.*" In the *Fragmenta* Vol, p. 49, Baron Mueller recognised this tree as the Bastard Mahogany, and in fourth Decade of his *Eucalyptographia*, it is correctly figured and described. It appears that, whilst Sir J. Smith gave this tree the specific name *botryoides*, Abbé Cavanilles suggested that of *platypodos* in allusion to the flatness of the flower-stalks. In the original figure, the leaves are represented much narrower than they appear in the Baron's figure, but there can be no doubt but that Smith's *E. botryoides* is one of the Mahoganies of the early settlers, and that it is perfectly distinct from the Blue Gum. According to the Baron, the species ranges from Lake Fyers and the lower Snowy River through Gipps Land to the Southern portion of New South Wales; preserving everywhere its character as a tree found not far from the coast and occurring in moist sandy places.

8. *E. hæmastoma* (Sm. Oct. Soc. Linn., Lond., 3, p. 286). This tree, which in consequence of similar flowers and fruit, has been associated with *E. Sieberiana* or the Mountain Ash of the interior is properly the "White Gum" growing near Sydney and its variety *micrantha* occurring from Port Jackson to the Blue Mountains, The description, *taken in consideration with the smooth bark*, cannot well be mistaken : "*E. operculo hæmispherico depresso mucronulato, umbellis lateralibus terminalibusque, pedunculis compressis, ramulis angulatis, fructu subgloboso.*" And then is added the observation, "*Folia coriacea lanceolata in acumen lineare longum producta. Flores umbellati non capitati, operculum depressum mucronatum. Fructus globosus apice dehiscens, orificio margine lato rubro cincto.*" The specific name taken from the broad red rim of the fruit, is certainly a guide to the determination of the species so far as the neighbourhood of Sydney is concerned, but since it has been found that a similar peculiarity attaches itself to the fruit of other species, this designation is not so appropriate as it was in the early days of the Colony. It

is difficult to say whether Smith's description applies to the true White Gum or the half-barked tree with similar flowers and fruit which is frequently associated with it, but, following the description and figures of the *Eucalyptographia*, we cannot err in restricting the term *hæmastoma* to the smooth tree, and *Sieberiana* to the half-barked one. They are, according to the artificial system, closely allied, though the texture of the bark places them in different sections.

9. *E. piperita* (Sm , Act. Soc. Linn., London., 3, p. 286; Smith's Nov. Holl., 42 ; White's itin., 226, c. icone.) The description of this species, though common in the neighbourhood of Sydney and Parramatta, is so vague and imperfect that it has been applied to "Blue Gum," and "Stringy Bark," as well as to the "Peppermint" which it was originally intended to designate : "*E. operculo hæmisphærico mucronulato, umbellis lateralibus subpaniculatis solitariisve, pedunculis compressis, ramulis angulatis foliis ovatis licet obliqua sint.*" Without reference to the original specimens or the figure given by Baron Mueller, it would be impossible to determine the species indicated by Smith, and, even in the latter, the scabrous seedling of a Stringy Bark is incorrectly associated with it. Mr. Bentham, judging from the dry material before him, supposed that the Peppermint was a variety of Stringy Bark, but independently of the fact that the respective nature of their bark places them in separate sections, there is a marked difference in the shape of the leaves and fruit. It may now be considered as certain that Smith's *E. piperita* is the Peppermint growing near Sydney, the leaves of which yield an oil resembling Peppermint in scent. There are now other trees called by the same name (*E. longifolia* or the Woolly Butt, and *E. dealbata* on the other side of the Dividing Range), but at the period when White forwarded his specimens to Europe these species were unknown, and the only tree from which the colonist extracted the so-called Peppermint oil was *E. piperita*.

10. *E. obliqua* (Sm., Act. Soc. Linn., Lond., 3, p. 287; Nov. Holl., 43; Ait. Kew. 2, p. 157; L'Hérit. Sert. angl. 18.) No species of the first Eucalypts known in Europe has given Botanists more trouble than this, which is thus briefly described: "*E. operculo hemisphærico mucronulato, umbellis lateralibus solitariis, pedunculis ramulisque teretibus.*" Since the publication of the third volume of our Flora, in which *E. obliqua* is supposed to represent Stringy Bark or the Messmate, Baron Mueller has proved from the original specimen still in the Banksian Collection that this was the first species of Eucalypt known in Europe, and that the specimen of it was procured in Tasmania during Furneaux's voyage. On this species L'Héritier founded the genus in 1788. Baron Mueller regards *E. obliqua* as the Stringy Bark of Tasmania and South Australia, and the Messmate of Victoria. There is, as Mr. Bentham perceived even from dried specimens, a close alliance between this tree and the common forms of Stringy Bark in this Colony (*E. capitella*, *E. eugenioides* and *E. macrorhyncha*), and it is probable that the time may come when all these will be regarded as varieties of one common species, differing from each other in proportion to their distance from the sea-coast, the geological formation of the soil, the elevation above the sea-level, and the comparative temperature of climate. Until however, further investigation has shown the probability of this amalgamation, it may be well to consider *E. obliqua* (or *E. gigantea*, Hook.) as the Tasmanian Stringy Bark.

11. *E. corymbosa*, ("*E. operculo hæmisphærico mucronulato, calyce tereti, umbellis corymboso-paniculatis terminalibus.*" Sm., Act. Soc. Linn., Lond., 3, p. 287, Nov. Holl., 43.) To this is appended, "*Flores magni speciosi formant paniculam magnam terminalem ex umbellis compositam, qua nota a reliquis distincta. Folia lanceolata coriacea. Fructus turbinatus calyce urceolato persistenti, et stylo in hac cavitate persistenti coronatus.*" As this description is inappropriate for any other tree at Port Jackson besides that commonly called "Bloodwood," there has not been

much difficulty in the application of it. The corymbose arrangement of the flowers, the urceolate form of the fruit, and the numerous transverse parallel veins of the leaves, distinguish this tree from any of the preceding, whilst the kino-secretions of a blood-like colour, which fill the concentric fissures of the wood render the popular name of the tree appropriate. Though only known from Port Jackson in the early days of the Colony, *E. corymbosa* is now known to occur from Victoria to Rockingham Bay. In the last mentioned place, the species seems to merge into a closely allied form which Baron Mueller calls *E. Abergiana*. Beyond the Darling also and in Queensland, there is another form (*E. terminalis*), which approaches *E. corymbosa* so closely that they can scarcely be distinguished in dried specimens. The Baron, however, regards the three as distinct.

12. The last of Willdenow's Eucalypts is *E. paniculata*, thus described: "*E. operculo hæmisphærico submutico, calyce anguloso umbellis subpaniculatis terminalibus* (Sm., Act. Soc. Linn., Lond., 3, p. 287). He adds, "*differt a præcedente: calyce angulato operculo submucronato, et quod omnibus partibus minor sit. Umbellæ formant nunquam paniculam amplam sed parvam; rami inferiores paniculæ sunt axillares.*" In the *Fragmenta* (Vol. 2, p. 174) the Baron has given a description of this species, taken principally from Smith, and he further states that specimens of it were originally collected by David Burton; whilst, in his *Eucalyptographia*, he connects it with one of the forms of Iron Bark which used to be common near Sydney. Though the wood varies in colour, it is generally paler than that of *E. siderophloia* and has obtained the name of White Iron Bark. This species is now known to have a wide range, but strange to say, in South Australia, where it seldom exceeds 30 feet, it goes by the name of White Gum Tree, the outer layers of the bark being deciduous. *E. paniculata* produces kino, as well as its congeners. According to the artificial arrangement, it stands near *E. largiflorens*, but no one, who has had an opportunity of seeing the two trees in a

living state, would suppose that they were allied, the bark and wood being so very different. Though bearing a great resemblance to *E. siderophloia*, it differs from that species in the shape and length of the operculum, as well as in the smaller size of the leaves.

In concluding this paper, it may be remarked that a review of the species first known in Europe is interesting, not only in an archæological point of view, but as affording an illustration of the progress which has been made in descriptive Botany within the last century. When the short and unsatisfactory descriptions of Smith's are compared with those of Mr. Bentham and Baron Mueller, one cannot help seeing the advance which has been made in the delineation of species, and the satisfactory steps which have been taken in seizing upon those features which connect them together. Botanists have always felt a difficulty in dealing with the genus *Eucalyptus*, because, whilst many of the species have flowers and fruits very similar, they are nevertheless perfectly distinct in wood, bark, and habit. It was not until Baron Mueller described many of them in the second volume of the *Fragmenta*, and subsequently in connection with Mr. Bentham in the third volume of the *Flora Australiensis*, that a subject which had remained dormant for nearly half a century was again forced upon the scientific world. Whilst, however, much was done by these works in the determination of species, it remained for Baron Mueller to follow up the subject in his *Eucalyptographia*. He has already described and figured 80 species of the genus, and these are so well defined, that in studying the descriptions, it is impossible to apply them to any other trees than those ntended by the author.

On some new Australian tubicolous Annelids.

By William A. Haswell, M.A., B.Sc.

[Plate XII.]

Eupomatus elegans, *sp. n.* (Plate XII., fig. 1.)

The operculum presents distally a circlet of twenty tapering processes, which fit close together below, but diverge towards their apices ; each of these is ornamented with several pairs of short acute side branches ; below their distal circlet is a collar of about forty palisade-like processes placed in close apposition, the rounded ends of which give the collar a crenated border. Branchiæ pinnate. Setæ simple. The branchiæ are of a brilliant scarlet, their stems white at the base and rich brown more distally. The operculum is yellow with a transverse brown band. The tube is smooth and of a cylindrical, somewhat sigmoid form.

Hab. Port Jackson.

This species differs from the European *E. trypanon* in the greater number of the processes in the distal circlet on the operculum.

Ammochares tenuis, *sp. n.* (Plate XII., fig. 2.)

The segments vary in number between nineteen and twenty-five ; the middle ones are the longest, being several times as long as broad ; the first three and last three or four are much shorter. The dorsal setæ are simple needles ; a neuropodial transverse ridge with minute uncini occurs in all the segments except the first two and two or three at the posterior extremity of the body. There are about fifteen branchiæ, presenting short branches, which may in turn be subdivided. In each of the first seven segments is a pair of vermiform glands,* each of which opens near the parapodium, its inner extremity being suspended freely within the perivisceral cavity. The alimentary canal is surrounded

* It is conjectured that these serve to secrete the tube. There appears to be a lumen lined with cubical, non-ciliated cells.

from the third segment backwards by a close plexus of pseudo-hæmal vessels† which undergo synchronous peristaltic contractions passing from before backwards.

This species is exceedingly common in Port Jackson under stones near the upper tide limits. One specimen was observed in the act of swallowing a small Isopod.

Clymene integrinatis, *sp. n.* (Plate XII., figs. 3—6.)

The head is amalgamated with the buccal segment. The mouth is surrounded by a thickened lip. The upper surface of the head presents a low longitudinal ridge, The first three segments are devoid of hooklets, but possess simple setæ placed on slight lateral projections. The last three segments are without either hooked or simple setæ; the last has an oval concave terminal disk $\frac{1}{4}$ of an inch in long (*i.e.* dorso-ventral) diameter, and a little less in the transverse direction, with an entire margin except for a slight notch in the middle of the ventral border. The anus is situated near the middle of the terminal disk, but rather nearer the ventral than the dorsal aspect; it is key-hole-shaped and is surrounded by a number of minute, short, radiating ridges. The simple setæ are free from serrations or teeth; the uncini have usually five accessory teeth.

This species is not rare among sand and shingle in some parts of the shores of Port Jackson. The absence of crenulations on the borders of the terminal disk separates it from most species of the genus with the exception of *C. urceolata*, Leidy, from the Atlantic coast of the United States.

Sabellaria (Hermella australiensis), *sp. n.* (Plate XII., f. 7—11.)

The total length of the animal is about an inch and a half; that of the head $\frac{3}{16}$ths of an inch, and that of the "tail" about

† In the European species this has been described as a peri-intestinal sinus.

$\frac{3}{10}$ths. The thorax is composed of five segments; the abdomen of about forty. The body is stout, thickest in front, narrowing somewhat behind. The head, including the *lamina coronaria* (*operculum*, Quatrefages), is rather longer than broad. The opercular setæ are arranged in two long ovals; the setæ of the outer limbs of the ovals are fifteen or sixteen in number on each side, slightly curved, acute, bordered with two rows of prominent spinules; the setæ of the inner limbs are twelve or thirteen, simple; on each side, at the dorsal extremity of the rows are either two or three stout brown setæ, which are strongly hooked. The prehensile cirri are extremely numerous and delicate, arising from sixteen compressed lobes; along the bases of the outer rows of setæ is a series of eleven to thirteen short cirriform processes, the two or three most dorsal of which are larger than the rest. The mouth is surrounded by a raised rim. The first segment of the thorax presents on either side of the mouth a triangular lobe, and externally a short subconical cirrus, at the base of which is a small bundle of setæ. The second segment has a bundle of neuropodial setæ, similar to those of the first, but has no notopodium; it presents a series of three cirriform processes on either side. In the following three segments the notopodium is a broad lamina armed with a row of seven or eight compressed, straight, blade-like setæ and some minute setules. The abdominal parapodia are likewise biramous, the neuropodia being minute mammillæ with about half a dozen setæ, the notopodia transverse ridges.

A common species on Thursday Island, Torres Straits.

As in Grube's *S sexhamata* the hooks of the *lamina coronaria* are sometimes two, sometimes three, often two on one side and three on the other.

Amphicteis foliata, *sp. n.* (Plate XII., figs. 12—14.

The body is subcylindrical, but to some extent dorso-ventrally compressed, broadest in front, tapering gradually behind, the greatest breadth being about a twelfth of the length, composed of thirty segments, the length of which in the anterior region of the body is about a third of the breadth.* The præstomium is small and not separate from the buccal segment. The whole head presents the form of a subconical lobe, about one-tenth to one-twelfth of the total length of the animal, with the mouth at the truncated apex; on the middle of the dorsal surface of this lobe are two longitudinal ribs, the anterior ends of which project a little above the mouth; at the hinder end of these is a shorter anteriorly divergent pair of ridges, and on either side of them bounding the dorsal surface of the head, a third pair of broad ribs which converge from before backwards. Protruding from the mouth are a number of feathered, ringed, oral tentacles. On the three first pairs of somatic segments, which are not very distinct, there are three pairs of cylindrical cirri which are somewhat longer than the breadth of the body, and a pair of foliaceous branchiæ of about the same length, but wide, thin and leaf-like; these appendages are very readily detached; behind the root of each branchia are a number of short cylindrical processes. On the same segment there is on each side a bundle of ten long smooth tapering setæ, arranged in the form of a fan and directed forwards and outwards. The parapodia are biramous, the notopodia with slender, tapering, perfectly smooth setæ; at the extremity of each notopodium on its dorsal aspect is a rounded knob-like projection, and nearer the base is a short cirrus, on the ventral aspect is another short tubercle; the neuropodium is a small elevation with numerous short pectinated setæ presenting a curry-comb-like appearance.

The length is about an inch. The tube is formed of cemented sand-grains.

Two specimens of this species were obtained with the dredge at a depth of 15 fathoms in Port Molle, during the cruise of H. M.S. "Alert" on the Queensland Coast.

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* A portion of the hinder extremity of the body is lost.

In one of the specimens, which I dissected, the anterior portion of the alimentary canal was found to be invaginated for a considerable distance within the posterior portion, shewing a corresponding power of eversion which, however, was not observed in the living specimens. Following the thin-walled oesophagus is a very short gizzard-like portion with thick walls. To this succeeds the wide intestine which presents a thick epithelial lining made up of closely-packed elongated, cylindrical cells with large and distinct nuclei; in the hinder region of the body the intestine becomes extremely narrow and the epithelial lining very thin. Throughout its length the alimentary canal seems to be surrounded by a vascular plexus. The nerve cord is remarkable on account of the trigonal form of its lateral halves.

There are two points in which this species differs from the genus *Amphicteis* as defined by Grube, viz.—in the oral tentacula being pinnate, and in one pair of branchiæ being foliaceous; but it is certainly in most other points a very near ally of *Amphicteis Philippinarum*, of Grube.

Explanation of Plate.

Fig. 1.—Operculum of *Eupomatus elegans* × 15.
,, 2.—Anterior region of the body of *Ammochares tenuis*, magnified.
,, 3.—Posterior region of the body of *Clymene integrinatis* × 4.
,, 4.—Anterior region of the same.
,, 5.—Anal disc of the same.
,, 6.—Ventral uncinus of the same.
,, 7.—Head and anterior region of *Hermella australiensis* from the ventral aspect, magnified.
,, 8.—The same, lateral view.
,, 9.—Opercular setæ of the same, highly magnified.
,, 10. and 11.—Opercular uncini of the same.
,, 12.—*Amphicteis foliata*, dorsal view, magnified.
,, 13.—Head of the same from the ventral side, more highly magnified.

Fig. 14.—Section through the body of the same in the region of the gizzard × 22. *a.* nerve-cord ; *b.* ventral vessel ; *c.* intestine ; *d.* gizzard ; *e.* ventral longitudinal muscle ; *b*, oblique muscle ; *g.* dorsal longitudinal muscle.

New species of Agaricus discovered in West Australia.

By the Rev. C. Kalchbrenner.

[Though now at a far advanced evening of life and no longer enjoying unimpaired eyesight, the Hungarian Divine has elaborated some more Australian fungaceous plants in addition to those formerly recorded in the Transactions of the Linnean Society of New South Wales. The accomplished lady, who at my request has commenced to collect fungi about the neighbourhood of Swan River, rendered her collections all the more valuable through accompanying them by splendid coloured drawings of each species, prepared by her own hands. The importance of this for the examination of succulent fungi from dried specimens I had pointed out to Mrs. Forrest ; and I wish that ladies in other parts of Australia would devote their artistic talent likewise to such original and really useful purposes.—F. v. Mueller.]

Agaricus Forrestiæ, (Sect. *Amanita*).

A. pileo carnoso convexo plano subdepresso laevi glabro nudo albo-cinerascente vel fuscescente margine haud striato, stipite valido faroto aequali albo fibroso glabrescente non bulboso, lamellis liberis ventricosis albis postice rotundatis, annulo amplo dependente, volva obsoleta. Pileus 4″ latus ; stipes pro ratione curtus, 3″ longus, fere 1″ crassus. A proximo *Ag. Persoonii* differt ob stipitem haud elongatum et radicatum et pileum tenuem.

Agaricus carneo-flavidus, (Sect. *Tricholoma*).

Ag. pileo carnoso hemispherice expanso leniter floccoso squamuloso carneo-flavido quasi persicino, stipite solido crasso subventricoso fibroso concolore, carne pallido-flavescente, lamellis emarginato-adnatis subdistantibus rigidis albo lutescentibus. Pileus admodum compactus, 3″ latus; stipes fere 2½″ longus, circiter 1″ crassus.

Agaricus turbinipes, (Sect. *Tricholoma*).

Ag. amplus, omnino dilute rufus, pileo carnoso convexo irregulari stipite turbinato crasso lamellis latis subconfertis.

Agaricus plagiotus, (Sec. *Tricholoma*).

Ag. pileo carnosulo plano depresso eximie umbonato obliquo laevi glabro pallido-rufescente, stipite excentrico faroto cylindrico basi parum incrassato concolore, lamellis sinuato-adnatis confertis albis. In viciniam *Ag. humilis* locandus, pileo autem obliquo ad stipitem verticali nec non umbone eximie prominente hemisphærico distinctus.

Agaricus bicinctus.

Ag. pileo convexo obtuso dilute umbrino squamulis obscurioribus ornato, stipite solido bulboso fibrilloso pallido basi beviter radicato ob velum collapsum circa medium et supra basim dupliciter cingulato, lamellis adnatis confertis pallidis. Pileus circiter 3″ latus; stipes supra basim 1½″ crassus. *Ag. heteroclito* proximus.

Mrs. Forrest's collections show the following Agarics also to occur at Swan River:—

Agaricus (Tricholoma) rutilans, Schæffer.
„ (*Tricholoma*) *pinaeotus*, Fries.
„ (*Naucoria*) *melinoides*, Fries.
„ (*Naucoria*) *abstrusus*, Fries.
„ (*Psalliota*) *arvensis*, Schæffer.

Agaricus (Psatyra) obtusus, Fries.
,, *(Ponaeolus) campanulatus*, L

On some points in the anatomy of the urogenital organs in females of certain species of Kangaroos.—Part I.

By J. J. Fletcher, B.A., B.Sc.

Introductory.

This paper continues the subject treated of in a previous communication, (Linn. Soc., N.S.W., Vol. vi., p. 796) and gives some account of the organs of sixty kangaroos obtained during this year. My attention has been directed chiefly to the question of the presence or absence of a direct communication between the median portion of the vagina and the urogenital canal, but some of the more salient characters of these two chambers have been noted, especially of such as previous accounts have made but slight mention, or as in the case of species in which the urogenital organs have been hitherto undescribed.

The results arrived at are:—

(1.) Corroborative of the *post partum* existence of the direct communication in some species, in which this condition has already been met with.

(2.) Descriptive of the *post partum* existence of the direct communication in ten females belonging to two species (*Halmaturus dorsalis* and *Onychogalea frænata*) of which the urogenital organs have hitherto been undescribed.

(3.) Corroborative of the anomalous condition prevalent in *Macropus major*.

(4.) Descriptive of the conditions presented by a series of unimpregnated specimens.

Of my sixty specimens, forty-four were from animals which had certainly produced young, while the remaining sixteen form an interesting series of virgin specimens, of which with the exception of two, I have cut sections. These two groups will be considered separately, the consideration of the first forming Part I. of this paper. Having been unable to complete my account of the second group in time though all the specimens have been examined, Part II. with summary and conclusion is held over until the next meeting.

Part I.—On the organs of females which have certainly produced young.

The animals from which these organs were taken, had, as in the majority of cases, young ones in the pouches, or they had large but empty pouches and frequently young ones running with them. The specimens are referable to the following genera and species:

Brush Wallaby (*Halmaturus ruficollis*) ...	4 specimens.
Wallaroo (*Osphranter robustus*)	1 ,,
Red Kangaroo (*Osphranter rufus*)	3 ,,
Dorsal-striped Wallaby (*Halmaturus dorsalis*)	6 ,,
Bridled Kangaroo (*Onychogalea frænata*) ...	4 ,,
Grey Kangaroo (*Macropus major*)	26 ,,

Halmaturus ruficollis.—In my previous account of the organs of this species I unintentionally overlooked Pagenstecher's reference to them, though an extract which I myself made from his memoir is given in the paper by Mr. Lister and myself (P. Z. S., 1881, p. 981). The omission is due to my having had no copy of the passage with me, and to the want of opportunity for again consulting the original paper out here. The passage is as follows: "In the first place it may be stated with regard to the generative organs, that Owen is perfectly right in saying that in *M. major* no communication at all exists between the median vaginal cæcum and the portion designated by him as the vestibule, whilst on the contrary *H. ruficollis* (*Bennettii*) in our collection shews a complete open communication." No further description is given and it is possible that the specimen in question was *H. Bennettii*, but that Pagenstecher used the term *H. ruficollis* merely as a synonym.

Of my four specimens two were from animals measuring 25½ and 29 in. respectively, this measurement, here as throughout this paper, being from the tip of the nose to the root of the tail. Each of them had a mammary fœtus in the pouch, the young ones measuring 7½ in., 13 in., 10 in., and 7 in. respectively. All the specimens shew a direct communication, as in previously described examples. The ridges in the urogenital canal are as well marked as before, but as in other species, when any number of specimens is examined, many differences in detail are met with, both here and in the median vagina. For instance the median ridge may measure as much as ¾ in. in length, or it may become imperceptible at ¼ in. from its anterior extremity. In one case from the posterior extremity of it a secondary ridge curves outwards and forwards to the longitudinal ridge on one side of it. There are also some secondary longitudinal ridges without any definite arrangement, and even relatively less conspicuous than is the case in the two species next to be considered.

In the median vagina no well-marked longitudinal septum was met with, but this may have been due to the way in which the chamber was cut open as is explained later on. On laying aside the cut edges of the dorsal wall, the ventral surface is slightly convex from side to side, and has a depression running along each margin. It presents slight longitudinal furrows and ridges usually more numerous anteriorly. Sometimes however there are transverse puckerings, especially in the anterior portion. From the margins slight imperfect septa or trabeculæ sometimes reticulating, radiate obliquely to the side walls. In one specimen the dorsal wall was very thin, while in another it was more than double the thickness. Once a well-marked projection intervening between the two papillæ carrying the ostia uterorum was noticed. This perhaps was the remnant of a longitudinal septum.

Osphranter robustus.—The animal from which my specimen came was a fine adult female, measuring 33 in. The pouch was empty and very large, and its walls were covered with much of the brown secretion, such as Morgan,* more than half a century ago had observed "always to exist in these animals during the periods at which the pouch remains unoccupied by the young." One of the functional teats was slightly longer than the other, otherwise each of them as well as each of the two supplemental teats measured nearly $\frac{1}{2}$ in. The left uterus contained a blastodermic vesicle about the size of a pea.

This is the finest specimen of the urogenital organs I have seen, and shews the direct communication excellently, its orifice being very large, and having the usual situation on the median ridge just in advance of the meatus urinarius, which is only half the size.

The urogenital canal, measured from the anterior end of the median ridge to its distal margin is $2\frac{1}{4}$ in. long as compared with 2 in. in each of specimens (*a*) and (*b*.) of the same species of my former paper. This is slightly longer than I have found it in four specimens of *O. rufus*, and very much longer than I have ever seen it in *M. major*. A further comparison of the organs in these three species, the animals of which attain much the same size, will be given later on. The urogenital canal shews the two principal longitudinal ridges and also the median one very well indeed. In addition there is a well-marked though not so prominent secondary longitudinal ridge on the outer side of each of the main ridges and running parallel with it at a distance equal to that which intervenes between each of these and the median one. One of these secondary ridges runs to the inner side, the other to the outer side, of the entrance to the lateral canal on the respective sides. There is also another ridge on the dorsal wall. Each of the main ridges is $1\frac{1}{16}$ in. long, $\frac{3}{16}$ in. high, and $\frac{3}{16}$ broad,

* Morgan, Linnean Soc. Trans., xvi., 1831.

but the height and breadth gradually diminish as the ridge is traced backwards, The median ridge extends backwards for an inch, rapidly decreasing in height posterior to the ostium urethræ. The secondary ridges are as long, but at the same time lower and narrower than the main ones.

These ridges are permanent structures and are not due merely to the contraction of the walls of the canal. Whether they have any functional importance beyond increasing the surface of the mucous membrane lining the urogenital passage, or whether they are in some way connected with the mode of development of this portion of the urogenital organs, is not at all clear at present; but they form too conspicuous a feature to be passed over in silence. They seem to be absent sometimes in specimens of *M. major*, though twenty-five of mine shew them very well. Neither Home nor Owen seems to refer to them, though Home's figures, which however are very poor, give one the idea that there were ridges present, and Prof. Owen speaking of the Wombat says "the urogenital canal is lined by a thick epithelium, and its surface is broken up into countless oblique rugæ and coarse papillæ betraying a certain regularity in their arrangement."

In the median vagina no longitudinal septum was seen, but its ventral surface presents two ridges with a well marked groove between them. They start from the anterior end of the chamber and at $\frac{5}{8}$ in. from the ostium of the direct communication they curve outwards and fuse with the side walls. They increase gradually in height from before backwards and the groove separating them averages $\frac{1}{16}$ in. in width. When the ridges join the sides the groove opens out into a chamber which opens into the urogenital canal by the direct communication. The ventral wall of this chamber is marked by a slight median elevation. Specimens (*a*) and (*b*) of my former paper have been referred to for comparison, but neither of them presents a similar arrangement of ridges and groove. Beyond some slight longitudinal folds, and some transverse puckerings they present no features worthy of remark.

Osphranter rufus.—This species is usually spoken of as *Macropus rufus.* By Mr. Gould however it was referred to his genus *Osphranter.* The characters presented by the urogenital organs, are so similar to those of *O. robustus* and so different from those of *M. major*, that they seem to me to offer evidence of some taxonomic value, in favour of Mr. Gould's view. Moreover on p. 54 of his valuable Manual Mr. Waterhouse says, "As regards the section *Macropus* proper (as now restricted), characterised as having the muffle hairy, it is necessary to state that the species which are arranged in that section differ as to the extent of the part of the muffle which is clothed with hairs; and in some cases, as in *M. rufus*, the muffle is quite as imperfectly clothed as in certain *Halmaturi* in which the muffle is said to be naked."

The three specimens now to be described are the first of this species which I have obtained. For two of them I am again indebted to Mr. F. Morley who has taken much trouble to increase my stock of material and to whom my best thanks are due. One of the two females had a young one in the pouch, the other had an empty pouch, but was suckling a haired young one running with her. Of the third I have no particulars except that my collector was satisfied that she had had young. This specimen was in an early stage of pregnancy.

All three specimens shew the direct communication, and are essentially like the specimem figured in the paper by Mr. Lister and myself (P.Z.S., 1881, p. 985).

The urogenital canal is about as long as in *O. robustus*. It varies from 1¾ in., in one specimen which however is much smaller in every way than the others, to 2¼ in. They all present conspicuous ridges much as in the other species. The two apertures are situated on the median ridge, but the latter, immediately posterior to the orifice of the direct communication, first suddenly and then more gradually, diminishes in height, so that that orifice appears to be situated on a promontory having the ostium urethræ at the base of its tip. Both apertures are however really situated on the same ridge but at different levels. The secondary ridges instead of being parallel to the main ridges, mostly fuse with them posteriorly and then run diagonally outwards and forwards so as to present the appearance of bifurcations. The latter may start from very near the posterior extremity of the main ridges or even in advance of this, and their origins may be on the same level, or one may start as much as $\frac{1}{4}$ in. in advance of the other, or as in one specimen one secondary ridge may be parallel to, and the other a bifurcation of, their respective main ridges. A large virgin specimen is in no wise different as far as the ridges are concerned. The arrangement of the secondary ridges does not however appear to be a characteristic one, for the two Wallaroo specimens (*a*) and (*b*) of my previous paper present similar variations from the arrangement in the specimen of the same species already described above. Still, as mentioned before, they form too marked a character to be entirely passed over. Besides the secondary ridges there are other minor and less well-marked asymmetrical ridges varying in their arrangement in different specimens.

In the median vagina all the specimens present a very similar condition to what has been described above in *O. robustus*, that is to say, the ventral surface is marked by a median longitudinal groove less conspicuous however than in that specimen, and therefore it does not so conspicuously give rise to the appearance of ridges. In the virgin specimen the groove is present only anteriorly for one inch when it disappears, and the whole ventral surface itself narrows and assumes the appearance of a ridge bordered on either side by a depression. Septa often reticulating pass in all the specimens from the ventral surface to the side walls and in one specimen there are many transverse puckerings.

There are also many insignificant longitudinal folds, but without any very definite arrangement.

On comparing the urogenital organs of this species with those of *O. robustus* they agree in the following particulars: (1) in having a post partum direct communication between the median vaginal and the urogenital chambers, and in not having it before parturition so far as we know at present; (2) in having the lateral canals developed to about the same extent; (3) in having the urogenital canal, fully 2 in. or more long in average specimens; (4) and in having correspondingly long and conspicuous ridges on the ventral surface of that canal. In addition they agree essentially in other particulars not now under consideration, and as far as I can see they do not differ materially from one another in any single important particular.

On p. 62 of the article Marsupialia, Professor Owen says "It is not unusual to find the vaginæ of the Kangaroo distended with a gelatino-mucous adhesive secretion containing hard irregularly shaped fibrous masses. One of these bodies which was found in the mesial cul-de-sac of a Kangaroo was described and figured by Home as the vertebral column and occipital bone of a fœtus * * * * Professor Leuckhart who found similar bodies in the vaginal tube of a Kangaroo, compares them to a mola or false conception, but observes that there was nothing in their structure that would permit him to form a conclusion that they were parts of a fœtus." Again on p. 63, the same distinguished author speaks of the "inspissated secretion commonly present both in the cul-de-sac and the lateral canals." Other observers have described similar finds. In one of my specimens of *O. rufus* the anterior portion of the median vagina was much distended, and this was found to be due to the presence of two yellowish resinous-looking masses of irregular shape, which extended some way into, and completely blocked the lateral canals. There was a third similar but smaller fragment between the other two. In a specimen of *H. ruficollis* and in about the same region a similar mass was found. All these are doubtless of like origin to the bodies described by Prof. Owen. So far these are the only examples met with by myself.

Halmaturus dorsalis.—I have never met with any description of, or allusion to, the urogenital organs, either of this species or of the one next to be considered. Six specimens, of which one was pregnant, were sent me, along with their skins by my collector. In their general characters they are very much like the organs of *H. ruficollis,* except that the lateral canals are longer and make a wider arch than in the latter species. The lateral canals are relatively as long as in *M. major* and surpass *H. ruficollis* in this respect just as *M. major* does the Red and the Wallaroo.

All these specimens shew the direct communication, its aperture which has the usual situation, in every case being seen at once on laying back the cut edges of the dorsal wall of the urogenital canal.

The urogenital passage in three specimens was damaged just at the extreme end, but in three others it averages $1\frac{1}{4}$ in., and in this respect agrees with *H. ruficollis.* In all there is an arrangement of ridges very similar to what has been described in the last mentioned species. Sometimes however the median ridge suddenly drops for $\frac{1}{16}$ in. between the orifices of the direct communication and of the urethra, and the former may then appear to be situated on a promontory with a free tip just as has been described above in *O. rufus*, and for the same reason. Occasionally the median ridge disappears altogether immediately posterior to the ostium urethræ, or it may extend backwards for $\frac{1}{4}$ to $\frac{1}{2}$ in., much as in *H. ruficollis.* In the latter species the marked difference in level between the two orifices, and the extreme shortness and sudden disappearance of the median ridge have been met with less frequently than in *H. dorsalis*, though I do not know that this is a point of any importance.

Secondary ridges are also to be met with but they are not so conspicuous even relatively as in the Red and the Wallaroo. They may be parallel to the main ridges, or may appear as bifurcations of them and they may or may not extend as far forwards as the distal openings of the lateral canals. In one case the whole interior of the urogenital canal was much more irregularly rugose than usual.

In regard of the median vagina no two of them are quite alike, either in the arrangement of the folds and puckerings, or in the appearance presented by the ventral wall. The latter in one case appears as a narrow ridge with a slight median groove. In others there is a more or less well-marked ridge, or the ventral surface may be flat. In all cases there are longitudinal folds and obliquely radiating trabeculæ and transverse puckerings, but all without definite arrangement. An interesting feature about these specimens is the extent to which the papillæ on which the ostia uterorum are situated, project into the cavity of the median vagina which they block to such an extent as to render it difficult, if not impossible for an embryo to pass into the lateral canal, and correspondingly easy for it to pass into the urogenital passage through the direct communication. The papillæ were laterally in more or less close contact, and their tips may be as as much as $\frac{5}{16}$ in. below the lower margin of the entrance to the lateral canals. Externally their large size causes a distention, in some cases as marked as that in the specimen of *O. rufus*, in which it was due to the presence of the waxy looking masses described above. Except in two specimens *Onychogalea frænata* I have not noticed this character in such a marked degree in other kangaroos.

Onychogalea frænata.—The organs of four of these pretty little scrub kangaroos have been examined. As in the preceding case I know of no reference whatever to the anatomy of this species. One animal shot by myself had a young one 6 in. long on the teat. Of the other three which were got by my collector, two had young ones 3 in. and 5 in. respectively, while of the third I know only that she was not a virgin. The organs, from the distal portion of the Fallopian tubes to the vulva measure $2\frac{3}{4}$ in. in a straight line. The most striking feature about them is the shortness and consequently very slight arching of the lateral canals. When these are dissected away from the sides of the median vagina, to which they are closely bound by connective tissue, their length does not exceed that of the straight piece of median vagina intervening between their anterior and posterior extremities, by more than $\frac{1}{2}$ in. They are very much shorter even relatively than is the case in any other species described in this paper, and more like the specimen of *Dendrolagus inustus*, figured on p. 989 of the P.Z.S. for 1881. Their diameter is very uniform and does not exceed $\frac{1}{16}$ in.

In each of the four specimens there is a direct communication between the median vaginal and the urogenital canals. Its orifice is well marked and has the usual situation. The urogenital canal measures $1\frac{1}{8}$ in. in length, that is not much shorter than is the case in an average specimen of *M. major*, even considering the disparity in size of the animals. It shows substantially the same arrangement of conspicuous ridges as in the previously described species, though in one specimen they are very broad and more massive altogether than usual, and in two specimens they do not very sensibly diminish in size throughout and become fused in the last $\frac{1}{4}$ in. of their course, though a slight superficial depression still shews their originally double character. In one case the median ridge at a $\frac{1}{4}$ in. from its anterior end fuses posteriorly with one of the main ridges. There are traces of secondary ridges but these are irregular and not very conspicuous.

There is no doubt about the continuity of the tissues of the median vagina and the urogenital canal, and externally one looks like a continuation of the other. The walls of the former are thick and firm and give it a circular outline. It is broadest anteriorly just in the region of the origin of the lateral canals and tapers gradually and slightly towards its end. Internally it is much folded both longitudinally and transversely, but there are no marked features to be described. The papillæ on which the ostia uterorum are situated, are in close contact laterally, and in two cases are very large, and being similar to what has been described above in *H. dorsalis*, are mainly responsible for the increase in breadth in this region. In the other two specimens the papillæ are much smaller.

Macropus major.—Of this species twenty-six specimens have been examined. Three of them obtained by myself were from animals each of which had a young one in the pouch. Two of the young ones measured 2 in., the third 9½ in. Of five others, kindly given me by Mr. Morley, four were from females with young in the pouches, and the fifth was from a female suckling a haired young one. The remaining eighteen were obtained by my collector, who at my request carefully distinguished the organs from animals which had had young from those of virgin animals. In not one single instance was there any direct communication between the median portion of the vagina and the urogenital canal, and in all cases I have been able most satisfactorily to make out the cæcal condition of the cul-de-sac.

From four specimens taken at random, sections were cut, while each of the others was carefully dissected and subsequently re-examined. The former may be considered first.

In each case the organs were cut across well above the bottom of the cul-de-sac, and then from the distal portion sections were cut, beginning at the proximal end. On account of the larger size of the sections and because the material was not specially hardened, the sections are not so thin as in the case of the virgin specimens described later on. Supposing the sections to be placed with their ventral surface away from, and the dorsal surface towards, the observer, then what one sees is this: Near the top of the section is the aperture of the urethra; below this is that of the cul-de-sac much wider from side to side than the former, and about the same height from above downwards; and lastly below and on either side of the middle aperture, come the openings of the lateral canals which at first are quite separate from one another and merely connected loosely by connective tissue, but in the very last part of their course their inner walls fuse and so in sections they are separated by a narrow septum. The outline of the openings is more or less convoluted. The following changes then take place in successive sections of three of the specimens. The urethral aperture gradually becomes smaller and finally opens into the urogenital passage, its ostium being situated on the median ridge. The aperture of the cul-de-sac after having gradually diminished in size until it is no bigger than a pinhole, disappears altogether. This happened in the 23rd, 17th, and 16th sections respectively, before the septum between the apertures of the lateral canals thins away, until they are no longer separated, and now give rise to the anterior portion of the urogenital canal. The sections intervening between the last shewing the aperture of the cul-de-sac and the first shewing the meatus urinarius were carefully counted, and were found to be 45, 50, and 41 respectively, (equal to about $\frac{1}{4}$ in.).

The fourth specimen presented some interesting differences. In the earlier sections which were $\frac{9}{16}$ in. from side to side, the aperture of the cul-de-sac measured $\frac{3}{8}$ in. in the same direction, and averaged $\frac{1}{8}$ in. from above downwards, but was slightly wider than this just at one end. Then, instead of diminishing to a pinhole as before, it became blocked for $\frac{1}{3}$ in. in the middle only. The blocking increases in width from side to side in succeeding sections, until in the course of half a dozen of them, there is nothing left of the original aperture but a small hole at either extremity, the intervening space having been completely filled up.

Next in the course of a few sections, one of these holes disappears entirely, while the other continues much as before. Between fifty and sixty consecutive sections had been mounted after the obliteration of the rest of the original aperture, when, evidently within a few, probably not more than ten, sections of reaching the meatus urinarius, a piece of tissue broke off and put a stop to further operations. In all these sections the remnant of the above mentioned hole is distinctly traceable though it has gradually become smaller and is situated in the middle of a small area different in appearance from the surrounding tissue. Now whether this is merely a pocket of the median vagina, or whether, if it had been situated in the middle line it might not have become a direct communication to the urogenital canal, is not easy to decide. At any rate it is of interest as shewing that there was a much closer connection between the tissue of the cul-de-sac and that of the urogenital canal, than was the case in the specimens figured and described by Professor Owen and by Brass, a point to which further reference will be made.

The remaining twenty-two specimens were carefully dissected, but there was no direct communication in any single example. I was able in every case to make out the cæcal condition of the cul-de-sac, as well as the absence of any aperture but that of the meatus urinarius, on the wall of the urogenital canal. The distance from the end of the cul-de-sac to the ostium urethræ averages $\frac{5}{16}$ in., but I have met with it as low as $\frac{3}{16}$ in., and as high as $\frac{7}{16}$, but it is quite possible that the exact position of the urethral orifice may not be quite invariable.

At present, leaving out of consideration the Rat Kangaroos, which so far, are in the same category, *Macropus major* is the only species of kangaroo in which this *post partum* absence of a direct communication between the median vagina and the urogenital canal, is certainly known to exist. True it is that its presence has not yet been met with in *M. Parryi*, *Dendrolagus inustus*, or *Dorcopsis luctuosa*, but of the first and last only one isolated specimen in each case, and of the second only three specimens have been examined, and in no single instance is there any evidence forthcoming that parturition had taken place.

What evidence there is, is strongly in favour of their being virgins, and has already been discussed in the paper in the P.Z.S., 1881. It must be remembered however that in the same paper a single instance is given of the occurrence of the direct communication in *M. major*, and allusion is made to specimen No. 3460 D. in the Museum of the College of Surgeons in which *inferentially* there is a like condition, but this state of things is very exceptional. On the other hand, the at any rate *post partum* existence of a direct communication has now been described in ten species in addition to two in which it is described for the first time in this paper. Clearly then in *M. major* there is, as a rule, a persistence of what was probably a more primitive condition of the vagina in kangaroos, while in other species as far as we know at present, the addition of a direct communication has been found to be advantageous. Why there should be this important and interesting difference, it is not easy even to offer a suggestion. It will be of interest to know the condition in the species whose urogenital organs are yet undescribed, and I hope shortly to be able to continue the investigation of this point.

On the very reasonable supposition that Home's specimens did not belong to *M. major*, for he simply speaks of them as kangaroos, and his figures do not give much help on this point, it is not difficult to explain the controversy which has arisen as to the presence of the direct communication in question, since its origin is clearly traceable to the fact that different observers have drawn their conclusions from the consideration of specimens which present different conditions under similar circumstances. Taking this view of the matter, the following passage from a review of Pœlman's paper written some thirty years ago by Van Beneden,* is interesting: "Deux museaux de tanche, s'ouvrant dans une cavité formant un cul-de-sac ; deux vagins en forme d'anse ; une cavité unique où les vagins aboutissent

* Bull. de l' Acad. Roy. de Belgique, xviii., pp. 579-80.

avec les canaux excréteurs des reins, voilà ce que l'on observe en général dans l'appareil sexuel femelle des Marsupiaux. Deux anatomistes de premier ordre disent que la cavité dans laquelle s'ouvre le museau detanche ne communique jamais avec la cavité urétro-sexuel. Deux autres savants, non moins illustres admettent au contraire, l'existence de cette communication ; mais presque tous les anatomistes se rangent de l'avis des premiers, parce que les derniers ont se souvent laissé induire en erreur par des vues théoriques. M. Pœlman a eu l'occasion de disséquer une femelle de Macropus, qu 'il dit appartenir *M. bennettii* et il a porté son attention sur ce point. Peu d'anatomistes s'attendront au résultat annoncée par M. P., et ils apprendront, je crois, avec étonnement, que la communication directe ente le canal urétro-sexuel, et la cavité daus la quelle s'abouchent les museaux de tanche existe réellement daus ce didelphe. En resulte-t-il que Cuvier et Owen ont mal vu ? Nous ne le pensons pas, et nous croyons plutôt que la disposition signalée par Carus & G. St. Hillaire, et que M. Pœlman vient de reconnaitre daus le *M. bennettii* est sinon individuelle, du moins propre à une ou à quelques espèces."

The urogenital canal in this species is comparatively short, its length in average specimens being $1\frac{1}{2}$ in. One of my specimens which came from a female measuring 35 in. has the canal remarkably short, its length barely exceeding $1\frac{1}{4}$ in. Twice I have met with it $1\frac{5}{8}$ in., but in the majority of my specimens the above average obtains. The presence of ridges on the ventral wall of the canal has not, as far as my knowledge goes, been previously described in this species and does not seem constant. Professor Owen does not allude to them and no information can be gathered from his figure since the ventral wall of the urogenital canal has been dissected away. In Brass's figure there is no sign of ridges and the ostium urethræ is situated on a small papilla, nor does he allude to them in the text.

Of one of the specimens described in the paper (P.Z.S., 1881) it is said that "there are no distinct longitudinal folds in the urogenital chamber," while the condition of the other is not given. In one only of all my specimens is there any difficulty in recognising ridges similar and similarly situated to what have been described in other species ; the chief difference being that they are shorter and as a rule not so conspicuous as in the Red and the Wallaroo. In average specimens the ridges are about $\frac{3}{4}$ in. long, $\frac{1}{8}$ in. high, $\frac{1}{16}$ in. broad. In the specimen already mentioned as having a remarkably short canal, the three ridges are $\frac{1}{2}$ in. long, $\frac{3}{16}$ in. high, and $\frac{1}{8}$ broad, and terminate abruptly. In the exceptional specimen referred to above the separate ridges are certainly not as well marked as usual, but careful examination shews that this is due to the ridges which are short, having fused anteriorly and posteriorly, leaving a hollow between them. The remnant of a median ridge projects slightly into this anteriorly and rather below its tip is the meatus urinarius.

In some specimens the length of the median ridge is often insignificant and it may gradually diminish in height, or it may make a sudden drop and then continue at a lower level. On the whole then the ridges in this species may be said to be on the same type as, but shorter, lower, and narrower than is the case in the Red and Wallaroo, and to be more like what has been described in the Halmaturi.

The vaginal cul-de-sac presents variety in details, so that it is impossible to give a good description which will apply to any number of specimens. In several instances the arrangement is very similar ts what has been described above in the Wallaroo. In one case two ridges start from the level of the lateral canals and proceeding backwards along the ventral surface curve outwards and join the sides near the end of the cul-de-sac, while in the median line between them there is a slight elevation which extends to within $\frac{1}{4}$ in. of the bottom of the chamber. Between the median and lateral ridges on either side there are numerous reticulations, especially towards the posterior portion of the cul-de-sac. Sometimes the ventral surface presents only obscure longitudinal folds and radiating trabeculæ without any other marked feature. I have several times met with the reticulate structure described by Professor Owen in his specimen.

In two specimens the remains of a well-marked longitudinal septum such as the same distinguished anatomist has described in the cul-de-sac were met with. This septum which runs along the dorsal wall, extended in one specimen completely across the cavity for a distance of ¼ in., near the bottom of the cul-de-sac, while for the rest of its course, as throughout in the other case, it was only partial. To see this septum the cul-de-sac should be laid open laterally or from the ventral surface but as it was more suitable for my purpose, the dissections in all my other specimens were made intentionally from the dorsal aspect, and accordingly the septum was injured or overlooked, both in this and the other species mentioned in this paper.

On comparing the urogenital organs of *M. major* with those of the Red Kangaroo and the Wallaroo, which two agree pretty well as has been already pointed out, the following points of difference are noteworthy. *Macropus major* has (1) as a rule no direct communication between the cul-de-sac and the urogenital passage; (2) the lateral canals considerably longer; (3) the urogenital canal shorter by about one-third of its length; and (4) ridges, in the urogenital canal as a rule on the same type, but of smaller dimensions than is the case in the other two species, and exceptionally the ridges may be absent altogether, whereas in the Wallaroo and Red they are always present as far as we know at present. I suspect too that the median vagina is probably relatively longest in *M. major*, and on this point as on that of the relative lengths of the lateral canals, a series of measurements would be interesting, but up to the present, want of leisure and of additional specimens of *O. robustus* and *O. rufus* has prevented the investigation of these details.

While then so far as the *post partum* absence of a direct communication in *M. major* is concerned, my observations agree with what Professor Owen, has described, yet in regard of the extent to which the cul-de-sac is continued backwards, and of its relation to the urogenital passage, my specimens, without exception, differ from the specimen described and figured by the same great anatomist as well as from the very similar one examined by Brass. Professor Owen's account is this: *" In the specimen examined by me, this part of the vagina (cul-de-sac) was not continuous by means of its proper tissue with the urogenital canal, but was connected thereto by areolar tissue." In Brass's figure the break is even more marked. All my specimens differ from both these, not only in respect of the increased backward extension of the cul-de-sac, but also in its acquiring a much more intimate relation, both with the tissue of the urogenital canal as well as with that of the bladder and urethra. In Professor Owen's figure the ventral wall of the cul-de-sac and of the urogenital canal along with the bladder and its attachment have been dissected away, while in that of Brass the specimen is seen intact from the dorsal aspect and shews no connection between the tissue of the bladder and urethra and that of the cul-de-sac, quite different from any thing that has come under my observation.

Clearly in those species in which a direct communication prevails, the tissue of the median portion of the vagina must be continuous with that of the urogenital passage. A similar condition was described in the second specimen of *M. major* mentioned in the paper† already quoted. From the examination of a large number of sections from this region of the urogenital organs as well as from the careful examination of over twenty specimens, there would seem to be very intimate relation between the tissues of the two chambers in all my specimens. More-

* Comp. Anat., vol. iii., p. 683.

† P.Z.S., 1881, p. 387.

over the important part which the bladder and the urethra play in bringing about this relation, must not be left out of consideration. The meatus urinarius is situated on the ventral wall of the urogenital chamber at about ¼ in. from the anterior end of the latter, consequently the tissue of the urethral wall must be continuous with that of the urogenital canal. Similarly the tissue of the cervix of the bladder fuses with that of the wall of the cul-de-sac at about ½ in. from its end, and the urethra has the appearance of being buried in the wall of the cul-de-sac. Hence throughout its course, the urethra is fused with the wall of the cul-de-sac on the one hand, and with the wall of the urogenital passage on the other, and so helps to bring these parts into very close relation. This is the arrangement which Brass figures in *Hypsiprymnus*, and *H. bennetti*, while in his figure of *M. major* the arrangement is quite different. Possibly Prof. Owen's specimen was like this too: in which case these two specimens, as it seems to me, can be regarded only as interesting and remarkable variations from the more typical arrangement which I have met with in a larger number of examples, and which obtains in other species.

On a species of Brachyphyllum from Mesozoic Coal Beds, Ipswich, Queensland.

By the Rev. J. E. Tenison-Woods, F.L.S., &c.

A very interesting discovery has been lately made at the Tivoli Mine, Ipswich, Queensland. The coal beds there have yielded a specimen of *Brachyphyllum*, closely allied to the well-known and common Oolitic *B. mammillare*, Brongt. It is associated with *Tæniopteris*, *Alethopteris australis*, *Equisetum rotiferum* (nobis), *Thinnfeldia adontopteroides Sphenopteris elongata*, etc. It was brought to me by Mr. Meston, who was then the proprietor of the mines, and was found amongst the shale in the workings immediately above the coal seam in somewhat impure coal.

BRACHYPHYLLUM CRASSUM, (an var *B. mammilare* ?)

Plant robust, thick, stem and branches repeatedly dichotomous. Leaves thick and fleshy, densely crowded, homodromous, short, broad, obtuse, conspicuously keeled, erect, and closely imbricate, slightly spreading. Branches and branchlets very little narrower than the parent stem and of equal width to the summit. All portions of the plant conspicuously curved. Three leaves visible in each spiral: about three rows in a centimetre. Length of leaves from 2 to 3 mill., breadth from 5 to 6 mill. Diam. of cauline stem at widest part 10 mill., of branchlets 8 mill. Length of shortest 18 mill. Longest diameter of plant 150 mill.: greatest width 105 mill., in which there are 13 bifurcations.

Amongst the fragments imbedded around the plant there are many portions of much narrower dimensions covered with rhomboidal depressions like a *Lepidodendron.* These are branches from which the leaves have been shed. They are about 30 mill. long, and 2 mill. wide, covered with lozenge-shaped depressions with a raised margin, of which two are exposed in each internode or spiral. They are also dichotomous and seem to proceed from the ends of the branches; some of them are straight and some curved, and they abound round the stems.

This very beautiful fossil which is so excellently preserved and so complete in its details resembles very closely in general habit the well-known *B. mammillare*, Brong., which is widely spread in Oolitic deposits of France, and Wiltshire, Oxford, and Yorkshire in England. But this fossil differs from every other known form in the thickness and shape of the leaves, and the continuous branching without much diminution of the diameter. In some cases the result of the branching is to give rise to a slightly thicker stem than the parent branch. Under the microscope also I find that the leaves are covered with a very fine granulation and the margins are slightly raised. The keel is sharp and raised, but not visible on all the leaves, which easily separate from the stem in the fossil, leaving a shapeless scar of brittle, shining coal.

There are no other plant remains in the slate except woody fragments, and the whole is covered with fine scales of silvery mica. I am inclined to the opinion that this is no more than a variety of the European fossil, but lest I should be causing confusion by a wrong identification, I give it another name. If, however, we had no other distinction between two species of trees than those which exist between these fossils, we should not be justified in separating them. There may, however, be distinctions in the inflorescence, which have not yet been discovered.

B. mamilare has been separated by Schimper from the plant wrongly so named by Lindley and Hutton, (See Foss. Flora, pl. 188 and 219, vol. 3. See also, Schimper, vol. 2, p. 336, *B. phillipsii.*)

In the Geological Magazine for Jany., 1869 (vol. 6, p. 5, pl. 2, figs. 12, 13) there are figures of rough branches of *B. mamillare.* Also Annales des Sciences Naturelles, 1 ser., vol. iv., plate 19, fig. 9, under the name of *Mamillaria desnoyersii*, Brong.

Vinger in his Genera et Species Plant Foss., p. 308, regards *Brachyphyllum* as a Cycad.

Note on the Cocoanut-eating Habit of the Birgus in the Solomon Group.

By H. B. Guppy, M.B., H.M.S. "Lark."

Whilst traversing, last September, the belt of screw-pines which borders the beach on the east coast of Malanpaina, the southern island of the Three Sisters, I came upon one of the large cocoanut crabs—a *Birgus*—closely allied (if not identical) with the well-known *Birgus latro* of the Philippines. Its length of body, when extended, was about 15 inches, being about 3 inches shorter than that of another individual of the same species which I had met with in the previous June in the vicinity of Star Harbour, St. Christoval, at a height of about 300 feet above the sea. Both these crabs were considerably stouter than the species which I observed a few days since in the Australian Museum.

The *Birgus*, which I observed at the Three Sisters, I found esconced in the angle between the buttressed roots of a tree, with a full-sized cocoanut within reach of its big claws. From the fresh-looking external appearance of the shell, it had been evidently but recently husked, which operation had been performed more cleanly than if a native had done it. There was an opening at the eye-hole end of the shell of a somewhat regular oblong form, measuring 2 by 1½ inches, and large enough to admit the powerful claws of the crab. The white kernel, which was quite firm as in the mature nut, had been scooped out for from 1 to 1½ inch around the opening; small pieces of the kernel lay on the ground outside the nut, and others were floating about in the milk inside, of which the shell was about a fourth-part full. I had without doubt disturbed the *Birgus* in the middle of its meal. Curiously enough, there were no cocoanut palms to be seen within fifty paces of the spot where the crab was found, nor were portions of the husk to be found in its retreat. The *Birgus* which I found on the St. Christoval coast was captured quite away from any cocoanut palms, on the top of a ridge about 300 feet above the sea.

In my own mind I have no doubt that the crab not only husked the shell, but also broke the hole at the eye-hole end of the nut. The island is uninhabited, and only occasionally visited by parties of natives from the adjoining coast of St. Christoval, who resort to the lee side of the island for the purpose of fishing, but never on the weather side, where the *Birgus* was found. Having explored the island I can affirm that there were no natives on the island during the ship's stay. Not only had the shell been very recently husked, but it was evident from the fresh condition of the milk and kernel of the nut that an interval probably of only a few hours had elapsed since the opening had been made. The late Mr. Darwin, in his Journal of the Beagle (p. 468, edit 1860), thus describes the manner in which these crabs remove the husk and perforate the hard shell, on Keeling Island, as observed by Mr. Liesk, an English resident. "After the husk has been removed fibre by fibre, the crab commences to hammer an opening in one of the eye-holes until an opening is made. It then turns round its body and extracts the white meat inside." From this description it would seem that a circular opening would be formed, whilst in the particular instance of this cocoanut the angular form of the opening, together with the appearance of the edges, would incline me to the opinion that the hole had been formed partly by biting and partly by the rasp-like surface of the big pair of claws. It is worthy of note that I observed no fragment of the shell in the milk within the nut.

I kept the *Birgus* alive on board on a diet of coconuts for three weeks, when one morning, to my great disappointment, I found it dead. Other foods, such as bananas, were offered to it, but were left untouched. Its appetite for cocoanuts continued unimpaired to the last day of its life. Mr. Isabel, leading stoker of this ship, who looked after it very attentively, tells me that its average rate of consumption was about two cocoanuts in three days. A number of these crabs in a cocoanut plantation might therefore prove a considerable pest; and if this represents the quantity of food which the *Birgus* consumes in a state of nature, a single crab in the course of twelve months would dispose of about 250 cocoanuts, which represents the annual production of two to three palms, and between twenty and thirty quarts of cocoanut oil. Being desirous of observing the manner in which the husk was removed, I had a cocoanut with its husk on placed in the coop in which the crab was kept. On one occasion the *Birgus* was surprised with the nut between its large claws; but notwithstanding that no other food was offered to it for a day and a half it did not attempt to strip off the husk. So the operation was done for it, and a small hole was knocked in the top of the shell. On the following day I found the shell—a young and somewhat thin one—broken irregularly across the middle, with the soft white kernel cleanly scooped out and eaten. It was afterwards found necessary to break the nuts for its daily food, as I was anxious to keep it alive until our arrival at Sydney.

As the crab disliked observation I was unable to gain much knowledge of its habits by watching. During the day time it was sluggish, did not eat, and kept in one quarter as far from the light as it could get; at night it moved about very actively, and fed vigorously on the cocoanuts. Some salt-water was kept in the coop, as the *Birgus* is said to descend to the sea-coast at night to moisten its gills.

The powers of smell (?) of this crab did not appear to be very keen. Strong liquor ammoniæ of the British Pharmacopeia, when placed about a couple of inches under its mouth, caused a little movement of the foot-jaws or maxillæ, but the crab showed no other signs of discomfort, and remained in the same posture. Chloroform, when similarly placed, produced a like effect on the foot-jaws, and by the gradual sinking down of one of the second pair of claws which was raised up in the air, it appeared to experience in some degree its physiological effect.

The habit of this crab when surprised away from its burrow, is not to turn round and run away, but to retreat in an orderly manner with its front to the foe. Having reached some root or trunk of a tree which protects in the rear its less perfectly-armoured abdomen, it makes a resolute stand, waves one of the second pair of long claws in the air and courageously awaits the attack. I observed the attitude of defence more carefully after I had brought the crab on board. The two large claws are held up close together to defend the mouth and eyes, but with the pincers pointing downward—the posture reminding me of the guard for the head and face in sword exercise. One of the long second pair of claws is planted firmly on the ground to give the crab additional support, whilst the other claw is raised in the air and moved up and down in a sparring fashion. The whole attitude of the *Birgus* when on the defensive is one of dogged and determined resistance. The big pincers which point downward are ready to seize anything which touches the unprotected under surface of the abdomen, but as on account of the position of the claws it can only forsee attacks from above; it cannot ward off a thrust directed against the abdomen, although it may afterwards inflict severe injuries on the aggressor.

NOTES ON BIRDS FROM THE SOLOMON ISLANDS.

BY E. P. RAMSAY, F.L.S., &c.

AMAURORNIS MOLUCCANA.

Capt. J. Macdonald has sent to the Museum a veritable specimen of *Amaurornis moluccana*, which is said to be identical with Gould's *Gallinula ruficrissa*, but if Gould's plates are correct, these birds are certainly distinct. Gould figures a yellowish and reddish *shield* at the base of the bill, nothing of the kind appears in the birds from New Britain, collected by the Rev. George Brown, or in this specimen from St. Anna, one of the Solomon Group.

NASITERNA FINSCHII, *Ramsay*.

The adult male, has the cheek feathers tipped with blue, and a deep orange-red spot on the abdomen; and those I consider to be the adult females have the cheek feathers tipped with rose, but there is no yellow, orange or red on the abdomen; "*there is no tinge of yellow on the forehead*," as stated by Mr. Tristram; and by no stretch of the imagination can the orange-red of the belly in the male be called yellow; if Canon Tristram has a specimen with a "tinge of yellow on the forehead and abdomen" and "a little pink patch on either side of the lower mandible," then I should say his specimen is not my *Nasiterna finschii*, but a distinct species: it might be the adult male of *N. mortoni*, or perhaps

Schlegel's *Nasiterna pygmea salamonensis.* My description of the species was taken from an adult male bird, which had been much damaged in the belly in shooting, and there are no red feathers on that region ; I at first, thought it to be a female, and so stated in my description, the red or rose feathers near the base of the mandible were not "overlooked" by me. I stated correctly these feathers are blue in the male, and rose in the female. (See P.L.S., N.S.W., vol. vii., pt. 1, Jany. 1882.) The yellow spot on the inner webs of the tail feathers, is confined to the outer three feathers, and is not found on the remainder, as one would suppose from Mr. Tristram's remark, Ibis, p. 133, 1882, the under tail-coverts in all my specimens are light yellow tipped with green, except on the central two feathers, the *yellow spot* on the outer tail feathers is common to several species of the genus. The pale yellow spot on the distal end of the tibia is conspicuous in all the adult males (dry skins).

NASITERNA MORTONII, P.L.S., N.S.W., VI., p. 721, VII., pt. 1, Jan., 1882.

Two specimens. I am not sure that this will prove to be a good species, no note as to locality, except "*San Christoval*," both are tied as females, there is rosey tint round the cheeks, no red on abdomen ; the bird described by Canon Tristram as having a "tinge of yellow on the forehead" and a yellow patch on the belly, may be the adult male of this species.

NINOX TÆNIATA.

A young bird with nestling plumage, the abdomen and flanks show indications of bars, and there are bars and spots on the wings, and broken bars on the tail feathers on their inner webs. Eyes large, dark pupil with narrow light-grey iris.

Hab. Wano, St. Christoval, Solomon's.

GEOFROYIUS HETEROCLITUS.

Males with yellow heads ; two males and two females from St. Christoval ; and two males and three females from "Wanu" St.

Christoval. A large series proves the *G. heteroclitus* and *G. cyaniceps* to be male and female of the same species.

CHALCOPHAPS MORTONII.

Adult male; the forehead white as far as the eyes, rest of the head and ear-coverts dull plum colour, the hind neck and inter-scapular region and shoulders vinaceous purple tinged with rosy violet; remainder of the plumage as in the type. This species is closely allied to *C. stephani* of New Guinea.

EDOLIISOMA (SALAMONIS, *Tristr.*)

Adult male, uniform bluish slate colour, above and below with a blackish band from the nostril (across the loreal region) *to the eye*, quills black, the secondaries and scapulars edged with slate blue like the back, tail black, the outer two feathers more or less tipped with the same tint, on the under surface of the wing; the basal portion of the feathers ashy blue; bill and legs black; bill from forehead 1 in.; wing 4·6; tail 4 in.; tarsus 0·5.

Adult female.—Like the male. Above the loreal region duller, the chin, throat, and the whole of the under surface, under wing and under tail-coverts rich cinnamon-rufous, ear-coverts like the upper surface, the outer two tail feathers like the belly but having the mesial portion of the inner webs towards the base black, the next third feather on either side black, slightly tipped and margined with cinnamon-rufous, the remainder of the tail as in the male. One specimen marked as a female (*juv.*) has the breast, abdomen and one or two of the under wing-coverts and tail mottled with rufous; it appears that the young females resemble the males, and not the young males the females.

Hab. St. Christoval.

This appears to be the same as Canon Tristram's *Edoliisoma salamonis.*

Dicrurus longirostris, *Ramsay*, P.L.S., N.S.W., VII., June, 1882.

This species was first discovered by Mr. J. Stephen.

Sturnoides (*Lamprotornis*) minor, *Ramsay*.

It is quite evident that this is the species which Canon Tristram alludes to under *Lamprotornis* or *Calornis fulvipennis*, his description of the wings and tail does not apply to the *L. fulvipennis* of Homb. and Jacquinot, in the voyage Pôle Sud., pl. xiv., fig. 2, there the *four first large remiges only*, are distinctly stated to be of an earthy-brown colour, and the tail is described to be bluish-black, while in the present bird all the quills of the wings and tail are dull earthy-brown; besides our bird is much smaller. Cockerell obtained several specimens of the true *Lamprotornis fulvipennis* of Homb. et Jacq., on San Christoval in 1878, as I before mentioned in my account of his collection, P.L.S., of N.S.W., vol. iv., p. 77, 1879.

Hab. San Christoval.

Myzomela pammelæna, *Sclater*.

One skin and one spirit specimen, these undoubtedly prove that there are two very distinct black species of *Myzomela* in the group, but whether this species be identical with *M. niger* I have no means of ascertaining.

Hab. Wano, San Christoval.

Carpophaga rubricera, *Tristr.*, Ibis p. 144, 1882.

This is the *C. rufigula* of Salvadori, the true *C. rubricera* is not found in the Solomon's, but comes from New Ireland and the Duke of York Islands

Wano, San Christoval.

Piezorhynchus squamulatus, *Tristr.*

I believe this bird to be the same as *P. vidua* (Tristram); if not it must be my *P. melanocephalus*, which I am inclined to think is only an adult male of *P. vidua*; I have a large series before me and they appear to be only different sexes and ages of one and the same species which must take the oldest name *P. vidua*, (Tristram).

Wano, San Christoval.

COLLOCALIA FUCIFAGA.

Several spirit specimens from San Christoval, young and adult. I have seen the same species from the Duke of York Group, and also in a collection made by Cockerell sen., at the Aru Islands, there are probably specimens in Mr. Goodman's collection as I am informed that this gentleman bought Cockerell's collection. The young and the adults both have the abdomen white also the the under tail coverts and a portion of the webs of the tail feathers.

Wano, San Christoval.

IANTHENAS (PHILLIPANÆ) ♀ ?

Mr. John Stephen has drawn my attention to several specimens of a "metallic-coloured" pigeon, which he sends, and believes to be distinct from *I. phillipanæ*, stating that the birds have been carefully sexed, and that the male and female are alike in plumage. The specimens sent differ from the type of *I. philippanæ* chiefly in having the throat and ear coverts only white, and of a clear dead white without any opaline lustre, the metallic lustre on the rump and upper tail coverts has a steel blue tint, and the rosy lustre is different on the whole; the metallic margins of the upper tail coverts and wing coverts above are much narrower. This specimen, or, as perhaps it may turn out to be, female of *I. pallidiceps*, may be thus described :—

Throat and ear coverts and all below line drawn from the angle of the mouth below the orbit, white without opaline lustre; the remainder of the plumage of a light, bluish, ashy grey, washed all over with a bright green metallic lustre, having a bluish tinge in certain lights, especially on the rump and upper tail coverts; the front of the head, crown, nape, neck, and all the under surface of the body tinged with a rosy metallic lustre, not very distinct on the abdomen and flanks, the wings and tail blackish ashy brown, a little lighter below, under tail coverts narrowly margined with a metallic green lustre, under wing coverts and axillaries like the under surface of the quills, the upper wing coverts and scapular narrowly margined with green; bill purple, red in dried specimen, and yellow at the tip, legs and feet of the same tint. In the adult male (?) there is a bronze reflection on the chest, and the rich rosy violet tints so strikingly seen in *I. phillipanæ* are scarcely visible in these specimens, but when seen in the sunlight are of a deeper rose colour; the tints also have a decided subterminal blue shade not seen in the other species, the metallic margins to the scapulars and wing coverts are much narrower, the measurements on the whole are much the same except in the bill, which is smaller, the feathers on the legs extend a little lower past the knee joint, and the concealed portions of the feathers on the body are darker, than in *I. phillipanæ*. On comparing the two birds the difference in the tints of the metallic lustre is very easily seen. The sexes are alike in plumage.

The following are the measurements of four specimens, two males and two females sent by Mr. J. Stephens, a pair of each from the islands of Uji and San Christoval :—

Measurements of *Ianthenas*—Ugi specimen 1, 2, and 4; San Christoval, 3:

	(1.)	(2.)	(3.)	(4.)
	In.	In.	In.	In.
Total length about	15	14·5	15·7	15·3
Wing	8·7	8·	9·3	8·5
Tail	6·	5·5	6·2	5·5
Tarsus	1·	1·	1·05	1
Bill from forehead	1·2	1·1	1·25	1·15
Bill from end of nasal groove	0·5	0·43	0·5	0·5
Bill from gape...	1·2	1·1	1·25	1·2
Sex	♂	♀	♂	♀

No. 2 is evidently a young bird.

Measurements of male and female of the *I. phillipanæ* from Ugi:

Total length about	...	15 in.	14·4
Wing	...	9·65	9·4
Tail	...	5·6	5·5
Tarsus	...	1	1·05
Bill from forehead	...	1·45	1·3
Bill from the tip...	...	05	0·48
Bill from gape ...	...	1·45	1·35
Sex	...	♂	♀

Legs yellow.

We have young and adults of both these birds; in the first lot all were like *I. phillipanæ*, and were sexed by J. Stephens and Morton and said to be males and females; in the second lot all are alike, and have only the throat and ear-coverts white, they were sexed by J. Stephens, and said to be males and females; some are young birds with a dull cap, but the white throat and ear-coverts distinct. If these birds then, have been correctly sexed, and there is no reason to believe otherwise, then they must be of two distinct species although found on the same Islands.

Wano, Ugi.

Astur versicolor and A. albigularis.

Stephen has sent a good series from which it appears that the birds with the deep rufous undersurface and black cross bands are younger than those with a paler or fawn coloured breast and hastate black tips to the feathers; there is one all slaty-black bird marked as a female, and two *A. albigularis*, with white undersurface also marked as females. I am afraid they must all belong to the one species and go under Gray's name of *A. albigularis*.

Ugi.

NINOX TÆNIATA ? Juv.

One specimen of a small *Ninox* from "Wano," San Christoval, is of a dull reddish-brown all over, inclining to rufous on the chest and face; the wing-coverts above have indistinct fulvous bars, the under wing-coverts fluffy and of a light buff, all the quills have six to seven white bars or spots on the basal half of the inner webs, and on the outer margin of the outer webs a row of dull white or fulvous spots, on the tail there are five or six white bars, similarly situated to those on the wing-quills; all the under surface of the body from the breast downwards is indistinctly banded with fulvous and dull reddish-brown; the throat is white, the rectæ long, strong, reaching beyond the bill, there are no bands or spots on the hind neck, mantle, back, rump, or upper tail-coverts, these parts are covered chiefly with fluffy plumage; on the head a few feathers are dotted here and there with fulvous; there is a blackish spot at the base of the primaries on the under surface formed by the blackish tips of the outer series of the under wing-coverts. Length 8 in.; wing, 5·8; tail, 3·1; tarsus, 1·05; bill from forehead 1 inch, from nostril 0·6, brown-white at the tip.

Wano, San Christoval.

HALIÆTUS LEUCOGASTER.

A young bird in an interesting stage of plumage, all the feathers of the hind neck and mantle, upper wing-coverts and scapulars, back, rump, and upper tail-coverts margined at the tips with white or fulvous white, some of the scapulars with fluffy pointed tips: the throat buff, all the feathers on the chest, breast, and remainder of the under surface rich tawny brown, streaked mesially and tipped with buffy-white; under tail coverts tawny-brown with fluffy tips.

Ugi Island.

MYZOMELA PULCHERRIMA.

There are three young birds, red to the flanks and the under tail-coverts also tinged with the same colour in one specimen, but the red on the body is not glossy like that on the adults; the outer webs of the primaries and secondaries are margined with olive, under surface of the abdomen and flanks, and under tail-coverts washed with olive.

Ugi.

MACROPYGIA RUFOCASTANEA, *Ramsay*.

Ugi.

HALCYON ALBICILLA.

Three specimens of this species. The blue line behind the eye is much narrower in some than in others, all these specimens have some of the upper wing-coverts narrowly margined with white, a blue spot on the tarsal joint.

Sex	♀	♀	♀
Length (circa) from the tips of bill ...	11 in.	11·5	10·8
Wing	5	4·85	4·9
Tail	3·2	3·3	3·25
Tarsus	0·75	0·7	0·7
Bill from forehead, tips worn down ...	2·4	2·35	2·2
Bill from nostril, tips worn down ...	1·9	1·0	1·74
Greatest width below nostril	0·7	0·67	0·65

Ugi Island, April, 1882.

Lieutenant T. H. Heming of H.M.S. Lark, has been good enough to send me the eggs of this species, which he informs me he took from a hole in a tree on the Island of St. Anna, Solomons, in September last; they were two in number, white and rather oval, one measures 1·35 x 1·1.

NOTES AND EXHIBITS.

Mr. C. Jenkins, L.S., of Yass, exhibited a collection of Palæozoic (Devonian ?) fossils, chiefly Brachiopods, collected by him between Cobar and Wilcannia. The formation appears to belong to the same horizon as the fossiliferous beds at Mount Lambie, &c.

Mr. T. A. Tenison-Woods gave a curious mythological account of a New Ireland idol, exhibited by him at the last Meeting. The story appears to have some connection with the legend of Degei, God of Fiji, as reported by Séeman, Mission to Fiji, 1860–61.

The Hon. P. G. King, M.L.C., exhibited specimens of *Pieris teutonia*, observed by him in great numbers near Tamworth a few days ago. They appeared to form part of a vast migration, moving without intermission towards the North. The same species has been unusually common in many parts of the Colony during the present summer.

Mr. E. P. Ramsay exhibited three species of *Oligorus*; one *O. Macquariensis* from Wagga Wagga, a second distinct species from Wilson's Creek, Richmond River, and a third, also different, from the Mary River, Queensland; also a new species of *Amphisile* from Wide Bay; three species of Mus, various shells from Queensland; samples of Dugong Oil, &c.; and photographs of Australian and New Guinea Aborigines. A collection of birds from the Solomon Islands, with numerous explanatory notes, was also laid before the Society.

Mr. Brazier exhibited a copy of "Mawe's Linnean System of Chonchology, 1823;" "The Voyagers' Companion," by the same author, and his "Introduction to the study of Conchology," 1832.

Mr. Haswell stated that he had much pleasure in announcing to the Society, that, thanks to the intelligent inquiries made by Mr. Morton of the Museum, while recently in Queensland, he had hopes that they were on the way towards learning something of the embryology of the *Ceratodus.* Mr. Morton had ascertained that the *Ceratodus* spawns in the Burnett River during the months of June, July, or August, the spawn being deposited in a slight excavation formed in the bed of the river at a depth of eight or ten feet, the male and female remaining in close attendance on it until hatched. Arrangements had been made by which it was hoped that a supply of the spawn might be obtained for observation next season.

ANNUAL GENERAL MEETING, WEDNESDAY, 31st JANUARY, 1883.

The President Dr. James C. Cox, F.L.S., in the Chair.

The Minutes of the last Annual General Meeting were read and confirmed.

The President then read the following address:—

GENTLEMEN,—

At the annual General Meeting held in the Society's Rooms on the 25th of January last, you conferred upon me for the second time, the honour of electing me your President, and now, in accordance with our rules, and as a preliminary step to vacating that distinguished position, it again becomes my duty to address you on the history of our past doings, and our present prospects.

Although feeling at the time much gratified by a re-election so expressive of approval of my presidential conduct, I must confess that I undertook with much hesitation the performance of the responsibilities attached to this high official trust, for the arduous nature of my professional duties, combined with the close attention due to the requirements of the many charitable institutions with which I am connected would leave me but little time to devote to writing as fully as I could have desired, upon subjects of natural history. Under such circumstances it is a consolation for me to know that the Society has not suffered by the inability on my part to contribute more largely, for I have the satisfaction to state that during my tenure of office there has been no lack of interesting papers furnished by the scientific labours of its members, and read at our monthly meetings, which exhibit a steadily progressive supply of fresh and reliable materials illustrative of Australian objects. It cannot, therefore, but be anticipated from the results already obtained, that year after year the uniform progress of a literature appropriated to the diffusion and advancement of science will be consistently maintained, incited as it is by the many additional charms presented by a country where so many treasures still lie unexplored.

Three parts of our proceedings for 1882 have already appeared in print, and have been distributed not only among our own members, but also freely to many of the kindred institutions at home and abroad. These, I am happy to say, have been favourably reviewed in all, and they are many, of the scientific periodicals of the day, which I and several others have had the opportunity of perusing, and I entertain no doubt that the 4th Part, which will complete our 7th Volume, will meet with similar approval.

Twenty-six members have been elected during 1882, and I deeply regret to add that the Society has lost by death four highly esteemed members, namely, Dr. Alleyne, M.D., President of the Medical Board, Mr. William Forster, M.L.A., the Hon. S. D. Gordon, M.L.C., and Sir William Macarthur. These gentlemen have been for very many years past so well and so honourably known—I may say throughout the length and breadth of the land—that it is sufficient for me simply to record their deaths to ensure a sorrowful feeling at the loss of such friends.

It will thus be seen that the number of additional members on the Society's muster-roll since my last address has steadily augmented. But this increase, as a rule, is attributable to the election of gentlemen who take an active interest in the study of Natural History, and, I regret to say, not due in a proportionate degree to the much-desired assistance by subscription of the large portion of the community, whose time is necessarily and assiduously occupied in commercial, mechanical and other pursuits, but to whom, without any encroachment upon their much-needed leisure hours, these patient researches of the studious frequently prove of substantial benefit; and it should be remembered that our association has from its commencement in the main endeavoured to keep the varied and extensive science of Natural History subservient to public utility and the useful arts; and there are not wanting instances in the pages of our journal to prove the success already achieved in that direction.

In the annual address for 1881 I drew your attention to the unusually large and valuable donations and loans of books, eminently adapted to our pursuits, which the Society had received, and pointed out that this exceptional acquisition was due to the munificence of the Hon. W. Macleay. On the present occasion it again falls within my province to report the continuance by the same liberal donor of these favours to the amount of nearly £300. To the Vice-President and several others of our members, and to those foreign Societies with which we are in correspondence, we were likewise indebted for gifts of books, works of reference, journals and transactions, together presenting a marked and valuable addition to the shelves of our library. These volumes, combined with the previous copious and expensive collection of works, formed a compact library suitable and adequate to our present wants, and the members rejoiced in having at their command so valuable an auxiliary to study. I need not tell you, for you are already well aware of the sorrowful fact, that all our hopes have been disappointed, and that not a single volume of this prized collection now remains.

On the morning of the 22nd September last at a quarter to 5 o'clock I was roused from my sleep by the ringing of the large bell of the Garden Palace, and on looking out from the verandah to ascertain the cause of such an unusual disturbance, I at once perceived, to my amazement and horror, a small tongue of fire issuing from the side of the great dome, which you know was situated nearly in the centre of this spacious building, and under which the whole of our ill-fated volumes were arranged. This small tongue of flame, fanned by the wind, then blowing a gale from the westward, and fed by an abundant supply of dry and well-seasoned timber, of which the building was mainly constructed, rapidly enlarged into a huge, raging, and fiery furnace. So furious indeed was this mass of fire that I observed sheets of the corrugated galvanised iron being torn off the roofing and hurled aloft to a considerable height. Several of these, caught by the gale, were carried across the wide expanses of Elizabeth and Rushcutter Bays, while portions of others, passing over Darling Point, were even found at Glenyarrah, the grounds of the late Hon. S. D. Gordon. In less than three-quarters of an hour from the time I first saw the fire, the whole of the vast range (upwards of five acres) of the beautiful Exhibition Building and all its valuable contents were reduced to a heap of burning ashes, and thus perished within these few minutes every work on Natural History that we possessed, several hundred pounds worth of volumes of transactions, and every record of our meetings. Our pecuniary loss, irrespective of that portion which it will be difficult ever to replace, cannot be estimated at less than £3,000.

Suffering under such a deplorable mishap it is soothing for us to feel that the sympathy incited by our misfortunes among our fellow labourers in science was universal and sincere, as testified by the many letters of condolence and offers of assistance which have already been received. It is a grateful task for me, as your President, to return thus publicly our hearty thanks to each and all for the kind and considerate feeling expressed for the great loss we have sustained. The President and Council of the Royal Society of New South Wales at once most liberally and thoughtfully placed at our disposal ample accommodation for the holding of our meetings, and for carrying on otherwise the business of the Society, until suitable arrangements could be made by us; and the neighbouring Societies of Victoria, South Australia, Tasmania and New Zealand, have also greatly added to our obligations by their ready sympathy and earnest proposals of assistance.

However much we may lament (and justly so) our own misfortunes, we cannot omit on so sad an occasion to express our deep and heartfelt sorrow for the far greater calamity which the the country at large has suffered by this dire conflagration. As these losses have been ably detailed in the journals of our city, it is quite sufficient for me on this occasion, and as a matter of record, to give an epitome of the principal items for the most part taken from the columns of the *Sydney Morning Herald* of the 23rd September, the day after the fire.

The Technological Museum, the numerous and excellent exhibits of which had been collected and arranged by Mr. Alfred Roberts, F.R.C.S.E., Professor Liversidge of the Sydney University, and Mr. Robert Hunt, Deputy Master of the Mint, the committee appointed for that purpose by the Trustees of the Australian Museum, was on the eve of being thrown open for the inspection of the public, but is now quite destroyed. The destruction of so valuable a display of select and well arranged technological specimens, the work of many years of persevering industry and devotion to the subject by these gentlemen, must necessarily prove disastrous to the community at large, and especially so to the student, when considered in an educational point of view. Let us hope that these gentlemen will not be disheartened by this failure, and that they will be liberally supported by the Legislature to enable them to reproduce these useful and splendid exhibits.

The Department of Mines contained all the fossils, minerals, and rocks collected by the Mining Department at the instance of Mr. C. S. Wilkinson, Government Geologist, and also the collection of the late distinguished Geologist, the Revd. W. B. Clarke, which, with his maps and library cost the Government £7,000. It is said that this geological collection was the most complete in Australia, and its value has been roughly estimated at £50,000. With the exception of some specimens, kept in an iron safe, of various precious stones and of gold, the whole of this extensive collection, together with all original papers and documents was burnt. It is true that a great portion of the fossils and minerals now lost can in time be supplied by similar exhibits, but many maps, books, and manuscripts, which were simply priceless, can never be replaced.

On the day of this calamitous event, the Council issued a circular to each of the various societies with whom we correspond, expressing our hope that any irregularity which may occur in our correspondence may be kindly attributed to the true cause, that of the loss of all our papers and effects, and not to any remissness on the part of the Council or its Officers.

I feel quite sure that the time has arrived when the literature of Natural History, considered in its most extensive sense, of this and the neighbouring colonies should be published in one general uniform and illustrated series. If such a work were compiled and issued in yearly parts, I think that the sale would amply recoup the cost, that it would be a great source of pleasure to the general public who are yearly taking more interest in Natural History, and that it would enable those who wish to make a study of this subject, to know what has already been done in this branch of science so far as our Australian Flora and Fauna are concerned. The works in which our Botany and Natural History were originally described are so scarce, so costly and so difficult of access that until such a publication can be brought out we cannot do better than mass together as many complete sets of them as possible; indeed, this is one of the objects for which our Society has been endeavouring to form for its members a library containing such works.

Among the many exhibits made before our Society during the past year was one of unusual interest, and of great importance. The exhibit I refer to was one by Dr. Thomas Dixson of the *Bacillus* described by Ebert as peculiar to typhoid fever. These exhibits were shown under the microscope with other preparations of germs (very like typhoid germs) from a cesspit, and others of diarrhœa evacuations, in which there was an absence of any such germs.

This almost quite new field of research into the bacterioid organisms interests the true botanist almost equally with the physician. Probably one of the most interesting and important scientific discoveries of the present age is the identification of the germs of various fevers, and even of tuberculosis, or as we more generally designate it—consumption. The theory that fevers when infectious are due to the presence of minute organisms, preceded their discovery many years. We all remember that Robert Boyle expressed his suspicion that such would be found to be the case, Lister proved the relation of organisms to *Septicæmia* and *Pyaemia*, and later we find Koch establishing by methods of almost mathematical precision the germs of Acute Traumatic Infection, Klebs and Thomasi that of Marsh Malaria, Bollinger that of *Anthrax cancroides* in cattle. But the triumph of the day is Koch's discovery and demonstration of the tubercular germ. Nothing is at times easier than in any given disease to find a germ, but it is hard to prove the germ to be the cause of the disease. Thus in tubercle there have been discovered before Koch's time several kinds of minute organisms; for instance, there was a micrococcus like form, a relatively stout bacterium, and some other forms particularly energetic in their movements, which however were certainly not the cause of tubercle. After much patient toil he found a germ not easy to see without being dyed, and moreover one which would not take the ordinary stains. It is a very slender rod, about half the length of a blood corpuscle, that is, the one seven thousandth to one ten thousandth of an inch, and about one twenty-five thousandth of an inch in breadth; it is very slow to propagate, and apparently perfectly motionless. Koch stands out prominently for his careful experiments, so we can with advantage follow him. He took some pure tuberculous matter, placed it in prepared blood in flasks which had the tuberculous matter mixed with it; none showed any trace of decomposition when it was examined microscopically, but after several days he noticed slight scales form on the otherwise unaltered blood. He took some of this scaly material and placed it in other flasks of blood; after repeating this process several times so as to be quite sure that he had only one kind of organism present he injected and ingrafted the scaly material into some animals, all of which became consumptive, and when they were examined, tubercles were found in their body, and the tubercles contained these little rods which we have seen composed the scales in the prepared blood, and which were present in the original animals which supplied the tubercular matter. Hundreds of experiments were executed, and we cannot but accept his conclusions. Many other fevers have been within the last year or two demonstrated with more or less accuracy to have definite organisms; for instance malaria, typhus, typhoid, and leprosy, have all of them *Bacillus* or rod-like forms. Then of the spherical forms we have the germs of Diptheria, hospital gangrene, puerperal fever, blood poisoning, &c. So also Erysipelas, Scarlatina, Variola, Vaccina, Mumps; even Syphilis has its germ, which belongs to the spherical forms (*Cocco-bacteria*).

These organisms, simple as they are, all differ in some way, either as regards size, method of propagation, activity of movement, or readiness of being stained. Indeed, as we know more about them, and discover new microscopic methods, we shall be able, doubtless, to distinguish them more effectually; as at present there is great physical resemblance between some forms which cause very different fevers. All the above organisms are classed as *Thallogens,* the order to which they belong being the *Schizomycetes.* Small as they are, these bodies propagate by spores considerably smaller than themselves; the mischief which they cause will be better understood when I remind you that their smallness allows them to get into the blood corpuscles and there propagate, and in doing so produce great impoverishment of this fluid. The question naturally arises, will a given kind of germ always produce the same result? Can smallpox germs be so altered as not to cause smallpox? Gravitz has shown that simple germs which are naturally not at all harmful can be made by careful cultivation intensely dangerous, and *vice versa* it has been shown that those of splenic fever can be made so mild as not to be nearly so dangerous as usual, and so to be safely used as inoculants. Yet those which cause one infectious disease have never been transformed into those which can cause another; in other words, the smallpox germ cannot produce scarlet fever. Interesting as all this is to the scientist, how much more is it to the physician, who hails in these discoveries the first step to the elimination, or at any rate, alleviation of the hitherto greatest curses upon mankind.

The recent complete and overwhelming destruction of all our property involves us in a momentous struggle that will require our utmost energies and persistent action for years to come. Let us then act strenuously and unitedly for the grand cause until we regain step by step the prosperous condition we held as it were but yesterday.

[The President described at some length the operation of recent legislation upon Oyster Culture, and suggested various improvements which might without difficulty be introduced into the Act. This portion of the address is necessarily of local and political interest rather than of general Scientific importance, and as it has been already published in the Sydney Journals, it is not thought necessary to reproduce it here.]

A vote of thanks, proposed by the Rev. J. E. Tenison-Woods was unanimously accorded to Dr. Cox for his very valuable address.

The Treasurer's statement showed:

	£	s.	d.
Balance from 1881	39	9	1
Receipts during the year 1882	147	6	3
	186	15	4
Payment during 1882	162	18	5
Balance in Commercial Bank	23	16	11

The following gentlemen were then elected Office-Bearers and Council for 1883:—

President:

C. S. Wilkinson, F.G.S., Government Geologist.

Vice-President:

Rev. J. E. Tenison-Woods, F.L.S.

Hon. Secretaries:

The Hon. William Macleay, F.L.S.
Professor W. J. Stephens, M.A.

Honorary Treasurer:

The Hon. James Norton, M.L.C.

Council:

Dr. James C. Cox, F.L.S.
W. A. Haswell, M.A., B.Sc.
Percival Pedley, Esq.
John Brazier, C.M.Z.S.
Hon. P. G. King, M.L.C.
Dr. Thos. Dixson, M.R.C.S.
H. R. Whittell, Esq.
J. J. Fletcher, B.A., B.Sc.

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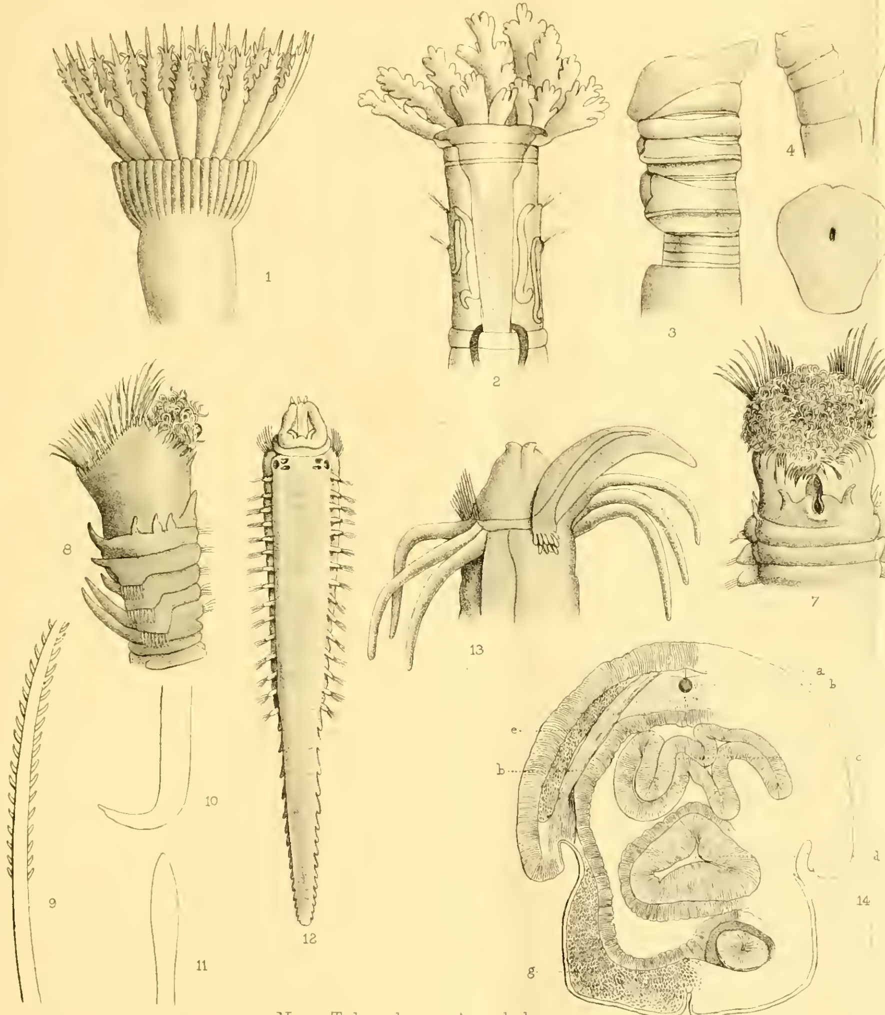

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New Tubicolous Annelida.

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THE PROCEEDINGS

OF THE

LINNEAN SOCIETY

OF

NEW SOUTH WALES,

VOL. VII.,

PART THE FIRST.

[WITH SEVEN PLATES.]

SYDNEY:
PRINTED AND PUBLISHED FOR THE SOCIETY BY
F. W. WHITE, 39 MARKET STREET,
AND SOLD BY THE SOCIETY,
1882.

[Price, 7/6.]

CONTENTS OF VOL. VII., PART I.

THE

PROCEEDINGS

OF THE

LINNEAN SOCIETY

OF

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VOL. VII.,

PART THE SECOND,

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[WITH SIX PLATES.]

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CONTENTS OF VOL. VII., PART II.

THE PROCEEDINGS

OF THE

LINNEAN SOCIETY

OF

NEW SOUTH WALES,

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CONTENTS OF VOL. VII., PART III.

THE

PROCEEDINGS

OF THE

LINNEAN SOCIETY

OF

NEW SOUTH WALES,

VOL. VII.,

PART THE FOURTH.

Containing the Papers read at the Meetings held in October, November and December.

[WITH ONE PLATE.]

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[Price, 10/.]

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