no index



# INTRODUCTION.

## VOL. II.

THE present issue of the SOUTHERN SCIENCE RECORD marks the commencement of the second year of its existence: and in forwarding to our subscribers and friends the first number of the second volume of the journal, we consider a few brief observations are due.

Taking a retrospective view of the progress of our scientific periodical, we are fain to confess that, though our efforts have met with most encouraging support in many directions, we have not received that amount of aid to which, it will generally be conceded, such a periodical is entitled, and upon which we fully and confidently calculated when entering upon so arduous an enterprise as the conduct of a scientific journal for Australia. There are not wanting, however, strong indications of ultimate success; and we are determined to persevere in our efforts, with the full expectation that our position in the world of advanced literature will become more and more pronounced and consolidated with the progressive growth of the Southern Colonies, and that, by fostering and popularising the study of the many interesting branches of the various sciences, our humble efforts may be the means of promoting amongst the people a sincere love of the works of Nature.

Prospectively, we look forward to a long career of usefulness as an auxiliary to the investigation and elucidation of the many questions of interest to the scientific world which from time to time arise.

With a view to meet the increasing demands made upon our space, we have resolved to inaugurate the second year of our existence by increasing the size of the RECORD from sixteen to twenty-four pages. The former number having, for some time past, proved altogether too few for our growing requirements, it is considered that the additional eight pages will enable us to present to our readers information respecting all scientific work throughout Australia and New Zealand; and while thus increasing the size, and consequently the expense of conducting, the journal, we do not alter the price from the low one adopted at the commencement. This may be taken as proof that we do not seek for pecuniary benefit for ourselves, but that our only desire is to establish a scientific journal that will be of use to workers and others interested in all branches of science.

There is also great room for improvement in the matter of subscriptions. Our subscribers' list might be extended with advantage; and the fact of increased size without alteration of price will, we hope, induce each one of our subscribers to endeavour to get one or two others to become subscribers also. If sufficient encouragement be received in this respect, we will endeavor to give wood-cuts to illustrate such papers as require it, and hope that we will soon be obliged still further to increase the number of pages.

We have to thank those gentlemen, honorary secretaries, and others, who have, during the past year, supplied us with notices of meetings of the various scientific societies throughout the Colonies, and hope they will continue to do so. There are still several societies from whom no reports are received, but we trust the secretaries of these will repair the omission and keep us well posted up in future, so that our pages may be in reality a "Record" of scientific doings throughout the colonies. We would also urge upon our friends generally that our columns for notes and memoranda might easily be extended if they would jot down and send us a few lines describing any strange occurrence, any new discovery, or valuable hint in the manipulation of specimens, good localities for collecting, &c., &c.

In view of the anxious and responsible character of our duties, we call upon secretaries of all scientific societies to render them as light as possible by forwarding, as early as they conveniently can, their reports of meetings, &c.

While cordially thanking those gentlemen who have already sent valuable matter for our use, we invite additional contributions from leading members of scientific societies, &c., as it is our desire that the journal shall become thoroughly comprehensive in its scope.

An Index to Vol. I is now in course of compilation, and will be issued to subscribers at an early date.

THE
# SOUTHERN SCIENCE RECORD.
MELBOURNE, JANUARY, 1882.

VOL. II.

## Australian Plants—(new or imperfectly known).

By Baron Ferd. von Mueller, K.C.M.G., M.D., Ph. D., F.R.S.

### *Billardiera floribunda.*

*Marianthus floribundus, Putterlick in Endlicher, novarum stirpium decades* 61.

Totally glabrous; leaves large, short-stalked, of firm consistence, lanceolar-ovate or sometimes narrow-lanceolar, flat, neither lobed nor toothed; flowers in simple or compound corymbs, occasionally almost forming umbels; majority of stalklets from about half the length of the flowers to fully their length; sepals linear-lanceolar, gradually pointed, usually not quite half as long as the corolla; petals always white, soon perfectly free, their lower portion narrow and connivent, their upper portion gradually much dilated and spreading, their summit acute; stamens hardly longer than the sepals; filaments thinly subulate; anthers nearly straight; style very short, but thick; stigma usually somewhat dilated; ovary sessile; ovules numerous; berry rather long, ellipsoid-cylindrical, blunt at the base, brownish-yellow outside, two-celled but filled with pulp; seeds many, oval-roundish, much compressed, not angular, brown outside, mostly placed horizontally; testa slightly wrinkled.

Scattered from King George's Sound to the Porongerup-Range and Blackwood-River.

Although specimens of this very handsome climber were gathered, as far back as 1833, by Baron Von Huegel, and thus the species became described already in 1839, yet it is only now, after ripe fruits have been transmitted by Miss Bunbury, that this plant receives its correct generic position. It was placed into *Marianthus* on account of its similarity to *M. candidus.*

### *Helichrysum Tepperi.*

Annual, minute, erect; leaves very small, nearly lanceolar and flat, beset with short crisp and jointed hair, all radical except solitary clasping leaves at the base of elongated bractless flower-stalks; stem capillary, scantily hairy, bearing 2 or 3 very small heads of flowers; scales of the involucre in few rows, hyaline-membranous, sessile, the outer scales oval and very short, the inner gradually linear-oblong, slightly pointed at the apex, not radiating; flowers 8-15 within the involucre and surpassed in length by it; the outer flowers extremely slender, female only and usually sterile, with stigmas exserted; the other flowers bisexual, narrow-cylindrical, with but very short teeth; anthers enclosed; fruits very minute, almost ellipsoid, pale, glabrous; bristles of the pappus 5-9, extremely fine, about as long as the corolla.

In Yorke's Peninsula; O. Tepper.

Habit similar to that of the minutest form of *Podolepis Lessoni* and *P. Siemsenii*; leaves more like those of the former; involucre and pappus much like those of the latter; floral structure very different from both.

*Millotia Kempei.*

Thinly-woolly; stems erect, leafy to near the summit; leaves all narrow-linear; scales of the involucre coherent through their woolly covering; corollas bright yellow; fruits almost smooth, attenuated gradually into the very slender summit; pappus none.

Near the Finke-River; Rev. H. Kempe.

In habit similar to *M. tenuifolia,* in indument and in the color of the corolla nearer to *M. Greevesii,* from both singularly distinct in the total absence of the pappus. The latter characteristic might warrant generic distinction of this plant (under the name of Kempea); but though in *Helichryseæ* no other case is known of any species—totally without pappus—being contained in a pappophorous genus, yet such cases are on record from among the genera of Angiantheæ.



## Families of Coleoptera, or Beetles.

By W. H. Wooster.

[Member of the Microscopical Society of Victoria.]

### PART V.

Lagriidæ.—*Shape*, oval or oblong, narrowed in front; soft. *Head*, prominent. *Neck*, more or less distinct, seldom absent. *Eyes*, more or less notched. *Antennæ*, 11-jointed, inserted in notch of eyes, not covered by lateral ridge of head. *Thorax*, much narrower than elytra, its top and sides not distinct. *Hind-feet*, with 4 joints, rest with 5. *Abdomen*, of 5 segments. *Size*, ¼ to ½-in. *Colors*, generally dull. Found on shrubs and hedges; very inactive. Some feign death when alarmed. The males of some have the last joint of the antennæ long. Ten species are given in Master's Catalogue, only one as Victorian.

Pedilidæ.—*Shape*, oval or oblong, narrowed in front. *Head*, prominent, sloping, with abrupt neck, sometimes invisible from above. *Eyes*, various. *Antennæ*, 11-jointed, filiform inserted just before eyes, not covered. *Thorax*, generally narrower than elytra, its top and sides seldom distinct. *Elytra*, without narrow fold, or with a mere trace at base. Four joints to *hind feet*, 5 to rest; penultimate joint sub-bilobed (except *Mitrelabrus*). *Claws*, simple. *Abdomen*, of 5 segments. But four species are given as Australian, and none as Victorian. I am not aware that I have seen any.

ANTHICIDÆ—(*Notoxidæ* of Westwood).—*Shape*, oval or oblong, narrowed in front; softish. *Head*, sloping, triangular, with narrow neck. *Eyes*, lateral, entire. *Antennæ*, 11-jointed, inserted laterally before eyes, not covered; filliform or gradually thicker to end. *Thorax*, narrower than base of elytra, top and sides not distinct, in some with a horn produced over the head. A *spine* between the hind coxæ. *Hind feet*, 4-jointed, rest 5; penultimate, nearly always sub-bilobed. *Claws*, simple. *Abdomen*, of 5 segments. *Size*, $\frac{1}{16}$ to $\frac{1}{4}$ in. *Colors*, dull. Found on flowers and shrubs, at grass-roots on ground, in sandy places, near rotten vegetables, &c., active. The maxillary palpi end in a large securiform joint. Sixty species are credited to Australia, none to Victoria, though I have taken a few.

PYROCHROIDÆ.—*Shape*, oblong or oval, narrowed before; softish. *Head*, moderately sloping, triangular, with narrow neck. *Thorax*, suborbicular. *Eyes*, rather large and prominent. *Antennæ*, placed just before the eyes, not covered; pectinate or flabellate in some males. *Elytra*, reach beyond abdomen, much wider than thorax. *Hind feet*, 4-jointed, the rest 5, penultimate joint sub-bilobed, *Claws*, simple, subdentate, or widened at base. *Abdomen*, of 5 segments in female, 6 in male. *Size*, $\frac{1}{4}$ to $\frac{3}{4}$ in. *Colors*, often red or gay. Found on leaves, flowers, dead logs, &c.; larvæ in rotten wood under bark. Fly well but walk lazily. But two Australian species are catologued, one of which is common in Victoria.

MORDELLIDÆ. — *Shape*, narrow, arched, pointed behind; firm. *Head*, inserted very low down, vertical, short-necked, resting on fore coxæ. *Eyes*, large, oval, depressed. *Antennæ*, 11-jointed, filiform or subdentate, placed before eyes and below base of jaws. *Elytra* narrowed behind, not covering abdomen, arched. *Legs*, long. *Shanks*, spurred, spurs on hind shanks very long. *Hind feet*, 4-jointed, rest 5. *Claws*, simple, notched, or pectinated. *Abdomen*, with 5 segments, last ends in a point. *Size*, $\frac{1}{8}$ to $\frac{1}{2}$in. *Colors*, mostly black with white or yellow spots. Found on flowers; nimble, some leap like fleas. Masters gives thirteen species, but only two as Victorian, though I have taken eight or nine.

# Oology of Australian Birds.

By A. J. Campbell.

## PART II.

## Order—INSESSORS.

### Family—*Caprimulgidæ.*

38. Ægotheles novæ-hollandiæ—(Owlet Nightjar). *Locality*—Australia, (except North), and Tasmania. *Egg*—Perfectly white, nearly round. Length, about 1 inch 1 line; breadth, 11 lines.

40. Podargus strigoides—(Tawny-shouldered Podargus). *Locality*—Queensland, New South Wales, and Victoria. *Egg*—Beautiful immaculate white, and of a long oval form. Length, 1 inch 10 lines; breadth, nearly 1 inch.

41. Podargus curieri—(Curier's Podargus). *Locality*—Victoria, South Australia, and Tasmania. *Egg*—White, and nearly a true oval in form. Length, 1 inch 9 lines; breadth, 1 inch 3 lines.

49. Eurostopodus guttatus—(Spotted Nightjar). *Locality*—Australia. *Egg*—Nearly uniform, olive stone-color, with here and there a roundish purple blotch or spot. Length, $1\frac{3}{8}$ inches; breadth, nearly 1 inch 3 lines.

### Family—*Hirundinidæ.*

53. Hirundo frontalis—(Welcome Swallow). *Locality*—Australia and Tasmania. *Egg*—Ground color, pinky white, with numerous fine spots of purplish brown, the interspaces with specks of light greyish brown, assuming, in some instances, the form of a zone at the larger end. Length, 8 or 9 lines; breadth, 6 lines.

55. Hylochelidon nigricans—(Tree Swallow). *Locality*—Australia and Tasmania. *Egg*—Pinky white, faintly freckled at the larger end with fine spots of light reddish brown. Length, 8 lines; breadth, 6 lines.

56. Lagenoplastes ariel—(Fairy Martin). *Locality*—Australia, except West. *Egg*—Sometimes white, others spotted and blotched with red. Length, $\frac{11}{16}$ inch; breadth, $\frac{1}{2}$ inch.

57. Cheramœca leucosterna—(White-breasted Swallow). *Locality*—Australia, except North. *Egg*—White, somewhat lengthened and pointed in form.

### Family—*Meropidæ.*

58. Merops ornatus—(Australian Bee-eater). *Locality*—Australia, *Egg*—Pinky-white. Length, 10 lines; breadth, 8 or 9 lines.

### Family—*Coracidæ.*

59. Eurystomus pacificus—(Australian Roller). *Locality*—Australia, except South and West. *Egg*—Pearly white, considerably pointed at the smaller end. Length, 1 inch 5 lines; breadth, 1 inch 2 lines.

FAMILY—*Alcedinidæ.*

60. DACELO GIGAS—(Great Brown Kingfisher). *Locality*—Australia, except North and West. *Egg*—Pearl white. Length, 1 inch 9 lines; breadth, 1 inch 5 lines.

63. TODIRHAMPUS SANCTUS—(Sacred Kingfisher). *Locality*—Australia. *Egg*—Pinky-white. Length, 1 inch 1 line; breadth, 10 lines.

64. TODIRHAMPUS PYRRHOPYGIUS—(Red-backed Kingfisher). *Locality*—Australia. *Egg*—Pinky-white. Length, 1 inch; breadth, $\frac{7}{8}$ inch.

66. CYANALCYON MACLEAYI—(MacLeay's Kingfisher). *Locality*—Queensland and New South Wales. *Egg*—Pearly-white, and nearly round in form. Length, 11 lines; breadth, 10 lines.

69. ALCYONE AZUREA—(Azure Kingfisher). *Locality*—Australia, except North and West. *Egg*—Pearly or pinkish white, rather round in form. Length, $\frac{7}{8}$ inch; breadth, $\frac{3}{4}$ inch.

FAMILY—*Artamidæ.*

73. ARTAMUS SORDIDUS—(Wood Swallow). *Locality*—Australia, except North, and Tasmania. *Egg*—Differs much in the disposition of markings; ground color, is dull white, spotted and dashed with umber brown: in some a second series of greyish spots appear as if beneath the surface of the shell. Length, 11 lines; breadth, 8 lines.

75. ARTAMUS CINEREUS—(Grey-breasted Wood Swallow). *Locality*—North and West Australia. *Egg*—Subject to considerable variation in color, and in character of markings; usually bluish-white, spotted and blotched with lively reddish brown, intermingled with obscure spots and dashes of purplish grey, all the markings being most numerous towards the larger end. Length, 11 lines; breadth, 8 lines.

78. ARTAMUS PERSONATUS—(Masked Wood Swallow). *Locality*—Australia, except North. *Egg*—Differs remarkably; ground color being light greenish grey, dashed and speckled with hair-brown principally at the larger end, and slightly spotted with grey, appearing as if beneath the surface of the shell. Length, $10\frac{1}{2}$ lines, breadth, $8\frac{1}{2}$ lines.

79. ARTAMUS SUPERCILIOSUS—(White eye-browed Wood Swallow). *Locality*—Australia, except North and West. *Egg*—Ground color, dull buffy-white, spotted with umber brown, forming a zone near the larger end: in some, these spots are sparingly sprinkled over the whole surface; others have the obscure grey spotting like those of ***A. sordidus.*** Length, 11 lines; breadth, $8\frac{1}{2}$ lines.

80. ARTAMUS LEUCOPYGIALIS—(White-rumped Wood Swallow) *Locality*—Australia, except West. *Egg*—Much lighter in color and more minutely spotted than those of any other species of the genus; ground color, fleshy white, finely freckled and spotted with faint markings of reddish brown and grey, in some instances forming a zone at the larger end. Length, 10 lines; breadth, $7\frac{1}{2}$ lines.

FAMILY—*Ampelidæ.*

81. PARDALOTUS PUNCTATUS—(Spotted Diamond-bird). *Locality*—Australia, except North, and Tasmania. *Egg*—Rather round in form, of a beautiful polished fleshy white. Length, 7½ lines; breadth, 6½ lines.

83. PARDALOTUS QUADRAGINTUS—(Forty-spotted Diamond-bird). *Locality*—Tasmania. *Egg*—White, round in form. Length, 7½ lines; breadth, 6 lines.

84 PARDALOTUS STRIATUS—(Striated Diamond-bird). *Locality*—Australia, except North. *Egg*—Fleshy-white. Length, 9 lines; breadth, 7 lines.

85. PARDALOTUS AFFINIS—(Allied Diamond-bird). *Locality*—New South Wales, Victoria, South Australia, and Tasmania. *Egg*—Beautiful white. Length, 9 lines; breadth, 7 lines.

FAMILY—*Laniadæ.*

88. STREPERA GRACULINA—(Pied Crow-Shrike). *Locality*—Queensland, New South Wales, and Victoria. **Egg*—Rather oval in form; uniform color, light chocolate, which is blended or clouded all over with mottle of a darker color. Length, 1 inch 6 or 7 lines; breadth, 1 inch 1 line.

89. STREPERA FULIGINOSA—(Sooty Crow-Shrike). *Locality*—Victoria, South Australia, and Tasmania. *Egg*—Pale vinous brown, marked all over with large irregular blotches of brown. Length, 1⅝ inches; breadth, 1¼ inch.

90. STREPERA ARGUTA—(Hill Crow-Shrike). *Locality*—Victoria, South Australia, and Tasmania. **Egg*—Somewhat long in form, ground color, light brown, inclined to pink, with a zone of reddish buff markings round the larger end. Length, 1 inch 10 lines; breadth, 1 inch 1½ lines.

91. STREPERA ANAPHONENSIS—(Grey Crow-Shrike). *Locality*—Australia, except North. *Egg*—The ground color of which is either reddish buff or wood-brown, marked over nearly the whole of the surface with blotches of a darker tint. Length, 1 inch, 9 lines; breadth, 1 inch 2½ lines.

* Now described for the first time.

# THREE SHORT COLLECTING TRIPS INTO THE COUNTRY.

By a Member of the F. N. C. of Victoria.

EXCURSION TO BERWICK DISTRICT.

The first of the above very enjoyable trips was made on Saturday, October 8th, to the Berwick district, on the Gippsland line of Railway. The members who were present mustered at the Railway Station, Flinders-street, in time to catch the 7·55 a.m. train from Melbourne. Berwick was reached in time for breakfast, which, after the journey, was most acceptable. After having breakfasted, a start was made for the Ranges. Those who came to collect entomological specimens got little sport, but the botanical party were very fortunate, the principal plants collected being the Terrestrial Orchidæ, which, in this favoured district, were in profusion. In a short sketchy account like the present, it would be impossible to enumerate all the species taken, and I shall only mention a few of the more prominent or rare kinds. The first one which we found was the curious *Pterostylis nutans*, the green nodding flower being in appearance not unlike a hood. A little further on was taken a very beautiful and showy species of *Pterostylis*, not unlike some of the larger forms of *P. cucullata*, and this, with a few other plants (including a beautiful white variety of *Glossodia major*) were sent to Baron von Müeller for examination. Travelling onwards, some plants of the singular little adder's tongue fern (*Ophioglossum vulgatum*) were met with, and quickly collected as a prize. As we neared Beaconsfield, we came across a place where orchids seemed to be here, there, and everywhere. The large and showy native leeks, (*Prasophyllum elatum*, and *P. flavum*) were found after a diligent and patient search, together with the minute lycopod (*Selaginella Preissiana*), and a very handsome white *Epacris*, very little known here *E. microphylla*, and rarely seen in collections, of which specimens for the Herbarium and cultivation were soon collected, so that folios and baskets were soon becoming inconveniently full. As I have previously remarked, insects were scarce, although quantities of the common swamp tea-tree, *Leptospermum lanigerum* (usually so fertile to an insect collector), were in full bloom, the general opinion being that the lateness of the season was the principal cause of this disappointment. Returning late to the hotel (Bain's), the remainder of the evenings were fully taken up in laying out the specimens, comparing notes, &c. This trip took three days, and the orchids alone collected were upwards of 30 species, the greater part of which were in flower. The other plants of interest were *Gentiana montana*, *Phylloglossum Drummondi* (a curious and rare little plant belonging to the order Lycopodiaceæ), *Camesperma vobubile*, and *C. ericinum*) the former a little gem, and aptly termed by the late excellent Dr. Hannaford, of Tasmania, the "love plant"), and the somewhat rare *Euphrasia Brownii*. I had almost forgotten to notice the finding of a beautiful orchid, viz., *Calochilus campestris*, now nearly extinct near Melbourne. This district is indeed a veritable paradise for the botanical student or collector, who can, if he be so disposed, form a very respectable collection of the principal orders of Victorian plants within a radius, say, of 10 miles of the township.

### EXCURSION TO THE YOU YANGS MOUNTAINS.

The second trip was made on the 1st November (Cup day), to the You Yangs mountains, in the vicinity of Geelong and Ballarat line of Railway, the members meeting at the railway-station in time for the 6·30 a.m. train. There were a number of the Club members present, although the great attraction of a Melbourne Cup day was too much for some of them to resist. On our arrival at the Little River Station, we started for the ranges (which are simply piles of immense boulders heaped one on the top of another, with a scant vegetation and a somewhat desolate appearance). A pleasant walk of about four miles brought us to the foot of the hills, where we were joined by a contingent of the members of the Geelong Field Naturalists' Club, introduced by one of our own members, who had been collecting fossils in the Geelong district. Insects here were few and far between, and plants equally so. The principal specimens taken were a very handsome beetle of the genus Uracanthus, a Longicorn (which may yet prove to be new), some small Longicorns, and Cleridæ, and a small though pretty species of *Stigmodera*, one of the Buprestis family, which was unknown to those present. The plants collected were the native tobacco, *Nicotiana suaveolens*, the pretty little native daisy, *Brachycome exilis*, and some specimens of the blue gum, *Eucalyptus globulus*, which, according to Baron von Müeller, (to whom the specimens were submitted), are identical with the common blue gum of Tasmania. Ferns were very scarce, there being but two species met with, viz., *Cheilanthes tenuifolia* (which grows here in great luxuriance), and the fan-leaved spleen-wort, *Asplenium flabellifolium*. The hills are covered with a scrub of *Prostanthera lasianthos*, a plant rarely met with elsewhere in such exposed and barren situations.

Water here is scarce, and tourists should provide themselves in this respect before starting. To the sportsman, this district should be a perfect elysium, as rabbits swarm from every rock and hill; but to the collector of plants and insects, it will, I am afraid, prove but a very indifferent field.

### EXCURSION TO PAKENHAM.

The last of these trips took place, on the 9th of November (Prince of Wales' Birthday), to Pakenham, on the Gippsland line of Railway, members leaving the Gippsland Station, Flinders-street, by the 7·55 a.m. train. Pakenham was reached about 10 o'clock, and a start made for the ranges. The ground about here was very swampy, and, to get any beetles at all, the members had to flounder about up to their knees in water. Insects were scarce, although some few very acceptable beetles were taken by members of the party, a good one being a longicorn, *Aphneope sericata*. Some smaller kinds, and an Elater, *Chrosis illita*. There were also a few small Buprestidæ, Cleridæ, and some few other families. Plants were mostly out of flower, although some of the more common things were in full bloom, as *Cassinia lævis*, *Leptospermum lanigerum*, and quantities of the handsome species of *Pterostylis* (the orchid referred to in the mention of our Berwick trip). Returning towards the Railway-station, we were fortunate enough to find two somewhat rare Orchids just appearing above ground, viz., *Gastrodia sesamoides*, and *Dipodium punctatum*, both of which are not, strictly speaking, bulbous, being generally found adhering to some old root or buried stump. These were lifted for cultural purposes, and brought with us to town. On the whole, the last two trips were but fairly successful; still they were thoroughly enjoyed by those who were fortunate enough to be present, and plans were laid for more lengthy trips during the coming season. In concluding these short, and necessarily imperfect, notices of our trips, it must be borne in mind that it is to these collecting trips members have to look for much additional support to the Club, and if the attendance be good, more interest in these very interesting field excursions will be noticeable every year—at least, we hope so.

## Adulteration of Tea, and a new process for the Extraction of Caffeine or Theine.*

By A. B. Griffiths, Medallist in Chemistry and Botany, &c.

[From Science Gossip, November, 1881.]

The tea-plant (*Thea Chinensis*) belongs to the natural order Ternstrëmiaceæ. It bears white flowers like the wild rose. The calyx is polysepalous and inferior; the corolla is polypetalous and hypogynous; the stamens or male organs of the plant are indefinite, polyadelphous and hypogynous; and the pistil or female organ of the plant is syncarpous and superior. The tea-plant is an evergreen; the leaves, which are of various sizes, are somewhat similar to those of the rose; they are serrated and arranged on the stem alternately.

The tea-plant is indigenous to China, but has been of late years introduced into India and Japan. It was first used in this country in the seventeenth century. The chemist has nothing or very little to do with the flower of the plant. It is the leaves to which his attention is drawn, because of their use as an article of diet by a large proportion of the human race.

Tea is sometimes adulterated with leaves of other plants, as, for instance, sloe, ash, hawthorn, &c.; but, by a careful microscopical examination, these adulterants can be easily found out. Genuine tea-leaves, when moistened with hot water and opened, and then examined by the microscope, show a very characteristic venation; when once seen, this character will not be easily forgotten.

The midrib passes from the petiole to the end of the leaf; and the veins proceeding from the midrib are parallel to each other, but these veins curve a little towards the edge of the leaf. By this character tea may be recognised from other leaves. The edge of the leaf of the tea-plant is serrated, but this is not an essential character. Tea is

* We reprint this paper from "Science Gossip," because of its bearing on a late controversy in the Melbourne Press.

adulterated in other ways besides the admixture of foreign leaves. Firstly, the leaves are often "faced," or artificially coloured with Prussian blue and turmeric, or indigo and talc-powder, to give a green colour. Black tea is often "faced" with plumbago. Secondly, the leaves are sometimes mixed with sand and other mineral substances; all these bodies can be detected by microscopical and chemical analysis in the ordinary way. There is still another method in which this leaf is rendered not genuine; that is, by the practice of selling the tea more or less exhausted.

The principal ingredients in the ash of tea-leaves are potash, protoxide of manganese, and phosphoric acid. The following table will show the percentage of these ingredients of the ash from a sample of genuine tea, and the same sample when completely "spent":—

| Genuine "Souchong." | | Spent "Souchong." | |
|---|---|---|---|
| Potash | 38·456 | Potash | 7·523 |
| Phosphoric Acid | 14·621 | Phosphoric Acid | 24·900 |
| Manganese Protoxide | 1·204 | Manganese Protoxide | 1·809 |

A pretty fair judgment as to adulteration of a sample of tea can be arrived at by a simple process of my own. The process is based on the extraction of the theine contained in tea, and ascertaining the percentage of theine extracted from a known weight of tea. Tea contains from a half to five per cent. of theine.

The way to proceed in this new process of extraction is to weigh out about 180 grammes of the sample of tea, and boil with 2 litres of distilled water in a glass beaker; allow the infusion to boil for five minutes; then add to the infusion a small quantity of glass (reduced to a fine powder) and magnesic oxide. Keep this mixture in strong ebullition for about twenty or twenty-five minutes, at the same time occasionally stirring with a glass rod. Again add 250 c.c. water, and boil for fifteen minutes longer. The aqueous extract is now to be evaporated very carefully to complete dryness. The residue left on evaporation is to be treated three or four times with rectified ethylic ether by means of Payen's percolator.

Three or four treatments with ether generally suffice to remove all the theine. The last portions of the ethereal washings, when evaporated, should leave no residue. These ethereal solutions are to be gently heated, and then allowed to evaporate in a shollow dish of known weight. The solid remaining is the pure alkaloid theine.

The dish and its contents are now weighed. The weight of the dish and the theine, minus the weight of the dish alone, gives, of course, the weight of the theine. From this, the percentage of theine in the original weight of tea can be ascertained by means of simple proportion.

If the percentage is less than a half per cent., you may conclude that the sample has been either adulterated with foreign leaves (which can easily be recognised by their botanical structures under the microscope, as I have alluded to at the commencement of this article), or the leaves have been exhausted.

The author has experimented upon various teas, among which may be mentioned, "Souchong," "Orange-Pekoe," and "Paraguay Tea" (*Ilex Paraguayensis*). The smallest percentage of theine was yielded by a sample of Paraguay tea.

This *Ilex Paraguayensis* is a kind of holly of South America; and the beverage it yields with water is called Maté by the natives.

Beside the crystallisable alkaloid theine, or caffeine ($C_8H_{10}N_4O_2$), which belongs to the family of "organic compound containing triad and pentad nitrogen;" the principal ingredients are an essential oil and tannin. The exhilarating effect of tea (which induces such a large proportion of the human race to partake of it in their daily diet) is owing to the presence of the above constituents. The essential oil is the ingredient that gives an infusion of tea the aromatic flavour; theine, combined with the essential oil, stimulates the stomach, and, by inducing a slight perspiration, gives a lightness and increased strength to the body of the consumer.

The astringency of tea is due to the tannin present.

The base, theine (in ordinary tea), is combined with tannic acid, forming tannate of theine. The author comes to the conclusion that, in the process of extraction just described, the mixture of glass and magnesic oxide has the power of liberating tannic acid, which may combine with a portion of the magnesic oxide, forming magnesic tannate; or the tannin may be left in an uncombined state, but, being almost insoluble in ethylic ether, is by this means separated from the base, theine.

There are three varieties of *Thea Chinensis*, namely, *Thea viridis*, *Thea bohea*, and *Thea assamica*; all of them yielding green and black tea. The difference in colour and quality of teas depends chiefly on the time of the year when gathered, and also the method employed in drying the leaves;—for this reason, also, the variation in the percentage of theine (that is, between a half and five per cent).

## SHELLS:

What they are, their structure and uses, how and where to collect them, with some account of their inhabitants.

BY J. F. BAILEY.

[Read before the Field Naturalists' Club of Victoria 10th October, 1881]

Continued.

All shells have a coating of animal matter, called the "epidermis," sometimes thin and other times thick and olive-colored, as in all fresh-water shells; sometimes it is silky, or fringed like hairs; in some species it is thick and rough, like coarse cloth; and in some it is drawn out into long filaments like *Modiola Australis.* In the cowries, with large mantle lobes, it is more or less covered up by an additional layer of shell deposited externally. The epidermis has life, but not sensation like the human scarf-skin, and it protects the shell against the influence of the weather, and chemical agents. It soon fades, or is destroyed, after the death of the animal in situations where, whilst living, it would have undergone no change. It is most developed in shells that frequent damp situations, especially fresh-water. All fresh waters are more or less saturated with carbonic acid gas, and in the absence of lime to neutralise the acid, the water acts on the shell, and would eventually destroy it if it were not for the protecting epidermis. This is most noticeable in the *Unios*, or river mussells. The epidermis is formed by the collar of the mantle, and consists entirely of animal matter, and, in the bivalves, is organically connected with the animal. The colors of most land shells depend on it, and are secreted by the border of the mantle, which often exhibits the same tints and pattern as the shell; a good example is *Voluta undulata.* The membranous and nacreous, or pearly, layers are formed by the thin transparent portion of the mantle, hence we find the pearly texture only as a lining to the shell so well defined in the Nautilidæ. So long as the animal continues growing, each new layer of shell projects beyond the one formed before it, and, in consequence, the external surface becomes marked with lines of growth.

During winter, or the season of rest which corresponds to it, shells cease to grow, and the periodic resting places are often indicated by interruptions of the otherwise regular lines of growth and colors. In many shells the growth is uniform, as in Voluta, but in others it is marked by the development of a fringe, or ridge, or row of spines; when these fringes are formed periodically they are termed *varices*, as in *Murex*, *Triton*, *Ranella*, etc.

Shells have so many different appearances when growing that several species have been made from one shell, especially Cypræa. When young, they have an expanded and very thin lip, which becomes enormously thickened, and toothed in the adult. The land shells have a thickened and toothed aperture, and in some instances—as *Anastoma*, and *Clausilia*—it is a marvel how they pass in and out.

Some shells, such as the Oyster and Spondylus, continue to increase in thickness long after they have continued to grow outwards, the greatest addition being made to the lower valve, especially near the umbones; and in Spondylus: some parts of the mantle secrete more quickly than others, so that cavities containing fluids are formed, and are consequently termed "water-spondylus;" some fine examples may be seen in our National Museum.

Shells always concealed by the mantle are colourless—as *Parmophorus Australis*, *Philine Aperta*, etc.; and those that are covered by the mantle lobes only when the animal expands acquire a glazed or enamelled surface: the Cowries and Olives are shells of this description. When the shell is immersed in the foot of the animal, it becomes partly glazed, for example: Cymba and Melo.

# PROCEEDINGS OF SOCIETIES.

## THE ROYAL SOCIETY OF VICTORIA.

The usual monthly meeting of the Royal Society of Victoria was held at the Society's hall, on Thursday evening, 8th ult.; Mr. Ellery in the chair.

The following gentlemen were elected as members:—Messrs. S. H. Ridge, B. Baker, F. A. Campbell, F. A. Dunn.

A paper was read by Dr. M'Gillivray upon "New Descriptions of Polyzoa found in Australia."

Mr. W. W. Culcheth, C.E., contributed a paper on "Floods in the river Barwon," in which reference was made to the late action against the Government for damages done to certain mills during the late flood, and suggestions were made whereby such accidents might be averted in the future.

Mr. Ellery read a paper, contributed by Mr. Sutton, on a new form of a secondary cell for electrical storage. The author declared that, after numerous experiments, he had discovered a cell which had great advantages over all others. Mr. Ellery remarked that the cell did not appear new, and, at the suggestion of Mr. Sutherland, it was decided to write to Mr. Sutton, asking him to forward one of the cells for experiment by the members.

At the conclusion of the papers specimens of polyzoa, referred to in Dr. M'Gillivray's paper, were inspected by the members, after which the proceedings terminated.

## THE FIELD NATURALISTS' CLUB OF VICTORIA.

The usual monthly meeting of the Field Naturalists' Club of Victoria was held in the Royal Society's Hall on Monday evening, 14th Dec., there being a good attendance of members, and the chair being occupied by Mr. J. R. Y. Goldstein, one of the Vice-Presidents of the Club.

By the courtesy of the Royal Society, a letter was read from Mr. K. L. Bramston, a naturalist of Ekateramasloo, in Russia, offering to exchange Entomological specimens; and, as two or three members undertook to correspond with him, the Club may expect shortly to have an opportunity of seeing the Russian collection in this branch of natural history.

Mr. Ernest King was duly elected a member, and Mr. W. Chambers nominated for membership.

Amongst the papers to be read at the ensuing meeting will be some by Mr. C. French, on ferns, Mr. D. Best, on beetles, and Mr. J. F. Bailey, on shells.

Prior to the reading of papers, Mr. H. Watts took the opportunity of referring to a statement made by him at a previous meeting, that it was impossible to tell what the spores of Algæ might produce, whether Lichens or Fungi, and, in support of this assertion, quoted the eminent naturalist Sir John Lubbock, who, however, had not himself proved the fact, which must still be considered uncertain.

Mr. J. G. Luehmann read a few notes, contributed by Baron von Müeller on a new Australian *Thunbergia*, a specimen of which was brought for inspection.

Dr. Lucas read a continuation of two papers on Geology, having especial reference to the origin of volcanic rocks, and illustrated his remarks by drawings on a board provided for the purpose. On this subject, as also that of the origin of earthquakes, a long discussion took place, the principal speakers being Mr. G. G. Ross, Mr. F. C. Christy, Mr. Goldstein, and others. Mr. Ross quoted from a work entitled "Nature's Bye-paths," by the well-known Dr. Taylor, who controverted the generally-accepted theory that volcanoes were formed by a tension or blister-like swelling of one part of the Earth's crust until the steam caused the upper part to crack and burst, a discharge of lava and ashes being the consequence; his (Dr. Taylor's) theory being entirely opposed to this. Mr. Christy gave the result of his experience in Japan, where earthquakes are of frequent occurrence, and Mr. J. R. Y. Goldstein quoted from the works of Professors Judd, Lyell, and others.

Some fine exhibits were shown, notably those of Mr. T. A. F. Leith, Mr. A. J. North, and Mr. C. French. Those of Mr. Leith consisted of long-billed Cockatoo from Gulf of Carpentaria, Burke's grass, and also the rock Parrakeet; and, as showing the influence of climate in the development of species, specimens of the blue-bellied Lorrikeet from Gippsland and from Port Darwin. Mr. North's comprised eggs of the satin Bower-bird (*Philsnorhynchus holosericus*), shining calornis (*Calornis metallica*), and New Holland Snipe (*Gallinago Australis*), all of these being very rare and difficult to obtain.

Mr. French included *Cerura Australis* and another rare wood-feeding moth from New South Wales, also *Polypodium Horsefieldii* and *Onoclea sensibilis*, two very rare ferns, the former being from Borneo, and the latter from Japan.

The meeting was terminated by the usual conversazione.

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## THE ROYAL SOCIETY OF NEW SOUTH WALES.

The monthly meeting of the Royal Society of New South Wales was held at the Society's house, Elizabeth-street north, 7th December, when there was an attendance of about 40 members. Mr. H. C. Russell, B.A., in the Chair.

The new members balloted for and elected were:—Mr. Robert Amos, 213, Macquarie-street; Mr. John Harris, Mayor of Sydney, Ultimo; Mr. Frederick Poate, L.S., Summer Hill; Dr. Arthur Annesley West, L.R.C.S., F.R.C.S., Glebe; and Mr. Frederic Wright, Harnet-street.

Mr. W. J. Murray and Mr. A. S. Webster were appointed auditors to audit the Hon. Treasurer's account to be laid before the Society in May next.

Eighty-six donations were received since last meeting, and acknowledged.

Mr. Russell then read his paper on the "Transit of Mercury," and illustrated it by an interesting experiment. A vote of thanks to Mr. Russell was proposed by Professor Smith, and carried unanimously.

Mr. F. B. Gipps, C.E., then read his paper on the "Storage of Water in the Colony," which was followed by that of Mr. L. W. Shepherd, "On the Evaporation of Water by Australian Forest Trees." Votes of thanks were passed, and the meeting terminated.

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## LINNEAN SOCIETY OF NEW SOUTH WALES.

We have just received part third, vol. VI, of the Proceedings of this Society, and, as usual, must give it the highest praise; 300 pages, containing about 20 papers by leading scientists on highly interesting subjects, form a grand contribution to Australian literature. Professor Ralph Tate, and Mr. J. Brazier, present useful papers on "Australian Fresh-water Shells. A paper by the Hon. W. Macleay, describing a new species of *Phasma* found in astonishing numbers completely destroying the Eucalyptus in the vicinity of the Binda Caves, re-opens the problem as to the cause of the large tracts of dead gum-trees occurring so frequently throughout the colonies. Mr. W. A. Haswell, M.A., &c., describes some new Australian *Brachyura*. Mr. E. P. Ramsay, F.L.S., describes a new species of *Hemerocœtes* from Port Jackson, and contributes a note on the *Oriolus affinis* of Gould, also describing its egg. The Rev. Dr. Woolls contributes three valuable papers on the "Plants of New South Wales." Mr. E. Meyrick, B.A., gives parts 5 and 6 of his description of Australian micro-

Lepidoptera, 158 species of the order *Tortricina*, 102 of which are new to science. Mr. Meyrick's work is invaluable, and deserves the highest praise. A very useful paper is given by Dr. Cox, on "the nomenclature and distribution of the genus *Pythia*," and five papers by Baron N. de Miklouho-Maclay are specially interesting. These are, "On a Preservative Fluid for large Vertebrata," (which we reprint in this paper), "On the Temperature in the Magdala Mine, Victoria," "On the practice of Ovariotomy by Queensland Natives, "On the Convolutions of the Brain of *Canis dingo*," and "On the practice of Cranial Deformation of new-born Children in some parts of the South Seas.

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## THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

The usual monthly meeting of the members of this Society was held at the South Australian Institute, on Wednesday evening, 6th Dec., His Honor the Chief Justice presiding. There was a fair average attendance.

Messrs. W. Gardner, M.D., Edward Davis, W. Fowler, and J. T. Smyth, B.A., were proposed as Fellows.

A resolution was agreed to that the hour of meetings of the Society, in future, be 8 instead of half-past 7.

Professor Tate exhibited specimens of three additions to the flora of South Australia, which he had recently discovered. The principal one referred to was a new species of *Hybanthus*, found at Wilpena Pound, which he described as one of the loveliest spots he had ever been in. He said that this made up twenty-eight additions to the flora of South Australia since the publication of the "Census" of last year, and that 200 species had been discovered within the last five years.

Professor Tate said there had been a great deal of criticism in the papers with respect to the teachings of scientific geologists, and they had been twitted with not agreeing; and the tone of some of the letters seemed to point to adverse opinions being given by professional men on a piece of alleged coal found in the Northern Areas. For the sake of geological science, he wished to explain how the two opinions were likely both to be correct. He then pointed out that the stuff first found on the Woolundunga Reserve, and sent to the Forest Board, was pronounced by the Chairman of the Board and others as a substance that might be carbonised remains of a mallee deposit. He judged that this deposit had not been found to be a thing likely to pay, and the Forester watched the people who had found it closely. He, however, had absented himself for two hours once, and on returning coal had been discovered. This had afterwards been shown to him, and he had no hesitation in pronouncing it to be good Newcastle coal. (Hear, hear).

The President—It was taken there.

Professor Tate—Picked up on the railway line, or brought there from Port Augusta. He had gone with the Conservator of Forests to the spot when the discovery was first reported, and, from geological observations, he was sure no coal did occur there. The opinions given on this subject had not been given on the same object, and both were in keeping.

Mr. F. W. Andrews placed before the Society specimens of a small fish collected near Mount Compass, near the Finniss, which were to be had in the streams in considerable number.

Mr. S. Smeaton produced a fine specimen of the porcupine ant-eater (*Echidua hystrix*), which had been sent him from the South East.

Mr. T. D. Smeaton said he heard they were propagated from eggs.

Professor Tate said he intended to be in Kangaroo Island shortly, and would make some investigations in reference to this animal.

Mr. J. H. Angas forwarded to the Society a statement of the various strata met with in an unsuccessful bore for water put down in the neighbourhood of Lake Frome. The boring-rod had stuck when at a considerable depth, and another bore was being put down near the spot at first selected.

Mr. C. Todd, F.R.A.S., read a paper entitled "Notes on observations of the Transit of Mercury," but explained that he read it in order simply that the matter might be formally brought before the Society, as the facts had all been laid before the public already.

Mr. T. D. Smeaton said he had observed the transit, and corroborated the facts which Mr. Todd had published.

Mr. T. B. Adamson said he also had observed the transit, but had not seen the black drop that they had looked for. Mr. Todd had referred to an invitation having been given by himself to any gentlemen who had telescopes to go to the Observatory and assist to observe the transit, but had said that no one had turned up. He would have been glad, but he had been there on the previous night, and intended to go back, only he found there was no shelter, and it was windy. There had been some very interesting spots on the Sun recently. He had seen the large red spot sometimes mentioned on Jupiter very clearly lately.

Mr. Todd said as to the red spot on Jupiter, which he believed he had been one of the first to observe, it was becoming hazy, as though a volume of cloud were forming over it. He had seen two of the rings of Saturn the other evening very plainly, and should be glad to assist any one who was curious on the point, but it was seldom so good an opportunity presented itself.

Mr. Todd thought the red spot on Jupiter might be that they were looking down upon the lower atmosphere, or perhaps the surface of the planet, and that clouds were now intervening. As Jupiter's satellite had been seen through the edge of the planet, it showed that much of what appeared to be the planet was surrounding atmosphere.

Mr. S. Pollitzer, C.E., read a paper entitled "Formulæ for determining Elements of Railway Switches and Crossings," and explained it on the blackboard.

The Society then adjourned.

## THE ROYAL SOCIETY OF TASMANIA.

The monthly evening meeting of the Society was held on Tuesday, the 15th November, His Excellency Sir John Henry Lefroy, K.C.M.G., the President, in the chair.

Messrs. H. M. Hull, E. B. Gawne, and W. H. Macfarlane, M.B., who had previously been nominated by the Council, were balloted for, and declared duly elected as Fellows of the Society.

The Hon. Secretary, Mr. Barnard, brought forward the usual monthly returns, viz:—

1. No. of Visitors to Museum: October, on Sundays, 559; on week days, 414; total, 973.
2. Ditto to Gardens, 4,607.
3. Plants, etc., received at Gardens during September and October:—From Mr. C. F. Creswell, Sydney, 1 bag of Norfolk Island Pine seeds, and 9 new Dahlia roots. From Messrs. H. Low, London, 50 plants. From Baron von Müeller, 6 papers of seeds.
4. Seeds sent from Gardens:—To the Botanic Gardens, Melbourne, 1 package; to Messrs. Villmorin, Andrieux, and Co., Paris, 4 ditto; to Mr. E. B. Heyne, Adelaide, 6 packets.
5. Books and Periodicals received.
6. Presentations to Museum.

Meteorology.—Mount Nelson, from the Marine Board, table for October.

Time of leafing, flowering, and fruiting of a few standard plants in the Botanic Gardens during October:—

8th. Carpinus betulus, commencing to break.
18th. Ailanthus glandulosus, ditto.
20th. Black Mulberry, ditto.
21st. Common Lime, ditto.
22nd. Elm, commencing to shed seed.
25th. Melia azederach, commencing to break.
30th Horsechestnut, in full flower.

The presentations to the Museum were as follows:—

1. From Mr. J. W. Johnston. Specimens of Native Bread (*Mylitta Australis*), from Broad Marsh.
2. From Mr. A. Jackson. A Musk Duck (*Biziura lobata*), from Hamilton.
3. From Mr. S. H. Wintle, F.L.S. A Poached Lamprey (*Geotria Allporti*), from George's Bay. A large Crab (*Pseudocarcinus gigas*, Lamaech), caught in 70 fathoms water, off St. Patrick's Head, East Coast, Tasmania.
3. From Mr. E. B. Gawne. A diamond Snake (*Hoplocephalus superbus*).
5. From the Rev. George Brown, C.M.Z.S. A Native Drum and 13 Spears, from New Britain. Specimens of the Shell from which the "Shell money" of New Britain is made.

6. From Mr. T. H. Bromfield. A young Porcupine Ant-eater (*Echidna setosa*).
7. From Mr. R. M. Johnston, F.L.S. Specimen of a species of Sea bream (*Girella tricuspidata*), from Southport. In reference to this specimen, Mr. Johnston remarks:—"This interesting fish was obtained by me from a dealer, and is locally known to the boatman as 'The Sweep.' Hitherto this species was either not known to exist in Tasmania, or it may have been confounded with some other member of the 'Sea Bream' family. Like nearly all of this group, it is an excellent fish for the table, and, in my opinion, when in good condition, is superior to the 'Sand Mullet' (*Mugit cephalotus*), and almost rivals the 'Trumpeter' (*Latris hecatteia*) in flavour. I have temporarily, with hesitation, placed it under Quoy Gaimard's *G. tricuspidata*. It is in some respects intermediate between the latter species and *G. simplex*, Richardson; but while it more nearly agrees with the latter in lateral and transverse series of scales, and in relative length of head, yet its peculiar, well marked, tricuspidate teeth ally it more closely with the former. The two species named are, however, very closely allied."

Presentations to Library:—

From the Ballarat School of Mines, two copies of the Annual Report for 1880.

From His Excellency the President, diagrams prepared by him to illustrate a lecture on the Southern Skies, delivered on the 17th ult., to be made use of hereafter for any instructional purpose the Council may think fit. Symons, British Rainfall, 1879. A file of the *Waratah Weekly News*, in Manuscript. Portrait of Mr. W. Spottiswoode, LL.D., President of the Royal Society. Magnetical and Meteorological Observations, taken in North America, by Captain Lefroy, R.A., and Sir John Richardson, C.B., M.D., 1855. Agricultural Report of Bermuda.

The President exhibited a number of harmonic curves drawn by Donkin's Harmonograph. This instrument is described in the Proceedings of the Royal Society for 1874. The mechanical construction of it is such that a finely pointed glass pen, following the motions of a pendulum, or of a regularly oscillating crank, traces an endless line on a sheet of paper, which is itself in motion under the influence of another crank or pendulum. Some of the curves were produced with pendulums, and some by wheel-work.

In this instrument one or both of the pendulums may be made to revolve either in a circle or in an ellipse. The result is to produce an endless variety of beautiful figures.

The attention of the Fellows was particularly called to the remarkable fact that whenever the ratio of the times of vibration, or of vibration and rotation, is one which corresponds to a definite interval in music, say thirds, fifths, octaves, the result is a figure symmetrical and pleasing to the eye, as the result of the two notes is harmony to the ear, and whenever the ratio of the times is not a musical interval, the result is an unpleasing figure, as it would be a discord in music. This was illustrated by many examples.

Mr. R. M. Johnston observed that the Harmonograph bore a slight resemblance to instruments made by some machinery manufacturers, which produced similar curves. There was also a form of harmonics produced upon films of soap. In this instrument (the "Phoneidoscope"), when true fifths, or any other harmonic intervals are put together, bubble rings are developed; and if two persons sang together into the instrument, at an interval of a full tone, a most disturbed stormy sea would present itself in the soap film.

The President remarked that the results Mr. Johnston mentioned all turned upon the same law of harmonics, although produced by somewhat different mechanical means.

A botanical paper, by Baron F. von Müeller, K.M.G., M.D., F.R.S., entitled "Notes on *Leontopodium catipes*, was read by the Secretary.

The meeting terminated with a vote of thanks to the authors of the paper read, and to the donors of presentations.

## A Solution for Preserving large Vertebrate for Anatomical Examination.

By N. de Miklouho-Maclay.

[From Proceedings of the Linnean Society of New South Wales, Vol. vi., Part 3.]

Ten days ago I found in a German Newspaper a Report of a meeting of the Anthropological Society of Berlin, held on the 19th of March, 1881, in which was stated, that Prof. R. Virchow informed the members present at the meeting that the specimen of the *Homo australis* "Umbelah" (alias Johny Campbell), sent by me from Bris-Brisbane in October last year in a preservative fluid, has safely arrived in Berlin and in *good* condition. This will give Prof. Virchow, or his pupils, the opportunity to make valuable anatomical dissections of this interesting specimen of the Genus Homo.

This happy result, which I hardly had dared to expect, induces me to give here the proportions of different ingredients of this solution, which is different from that of Mr. Wickersheim of Berlin.

I have used for my preservative fluid:

| | |
|---|---|
| 4lb White Arsenic<br>2lb Carbon. of Potash<br>3lb Corrosive sublimate<br>40lb Common Salt | Dissolve in 40 gallons of water. |

Speaking of this new solution, I must mention, with thanks, that Mr. R. H. Staiger, the late Gov. Anal. Chem., has assisted me with his theoretical and practical experience. I had also some advice from Mr. A. C. Gregory, C.M.G.

I have to add: that before I put the body in this solution I had, cutting the covering of the abdomen in the Linea alba, removed the tractus intestinalis from the cardia to the rectum, leaving heart, lungs, liver, kidney, etc., etc., "in situ." I injected also about 40lb of the Wickersheimer Fluid in the Aorta descendens, partly as a preservative, but chiefly in order that the glycerine, one of the elements of the fluid, might keep the members of the body supple. The body was not put in the liquor immediately after death. The first afternoon I had only time to take the brain out, the second day I removed the tractus intestinal, made the injections, and only after 48 hours was the specimen put in solution. The cold weather (16th and 17th August), aided by a free use of a wash of the Wiskersheimer Fluid, prevented all signs of decomposition. But after remaining in my solution for 10 or 14 days I observed that many parts of the body were swollen. To assist the penetration of the preservative fluid under the skin and prevent further decomposition, hundreds of acupunctures were made, whereafter the swelling was soon reduced.

I kept the body two months in the solution, and, as I was perfectly sure that the specimen was well preserved, I decided to send it to Prof. Virchow, and hope that this consignment will add a few facts to our knowledge of the Comparative Anatomy of the Races of Mankind.

After the specimen had been sent to Europe, I got a letter from Prof. Virchow (dated 27th Nov., 1880), in which he tells me that he himself did not believe that the Wickersheimer Fluid, while excellent for a cold climate, was suitable for use in tropical and subtropical regions; he advises me, in preserving such specimens as bodies of men: 1. To take the tractus intestinalis out and to preserve it in alcohol. 2. To inject a solution of Chloride of Zinc in the carotids and to put the brain in alcohol. 3. To inject also Glycerine and Carbolic Acid in some of the principal arteries, to keep the members movable. 4. To preserve the body in salt. He does not believe that Corrosive Sublimate is of importance, but thinks that Arsenic is good for preventing the formation of the Fungi.

Dr. Hector, whom I have seen lately in Melbourne, has told me that common sea-water, after it has been boiled and filtered, is an excellent preservative solution for many, principally marine, animals.

# NOTES, MEMORANDA, &c.

We hail with pleasure the advent of another colonial journal devoted to the interests of Science. The New Zealand *Journal of Science*, the first number of which is to be issued this month, judging by the prospectus we have received, bids fair to enter upon a long career of usefulness, under the editorship of Mr. G. M. Thomson, F.L.S., whose labors in science are pretty generally known and appreciated. The journal will be devoted to scientific matter pertaining to New Zealand, and will contain original contributions by gentlemen of known ability, also notes on every branch of science, reviews, and correspondence. Original researches will be recorded as they are made, and the various scientific societies of the colony will be fully reported. The journal will be issued bi-monthly, and the subscription has been fixed at the very low rate of ten shillings per annum, which ought to secure a long list of subscribers, especially when it is known that the journal will be published by that eminent firm Messrs. J. Wilkie and Co., of Dunedin.

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A NEW COLLECTING BOTTLE FOR POND-LIFE, &c.—In the July number of the *American Microscopical Journal*, Mr. C. E. Hanaman describes a handy form of collecting bottle, being a great improvement on any previously known. It is an ordinary wide-mouthed bottle, having a number of holes half an inch in diameter on one side at about one inch from the bottom. A piece of fine muslin is placed over the holes and secured by elastic bands above and below. Any quantity of water may be poured into the bottle, when it will run out quickly at the holes leaving the solid particles, or living organisms, in the water left in the bottle below the holes. When a sufficiency of objects are obtained from several fillings, these can be poured off into small bottles by pouring the contents out of the side opposite to the holes. The holes are easily made by using a sharp steel drill with turpentine or kerosene. The holes thus made can be enlarged as required by a common round file.

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MOUNTING STARCHES.—Good slides of the different forms of Starch are valuable as means of detecting adulteration of food. The simplest method of mounting these is to place a small portion of dry starch on a clear glass slip, then add a drop of carbolic acid, which will saturate the starch and also dispose the granules regularly and smoothly on the slide. When arranged satisfactorily, cover with the thin glass, and apply a drop of balsam or dammar at one edge of the cover; the varnish will at once run in, and the superfluous acid may be drawn off with blotting paper at the opposite side.—J. R. Y. G.

## The Epacrideæ of the Grampians.

By D. Sullivan.

[Read before the Field Naturalists' Club of Victoria 16th January, 1882.]

The bell-shaped corollas of the genus Epacris have probably suggested to our colonists the name "Native Heaths," by which many plants of this interesting Natural Order are well-known. Except, however, in general outward appearance, there is no analogy between our native Epacrids and plants of the order Ericaceæ. Examine any of the beautiful species of Ericas imported from Cape Colony, comparing the result of your investigation with the following description of the common Cranberry Bush (which we will, if you please, select as a type of the drupaceous section of the order Epacrideæ), and you will immediately perceive the essentially different structures of both. Ericas have eight stamens and *two-celled* anthers *dehiscing by pores at the summit.* Take *Erica Cavendishii* (Yellow), or *E. hybrida*, and you will find the leaves in whorls of 3 or 4, the number of corolla-lobes 4, sepals 4, stamens 8, with 2-celled anthers having horn-like decurrent appendages. The ovaries in both cases are 4-celled, with numerous ovules. The Epacrideæ, on the other hand, have *alternative* leaves, 5-sepals, 5 coralla-lobes, 5 stamens alternate with the lobes of the corolla, and 1-celled anthers dehiscing by a slit on the inner face.

### Epacrideæ.

1. *Styphelia humifusa*—(Cranberry Bush) –.A perennial prostrate shrub. *Leaves* simple, alternate, exstipulate, linear, acute, rigid, with minutely dentate margins. *Flowers* axillary, solitary. *Calyx* inferior, gamosepalous, 5-cleft, persistent, surrounded by bracts and 2 persistent bracteoles at the base. *Corolla* hypogynous, gamopetalous, tubular, 5-lobed, crimson, deciduous, with a valvate aestivation. *Stamens* 5, pentandrous, epipetalous. *Anthers* sessile, alternate, with corolla-lobes, 1-celled, dehiscing by a longitudinal slit on the inner face. *Ovary* superior, 5-celled; ovules solitary. *Style* slender, shorter than the tube of the corolla. *Stigma* small, undivided. *Fruit* drupaceous, oval, pulpy, pale green about the base, but the upper exposed part dark green, 5-cells. *Seeds* solitary, pendulous, albuminous. On the lower stony ridges of the Grampians this plant is somewhat erect or adscendant, often attaining a height of one foot. Bush children consume enormous quantities of cranberries, and gastric fever or convulsions is often the result. The pulp is perfectly harmless, but the hard bony endocarps must be injurious to the stomach when swallowed in large quantities.

2. *Styphelia Sonderi.*—A charming bush, from 1½ to 2 feet in height, has bright-red flowers, the bracts much larger, closely imbricated, and colored like the corolla. The *filaments* are strap-shaped, and the fruit, which remains enclosed in the persistent calyx and bracts, even after falling to the ground in a ripe state, is *cherry-red.* Common throughout the Grampians district. I have seen only one plant with white flowers, all the others being red. A plant with green

flowers is said to have been seen near Mount William. The emus subsist almost exclusively on the drupes of this plant for about two or three months of the year.

3. *Styphelia pinifolia.*—Is a well marked species, having yellow deciduous flowers and pine-like leaves. The fruit is oval, pulpy, and 3-celled. It is always confined to the higher regions of the mountains, being very abundant on the sub-alpine summit of Mount William.

4. *Styphelia adscendens.*—The greenish white flowers, much exserted stamens and style, narrow versatile anthers, and large, pale-green, very pulpy fruit, will enable any one to readily identify this species.

5. *Styphelia neurophylla* is a rare species restricted to the summit of Mount William, where it was discovered by Baron von Müeller. It resembles in many respects the sea-coast Styphelia, but the fruit is smaller, yellowish, pulpless, and 3-5-celled, while the leaves are distinctly 3-5-nerved.

6. *Styphelia thymifolia.*—Is also limited to the Grampians, and there to considerable elevations. Its general hairiness, irrespective of the somewhat thyme-like leaves, and small, green, pulpless, slightly lobed fruit, would be sufficient to distinguish it from its congeners. Height, 1-1½ feet.

7. *Styphelia rufa (var. albidiflora).*—An erect rigid shrub, with dingy white flowers, sparsely scattered over the lower spurs of the mountains. I have not been able to secure specimens with expanded flowers.

8. *Styphelia ericoides.*—Has the leaves nearly sessile and reflexed at the margins. The fruit is small, oblique-oval, brown, downy, longer than the sepals, pulpless, and 5-ridged.

9. *Styphelia gracilis.*—This may be distinguished from the last by its low habit and twisted leaves.

10. *Styphelia apiculata.*—Will always attract attention by its profusion of snowy white flowers, which are very much crowded towards the summits of the branchlets. It is the most generally distributed of the Styphelias, being met with on all the scrub-hills and heath-grounds of the district.

11. *Styphelia virgata*—Is very little more than a variety of the preceding. The branchlets are extremely slender, and the flowers are smaller and less crowded.

12. *Brachyloma daphnoides.*—An erect, glabrous shrub, 3-4 feet in height. *Leaves* oval, $\frac{1}{4}$-$\frac{1}{2}$-inch long, $\frac{1}{8}$-$\frac{1}{4}$-inch broad. *Petioles* conspicuous, pale, articulated at the place of insertion. *Bracts* brown, small, very deciduous. *Bractlets* 2, shorter than the sepals, persistent. *Sepals* 4 times shorter than the corolla, green on the keel, pale on the margins. *Corolla* bell-shaped, contracted at the middle, narrowly 5-lobed, white, glabrous, imbricate in æstivation. *Anthers* sessile *Style* robust, shorter than the tube of the corolla. *Stigma* reddish *Fruit* globose, pale, ridged, pulpless, 5-celled. This species is by no means rare on the heath-grounds and sand-hills about the ranges.

13. *Brachyloma ciliata.*—A dwarf species, with *ciliate* leaves very common about Mount William; would, without a close inspection, be readily mistaken for seedlings of the preceding.

14. *Brachyloma depressum*—Is confined to the lower stony ridges of the Grampians and adjoining ranges. It is the freest bloomer of the white flowered species, and mostly of a trailing habit.

15. *Brachyloma ericoides.*—Is a compact bush with red flowers, resembling, in general appearance, and easily mistaken for, *Styphelia sonderi.* The fruit is ridged and pulpless. This species is confined to the western portion of the mountains about Rose's Gap and Mount Zero.

16. *Monotoca scoparia.*—An erect glabrous shrub, 3-5 feet high. *Leaves* nearly oblong, acicular pointed, reflexed at the margins, short petiolate. *Flowers* small, white, in axillary racemes. *Sepals* about half as long as the short corolla. *Corolla-lobes* camparatively large, valvate. *Fruit* small, without pulp, 1-celled. Pretty common on the heath-grounds and elevated sand-hills through the district generally.

17. *Lissanthe strigosa.*—A dwarf shrub, easily mistaken for a small variety of *Epacris impressa.* Leaves linear, acicular-pointed, with prominent nerves, and reflexed at the margins. *Flowers* in axillary, contracted racemes, 3-6 together. *Bracts and bracteoles* minute. Sepals small and blunt. *Corolla* campanulate, contracted above the middle, with 5 impressions externally on the base, white or pink, with the lobes valvate in bud. *Anthers* sessile, dark brown. *Style* shorter than the corolla, bearded. *Fruit* globose, downy, pale, tinged with pink, ridged, 5-7-celled, generally the latter, pulpless. On barren, gravelly, or stony elevated ground in many parts of the district.

18. *Stenanthera conostephoides.*—Flowers axillary, solitary. Bracts becoming larger upwards, persistent. *Sepals* slightly longer than the fruit, acute. *Corolla* bearded, red. *Filaments* strap-shaped, short. *Anthers* short, hence the name. *Fruit* egg-shaped, 5-celled. *Style* exserted, stigma obtuse. *Leaves* nearly oblong, acicular-pointed, finely dentate on the margins. On the heath-grounds about Mount Abrupt and a few other places.

[I regret being unable to send a specimen of this fine plant. When I was on the Serra Range about 2 years since, the whole of the heath-grounds were burned, so that I could only procure a few imperfect flowers for examination.]

19. *Aerotriche serrulata.*—This insignificant plant will be easily recognised by its extreme hairiness, and the little tuft of hair on the apex of each lobe of the corolla. It grows in large patches on the scrub-hills, and occasionally among rocks on the lower spurs of the mountains. This is the last member of the drupaceous section of the Epacrideæ represented on the Grampians, as far as I can at present judge. The division with capsular or dehiscent fruits includes only the two genera, Epacris and Sprengelia.

20. *Epacris impressa.*—This well-known plant needs very little description. The fruit when ripe splits into 5 valves; the seeds in each

cell are numerous, brown in color, and reticulated ; the corolla is campanulate, and the anthers are sessile. We have at the Grampians all shades of color, from dark red to the purest white. There is a double flowering variety occasionally met with in which the flowers are closely packed tube within tube.

21. *Epacris obtusifolia.*—Is here a rare species occurring only in a few temporarily inundated places about Mount William. In height, it seldom exceeds one foot. The leaves are blunt, and the flowers always white.

22. *Sprengelia incarnata.*—Is an elegant plant, especially when seen under favorable circumstances on the shady margins of mountain streams, where it often attains a height of 8 feet. The flowers are densely crowded at the summits of the branchlets. *Sepals* acute and much longer than the minute, green, leaf-like bracts. *Corolla* deeply cleft. *Anthers* always syngenesious. *Fruit* dehiscing by 5 valves. *Seeds* brown, small, and finely reticulated.

To those acquainted with the "Flora Australiensis" no doubt the sketchy descriptions given here may appear useless; but to those who, like myself, have not the opportunity of consulting such excellent works, the few remarks embodied in this paper may not be uninteresting, and may possibly lead them to investigate for themselves the species occurring in their respective districts.

## Zeiss's Microscopic Objectives.

By W. H. Wooster, Springfield, Goldie.

[Read before the Microscopical Society of Victoria 26th January, 1882.]

Dr. Cox, of America, in a letter to the San Francisco Microscopical Society, written in response to a request from that body that he would give them the benefit of his large experience in microscopic matters, says that, "while there are many good makers of objectives, there are four that stand out pre-eminent, and these are—Tolles, of Boston; Spencer of Geneva, New York; Powell and Lealand, of London; and Zeiss of Jena." This, I think, after a good deal of reading and correspondence on the subject, is the universal opinion of those that have compared the best objectives of these makers with the best of all other makers, their most modern $\frac{1}{8}$ and $\frac{1}{10}$ showing more, and showing it better, than any $\frac{1}{16}$, $\frac{1}{25}$, or $\frac{1}{50}$ ever made on the old formulas.

Not only is Zeiss one of the foremost makers in the world of the most perfect class of objectives yet invented, viz., the homogeneous or oil immersion lenses (one of his $\frac{1}{12}$ being reckoned by Dr. Woodward the *best* glass belonging to the museum of which he has charge, and which includes a large number of the most excellent productions of the most renowned makers); but in low-angled cheap glasses he seems to hold a similar position. Mr. H. J. Slack, in a paper on Zeiss's objectives, read before the Royal Microscopical Society in 1875, of which he was then secretary, writes as follows:—"Zeiss has worked, under Prof. Abbe of Jena, on a plan precisely opposite to that followed by our leading opticians. He has, so to speak, minimised angle of aperture, and secured great working distance and penetration, and yet obtained an amount of resolving power hitherto supposed to be exclusively the property of far greater angled glasses. Small angles can do much more in the way of resolution than has been commonly supposed, and few objects require for their finest exhibition as large angles as are usually given to the most carefully made high powers. An optician can get great credit for giving a $\frac{1}{2}$ inch an angle too much for a $\frac{1}{25}$, but might get no credit for constructing a $\frac{1}{4}$ of moderate angle so perfect in correction as to possess the resolving power associated with a large angled $\frac{1}{25}$, and yet to accomplish the latter would be a feat of higher skill and of much greater usefulness. No English optician is known to the writer as now attempting this task, and we must refer to Zeiss's productions for illustrations of what has already been accomplished."

Dr. Piggot, quite an authority on the mathematics of the microscope and the testing of objectives, said, at the reading of said paper, that "the cheap English objectives were quite unable to do what the Zeiss's would do, which were so true in centering that, when tested by the light from a globule of mercury, they showed the diffraction rings with great accuracy, but the cheap English objectives would not, because in fault both as to centering and curving." He thought that "the accuracy of the rings showed the value of Zeiss's objectives to be 20 times greater than the cheap English ones."

Having, in consequence of the above and other similar recommendations of Zeiss's productions, secured three of his objectives for myself, and another for a friend, I thought that some account of them and their performances might be acceptable to the society. The first I got was the water immersion $\frac{1}{8}$, in January, 1881, some notice of which has already been before the members; the rest arrived towards the end of October, 1881, and consist of a 4-2 in. variable lens, a $\frac{1}{4}$, and a $\frac{1}{6}$, the last belonging to Mr. W. T. Moffat. In addition to these, Mr. F. B. Kyngdon, the Sydney agent (whose address is: Orient Brewery, Bourke Street, Waterloo, Sydney, and who will gladly furnish catalogues and every information), sent me for examination and report one of his $\frac{1}{25}$, so that I have now a practical acquaintance with Zeiss' objectives from very low to very high.

The workmanship in all is simply excellent, the various parts fitting accurately and working smoothly, the lenses having a high polish, reflecting a much brighter light from their surfaces than some I have seen, and showing no scratches under a pocket-lens, such as I have observed on both back and front lenses of several French objectives, and on the back lenses of an otherwise good glass of English make. Each objective is numbered with small figures on the front cell, which on all of them is conical. They all have great penetration, good flat field, excellent definition, good to the very edge, remarkable working distance, extraordinary power of bearing strong eye-pieces, and are all furnished with the society screw.

A few notes are offered on each lense separately. 1st, the 4-2 inch variable, angle not stated, called in his catalogue, a*, No. 105. This is a new style of objective, giving a certain power when closed, which is nearly doubled by propelling the inner tube bearing the front lens, by means of a raised milled ring which moves a pin in a spiral slot hidden within the outer tube. A graduated scale divides the difference between the highest and lowest powers into ten degrees. By cutting the slot a little further, so as to extend the scale to 12, I have made the power when open to be just double the power when closed. The changes can be effected instantly, while the glass is in work. Its power varies from 6 diameters with the A eye-piece, closed, to 40 with the D, open; but with draw-tube or higher eye-pieces will work up to 50 or 60 diameters remarkably well. I know of no other instance of a very low power bearing anything like a proportional amplification, viz., 10 times its lowest power, and still giving good work. For botanical, entomological, geological, and such like studies, where one often needs to examine rather large objects with very uneven surfaces, this glass cannot be beaten, and I have never seen it equalled. My lowest before was a $1\frac{1}{2}$ inch, which I often found inconveniently high. For such a low power the working distance is surprisingly short, which is as great an advantage in this case as long working distance is in high powers.

2nd, the $\frac{1}{4}$ of 50°, named C, No. 775. This has ample working distance for viewing infusoria, &c., in cells deeper than the thickness of an ordinary slide, or for direct bull's-eye illumination of opaque objects. It works well with a Wenham binocular, which is more than most $\frac{1}{4}$s will, though it seems to overdo the stereoscopic effect a little. Of course, from its very low angle, the resolution of diatoms is not its forte, though even here it has nothing to be ashamed of. Slack says, "that with the mirror turned away, and the microscope pointed to the sky for light, it (or, the C) has given good resolution of *Pleurosigma hippocampus* with the B eye-piece and diaphragm. This diatom I do not know; but I have done the same with *P. formosum* and *P. balticum* without any diaphragm, and have seen the lines clearly defined on *P. angulatum*, in balsam, with the mirror and blue sunlight. The way in which it brings out the anatomical details in such objects as injected human finger, or stained tongue of native cat, &c., is a treat to see. Slack says that his worked well with a Ross E eye-piece, and that no cheap English glass would stand that test. The highest eye-piece I have is a D, that was made for a small telescope, is stronger than a Ross D, but having a very small field lense collects much less light, and so is a severer strain than a Ross D; but the $\frac{1}{4}$ would evidently stand higher than that, and still give excellent work. Zeiss makes another $\frac{1}{4}$ of 90°, with or without cover correction, which, of course, would be much better for resolution, but would have proportionally less working distance.

3rd.—The $\frac{1}{6}$ of 75°, named D, No. 1,602. This, like the $\frac{1}{4}$ has no cover correction, but, having higher power and angular aperture at the same time, is decidedly superior to it in resolution, while it has more working distance than many $\frac{1}{4}$. The *P. angulatum* and *Surirella gemma* are shown splendidly with nothing but the mirror and lamp-light, and it has also resolved even Nos. 17 and 18 (*Cymatopleura elliptica* and *Navicula crassinervis*) on a Möller's Test Plate by lamp-light. The former has 63,000 lines to the inch, and the latter 86,000. I am not aware of any other glass whatever with so low an angle having performed such a feat. In all respects it is a splendid objective. He makes another $\frac{1}{6}$ of 105° which, of course, would excel this at resolution.

4th. The water immersion $\frac{1}{8}$ of 108° water angle, named G, No. 130. This is a glass upon which many very high encomiums have been passed, and I think most deservedly. It has collar adjustment for covers from $\frac{4}{1000}$ to $\frac{8}{1000}$ of an inch thick, but will work through covers $\frac{10}{1000}$ of an inch thick, if not more. The definition is superb, its penetrating and resolving power unusually good, and it is very easy to manage. It stands strong eye piecing extraordinarily well. With my D it gives 1,250 diameters, but draw tube and amplifier may both be added till 2,000 or 3,000 are reached, and still the image is good, and plenty of light may easily be got. Its performance on physiological objects is all that could be desired; and in regard to resolution and definition, let it suffice to say that, with my superstage reflex illumination, and sunlight, the mirror being on a separate stand, with B, C, or D eye-piece, it resolved with great beauty, clearness, and sharpness, Nos. 18, 19, and 20 on Möller's Test Plate, in balsam, 19 being *Nitzchia curvula*, and 20 the famous *Amphipleura pellucida*; the lines on the last run from 95,000 to 110,000 to the inch, but were shown from end to end; and Mr. Moffat confirmed my observations a few days after. This was in Nov., 1882, and, so far as known to me, I was the first in Victoria to resolve this redoubtable test.

5th.—The $\frac{1}{25}$ water immersion, same angle as the $\frac{1}{8}$, named L, No. 112. All of this make are guaranteed to work through a cover $\frac{8}{1000}$ of an inch thick, which is very unusual for $\frac{1}{25}$. As this is the first and only one of that power that I have yet handled, I am not able to compare its work with that of objectives of other makers of similar power. It is well known that these very high powers are much more difficult to manage than $\frac{1}{8}$ or $\frac{1}{10}$, of similar construction, and "require much more coaxing to make them do their best," as one authority says. Again the same writer remarks, that "a stand and an illumination that would give good results with an $\frac{1}{8}$ might cause disappointment with a $\frac{1}{25}$." I was made painfully aware that my stand was neither steady enough nor smooth enough in its working to do the $\frac{1}{25}$ justice. Of course its power is about three times that of the $\frac{1}{8}$ with the same eyepiece, and in this lies its chief superiority. As its angle is the same, its resolving power is about the same, but it will show very minute details more easily, on account of their larger size, and things that might be missed under the $\frac{1}{8}$ stand a less chance of escape with the $\frac{1}{25}$. The latter still has some advantage if both be eyepieced up to the same power, one working with an A, the other with a D. It does not bear strong eyepiecing so well as the $\frac{1}{8}$, but this could not be expected. I am assured by Mr. H. Sharp, one of the most experienced in Australia with high powers up to $\frac{1}{50}$, that "no $\frac{1}{25}$ yet made will bear $\frac{1}{2}$ inch or D ocular without showing fluffiness; with a $\frac{1}{50}$ this would be intolerable." With a sufficiently good stand and illuminating apparatus, the $\frac{1}{25}$ would be just the thing for delicate micrometry, tracing ultimate nerve-fibres, and such advanced work, and might well form the grand climax in a battery of objectives for any one who could afford it in addition to the $\frac{1}{8}$; but if only one could be got, then for general all round work the $\frac{1}{8}$ is to preferred, especially on any but the very best stands, because it is much easier to manage, has greater working distance, sharper definition, and a more useful and extensive range of powers.

In conclusion I venture to say that if the excellent qualities of Zeiss's lenses were better known, together with their small cost, they would be much more extensively used and appreciated. I shall be happy to show the working of mine at any time, and to give any particulars at my command. Now that Zeiss supplies lenses of such high excellence at such low prices (and he makes about 24 varieties from 4 inch to $\frac{1}{35}$), no one need put up with a miserable French triplet on account of the cost of really good objectives. Some years ago, when wishing to displace my own French objectives with the best that could be got at a moderate price, I was much at a loss which to choose, and inquired personally and by letter of several for information, the result being the choice above stated with every satisfaction. The above notes have been penned for the benefit of others similarly situated; and this is the only interest I have in laying before the society the foregoing account of Zeiss's objectives.

# Victorian Ferns and their Habitats.

By C. French.

[Read before the Field Naturalists' Club of Victoria 16th January, 1882.]

PART V.

## *Asplenium*—(Linnaeus).

*Asplenium flabellifolium*—(Cavanilles).—Rhizome tufted; fronds straggling or prostrate; pinnæ fan-shaped; sori, several on each pinna, linear, often confluent when old.

This pretty species, whose pendant fronds are so well-known to those who have collected ferns in Victoria, is to be found growing in the crevices of rocks, on nearly every mountain range and river of the Colony. There are two very distinct varieties of this species, the one being very small and delicate, the others larger and more robust, the latter being much the rarer of the two. This is a very useful species for small Wardian cases, miniature rock-work, bell-glass culture, and so on; also, when dried, is much sought after by ladies for splash work, &c., &c. The genus Asplenium is one of the most extensive, as well as one of the most beautiful, of all ferns, the sizes ranging from the minute *A. Kraussi*, whose fronds are less than an inch in length, to the fine broad-leaved *A. nidus* of New South Wales and the tropics, whose fronds not uncommonly reach the length of 8 feet. As decorative plants they stand in the first rank of ferns, and are largely used as exhibition plants, &c., &c. To grow the above species successfully it should be placed in a shallow pot or pan, in a mixture of broken bricks and the skimmings of soil from basaltic rocks. It should be planted rather high in the soil, so that the water will not be likely to lodge in the crown of the plant. On the ranges near Dromana, the Grampians (and formerly on the banks of the Yarra near Melbourne), this pretty fern may be found growing in great profusion. The fronds grow to the length of about from 6 inches to a foot. Found also in Queensland, New South Wales, Tasmania, Western Australia, and in New Zealand.

## *Asplenium trichomanes*—(Linnæus).

A small neat-tufted fern; fronds from 2 to 6 inches in length; rachis slender and black; sori chiefly several on each pinna, oblong linear, and distinct when young, uniting in a circular mass when old.

A well-known species, and one which is a universal favourite with fern collectors. In England this pretty plant may be found in moist rocks in shady situations, but in this colony it is confined chiefly to the sub-alpine regions, where it grows on the rocks as in the old country; and to find it here at so great a distance from our native land cannot but awaken pleasant and affectionate recollections in connexion therewith. To grow this species successfully, it should have, much the same treatment as the preceding species, with this difference, that it must be well shaded to ensure successful cultivation. The uses to which it may be applied are also similar to *A. flabellifolium*. I have not been fortunate enough to find this fern myself, but have received it several times from various sub-alpine parts of the colony. This species is very cosmopolitan in its character, being found, according to Bentham and others, in New South Wales, Tasmania, and dispersed over the temperate regions of the Northern and Southern hemisphere in the New and the Old World, and in some mountainous districts within the tropics.

*Asplenium Hookerianum.*—(COLENSO).

Fronds slender but rather rigid, the rachis slightly scaly-hairy. Sori few, usually only one or two on each segment, large in proportion.

This in Victoria is a somewhat rare species, but is not uncommon in cultivation, being found plentifully in many parts of New Zealand. As a decorative plant for small fern cases, &c., it may be useful, as it is very distinct in appearance from any other species. To grow it well it should be planted in some strong volcanic soil well mixed with sharp sand, and kept a little damp and shaded from the direct rays of the Sun. I have never found this species myself, not having been in the locality where it grows, but it has been found by F. Müeller and others in the Colac ranges, and on the upper Hume River, at an elevation of 4,000 feet. This is a variable species, and the specimens whch are here exhibited were sent to me from New Zealand by Mr. Dall, who has paid considerable attention to fern collecting in that colony. *A. adiantoides*, of Raoul, is identical with this species.

*Asplenium furcatum.*—(THUNBERG).

Rhizome thick, dark brown, scaly, hairy. Pinnae lanceolate. Sori few, large.

This in Victoria is also a rare species, having been found, according to Bentham, on the Grampians by Mr. Allitt. In appearance it is very elegant, and if well grown makes a very desirable plant for large Wardian cases, rockeries, and so on. To grow it well it should be planted rather shallow in the pot; the rule of thorough drainage should be carefully observed here as elsewhere, and a little shade will be necessary; syringing (as on all ferns and other plants, also, whose leaves have a hairy surface) should be done sparingly. This is also a cosmopolitan species, being found in New South Wales, Western Australia, widely spread over tropical America, tropical and Southern Africa, and the Pacific Islands. Height from 1 to 2 feet. *A. præmorsum* is identical with this species.

*Asplenium bulbiferum.*—(FORSTER).

Rhizome thick. Primary pinnae numerous. Pinnules lanceolate. Sori large, one to each lobe or tooth.

. A very handsome though common fern, and for out-door work in rockeries, artificial ferneries, &c., one of the very best of our indigenous species. In the dark moist gullies of our mountain regions this species may be found growing in great luxuriance, the dark green elegantly-shaped fronds contrasting well with the lighter green shades of *Pteris incisa*, &c., &c. In its wild state it is mostly found growing on fallen stems of tree-ferns in the most moist parts of our dense fern gullies, and this (as in Nature generally) should indicate the treatment which it requires to grow it artificially. This species is also somewhat variable in its character, being found in many different forms throughout the world. To grow it well, it requires plenty of clean water, ample pot-room, good drainage, and a little shade: the soil in this case is not a very important matter, as it will grow in almost any compost providing that it contains plenty of fibre and strong alluvial earth. In the gullies of the Dividing Range, Macedon, Gippsland, Arthur's Seat, this is one of the most commonly met with, and, as it lifts well, and is easily grown, it is much sought after by tourists and fern collectors. Height from 1 to 4 feet. Found also in New South Wales, Tasmania, South Australia, and scattered over various tropical and southern extra-tropical regions of the new and old world. *A. laxum* is identical with this species; and I may here remark that this fern will be readily distinguished by the proliferous and bulbous-like clusters of young plants on the upper surface of the apex of the frond, as in *Aspidium aculeatum*, from which, however, it is easily distinguished by being less rigid and by the very different disposition of the sori.

*Asplenium flaccidum.*—(FORSTER).

Rhizome short and thick, pinnæ coriaceous, narrow, 3 to 6 inches long, habit drooping.

This well marked and handsome species is to be found suspended from the stems of tree-ferns in many of our dark and almost impenetrable fern gullies. As a decorative plant it is of some value, being quite unlike any other of the indigenous species. To grow it well, it should be fastened with copper wire on to the stems of tree-ferns, old stumps of trees, or it may be planted in a basket, which should be well filled with fibre and other light material. In the Otway district this fern grows to the length of about 3 feet, and, when seen suspended from the damp and partly decayed trees, it is really a most charming object. This fern will be better known to most fern collectors as *A. odontites* (of R. Brown), which name is now given as a synonym of this species. Found also in New South Wales, Tasmania, and in New Zealand.

*Asplenium umbrosum*—(J. SMITH).

Fronds twice or thrice pinnate. Pinnules membranous, lanceolate, or oblong. Sori small, oblong, usually on the vein below the fork and then slightly curved.

This handsome species is of a very robust though elegant growth, being found in many of our dark fern gullies with fronds exceeding 4 or even 5 feet in length, the beautiful light green, and somewhat succulent nature of the whole plant being very striking and totally different to the other ferns to be found in the same gullies. As a decorative plant it is most valuable, being readily removed, of easy culture, the only essentials to success in this direction being plenty of water, strong alluvial soil, and a little shade. In the deep gullies on the river Leng Leng, in the Gippsland district, this fine species may be seen in perfection, and seems to be a monarch amongst the more humble species which grow in the neighbourhood. The best time to remove this species (and, in fact, the gully-ferns generally) is in the Autumn, and then it may be accomplished with little or no risk. This species has many synonyms, and the fern collector has to work hard to keep himself "read up" in fern literature to realize the important changes which are from time to time made by scientific men, sometimes, I am afraid, on very doubtful authority. Found also in Queensland, New South Wales, Tasmania, and ranges over tropical Africa and Asia, also in Norfolk Island and New Zealand. *Allantodea australis* and *tenera*, *Asplenium Brounii*, *A. Australis*, and *A. physosorus*, are identical with this species.

## Notes on a Thunbergia (new for Australia).

By Baron Ferd. von Mueller, K.C.M.G., M.D., Ph. D., F.R.S.

Among a small lot of dried plants, recently received from Mr. Walter Powell, and collected by him in Goode Island, occurs a *Thunbergia*, a genus famed for many ornamental species, among which the East African *T. alata* is the most familiar to horticulturists. In the native flora of Australia this plant-genus was hitherto only represented by *T. Arnhemica* (F. v. M., "Fragm." XI, 75), from N.W. Australia, to which, indeed, Mr. Powell's plant bears considerable affinity, the latter differing mainly in being more pubescent, in having hastate leaves on rather longer stalks, and in flowers very much exceeding the length of the bracteoles; it agrees with *T. Arnhemica* in the unbearded anthers with exceedingly short spurs, and in the undivided lips of the stigma; the fruit of the Arnhem's Land species is not yet available for comparison. Among extra-Australian congeners, our new one approaches in its characteristics very near to *T. fragrans*, differing, however, in the forms of the leaves, short leaf-stalks, almost glabrous calyx, with shorter teeth, anther-cells rather more pointed at the base, and shorter nearly glabrous fruit; the seeds of both require comparison. In their narrow corolla-tube both species agree and differ much, in this and some other respects, from *T. alata*. It is intended to bestow the finder's name on this new species. This new access to the Australian Acanthaceæ proves all the more welcome, as the order is, in this part of the globe, but very scantily represented when we compare its richness in India, so near to us, only one species of *Graptophyllum* from Endeavour River, and one of *Justicia* from Central Australia, having been added since the 21 species known as indigenous were recorded in vol. IV of the "Flora Australiensis" twelve years ago. Long previously R. Brown's Prodromus contained only 9 genuine species as Australian: none are known to occur in Victoria, Tasmania, South-West Australia, and New Zealand.

# Longicorn Beetles of Victoria.

By D. Best.

[Read before the Field Naturalists' Club of Victoria 16th January, 1882.]

## PART V.

37. *Uracanthus biritta*—(Newman).—Length, 9 to 10 lines; breadth at commencement of elytra $1\frac{1}{2}$ lines, and varying a little, if anything, towards the tips. Color, greyish down the centre, varied by a streak of pale brown down the sides; the edges being of the same color as the centre. Head dark brown. Thorax, grey and brown. Antennæ, serrated, and about two-thirds the length of the insect. Although, I believe, by no means rare, I have succeeded in securing only one specimen, and that was some three or four years ago at Caulfield, in the month of November, feeding on the *Leptospermum scoparium*, which was then in full flower. With so little data to go upon, I am naturally diffident about giving an opinion as to where it breeds, but as I have taken several of the genus out of the common wattle, *Acacia molissima*, and honeysuckle tree (*Banksia Australis*), I am inclined to think one of these must be its home. So far as Victoria is concerned I imagine this insect will be found in most places where the above scrub abounds, the more especially if in the vicinity of favorable breeding trees; it will, however, require very careful search to discover it. Masters, in his catalogue of Australian Coleoptera, published in Sydney in 1874, gives its habitats as New South Wales and Queensland, but, although I have not had an opportunity of seeing a specimen from either of these colonies, I should think it very possible the material difference in climate would effect some alteration in its appearance, and doubtless in size also.

38. *Uracanthus triangularis*—(Hope).—A larger species than the previous one, being fully 13 to 14 lines in length, by a breadth of about $2\frac{1}{2}$ lines. On each elytron, immediately below the junction with the thorax, are the triangular appearances from whence it derives its name. These triangular markings are of a chocolate brown color, and are also well defined by a distinct, although fine, white edging; the remainder of the elytra, with the exception of the tips, which are of a chocolate brown, are of a greyish color, and have the appearance of being covered with a fine down. Thorax greyish, having two fine white lines along its whole length, which join immediately between the eyes. Antennæ serrated, and the full length, sometimes a little longer than that of the insect. Breeds in the common wattle, from which it may be readily taken during the months of September to December. Although Masters gives its range as extending over New South Wales, South Australia, and Victoria, I think that it will be found to confine itself to within a limited radius of the sea coast; at all events I have never obtained it from any distance inland.

39. *Uracanthus simulans*—(Pascoe).—This is a very similar insect to the foregoing one, hence its title, from which it differs principally in the triangular markings being not so dark in color, or nearly so well defined. The greater portion of the elytra are of a greyish

color, with a somewhat more pronounced covering of down, which may account for the markings being rather indiscernable. Breeds in the common honeysuckle tree (*Banksia australis*), and may be taken thence during most months of the year. Whilst in company of a few of our members on an excursion on the first of July last, in the neighbourhood of Brighton, I secured a few specimens, and I have obtained them occasionally during all the intervening months up to November. Being in Tasmania last month, and seeing in places a number of these trees, I made diligent search for specimens of this *Uracanthus*, as well as other things, but was extremely disappointed, not meeting with the slightest success.

40. *Scolecobrotus Westwoodii* -(HOPE).—This family is somewhat allied to that of the *Uracanthus*, its general shape being very similar, but has no special markings, its chief characteristic being the distinct, punctured appearance on the upper portion of the elytra, the whole of which, as also the thorax and head are of one almost uniform light brown color. Antennæ serrated, and about three-fourths the length of the insect. I believe it breeds in one of the Eucalypti, but cannot say positively, having no opportunities of ascertaining; the fact, however, that my only two specimens were taken where there was but little other wood lends some support to my belief. Season, say Sept. to November, these being the only months I have heard of its being taken. Its range as given by Masters is a very wide one, extending over all the Colonies, with exception of Queensland and Tasmania. Length 14 to 15 lines, breadth $2\frac{1}{2}$ to 3 lines.

41. *Scolecobrotus sp.*—A much smaller species than the last, being not more than about half its size, and differing greatly in color, which is a much darker brown, the upper and punctured parts of the elytra being especially so. Antennæ serrated, and varying but little in thickness from commencement to tips, rather longer than the insect. Season and other particulars same as above.

42. *Tessaromma undatum*—(NEWMAN and others).—A very pretty insect, possessing, when first taken out of the wood in which it breeds, viz., the yellow box (*Eucalyptus melliodora*), a most shining-silk like appearance. Length 8 to 10 lines by a breadth of $1\frac{1}{2}$ to 2. Elytra dotted all over with excrescences. Color, intermingled shades of silver grey and brown. Thorax light brown, long and rather narrow, with a well defined spine on each side. Head also brown, and much depressed between the eyes. Antennæ light brown, and averaging a little longer than the insect, the first joint being very stout, the others tapering towards the tips. This insect, I think, has no special season, existing almost all the year round. I have taken it in the middle of both Winter and Summer under the bark of the gum trees, and any one purchasing a load of yellow box for fire-wood, can scarcely fail to meet with numerous specimens if he keeps a look out whilst splitting up the pieces. I believe it extends over nearly the whole of Victoria; I have met with it in almost every direction around Melbourne, also in the neighbourhood of Ballarat, and I know of its being found in many other places; it is ascribed also to the other colonies.

43. *Phlyctænodes pustulosus* —(Newman and others).—Length 12 to 14 lines, with a width of 2½ to 3. Color, a very dark brown, without variations of any kind, except in the antennæ, which are of a somewhat lighter shade. Thorax, having four spines on its upper part, the two forward ones being rather the larger, and on the sides two exceedingly well defined ones. Immediately on the thorax, where it joins the head, there is a well defined rim possessing in appearance much that of a stand-up collar. Antennæ serrated, varying little in thickness, and in length about two-thirds that of the insect. I have never taken it around Melbourne, but have secured it from under the bark of the gum trees about Ballarat. Its habitat is assigned by Masters to most of the Colonies, including Tasmania, where, in the neighbourhood of Deloraine, about 40 miles from Launceston, I last month obtained a specimen, and on examination found it in no way to differ from ours.

44. *Stenoderus suturalis*—(Castelnau and others).—Of all the Longicorns I have met with this is, I can conscientiously say, the one that may be taken in the greatest numbers. During the months of December and January it, in some places, literally swarms. Only within the last fortnight, whilst collecting on the Yarra in the neighbourhood of Heidelberg, off one piece of *Leptospermun lanigerum*, which was in flower, I do not exaggerate when I state that I shook hundreds, and if I had continued to shake the other pieces round about I might have secured thousands. So thick were they on this shrub that they monopolised it, no other insect having a show,—at all events I could see none, and so, in disgust, gave up shaking. During last Summer, upon shaking a low branch of a red gum-tree in flower, I brought down sufficient to almost cover the inside of my umbrella: there must have been at least a thousand. It also frequents a yellow flower (*Senecio gunniana var.*) growing on the banks of the Yarra and many other places. A special peculiarity of this insect is its strong and somewhat tarry smell, and so pungent is it, that after handling a specimen it will be some time before the odor completely disappears. From whence it derives this odor I cannot say, as I have never noticed anything of the kind in the flowers from which I have taken it: I am also at a loss to say in what wood it breeds, never, up to the present, having been successful in cutting any out; possibly, however, it is in the Leptospermum. Length, 7 to 8 lines; breadth, about 1½ and without any perceptible difference between male and female. Elytra striated with a distinct black marking down each side of the suture, remainder of a dull red color. Thorax completely black. Head black around the eyes, front part dull red. Antennæ black, varying but little in thickness, and in length about two thirds that of the insect. Over Victoria I think it is almost universal; and Masters ascribes it to most of the other Colonies excepting Tasmania, in which, however, I last month secured several. Indeed, there also I could have taken a quantity, and as in this instance it was feeding on the prickly flowering box (*Bursaria spinosa*), whose flowers certainly have an aromatic odor, it may be quite possible that it is from there this insect has the special function of extracting this (to me) most unpleasant smell, which obtains for it the well deserved name amongst collectors of the stinking Longicorn, a distinction partly shared in by

a much smaller Longicorn (*Syllitus grammicus*), of which I shall have something to say in a future paper.

45. *Stenoderus concolor.*—Not averaging quite so large as *suturalis*, nor does it possess, to the same extent at all events, the unpleasant peculiarity of odour pertaining to that insect. Length, from 5 to 7 lines; in breadth, a little over 1. Color of elytra pale brown or, rather, yellow. Thorax and head of a shining darkish brown. Antennæ approaching black, and from two-thirds to three-fourths the length of the insect. Not very common near Melbourne, but in some parts of the Colony very plentiful. I have taken it in Gippsland off a species of Helychrysum, and in Tasmania, about New Norfolk, it was very numerous on the flowering box, so that its range may be considered to be rather an extensive one.

46. *Atesta bifasciata*—(Pascoe).—Length, 9 to 11 lines; in breadth, averaging about 2. Elytra profusely punctured; in color a dark brown, nearly black, varied about half-way down by a broad band of a very light brown, the tips being also of same shade. Head dark brown, also the thorax, which is, relatively, rather long. Antennæ of lightish brown, serrated, and about three-fourths the length of insect. Its range, as given by Masters, is that of New South Wales and Victoria; and I believe that in most places where the red gum grows, there also will be found this beetle, as, in various parts of the Colony during the months of December, January, and February, I have never failed to secure specimens by searching under the loose bark of the trees.

Before concluding for this evening I would draw attention to my having, in a few instances, placed Tasmanian specimens side by side with the Victorian ones, so that members may have an opportunity of examining for themselves if there be any difference noticeable between them.

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## Oology of Australian Birds.

By A. J. Campbell.

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### PART III.

### Order—INSESSORS.

### Family—*Laniadæ*.

92. Gymnorhina tibicen—(Piping Crow-Shrike). *Locality*—Australia, except North. **Egg*—Ground color, bluish-grey, smudged or clouded all over with drab or brown; others are spotted with umber, both on the shell and appearing as if beneath the surface. Length, 1 inch 6 or 7 lines; breadth, 1 inch 1 line.

94. Gymnorhina leuconota — (White-backed Crow-Shrike). *Locality*—Queensland, New South Wales, Victoria, and South Australia. *Egg*—Very long in form, and of a dull bluish-white, in some instances tinged with red, marked with large zig-zag streakings of

The 11 species of eggs marked thus * are not described by Mr. Gould.

brownish red. Occasionally, eggs are met with which are spotted with black or umber-brown. Average length, 1 inch 8 lines; breadth, 1 inch 1 line. There is a remarkable pair of eggs of this species in my collection, of the usual size and shape, but of a beautiful bluish or greenish color, without any marking except a few indistinct freckles of chestnut about the top. They were taken on Phillip Island, Western Port.

94. Gymnorhina organicum—(Tasmanian Crow-Shrike). *Locality*—Tasmania. *Egg*—Lengthened form, with a ground color of greenish ashy grey, spotted and blotched, particularly at the larger end, with umber-brown and bluish-grey, the latter color appearing as if beneath the surface of the shell. Length, 1 inch 5 lines; breadth, 1 inch.

95. Cracticus nigrogularis — (Black-throated Crow-Shrike). *Locality*—Queensland, New South Wales, Victoria, and South Australia. *Egg*—Dark yellowish-brown, spotted and clouded with markings of a darker hue, and in some instances with a few minute spots of black. Length, 1 inch 3 lines; breadth, 11 lines.

99. Cracticus torquatus—(Collared Crow-Shrike). *Locality*—Queensland, New South Wales, Victoria, and South Australia. *Egg*—Considerable difference is found to exist in the color, the ground color of some being dark yellowish-brown, with obscure blotches and marks of a darker hue, and here and there a few black marks not unlike small blots of ink; while in others the ground color is much lighter, and the darker markings are more inclined to red, and to form a zone round the larger end. Length, 1 inch 3 lines; breadth, 11 lines.

100. Cracticus cinereous—(Cinereous Crow-Shrike). *Locality*—Tasmania and South Australia. (?) * *Egg*—Ground color, light greenish tinge, spotted over with chestnut or brown, particularly round the larger end, the spots appearing lighter beneath the surface of the shell; there are also a few ink-like dots on the surface. Length, 1 inch 3 lines; breadth, 11 lines,

Family—*Luscinidæ. (?)*

102. Grallina picata—(Pied Grallina). *Locality*—Australia. *Egg*—They differ considerably in color and in shape, some being extremely lengthened, while others bear a relative proportion; the ground color of some is a beautiful pearl white, of others pale buff; their markings also differ considerably in form and disposition, being in some instances wholly confined to the larger end, in others distributed over the whole surface, but always inclined to form a zone at the larger end; in some, the markings are of a deep chestnut-red, in others light red, intermingled with large clouded spots of grey appearing as if beneath the surface of the shell. Medium length, 1 inch 2 lines; breadth, 10 lines.

Family—*Campephaginæ.*

103. Graucalus melanops—(Black-faced Graucalus). *Locality*—Australia. *Egg*—Ground-color, varies from wood-brown to asparagus-green, the blotches and spots, which are generally disposed over the surface, varying from dull chestnut-brown to light yellowish brown;

in some instances they are also sparingly dotted with deep umber-brown. Length, 1 inch 2½ lines; breadth, 10½ lines.

104. Graucalus parvirostris—(Tasmanian Graucalus). *Locality*—Tasmania. **Egg*—Very similar to the *G. melanops*, ground color, beautiful dark green, and spotted or blotched, particularly at the larger end, with umber of different shades. Length, 1 inch 2½ lines; breadth, 10½ lines.

105. Graucalus mentalis — (Varied Graucalus). *Locality*—Queensland, New South Wales, and Victoria. **Egg*—Ground color beautiful green, and instead of being heavily blotched or spotted, like the preceding species, is marbled or clouded all over with light chestnut. Length, 1 inch 2½ lines; breadth, 10½ lines.

108. Pteropodocys phasianella—(Ground Graucalus). *Locality*—Australia, except North. **Egg*—Long and tapering in form, of a polished dark warm green or olive, without any blotches, but the slightest washings over the shell of a darker shade of the same tint, especially on the top of the egg. Length, 1 inch 3½ lines; breadth, 10 lines.

111. Campephaga leucomela—(Black and White Campephaga). *Locality*—Queensland and New South Wales. **Egg*—Ground color, light greyish-green, mottled all over with chestnut, and in some instances with umber, the color being so well diffused as to almost hide the ground color. Length, 10 lines; breadth, 7 lines.

112. Campephaga humeralis—(White-shouldered Campephaga). *Locality*—Australia. *Egg*—Differs considerably in color, some being of a light green blotched all over with wood-brown, while others have a lighter ground so largely blotched with chestnut-brown as nearly to cover the entire surface of the shell: some specimens are almost of a uniform greyish-green. Length, 9½ lines; breadth, 7½ lines.

113. Pachycephala gutturalis —(White-throated Thickhead). *Locality*—Queensland, New South Wales, Victoria, and South Australia. **Egg*—Ground color, yellowish white, speckled more about the larger end with small spots of dark brown or umber, larger blotches of a lighter shade of the same color appearing beneath the surface of the shell: some specimens have more of a pinkish blush in the ground color, with bolder markings of reddish brown. Length, 11 lines; breadth, 8 lines. I described this from my own specimens; because Mr. Ramsay is of opinion that Mr. Gould's *P. gutturalis* was described from specimens of West Australian birds, which he (Mr. Ramsay) has proved to be another species, viz., *P. occidentalis*, and there is no doubt the egg was described from the same quarter. Therefore in the following item I give Mr. Gould's description of the *P. gutturalis* egg, believing the *P. occidentalis* to be its parent.

Pachycephala occidentalis—(Western Thickhead).—*Locality*—West Australia. *Egg*—Ground color of brownish-buff, sparingly streaked and spotted with reddish brown and bluish grey, the latter color appearing as if beneath the surface of the shell. Length 10½ lines; breadth 8 lines.

114. Pachycephala glaucura— (Grey-tailed Thickhead).— *Locality*—Tasmania and Bass's Straits Islands; also specimens are shown in the Melbourne Museum as having been taken in Victoria. **Egg*—In shape, peculiar and inclined to oval, diminishing in a pretty curve from the shoulder to the apex, which is sharper than the bottom end of the egg; ground color yellowish white, which is darker round the shoulder, where is freckled a zone of small spots of dark-brown, and others dimmed as if being under the shell. Length, 11 lines; breadth, 8 lines.

116. Pachycephala rufiventris—(Rufous-breasted Thickhead). *Locality*—Australia, except West. *Egg*—Of an olive tint, with a zone of indistinct spots and blotches at the larger end. Length, 11 lines; breadth, 8 lines.

122. Pachycephala olivacea—(Olivaceous Thickhead)—*Locality.*—New South Wales, Victoria, South Australia, and Tasmania. **Egg*—Extremely beautiful; form being characteristic of that of the *P. glaucura*, having the peculiar but graceful diminishing curve from the shoulder to the apex, which is as sharp as the bottom end of the egg; ground color generally whitish, sometimes with a tinge of yellow, with a few spots or blotches of umber of different shades scattered over the shell, and inclined to form a belt round the shoulder, where a few appear as if beneath the surface of the shell. Length, 1 inch 1 line; breadth, 9½ lines. This description is from Tasmanian specimens: they appear very rare on our continent; I only know of one nest being taken, and that in South Gippsland.



# PROCEEDINGS OF SOCIETIES.

## THE FIELD NATURALISTS' CLUB OF VICTORIA.

At the usual monthly meeting of the Field Naturalists' Club of Victoria, which was held at the Royal Society's Hall on Monday evening, 16th January, there was a fair attendance of members, and Mr. H. Watts presided. A ballot was taken for Mr. W. Chambers, who was duly elected a member.

Mr. D. Best's paper on the Longicorn Beetles of Victoria was advanced a stage, by the description of ten species, included in the genera *Uracanthus*, *Scolecobrotus* *Stenoderus*, *Atesta*, and *Phlyetænodes*. Specimens of each were exhibited, and of the *Stenoderus*—(especially of *S. suturalis*). Mr. Best gave some most interesting particulars relative to the peculiar odor for the emission of which these insects are noted, and also of the numbers in which they may sometimes be taken, he having often shaken several hundreds off a single branch of the flowering box (*Bursaria spinosa*).

An excellent description of the Epacrideæ of the Grampians was contributed by Mr. D. Sullivan, who, in the most generous manner, presented to the Club the specimens accompanying his paper all of which were very carefully prepared; and this may be considered a most valuable instalment towards the formation of the Club's contemplated museum.

The seventh part of Mr. C. French's paper on Victorian Ferns was also read. It comprised the genera Asplenium and Aspidium, and gave many interesting and instructive particulars relative to their habitats, and the proper method for cultivating them. Some fine exhibits were shown on this occasion, amongst them being three rare species of Parrakeet—viz., Pale-headed, Earl of Derby, and Red-capped—by T. A. F. Leith; two rather rare Orchids—viz., *Dispodium punctatum*, and *Cryptostylis longifolia*,—by D. Kershaw; Nest and Eggs of the Lanceolated Honey-eater—(very rare, and difficult to obtain)—by A. J. North; also Coleopterous and Lepidopterous insects, by C. French, F. G. A. Barnard, and J. E. Dixon.

The meeting terminated after the usual conversazione.

## THE MICROSCOPICAL SOCIETY OF VICTORIA.

The ordinary meeting of the Microscopical Society of Victoria was held on 26th January. The President, Dr. Ralph, occupied the chair, and there was a fair attendance of members.

A paper by Mr. W. T. Moffat was read, "On the Ganglionic Nerves of the Centipede."

A paper by Mr. W. T. Moffat was read, "On a new Cell for Glycerine Mounts."

A paper by Mr. Wooster, was read "On Zeiss's Objectives and their work." These papers were well received, and gave rise to considerable discussion, after which the meeting terminated.

## WELLINGTON PHILOSOPHICAL SOCIETY.

The sixth meeting of this Society was held at the Colonial Museum on Saturday evening, 21st July, 1882, Dr. Hector, President, being in the chair. After the minutes were confirmed, the Secretary announced the following new members:—Messrs. E. Best, Allen Hogg, M. Fearnley, C. Hedley, J. McLennan, A. F. Somerville, and Dr. T. R. King.

A list of the additions to the library since last meeting (some 40 volumes) was laid on the table, and the principal objects added to the Museum were exhibited.

The following interesting papers were read and discussed during the evening:—

1. "On the causes leading to the rapid extinction of the Maori race," by Dr. Newman. The author gave a most interesting account

of the Maoris from the earliest period, describing the manner in which they lived, and comparing their habits and customs then, and their mode of life at the present day. He quoted eminent writers on the subject, and statistics, especially recent statistics, to prove that the Natives had decreased, since 1840, to less than one-half their number, and were still rapidly diminishing. There were several causes for this rapid decay of a race formerly so numerous, such as the introduction of certain diseases, the position of their dwelling-places, generally on low-lying ground, and often on the edges of swamps, while formerly they occupied elevated and healthy positions; bad food, and the habit of drinking, combined with other vices, although he did not think these causes were so fatal to them as was supposed. But although these causes were helping to do the work, yet the Maoris were but following in the wake of other similar races in countries far apart, who were fast dwindling away from sheer inanition and decay. The paper contained a lengthy account of certain diseases which prevail and are fatal to the Maoris, which would bear out many points he had advanced. This portion was not read; but the appearance of this paper in the next volume will, no doubt, be looked forward to with interest. Dr. Grace agreed with a good deal in the paper, but did not accept the statement that the Maori race were dying out so fast as the author seemed to think. No doubt they were decreasing, and the fundamental cause was their indolent habits. If it were possible to make the Maoris do a fair share of work for their existence the race would improve. In Jamaica, which was a fertile country, the Natives were lazy, and they were decreasing. But in Barbadoes, where the soil and climate were not so good, but where they were obliged to work for their living, they were increasing. We had a duty to perform in improving the race. We had to a certain extent deprived them of their vigorous habits, and have not succeeded in impressing upon them the benefits to be derived from true industry and virtue. He did not think they suffered much more from introduced diseases than did Europeans. The need for healthy manual labor was at the root of the evil, especially in a humid climate like ours, where such habits are necessary. He did not look with despair at the future of the Maori, and he thought that in 50 years hence we should have a larger population of Natives than we have now.

The President, in thanking Dr. Newman for his eloquent address, said he was inclined to agree with Dr. Grace, except that he appeared to underrate the effect of the great epidemics of measles and such diseases in former times; but the Maori race was not at present decreasing so fast as formerly, except in the vicinity of towns and large settled districts. In the King Country he had seen large families of healthy children. He, therefore, could not agree with the author in attributing the decrease of the Maoris to an inherent tendency to decay. We were really to blame, and chiefly from having induced the Natives to abandon their old habits and customs. We have destroyed their social organisation, and not replaced it with ours. In serving our own purposes we have undermined the authority of the chiefs, without being able to establish European authority among them as a substitute. There appears to be no reason why the race should have decayed if it had been left alone, or only gradually assimilated to our own, and it is no use trying to excuse ourselves by any other natural law but that of might.

Dr. Newman, in replying, said that he still believed the race was disappearing, and that evidence to bear out that fact would be found in his paper.

2. "On the Fallacies in the Theory of Circular Motion," by T. Wakelin, B.A. Univ. N.Z. As this was purely a mathematical paper, and the author not present, it was taken as read.

3. "On the Extinction of the Moa," by C. H. Field, of Wanganui.

This was an account of the finding of Moa bones in the sand-hills at Wanganui, and an exhibition of some of these bones showing sharp, clean cuts in them, which, the author thought, must have been made with a steel weapon while fresh, and therefore that the bird had lived since the arrival of the Europeans.

Dr. Hector, although agreeing with the author as to the survival of the Moas to a comparatively late date, thought that such bones might have been originally in swampy ground and soft, in which state they are easily cut with any tool like a spade or mattock, and afterwards harden on exposure and bleaching in sand.

4. "On an Abnormal Growth of the Flax Plant (*Phormium tenax*)," by the Rev. P. Walsh, with drawing. This gave an account of the sprouting of a fan of new leaves from the apex of a flower-stalk on which there were dead pods.

5. "On a Deposit of Moa Bones on the property of the Hon. W. Robinson, at Motanau, North Canterbury," by A. McKay, of the Geological Department. Specimens were placed on the table, and Dr. Hector explained the locality, and stated that this was probably the oldest Moa deposit yet found. A skull and other bones of the extinct gigantic eagle, *Harpagornis*, first discovered by Dr. Haast, were also found in this locality, this being the first skull secured of this interesting bird. The deposit is of early Pliestocene age; and the Moa bones belong exclusively to the species *Dinornis elephantopus*, *D. casuarinus*, and *D. didiformis*. There are also some bones of a large Ralline bird not yet determined.

6. "On New Species of Recent and Fossil Shells," by T. W. Kirk, Assistant, Col. Museum. This paper described a new genus with two species of recent shells, *Huttonia* (N.Z.), *H. iriculor*, and *H. hamiltoni*, and a new Aplysia, *A. hamiltoni*. This fine shell measures 1·6 x 1·4. The new fossil shells are from the Pliocene beds at Napier, viz.:—*Trivia zealandica* (N.Z.); *Marginella propinqua* (Tate); *Marginella hectori* (N.Z.); *Erato lactea* (N.Z.); *Pleurotoma tuberculuta* (N.Z.); *Cardita lutea* (Hutton.)

7. Four new plants, described by Mr. J. Buchanan, F.L.S., two of which were obtained during a recent exploration to the Tararua Ranges, *Haastia loganii* (N.Z.), *Raoulia rubra* (N.Z.), a new orchid found by Mr. W. T. L. Travers at Mungaroa, *Epiblema grandiflorum* (R. Br.); and a fern, new to New Zealand, *Pteris longifolia*, found by Mr. Lascelles at Tarawera.

Dr. Hector stated that during the recent expedition to the Tararua Mountains, Mr. Buchanan, in company with Mr. H. Logan and party, had procured about 1,500 live plants, which had been divided between the various domains in the colony, a portion also being sent to Kew. Many of them will be most beautiful additions to gardens.

8. Specimens of Lichen collected on the Island of Kapiti, where it is abundant, with samples of dyes made from it, were exhibited by Mr. W. H. Levin, M.H.R.

The Lichen belongs to the genus Leuconora, which was formerly used as a dye-stuff under the name of Archil till displaced by the less fugitive Aniline dyes.

9. Suggestions relative to the Rabbit nuisance, by Henry Tryon. The author suggests the use of *Barium chloride*, mixed with four times its weight of meal, as a poisonous agent, also the introduction of the peculiar scab insect *Sarcoptes cati*, which attacks cats, and is fatal to rabbits, but does not affect other animals.

10. "On Solar Heat," by J. C. Crawford, F.G.S. This was a short paper, in which the author draws attention, and to some extent accepts the views put forward by, Mr. W. P. Wilson in the *Victorian Review* of 1st January, 1881.

## NOTES, MEMORANDA, &c.

"On the Fertilization of New Zealand Flowering Plants" is the title of an admirable paper, by Mr. G. M. Thomson, F.L.S., read before the Otago Institute, May 11th, 1880, which deserves more than a passing notice, inasmuch as it treats of an interesting subject of which very little is known, treats it in a thoroughly scientific manner, and thus opens the way for fuller and more detailed work in the future, which we hope to see continued by other and numerous observers. The subject is an important one viewed in its relations with the distribution of insects; indeed these two subjects are so intimately connected that it is almost impossible to treat them separately, and the author has wisely united them, to a certain extent, in the paper under consideration. The phenomena of the fertilization of flowering plants, and the terminology used in connection therewith, are explained briefly and simply for the guidance of beginners, and the author proceeds to allude to the prevalent imperfection of the New Zealand flowers (assuming that separation of the sexes constitutes imperfection),* which characteristic, he considers, cannot yet be satisfactorily explained. He then summarises the results of his examination of 433 species, belonging to over fifty natural orders, and gives the

* On the principle generally recognised in Biology, that higher grades of organisation are marked by increased specialisation of function, it appears to us that

respective numbers of flowers which are conspicuous or inconspicuous fragrant or scentless, and melliferous or without honey: also the number which are unsexual or hermaphrodite; self-fertile, entomophilous, or anemophilous; proterandrous or proterogynous. It is shown that Mr. A. R. Wallace's remarks on the paucity of insect life in New Zealand, and the correlative deficiency of gaily-colored flowers require considerable modification, owing to the very large number of insects which have been described since he wrote, also to the fact that many plants are fertilized by insects belonging to families not touched upon by Wallace, particularly the moths and the Diptera, which order Mr. Thomson suggests will probably be found by far the most numerous class of flower fertilizers in New Zealand. The number of plants with conspicuous flowers appears also to have been under-rated, as Mr. Thomson finds that they constitute fully half of those which he has examined. The entomophilous flowers are estimated at 23 per cent. of the whole, the anemophilous at 29 per cent., and those apparently self-fertile at 48 per cent.; of these latter, however, many probably have their fertilization aided, if not exclusively effected, by insects. A few appear to be fertilized by birds. Mr. Thomson points out that his observations do not extend to many of the mountain species, among which are some of the finest flowers in New Zealand.

Detailed notes of the author's observations on each species are given, which will be of great value to future workers in the same field. There are some notes on the carnivorous propensities of the New Zealand species of *Drosera*, also on the bladders of *Utricularia monanthos*, the latter illustrated.

unisexual flowers should be ranked higher than hermaphrodites, a conclusion which seems to be borne out by the fact (alluded to by Mr. Thomson) that even in hermaphrodite flowers, better results are produced by the application of pollen from a different plant than by self-fertilisation. The term imperfect, therefore, as applied to unisexual flowers, must be taken in a limited sense, and not as implying any inferiority.

# On the Ganglionic Nerve of the Centipede.

By W. T. Moffat, Romsey.

[Read before the Microscopical Society of Victoria 26th January, 1882.]

It would be difficult to say which part of the human system is least wonderful in its construction and operation, but it is almost universally admitted that its highest development is that wonderfully complex ramification of fibres which interweaves and meshes the whole frame of man from its centre to its circumference, and which has received the name of the Nervous System.

During late years, the character and functions of this elaborate organization, has received very considerable attention from advanced scientists, and, notwithstanding the important discoveries of Sir Wm. Bell, and our veteran champion of histological microscopy, Dr. Beale, we believe that still more important discoveries remain to be made in the future. The functions (at least some of them) of the afferent and efferent, or sensory and motor, nerves have been explained, but who can say that they have passed beyond the bounds of speculation regarding the duties performed by the Ganglionic System?

It is maintained by some medical men that all diseases of the human body may, and should be, treated through the nerves, and that sometimes nerve force is too low, sometimes too high. If this be so, how is this force to bê increased or reduced? What is its nature, and how is it generated? when generated, how is it discharged? Some hastily answer, the brain regulates all. Suppose this be admitted for a moment, can any one explain the *modus operandi* by which the brain uses this force in transmitting its will to all parts of the body? Or will those who give the brain credit for being the seat of all nerve force explain how it operates at all times, under all circumstances, during sickness and health, during activity and repose, in reason and insanity, in keeping up the rhythmical and vital movements of the human heart? or how it controls the discharge of gastric juice from the vessels of the stomach by which such important changes are produced in the food supplied to that organ.

It is not intended here to follow the nerve systems in the complexity of their work among these organs, nor to attempt to answer the questions already propounded above. *Part* of the nerve action, in controlling and regulating the operations of the heart and stomach, is known, *much* is still only conjecture, but enough is known to make it *certain* that the brain is not the only seat of nerve force, and, further, that it has nothing to do with many of the complex actions performed by that wonderful arrangement which has improperly, I think received the name of the Sympathetic Nerve.

Those who may wish to commence the study of nerves, their functions and distribution, require first to become acquainted with their appearances, in different states, and under different conditions; and the nature of the elementary fibres and cells which go to make up a nerve trunk.

Often the inexperienced histologist gazes through his microscope in wonder at a display of minute fibres which he believes to be nerves, but which he finds, on gaining experience, to have been only a distribution of finest trachea, or, perhaps, a peculiar arrangement of fibrous tissue caused by the evaporation of the fluid which, when fresh, gives it an almost homogeneous appearance; or capillaries whose collapse, in consequence of the discharge of their contents, the chemical action of re-agents, or the fluids in which they have been or are being prepared, causes them to look somewhat like nerve fibres. I am not aware that any definite appearance can be described to render it possible for a beginner, or, in fact, for any one, to pronounce with certainty as to whether any given fibre is nerve or not; but by careful practice in observing, considerable expertness in deciding may be attained.

Nerve fibres may be easily obtained from the eye of almost any small animal, such as the mouse, frog, or sparrow, by cutting off a piece of the optic nerve and tearing it up with fine needles, or by carefully removing a small portion of the retina. But by far the most interesting example of nerve structure that the writer has examined is the nerve column, or Ganglionic System of the Centipede.

A fellow member of the Microscopical Society made the discovery in the following manner:—he found a centipede which by some means had been scalded to death, and in looking through it for some purpose he came to a line of small white spots just discernible by the naked eye. These he at once concluded were nerve ganglia, which subsequent examination confirmed. He communicated the information to the writer, who lost no time in finding a subject on which to operate. The method of procedure was as follows:—The centipede, uninjured, was dropped into boiling water and instantly killed, then pinned out on a loaded cork, and cut carefully along the whole length of each side, just above the legs, by means of a very fine pair of dissecting scissors, care being taken not to injure the tissue lying just below the skin. The whole of the upper integument, consisting of a series of horny plates, was removed in one piece, displaying the muscles of the back, which were torn off by the aid of a pair of fine needles until a brown line was observed running down the centre of the insect. This, on being cut into, displayed the beautiful white spots referred to lying immersed in a kind of serum. The whole cavity was now washed out by using a fine syringe, and a cut was made down each side of the body, and close by the legs, to sever the nerve-cords supposed to branch out from each ganglion. The nerve trunk, severed at the upper and lower extremities, was now removed by means of a pair of forceps, and a fine curved needle inserted under the column, to a glass slip, and then carefully washed, first with pure water and then with a mixture of glycerine and water, and, on examination, it was found that a number of the nerve-fibres which branch off from the ganglia were attached. At this time the head was not dissected. If any one follows the course just described, he will not find much difficulty in becoming possessor of a beautiful object, whether he desires to study its structure further or not.

Several plans of preparing and mounting may be adopted. The cord may be cut into pieces of convenient size, and, after being allowed to soak 48 hours in glycerine, may be easily mounted in that medium in the double cell described by the writer in a former paper: or a part may be immersed in Dr. Beale's carmine fluid and stained. This method displays certain details of structure very beautifully. Another part may be subjected to pressure in the compressorium, or by means of a strong spring clothes-peg, care being taken to cover the thin glass with a small piece of cork, and, lastly, a piece should be mounted without any pressure having been applied. It is recommended that each of these methods be tried, as each displays different characteristics of the structure, and all are useful.

An examination of this beautiful object by the writer has led to the following general observations, which it is hoped members of the Society may verify and elaborate for themselves:—The nerve columns of the centipede consist of a number of ganglia united together by means of a double column of nerve-fibres, the whole being enclosed in an outer sac or covering containing a grey serum. The nerve-trunks, contained in the usual sheath, are fibrous in appearance, and are a dull white in color. As they enter the ganglia, all trace of fibre disappears, and they seem to become merged into the substance of the ganglia. Each ganglion appears to consist of a number of minute cells enclosed in a thin sac or covering, to which is distributed a plentiful supply of most minute tracheæ which ramify on the whole inner surface of both its sides. From each side of these ganglia are seen to branch four smaller nerve-trunks, and at the upper and lower edges of the 1st and 4th nerves respectively may be seen the main tubes by which the trachea enter. Thus each ganglion is supplied with four main tubes of trachea, and finds food and force for eight nerve-cords or trunks, which proceed outwards in the direction of the legs. He has not yet been able to trace these nerves in their course further than the sides of the centipede, but shall be pleased to hear that some more advanced members of the Society have succeeded in following them to the extremites. All the nerves, both those that join the ganglia together and those that branch off in the direction described, instead of being composed of cells, are fibrous, and thus lead to the conclusion that each of the ganglia is a nerve-centre in which nerve-force is generated and by which it is expended.

The writer has often wondered why a centipede is so difficult to kill. If it be cut into pieces, each piece seems to have just the same vigour as before, which lasts for a considerable time. He has sought in the books that are within his reach in vain for any explanation of this fact. May not the reason be found in the nerve structure? Are not these ganglia minor heads, so to speak, performing at least some of the functions usually credited to the head in more highly organized beings, capable of generating and directing a certain amount of nerve-force, limited only by the supply of the fluid which serves as pabulum to the nerve cells when acted upon by oxygen? It must be remembered that the circulatory system of insects is very simple? in many cases the heart is only a somewhat larger cavity than the rest of the vessels, and the functions of the lungs are performed by the wonderful net-work of trachea that traverses the whole body, even to its finest extremities. Thus they have the means of conveying oxygen to the nerve-centres sufficient to support life for a considerable time after the body has been cut into pieces. The presence or absence of a nerve centre will determine whether in any given part of one of these lower forms of animal life independent existence can be maintained. Of course other causes operate to determine the duration of such independent life.

These and many other interesting speculations have arisen in the mind of the writer while pursuing his somewhat disconnected examination into the structure and functions of the nerves of insects: whether these speculations are new or not he has no means of ascertaining, none of the books to which he has access having afforded the slightest information, as has already been stated. He has therefore adopted the course considered most likely to throw light on his investigations by asking through this paper that the knowledge and experience of those members who may, perhaps, have devoted more time to the study of nerve-structure than has been possible for him may be made available, not only for his, but also for the benefit of those who have thought little if anything on the matter.

The following positions the writer has demonstrated by his own observation:—

1st. That centipedes have nerve-columns composed of ganglia united by cords which run the whole length of their bodies.

2nd. These ganglia are cellular, while the cords uniting them are fibrous.

3rd. From each ganglion proceeds four pairs of nerves, and it is furnished with two pairs of trachea.

Further elucidation of the following points is sought:—

1st. As to what is the ultimate destination of the nerves which proceed from each ganglion?

2nd. Are not these ganglia centres of life for the parts to which their nerves extend, subject to such action as the head of the centipede may be capable of exerting upon them?

3rd. Is not the reason of the centipede being able to live for some time after being cut into pieces to be found in the principles suggested?

What a greater insight into functions of nerves, the means of maintaining their healthy condition, or repairing the injuries caused by disease or accident, may do for the alleviation of suffering, or the perpetuation of health, it is impossible to say. One thing, however, is certain, viz., that our knowledge of this wonderful mechanism through which the Creator operates to work His will in the Universe, whether it be in the gigantic effort of the noblest of His creatures to fathom the depths of His wisdom, or of the humblest insect in following the instincts implanted in its nature, is as yet in its infancy. May we who are privileged to use an instrument which reveals the hidden things of His great Creation use it to discover, if possible, a means to the further preservation of the health of that body of which it cannot display the life.

# Native Plants of the Grampians and Vicinity.

Arranged generally under the direction of

Baron Ferd. von Mueller, K.C.M.G., Government Botanist.

By D. Sullivan.

[Read before the Field Naturalists' Club of Victoria 23rd January, 1882.]

> "Wondrous truths, and manifold as wondrous,
> God hath written in those stars above;
> But not less in the bright flowerets under us
> Stands the revelation of His love."
> —Longfellow.

PART I.

To vary the monotonous routine of village life, I commenced, about nine years since, to collect mosses and ferns as an agreeable recreation after the harassing work of my school was over for the day or week, as the case might be; and, having consulted Baron von Müeller with regard to the scientific names of such plants, that kind and eminent botanist advised me to make a complete collection, not only of mosses and ferns but of plants of every description occurring in my neighbourhood, all of which he kindly promised to name for me. I need scarcely say that I at once availed myself of this generous offer, and have since enjoyed the privilege of being included among his friends and receiving information from him which I could not otherwise obtain without an outlay that my very moderate income would not permit me to incur.

At the suggestion of the same eminent gentleman, I now venture to compile a census of the plants of my district as far as the limited material at my disposal will permit, with the hope that such a work may be of use for reference, and in encouraging others who, perhaps, have better opportunities than fall to my share to collect and study the plants of their respective districts, in which pursuits Baron von Müeller will, no doubt, be willing to advise and assist them, as he has done in my case, and that of others through out the colony.

The 600 species brought together in this primary effort do not by any means represent the flora of the Grampian district, but may be considered as a good first instalment of the whole number of species indigenous to these highly favoured mountains and the surrounding district. In the Monocotyledonous class, especially in the *Restiaceæ*, *Cyperaceæ*, *Juncaceæ*, and *Gramineæ*, much remains still to be done; and in Cryptogams, with the exception of ferns, scarcely anything has been done. There are about one hundred additional species in my collection, in a more or less incomplete state, which would bring the number up to 700 species. These, when identified, and others which I hope in the meantime to collect, will be given in supplementary lists. Possibly the number of plants in the district, all told, will amount to 1,000 species. I am not aware as to the entire number of plants in Victoria, but my own collection from all quarters amounts to 1,600.

The vegetation of the Grampians and adjoining mountains is not, generally speaking, luxuriant, but it is varied and beautiful, each range, and even the peaks and gullies of the same range, having special objects of interest exclusively confined to their own narrow limits, and vainly sought for elsewhere. In no part of Victoria does the incomparable *Epacris impressa* form so prominent and beautiful a feature in the landscape as about these mountains, where, for many miles in extent, it stretches out before the admiring gaze of the beholder in all the possible shades of rose, pink, and white, which, contrasted with the tall grass-trees (*Xanthhorrhaea Australis*) and the glossy foliage of the young stringy-bark tree, leaves on the memory an impression not readily effaced.

Introduced plants have not yet, to any appreciable extent, made their way on the mountains, although many are to be seen on the road leading to the saw-mills. I found *Guaphalium luteo-album* on many of the higher ridges, and on the banks of some of the streams at their bases. *Cryptostemma calendulacea* and the Bathurst bur *(Centaurea)* are spreading rapidly about the settlements, and likely to become sore pests to the graziers and agriculturists. Mallows, clovers, thistles, sow-thistles, two species of Hypochaeris, nettles, erodiums, silenes, sorrels, docks, chick-weed, melilotus, furze, plantains, English and other grasses are the principal introduced plants now making headway over the district. Some of them have been a blessing rather than a curse during the late droughts. *Trifolium procumbens*, the common thistle (*Carduus*), and the Cape weed have been greedily devoured by cattle, and for the past three or four years no war has been waged against these plants. As the squatters' leases expire this year, it is to be hoped that some steps will be taken by the Government to reserve the mountains, and a part of the heath-grounds at their base, for the growth of the native timber trees and pines for economic purposes. The fine peaty soil about Mt. William would be well adapted for the growth of the latter. If the present system of allowing squatters to burn all before them be allowed to continue, not only will the rare and beautiful plants of the district disappear, but the supply of timber for local purposes will become extremely limited. Some measure to restrict bark-strippers is also urgently required, as what was at one time one of the best districts for wattle-bark is now becoming entirely denuded of the two species of acacia yielding that valuable article. I have seen thousands of young trees of not more than one inch in diameter killed for the sake of the miserable scrap of bark which can be obtained from each.

To Baron von Müeller's credit, be it observed that he has for many years been endeavouring to educate the public to the importance of the subject of timber reservation and forest culture for the benefit of our own and future generations; and, now that South Australia has set us a good example, there is a possibility of his efforts being more fully appreciated, and his wishes to some extent realized. Under the general name of the Grampians is included the Serra Range, Victoria Range, the Grampians proper, and the Range of which Mt. William forms the culminating point. The latter is the highest mountain in the system, its altitude being variously estimated at from 4,000 to 5,000 feet above the level of the sea.

The country lying between Stawell, Ararat, Moyston, and the mountains, is, on the whole, hilly, and, with the exception of the heath-grounds, more or less auriferous. The plains of the Hopkins extend to the base of Mt. Sturgeon and Mt. Abrupt (Serra Range), and nearly to that of Mt. William, while the plains of the Wimmera reach nearly to that of the Grampians on the opposite side.

All the ranges are composed of the sandstone or freestone which has lately occupied public attention, and which, should it succeed in being pronounced equal to the Tasmanian stone, will have the advantage of being inexhaustible in supply.

The Black Range and the low hills about Mt. Ararat are composed of granite.

## Dicotyledonous Plants.

### (I). *Choripetaleæ Hypogynæ.*

1. Ranunculaceæ.
2. Dilleniaceæ.
3. Magnoliaceæ.
4. Lauraceæ.
5. Cruciferæ.
6. Violaceæ.
7. Pittosporeæ.
8. Droseraceæ.
9. Hypericineæ.
10. Polygaleæ.
11. Tremandreæ.
12. Rutaceæ.
13. Lineæ.
14. Geraniaceæ.
15. Sterculiaceæ.
16. Euphorbiaceæ.
17. Urticeæ.
18. Sapindaceæ.
19. Stackhousiaceæ
20. Portulaceæ.
21. Caryophylleæ.
22. Salsolaceæ.
23. Amarantaceæ.
24. Ficoideæ.
25. Polygonaceæ.
26. Casuarineæ.

### (1). Ranunculaceæ.

***Ranunculus** lappaceus* — (Smith). — Very common throughout the entire district, reaching occasionally to grass flats on the lower ridges of the mountains.

*aquatilis*—(Linne).—In swamps and lagoons near Mount William, by no means common here.

*rivularis*—(Banks et Solander).—On the Wannon, and some of the streams about Mount William; also on temporarily inundated flats.

*parviflorus*—(Linne).—About water-holes and on gravelly soil reaching to the base of the mountains.

*hirtus*—(Banks et Solander).—On pastures in a few places only near Mount William.

***Myosurus minimus***—(Linne).—Sub-saline flats.

***Clematis aristata***—(R. Br.).—In most of the gullies of the mountains.

(2). Dilleniaceæ.

*Hibbertia billardieri*—(F. v. M.).—On the margins of mountain streams at an altitude of about 2,000 feet.

*densiflora*—(F. v. M.)—Lower ridges of the mountains, not rare; also on sand-hills near Moyston.

*stricta*—(R. Br.).—Sandy and gravelly scrub-hills over the whole district.

*serpillifolia*—(R. Br.).—On some of the higher peaks of the mountains.

*humifusa*—(F. v. M.)—Scrubby elevated heath-ground about Mount Abrupt, and rarely on stony ridges of the adjoining ranges.

*fasciculata*—(R. Br.).—Pretty common on the heath-grounds of the ranges generally.

*virgata*—(R. Br.)—About Mount Abrupt and Mount Sturgeon, and sand-hills near Mount William.

(3). Magnoliaceæ.

*Drimys aromatica*—(F. v. M.).—Summit of Mount William only, where it is exposed to the most intense cold. Height $2\frac{1}{2}$ to $3\frac{1}{2}$ feet.

(4). Lauraceæ.

*Cassytha glabella*—(R. Br.).—On bushes and small trees from the heath-grounds to an altitude of 2,000 feet.

*pubescens*—(R. Br.).—Same as *C. glabella.*

*melantha*—(R. Br.).—Rarely to be met with on small trees about the mountains.

(5). Cruciferæ.

*Nasturtium terrestre*—(R. Br.).—Rare on the Wannon.

*Barbaræa vulgaris*—(R. Br).—Very rare on the Wannon.

*Cardamine dictyosperma*—(Hooker).—Wannon, and streams from Mount William.

*laciniata*—(F. v. M.) Sub-saline flats near Mount William.

*hirsuta and var glabra*—(Linne).—Wet places over the district generally.

*parviflora*—(Linne).—Moist granite slopes near Mount William, on the summit of Mount Ararat, and in wet clayey soil generally.

*Capsella elliptiea*—(C. A. Meyer).—Mount Ararat, Black Range, and granite ridges near Mount William.

*Lepidiam ruderate*—(Linne).—On the above-named ranges, and on gravelly hills; not by any means abundant.

## Definitions of some new Australian Plants,

by Baron Ferd. von Mueller, K.C.M.G., M.D., Ph.D., F.R.S.

*Phyllanthus Tatei.*—Dwarf, and somewhat shrubby; branchlets slightly pubescent; leaves very small, scattered, of stiff consistence, shining, oval or elliptical or some roundish, smooth; flowers minute, of both sexes on the same plant, axillary, solitary, on very short stalks; sepals six, yellowish, nearly ovate, the inner somewhat longer than the outer sepals, all membranous; stamens three, connate; filaments extremely short, free only at their base; anthers longitudinally dehiscent, forming a ring around the common connective; stigmas two or three, subulate, recurved, undivided, much longer than the style; ovary upwards attenuated, compressed when two-celled.

On the Bundaleer-Range near Spencer's Gulf (Professor Tate). Habit much like that of the Tasmanian *P. australis*; floral characters those of the section Synostemon.

*Spartothamnus teucriiflorus.*—Young branches and inflorescence grey-silky; leaves minute, bract-like, from linear-,to ovate-lanceolar, on the main-branches very distant and finally deficient; flowers through diminution of the leaves somewhat racemous; calyces longer than the flower-stalks, their lobes semilanceolate; corolla white, nearly half exserted, comparatively large, outside scantily silky, its lowest lobe obovate, of about twice the size of the four other almost oblong lobes, the tube bearded inside above the base; stamens arched; two of the filaments considerably longer than the corolla; anthers kidney-shaped, opening by a single vertical fissure; stigmas several times shorter than the style; fruit almost globular.

Near the Finke River (Rev. H. Kempe); between the Murchison, and Gascoyne River (E. Giles).

More robust than *S. junceus*, neither glabrous nor crisp-downy; leaves always exceedingly small, flower-stalk never longer than the calyx, flowers twice as large as those of *S. junceus*, calyx-lobes less acutely pointed, corolla slightly silky outside, style longer, stigmas proportionately shorter, fruit not seen in a matured state, not lobed.

The starry downy variety (puberula) of *S. junceus* I am inclined to separate specifically on account of its more copiously developed and larger leaves, its more abbreviated flower-stalks, less pointed calyx-segments and also outside star-hairy corolla. It is known to me only from near the Cape River, Suttor River, Maranoa and Warrego. In habit it is also strikingly different from the genuine *S. junceus*.

*Lyperanthus Forrestii.*—Leaves at or near the base of the stem, three, the lowest ovate-lanceolar, all several times shorter than the stem, a solitary smaller narrow-lanceolar leaf near the middle of the stem; flowers two or three, on conspicuous stalklets; bracts rather large, ovate-or narrow-lanceolar, acuminated; a pedicellate very minute floral rudiment placed with the uppermost stalklet; upper lobe of the calyx cymbeous-lanceolar, the four other lobes narrow-or linear-oblong, much attenuated towards the base, all of nearly equal length, rather blunt and somewhat spotted; labellum by nearly one-third shorter than the calyx-lobes, rhomboid-wedgeshaped, attenuated into a narrow base, slightly crenulated and undulated, neither distinctly lobed nor ridged, but dotted all over with minute sessile glands; column somewhat shorter than the labellum or nearly as long, very narrowly winged; anthers suddenly terminated into a very short and narrow point.

Near the Stirling Ranges, *J. Forrest.* This West Australian species comes systematically nearest to *L. ellipticus* from New South Wales; but the latter plant might be separated from the genus on account of its creeping root stock and reversed flowers, the resupination, according to the beautiful plate, published by Mr. Fitzgerald, and according to a handsome drawing, made by Mrs. Calvert, seemingly not being solely due to a pendent position of the flower-spikes. From the few dried and much shrivelled specimens of *L. Forrestii*, hitherto secured, I have not been able to ascertain, whether its flowers are also turned upside down; if so, the species would become a second one in the new genus indicated, and by which I would like to honor the splendid researches of the Sydney Orchidologist in naming it *Fitzgeraldia.* As a *Lyperanthus* Mr. Forrest's plant might be transferred to *Caladenia* in accordance with the view of Dr. G. Reichenbach on the limits of that genus.

## Victorian Ferns and their Habitats.

By C. French.

### PART VI.

*Aspidium aculeatum.*—(Swartz).

Rhizome, short and thick. Fronds, twice pinnate. Sori, usually 6 to 8 on each pinnæ, very proliferous.

A common but useful, though somewhat formal and stiff in general appearance, this is quite familiar to all who know anything of ferns, as the cat-head fern of the colonists. It grows plentifully on the bare hilly slopes of our mountain regions, and seems to be equally at home in the darkest and most moist parts of the fern gullies. This species has the peculiar habit, as is the case with many other ferns, including *Asplenium bulbiferum* and *A. flabellifolium*, of reproducing itself by means of small bulbous little plants on the upper surface of the apex of the fronds, which gives to the plant a most singular appearance. The stipes of this species, particularly the lower part, are covered with dark brown scales mixed with hairs, and by this alone it can easily be distinguished from any other species growing in the same locality. As a decorative plant it is of great value, more particularly for dwarf work in fern gullies and rockeries. It will also stand more heat than many of our indigenous species, and should be largely used where dwarfing effect is required. It can be grown almost anywhere, and a little wood ashes mixed with the soil will add greatly to the vigour of its growth. It is easily removed, and almost at any season of the year. Height from 1 to 3 feet. *Aspidium proliferum* and *Polystichum vestitum* are identical with this species. Found, according to Bentham and others, in New South Wales, Queensland, Tasmania, and in most temperate and sub-tropical regions of the globe.

### *Aspidium capense*—(WILLDENOW).

Rhizome creeping. Fronds, broad and rigid. Pinnae, coriaceous. Sori often large.

This well-known species may be found adhering to the stems of tree ferns in nearly all fern gullies throughout the colony. The fronds are of a thick leathery texture, with the sori very prominent and often of a beautiful dark brown or nearly black color, which, on the green ground of the frond, gives an elegant though somewhat regular pattern to the plant. This species is very useful for planting in moist rockeries and other out-door ferneries where a little shade and plenty of moisture is at hand. As a fern from which dried specimens can be used it is most desirable, as the fronds keep their color well if sufficient pressure and frequent changes of paper be attended to during the process of drying. In growing this, as well as other pendant species, care should be taken that the plant is fastened on to some porous material, and also that it has sufficient room (in height) for its graceful drooping fronds to grow clear of the ground and other obstacles. This is also a cosmopolitan species, being found in New South Wales, Tasmania, and generally spread over the tropical and southern extra-tropical regions of the globe. *Polypodium capense, Aspidium coriaceum,* and *Polystichum coriaceum* are identical with this species.

### *Aspidium hispidum*—(SWARTZ).

Rhizome thick, creeping, covered with brown scales. Sori, solitary on the small segments or lobes. Stipes and secondary rhachis, hispid.

A handsome, and in Victoria a somewhat rare species, although common in New Zealand. I have only on one occasion found a specimen of this fern myself, viz., in the valley of the Watts River at Fernshawe, although it had been previously found in the same locality, by Mrs. Jefferson, a lady who takes much interest in the ferns of the district, and, later on, by Mr. P. Dattari, a member of the Field Naturalists' Club. To grow this species well it should be planted in some good alluvial soil, well and thoroughly drained, and a little sharp sand if added to the compost will be found beneficial. This species, if well grown, is very useful for the decoration of the dinner-table where ferns are desired. The very hairy appearance of this fern will cause it to be easily recognized from any other species growing in or near our fern gullies. Height from 1 to 2 feet. Found also at Cape Otway and New Zealand. *Aspidium setlosum* and *Nephrodium hispidum* are identical with this species.

## Some Curious Plants.

By W. R. Guilfoyle.

[Read before the Field Naturalists' Club of Victoria 13th February, 1882.]

*Raoulia Mammilaria.*—(Hooker, Fil).—(New Zealand).

*Compositæ.*—This plant is found growing in dense tufts in rocky, mountainous districts,* and when large plants are seen very much resemble sheep— whence its common name. The women in the mountains use these plants for rough pin-cushions.

Pith—from *Juncus effusus.*—(Linnæus)—(China).

*Juncaceæ*—The material used in the manufacture of the pith hats so largely imported from China to this and the adjoining colonies. Blocks the shape of the desired hats are wound round with the cord of this pith and paper from the rice-paper plant (*Aralia papyrifera*), beginning at the bottom and proceeding upwards. As the work goes on, paste is brushed on to stick the cords together. The whole is covered then, both inside and out, with silk or other material, and neatly finished off.

Pituri—*Duboisia Pituri.*—(Bancroft)—(Central Australia).

In a paper read by Dr. Bancroft, of Queensland, before the Philosophical Society of that colony, the following particulars among others are given, which, presumably may be of interest on exhibiting the Pituri :—

"The blacks in Central Australia value highly this plant, using it in a similar manner as tobacco for chewing, &c.

"From chemical experiments made, Pituri was found to contain an alkaloid, which, on further investigation, was proved to be nicotine. The natives were very reticent when asked as to the place of growth, and some time elapsed before the spot could be found, they merely stating by their expressions that it was a long, long way off. It has, however, been found growing 50 miles east and west of the 138th meridian, the boundary between Queensland and South Australia, and from 20° to 25° South latitude. It is a shrub or small tree 8 feet in height. Leaves 3 to 3½ inches long. Stem diameter at the thickest part 6 inches.

"The blacks break off the boughs, and tie them up in netting till dry, after which they break the leaves up and enclose in closely netted bags in the shape of a crescent. These are carried a long distance for the purpose of barter. Before chewing it they burn the leaf of another shrub they call Montera, the ashes of which they mix with Pituri. It is said that a black unaccustomed to this weed becomes intoxicated by the chewing of it. The Cooper's Creek tribes

*The specimen exhibited was from Mount Torlesse, N.Z., 5,500 feet in altitude.

never venture on their long marches without it for the purposes of deadening the cravings of hunger, and support when fatigued. King, the survivor of the Burke and Wills expedition, who had lived seven months with these natives, when rescued by Howitt, stated that when his food became scarce and bad, as merely to support life, he sometimes obtained a chew of Pituri, which soon caused him to forget the hunger and miseries of his position. The discovery of this plant shows the curious circumstance of the black man of Central Australia coming across the same narcotic principle as the red man of America, and in a plant differing so widely in an external aspect."



## OOLOGY OF AUSTRALIAN BIRDS.

BY A. J. CAMPBELL.

PART IV.—*(Continued.)*

### ORDER—INSESSORS.

FAMILY—*Campephaginæ.*

123. COLLURICINCLA HARMONICA—(Harmonious Shrike-Thrush). *Locality*—Australia, except North and West. *Egg*—Beautiful pearly white, thinly sprinkled with large blotches of light chestnut-brown and dull bluish grey, the latter color appearing as if beneath the surface of the shell. Length 1 inch 2 lines; breadth 10 lines.

124. COLLURICINCLA RUFIVENTRIS—(Buff-bellied Shrike-Thrush). *Locality*—West Australia. *Egg*—Beautiful bluish or pearly white, with large blotches of reddish olive-brown and dark grey, the latter appearing as if beneath the surface of the shell. Length 1 inch 1 line; breadth 10 lines.

125. COLLURICINCLA BRUNNEA— (Brown's Shrike-Thrush).—*Locality* — North Australia. *Egg* — Pearly bluish white, spotted and blotched with markings of olive-brown and grey, the latter appearing as if beneath the surface of the shell. Length 1 inch 2 lines; breadth 10 lines.

126. COLLURICINCLA SELBII—(Selby's Shrike-thrush).—*Locality*—Tasmania and Flinders Island. **Egg*—Very similar to that of the *C. harmonica*, smooth shell and pearly white, sparingly marked with a number of dark olive blotches, and dull grey ones appearing beneath the shell's surface. Length 1 inch 2 lines; breadth 10 lines.

127. COLLURICINCLA PARVULA—(Little Shrike-Thrush)—*Locality*—North Australia. *Egg*—Beautitul pearly flesh-white regularly spotted all over with dull reddish orange and umber-brown; like the eggs of the other species of the genus, they are also sprinkled over with bluish markings, which appear as if beneath the surface of the shell. Length 1 inch; breadth 9 lines.

Eggs marked thus * not previously described

129. Falcunculus frontatus—(Frontal Shrike-Tit). *Locality*—Australia, except North and West. **Egg*—Pearly white and shiny, freckled over, especially at the larger end, with dark olive or umber spots, as many spots of a greyish color appearing beneath the shell's surface. Length $10\frac{1}{2}$ lines; breadth $7\frac{1}{2}$ lines.

130. Falcunculus leucogaster—(White-bellied Shrike-Tit). *Locality*—West Australia. *Egg*—Glossy white, with numerous minute speckles of dark olive most thickly disposed at the larger end. Length $10\frac{1}{2}$ lines; breadth $7\frac{1}{2}$ lines.

131. Oreoica cristata—(Crested Oreoica). *Locality*—Australia. *Egg*—Varies much in color; the ground-tint being bluish-white, in some instances marked all over with minute spots of ink, black in others, long zig-zag lines of the same hue. In some, these markings are confined to the larger end, where they form a zone; in others they are equally spread all over the surface, intermingled with black markings, also blotches of grey, appearing as if beneath the surface of the shell; and some eggs have been found with the ground color of the larger end of a beautiful bluish green. Length 1 inch, $1\frac{1}{2}$ lines; breadth $9\frac{1}{2}$ lines.

## Family—*Muscicapidæ.*

134. Rhipidura albiscapa—(White-shafted Fantail).—*Locality*—Australia, except North and Tasmania. *Egg*—Ground-color white, blotched all over, but particularly at the larger end, with brown slightly tinged with olive. Length 7 lines; breadth $5\frac{1}{4}$ lines.

136. Rhipidura rufifrons—(Rufous-fronted Fantail).—*Locality*—Queensland, New South Wales, and Victoria. *Egg*—Ground-color, stony white, speckled all over with purple and yellowish brown spots and markings disposed so numerously as to form a zone at the larger end. Length 8 lines; breadth 6 lines.

139. Sauloprocta motacilloides—(Black Fantail).—*Locality*—Australia. *Egg*—Dull greenish white, banded round the centre or towards the larger end with blotches and spots of blackish and chestnut-brown, which in some instances are very minute. Length $9\frac{1}{2}$ lines; breadth 7 lines.

141. Seisure inquieta—(Restless Flycatcher).—*Locality*—Australia, except West. *Egg*—Dull white, distinctly zoned round the centre with spots of chestnut and greyish brown, the latter color appearing as if beneath the surface of the shell. Length $9\frac{1}{2}$ lines; breadth 7 lines.

142. Piezorhynchus nitidus—(Shining Flycatcher).—*Locality*—Queensland. *Egg*—Bluish white, blotched and spoted all over with olive and greyish brown, the spots of the latter hue being less numerous and more obscure—the spots inclining towards the form of a zone at the larger end. Length 10 lines; breadth 7 lines.

146. Myiagra nitida—(Shining Flycatcher). *Locality*—Queensland, New South Wales, Victoria, and Tasmania. *Egg*—Somewhat round in form, and of a greenish white, spotted and blotched all over with umber-brown, yellowish brown, and obscure markings of purplish grey. Length 9 lines; breadth 7 lines.

149. Micrœca fascinans—(Brown Flycatcher). *Locality*—Australia, except West. *Egg*—Pale greenish blue, strongly marked with dashes of chestnut-brown and indistinct blotches of grey. Length 9 lines; breadth $6\frac{1}{2}$ lines.

Family—*Luscinidæ.*

155. Gerygone albogularis—(White-throated Gerygone). *Locality*—Queensland and New South Wales. **Egg*—Very similar, both in size and color, to that of the *Malurus cyaneus* (Superb Warbler), white ground, and speckled with reddish brown. Length $8\frac{1}{2}$ lines; breadth 6 lines.

156. Gerygone fusca—(Brown Gerygone). *Locality*—Lower Queensland, New South Wales, and Victoria. *Egg*—Minutely speckled with reddish brown on a white ground. Length $7\frac{1}{2}$ lines; breadth $5\frac{1}{2}$ lines.

161. Smicrornis brevirostris—(Short-billed Smicrornis). *Locality*—Queensland, New South Wales, and Victoria. *Egg*—Dull buff, marked with extremely fine freckles at the larger end. Length $6\frac{1}{2}$ lines; breadth $4\frac{1}{2}$ lines. This is one of the smallest of Australian eggs.

Family—*Saxicolidæ.*

163. Erythrodryas rhodogaster—(Pink-breasted Wood Robin). *Locality*—Victoria, South Australia, and Tasmania. *Egg*—Greenish white, thickly sprinkled with light chestnut and purplish brown. Length $8\frac{1}{2}$ lines; breadth $6\frac{1}{2}$ lines.

165. Petroica multicolor—(Scarlet-breasted Robin). *Locality*—Australia, except West, and Tasmania. *Egg*—Greenish white, slightly tinged with bluish or flesh color, rather minutely freckled with olive-brown and purplish-grey, the latter more obscure than the former; the freckles are very generally dispersed over the surface of the shell, but in some instances they also form a zone near the larger end. Length $8\frac{3}{4}$ lines; breadth 7 lines.

166. Petroica goodenovii—(Red-capped Robin), *Locality*—Queensland, New South Wales, Victoria, and South Australia. *Egg*—Bluish white, with numerous fine speckles, particularly at the larger end, of yellowish-brown and purplish-grey, the latter appearing as if beneath the shell. Length $7\frac{1}{2}$ lines; breadth 6 lines.

167. Petroica phœnicea—(Flame-breasted Robin). *Locality*—Queensland, New South Wales, Victoria, South Australia, and Tasmania. *Egg*—General color is greenish-white, spotted and freckled with purplish and chestnut-brown: much variety occurs in these markings, some assuming the form of large, bold, irregular spots and blotches, while in others they are merely minute freckles. Length 9 lines; breadth 7 lines.

168. Melanodryas cucullata—(Hooded Robin). *Locality*—Australia, except North. *Egg*—Rather lengthened in form, is light olive-green without any spots or markings, but occasionally washed with brown, particularly at the end. Length 10 lines; breadth $7\frac{1}{2}$ lines.

## Drawings and Paintings from the Microscope.

[From "Science Gossip" for January, 1882.

Drawings of microscopic preparations under the highest powers, illustrative of minute points of structure, are necessarily of great scientific value, and are the result of a high intelligence brought to bear upon the revelations of the instrument. But there is open to the microscopist of artistic taste and ability a most engaging pursuit in making drawings under moderately low powers, where all the varieties of well-managed illumination can be brought to bear. Opaque objects in such circumstances may be worked up with a binocular microscope into pictures of great artistic excellence, showing extraordinary points of colour, contrasts of light, and solidity of form. Not only prepared objects, but fresh and ever-living specimens may be so disposed and displayed by combination of illumination as to be inconceivably beautiful, and worthy the efforts of the most accomplished artist; the marine, and especially the fresh-water polyzoa would be objects of this class. A water-colour painting of a group of peaches or grapes, although of no scientific value, has, like any similar work, the peculiar charm of a gratification felt in contemplating the quality of the art exercised in producing it. Under the microscope there are objects of surpassing beauty, elegance of form, effulgence of colour, and, with definite arrangements, revealing charms of light and shade that words, even from the pen of a Ruskin, would fail in describing: paintings of such things, without reaching a scientific status, are certainly as acceptable as any studies of still life, and are far more interesting as exhibiting a curious beauty and structure, unrevealed except by the instrument. It is proposed to offer a few hints from practical experience of the best methods of procedure. It is presumed that the student has a fair knowledge of ordinary drawing, understands something of colour, and can handle a microscope and its various accessories, as a tool, with ease and certainty; the most successful at this work would be a dexterous microscopist with a great love for and appreciation of art, and a capability of rendering it; but practice in this direction does wonders.

The effect of a microscopical painting is greatly enhanced by its being drawn within a circle, surrounded by a black margin, forming a square. The size of this circle is of some importance; it may be too large or too small. After experiments it was ascertained that a circle three inches and three-quarters in diameter gave the best effect, and approached nearest the impression made on the mind of a field of view as seen with a B eye-piece; to have such a circle always handy, a brass gauge should be made four inches and three-quarters square, with a circular opening of the dimensions above given. This gauge is of more importance than may at first appear: placed on a drawing-block, a pencil run round the interior circle, and outside the square edge, gives the interior space for the drawing, and the lines to guide the backing up of the margin with Indian ink. The advantage of a block thus prepared is manifest. When proceeding to arrange an object for drawing, the camera lucida, for fixing positions, tracing general contours and outlines, is an important instrument. Removing the cap of the eye-piece (the A should always be used in drawing) the camera is slipped on and adjusted. After clamping the object to the stage, the body of the instrument is carefully depressed into a horizontal position, as the light is arranged just sufficiently to plainly see the object through the camera and the margin of the field of view well defined with a Ross No. 1 stand. The distance from the front of the objective to the edge of the camera prism is about twelve inches, and from the camera to the table surface (at right angles) eleven inches; the view projected on the circle of paper placed on the table would consequently over lap; block should therefore be raised in any convenient way, until the field of the microscope and the white circular space exactly coincide; the subject will then be in a fair proportion. Another advantage of the black margin is, that if, when using the camera, the drawing should slip, as it is very apt to do, the dark circle will assist in replacing it.

The light on the paper should be in excess of the light on the object. In the employment of the camera lucida, speed and precision are essential. Quickly make easily-recognised points and lines: do not linger over small matters: nothing fatigues the eye sooner than the use of this instrument. Indeed, to manipulate it with advantage requires considerable practice. No drawing can be greatly advanced by it. Contours, salient points, and especially measurements may be quickly and accurately fixed and drawn, but any attempt at elaborate detail will end in confusion. Useful as the camera is in the earliest stages, it should be discarded as soon as possible. The microscope is then placed in position, the lights adjusted, and the drawing continued by actual observation through the instrument. The blocks should be made of carefully-selected paper, thin, hard, smooth. The drawing in its general details should be made with a pencil of the best quality, extremely hard, and capable of taking a fine point, and yet not tearing the surface of the paper. The work may then be corrected and improved with a fine pen charged with Indian ink or Payne's grey, somewhat diluted. If intended for painting, the drawing should never be touched with rubber of any description, and no attempt at shading should be made either by pencil or pen. At this point the ability of the artist begins to tell, and no written guidance can be offered beyond some general hints, derived by experience, of the character of objects best adapted for copying, and the method of exhibiting and illuminating them. The light is of paramount importance: it should be a movable argand gas-burner, fed through a flexible tube, capable of being raised or depressed, with a green cardboard shade—the edge just below the level of the flame in the shade: circular holes and slits may be cut for special purposes. Of illuminating transparent objects little need be said. Transmitted light from the simple mirror means a good effect: it is obtained by allowing the rays of light to pass through a piece of thin tissue-paper placed over the opening of the substage. Such objects as the proboscis of blow-fly, tongue of cricket, spiracles and other parts of insects cannot be displayed to greater advantage. It may be mentioned here that to have an effective drawing, the object, or the part selected, should be magnified to

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nearly occupy the field of view. With sections of injections (opaque)' such as tubercular lung, the whole field would necessarily be filled. As high a power as is consistent with the preservation of a fairly plane surface should be employed. The instruments for light are the parabolic illuminator (see Carpenter, 5th ed. p. 141), a small plane convex condenser, on separate stand, and, the most important of all, the side reflector or silvered speculum (see Carpenter, 5th ed. p. 150): the most useful form of speculum, for drawing purposes, is that which has a separate fitting to the *stand* of the microscope. That which is attached by a spring clip to the objective is not so efficacious in producing oblique rays, nor so completely under control in producing artistic contrasts of light and shade by the primary object to be attained. The Lieberkühn has a positive defect in artistic illumination: it sends the light perpendicularly all round the object, giving little or no diversity of shadow, and cannot be used with effect.

In painting objects under the parabolic illumination, or with the side speculum, the painting of the background should be treated with especial care, and stippled up to the tone. Actually seen under the instrument, the iridescent eggs of insects are generally attached to fragments of wood or leaves, parasitic eggs to feathers. These should be carefully painted, and the background beyond stippled up to the edge of the circle. Such objects make lovely drawings. It would be difficult to particularise subjects suitable for drawings—so immense are the resources. Many are so exquisitely beautiful, that even with good management, cultivated taste, and fair skill, the best representations fall far short of the actual object; but let not the student be disheartened, for to render these things on paper in their perfect integrity it would be necessary, if such a process could be conceived, to dip your brush in light. All that can be hoped for is a semblance. The young artist may here be reminded that in his painting the most exalted light at his command is the pure white of his paper, which should be always jealously preserved. A prepared specimen, or slide, should be perfect, but many most common objects of easy access, hastily arranged, form admirable subjects for the purposes of drawings.

Some years ago a work on the microscope was published by the late Richard Beck. It contained a plate representing a mere splinter of lucifer-match under reflected light. Nothing is more suggestive than such a drawing as showing the accessibility of subjects. Of preparations there is a wide field. A few may be mentioned. Sections of shell with a dark ground, or parabolic illuminations. A portion of the field should be disclosed to be carefully stippled up to an even tone, some degrees lower than the black margin; polycistina and foraminifera, under parabolic illumination. Power to be used, two-thirds. The shells should not be selected or arranged (all arrangements are atrocious), but a fair group drawn in position as they happen to be found. Polycistina, as an opaque object, with side speculum, under a two-thirds, is a most beautiful subject. In using the speculum, the gas-flame should be as close as possible to the stage, and on the same level; a small plane convex condenser, on a separate stand intervening, throws the light on the speculum, which can then be manipulated, until the best effect is obtained. Eggs of insects, by side-lights, are most beautiful. The power should exhibit them as nearly filling the field background, and accessories should be painted to throw them forward. Sections of spines of echinida are seen to advantage with parabolic illumination. Too much care cannot be bestowed on the drawing before it is touched with colour. Other beautiful subjects are the marine algæ, with pyriform spores. The sori and indusia of ferns—Marattia, in particular, showing a series of pods, on a delicate green frond, with inch objective and side-light, is magnificent in colour and solidity. The same may be said of the polypidoms of zoophytes, peristomes of mosses, anthers and pollen of flowers. Rotifera and polyzoa may be rapidly and effectively drawn on dull black paper with opaque colours. Many injected preparations can only be copied in the same way. The pigments should be mixed with flake white and gum, which forms an admirable medium for drawings of this description. Heads of spiders, as a specimen, *Epeira cornea*, showing the eyes, and many parts of insects, as opaque objects under an inch objective and side-light, are worthy the highest artistic efforts. A combination of illumination may be employed with much success. That most common insect, *Tingis*, with its perforated elytra and lace-like appendages, can only be displayed, if mounted as a transparent object, by light from below, with the dark ground illuminated, and from above, with the side speculum; tongues of mollusca, and many semi-transparent preparations, should have simultaneous lighting in the same way.

The colours should be dry cakes rubbed down as required. Moist colours in tins soon become contaminated. The first importance in this work is to keep the palette pure; everything should be of the first quality. Pale cadmium, cobalt, Payne's grey, and Hooker's green No. 1 and 2 are indispensable. The Indian ink should be of superlative excellence; its quality varies, from six to eight shillings for a very small stick, to a shilling for one ten times the size. In pursuing microscopic painting it is essential to be as careful and tender of your materials as old Hunt must have been in his wonderful transcripts of flowers and birds' nests. All your colours should be prepared and your tints mixed (to use the words of Opie) with brains.

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Column of Exchanges.—In answer to several inquiries upon the subject, we beg to announce that we are willing to reserve a space for subscribers who have objects of interest which they are desirous of exchanging for others not yet in their possession. It is necessary, however, that each notice be confined to three lines, for which it is not our intention to make any charge, our desire being to increase the usefulness of the *Record*.

# PROCEEDINGS OF SOCIETIES.

## THE FIELD NATURALISTS' CLUB OF VICTORIA.

At the usual monthly meeting of the Field Naturalists' Club of Victoria, which was held at the Royal Society's Hall on Monday evening, the 13th Feb., there was a very fair attendance of members, the chair being occupied by Mr. J. R. Y. Goldstein, one of the Vice-Presidents of the Club.

A few short notes, contributed by Mr. W. R. Guilfoyle, were read by Mr. F. Pitcher on the *Raoulia mammilaria*, an extraordinary-looking plant from New Zealand, and which, from its peculiar resemblance thereto, is known as the vegetable sheep; also on the Pith of the *Juncus effusus*, generally known as the Chinese pith of commerce; and on the Pituri plant, with whose narcotic properties the natives of Central Australia are well acquainted; and they are also now attracting some attention from the medical world. Specimens of each were kindly forwarded by Mr. W. R. Guilfoyle for exhibition.

Mr. J. F. Bailey read the second part of his paper on Shells, on this occasion confining himself to the Bivalves. His explanation of their structure, mode of growth, and movements proved very interesting, and amongst the specimens he brought for the purpose of illustration were a rare fresh-water mussel (*Mullerie lobata*) from the Rio Chencke, and an almost equally rare marine one (*Pedem spondylum*) from Java.

Dr. T. P. Lucas, who contributed a further instalment of his paper on Geology, explained, and illustrated by drawings, the various forms of metamorphic rocks, including clay-slates, marbles, &c. He also alluded to the recent work by Professor Darwin on the Earth-worm, reading several extracts therefrom, and expressed the hope that such works might be the means of inducing members of the Club to study more attentively the history of some of the humbler forms of animal life. The customary exhibition of specimens, and conversazione, brought the meeting to a termination. The exhibits included a fine collection of 72 species of the Schizorhina and Lomaptera families of Beetles from various parts of Australia, also 80 species of Beetles recently collected in Gippsland, by Mr. F. De Boulay; Mr. C. French, jun., also exhibited a collection of Beetles from the same district; Nest and Egg of *Anthornis melanura*, by Mr. A. J. North; and Mr. T. A. F. Leith, three fine species of Parrakeets from New Zealand.

## THE MICROSCOPICAL SOCIETY OF VICTORIA.

The ordinary meeting of the Microscopical Society was held last evening at the rooms in Collins-street. There was a good attendance of members.

Mr. F. Barnard read his paper on "A method of preparing Dammar as a medium for mounting," and distributed specimens for experiment.

Dr. Ralph exhibited cyclosis in the American plant *Anacharis alsinastrum.*

The Rev. J. J. Halley exhibited a fine series of slides, showing the latest methods of double and treble staining of plant sections. These were very beautiful and much admired.

Mr. Allen showed a new portable microscope by Baker, of London, an extremely useful instrument, which gave general satisfaction.

Mr. Goldstein showed a series of Steinheil's aplanatic pocket lenses.

The Secretary acknowledged the receipt of a dozen slides, principally of anatomical injected preparations, presented by the Rev. J. Spaven, for the Society's cabinet; also a donation of doubled-stained plant sections, from the Rev. J. J. Halley.

The meeting terminated with the usual conversazione.

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## LINNEAN SOCIETY OF NEW SOUTH WALES.

The ordinary monthly meeting of this Society was held on Wednesday evening, 22nd February, at the Free Public Library, 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. The following gentlemen were elected members of the Society: —Dr. P. H. MacGillivray, of Victoria; Dr. Ewan, Wynyard square; Mr. Bailey, Swanston-street, Melbourne. The receipt of the following donations was acknowledged:—Description of some remains of the Gigantic Land Lizard (*Megalania prisca,* Owen) of Australia, parts II and III, by Professor Owen, C.B.; from the Government of Western Australia—Report on the Forest Resources of Western Australia, by Baron Ferd. von Müeller, K.C.M.G.; Lecture on Injurious Insects, by Miss Eleanor A. Ormerod, F.M.S.; from Professor 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 Pulmoniferous 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; The *Royal Microscopical Society's Journal* for December, 1881; *Southern Science Record,* January, 1882, vol. II, No 1.

The following papers were read:—1. On *Fossarina petterdi* (Brazier), by Professor Hutton, of New Zealand. 2. List of the freshwater shells of New Zealand, by Professor Hutton, New Zealand. 3. On the freshwater fishes of the Palmer River, by the Hon. William Macleay, M.L.C. 4. On the plants of New South Wales (conclusion), by the Rev. Dr. Wools, F.L.S. 5. Botanical Notes in Queensland (part 1), by the Rev. J. E. Tennison-Woods, F.L.S. 6. Remarks on some fluviatile Shells of New South Wales, by John Brazier, C.M.Z.S. 7. On the Zoology of Lord Howe's Island, by E. P. Ramsay, F.L.S.

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, pendant from dry bricks.

Dr. Cox exhibited copies of "White's Voyage to New South Wales, 1790," and "Phillips' 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 a *Helix* from Kent's Group, Bass Straits.

## NOTES, MEMORANDA, &c.

The first number of the New Zealand *Journal of Science* is before us, and we are gratified to find that our anticipations concerning it, expressed in our January issue, are likely to be realised. The articles are of high scientific value, though presented in a less technical form than if contributed to some learned society, and will, therefore, command the attention of many young aspirants to scientific pursuits, who might otherwise be repelled. We heartily agree with our contemporary in saying that no one working at any branch of scientific study, or merely interested in the spread of scientific knowledge, will deny that great advantages are likely to result from such a publication. The want of some closer and more frequent means of communication between our scientific workers than is supplied by the Transactions of Societies has often been expressed, and has latterly become a serious want. Our own attempt to furnish such has met with very fair support, and is, we are happy to say, gradually increasing in favor. Our chief desire in starting the *Southern Science Record* has been to encourage the spread of scientific knowledge amongst those who are prevented by business, or by dwelling at a distance, from attending the meetings of our learned Societies. We therefore willingly accord a hearty greeting to our cotemporary as having similar ends in view, and we trust that the New Zealand *Journal of Science* will meet with the fullest support and encouragement on the part of those for whom it is written, as well as from those in the higher ranks, who desire to obtain aid from willing workers, or to encourage the spread of knowledge and the search for truth. In a brief notice like this we cannot give more than a mere mention of the contents. But we would especially commend the article "On a common New Zealand Pycnogonid, together with a Translation of Semper's Key to the Genera,"* by Mr. G. M. Thompson. This brings the information on the family

* In conjunction with this the student must read Mr. E. B. Wilson's report upon the Pycnogonida of the "Blake" Expedition.—Bull. Mus. Comp. Zool. viii (1881), pp. 239-56 (5 pho.).

down to date, and will be useful for workers in Australia as well as New Zealand.† The same must be said of Professor Hutton's translation of Semper's recent Monograph on "The Genera of Holothuridea," as it will enable any student to classify correctly the numerous members of this class to be found in our Southern seas. Professor Hutton supplies a paper "on Earthquakes." Captain T. Broun gives useful hints "On the Collection and Preservation of Coleoptera. Mr. W. M. Maskell, favorably known for his studies of the Entomostraca, &c., describes "A Visit to the Weka Rock Paintings." Professor T. Jeffrey Parker contributes an article "On the Preservation of Invertebrata." There is also a valuable "Report of the Committee of the British Association on the manner in which Rudimentary Science should be taught, and how Examinations should be held therein in Elementary Schools." Then we have extracts from "Transactions of Societies bearing on New Zealand Natural History, and General Notes, Meetings of Societies, and Correspondence. The journal (of 48 pages) is to be published bi-monthly, and will, no doubt, meet with the encouragement it deserves.

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The Royal Society of South Australia has, with commendable speed, issued the fourth volume of its Transactions and Proceedings, bringing the date to November, 1881. There are 170 pages of matter, most of which is of unusual interest, indicating that the society is entering on a course of good systematic work, which will, doubtless, lead to beneficial results. Foremost amongst the articles of this character stand two of Professor Tate's, contributions "A list of the Charas, Mosses, Liverworts, Lichens, Fungals, and Algals of extra-tropical South Australia," and "A supplement to the Census of Flowering Plants and Ferns" of the same region. These place the student in the position of knowing exactly where he must start from, and will save a deal of annoying work. Mr. J. G. O. Tepper, F.L.S., contributes several articles, two being devoted to a careful description, with plates, of the propagation of *Cymodocea antarctica*, that strange flowering plant, commonly mistaken as a sea-weed, that occurs in enormous quantities along the southern coast of Australia, and yet, previous to Mr. Tepper's work, nothing was known of its habits. The same author supplies a useful paper, very nicely illustrated, "On the Papilionidæ of South Australia," describing 34 species. Mr. Sydney E. Holden contributes a translation of M. Fauvel's recent work on the Staphylinidæ of Australia, giving full descriptions of 32 species found in South Australia. Mr. Gavin Scoular contributes "A sketch of the Geology of the District around Manoora." Mr. W. Rutt, Prof. Tate and Mr. Tepper, also contribute notes on the Geology of the Colony. Mr. S. Smeaton gives "Diagnoses of new species of South Australian Plants," being translated from the *Fragmenta Phytographiæ Australiæ*, and Baron von Müeller gives descriptions of two new plants. There are also several miscellaneous contributions to the natural history of South Australia by various authors, and the Annual Presiden-

† A revision of the Holothuroida, by Dr. H. Ludwig, has been published recently in Zeitschr. f. wiss. Zool., xxxv (1881), pp. 575-99.

tial address, delivered by Prof. Tate, wherein the learned author considers "Geology in its relation to mining and water supply in South Australia," showing the necessity for conducting all such enterprises on careful consideration of the geological characters of the country. This address contains much useful information, and it ought to be printed separately and circulated broad-cast over the Colony. Then follows an abstract of the proceedings of the Society for the year, and the report of theCouncil, the latter giving a very satisfactory statement of the position and prospects of the Society.

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ZOOLOGY OF VICTORIA.—Once more Professor McCoy is to the fore with one of his important works dealing with the Natural History of a part at least of the Australian Continent. The present issue is the sixth of the "Decades," of the Prodromus of Natural History issued by Government. The first lithograph represents the *Rhodona officeri*, a kind of lizard the limbs of which are so small that the reptile is often mistaken for legless, and supposed to be a snake, and on that ground has often been sent to the museum as a novel species of the serpent tribe. Another lithograph showed the *Vermicella annulata*, or black and white ringed snake, a very rare species in Victoria that does not occur further south than Sandhurst. The *Ranoidea aurea*, or green and golden bull-frog, forms the object of another drawing, which gives a splendid idea of this beautiful batrachian, the letter-press giving some interesting facts with respect to this little animal, which is deserving of being kept as a pet equally with the gold and silver fish so common in drawing-rooms. The *Aulopus purpurisatus*, the Australian Aulopus, one of the most magnificently-coloured of Australian fishes, and known in Sydney as the "Sergeant Baker," has two lithographic sheets to itself. That strange sea monster the *Zyguna malleus* (the Hammer-headed Shark) is shown in profile, and the peculiar shape of the head and arrangement of the eyes by a diagram of a view of those parts as taken from below. The same sheet also presents us with a profile of the *Pristiophorus nudipinnis*, or saw-fish, the armed snout of which plays so conspicuous a part among the weapons of the South Sea Islanders. Four of the lithographic sheets are devoted to excellently-drawn figures of Polyzoa, of which fourteen species are given. As may be supposed, with such artists as Messrs. Bartholomew, Ripper, and McGillivray the illustrations are all that can be desired, while the descriptions by the latter gentleman, technical enough to meet the exigencies of scientific men, are full of interesting details, which will certainly suit the popular taste. The present and preceding volumes should be in the hands of every country resident, and resident at, or visitor to, the sea-side. Our sincere hope is that the series will be continued indefinitely, and with greater regularity, and we would like to see more attention given to work done in former years, of which there must be great quantities ready for publication. This would enable students to take up definite and varied lines of study. All new work ought to be left for publication in the transactions of our several learned societies, instead of allowing the Decades to enter into competition with them, not only to their detriment but to the injury and prevention of scientific study by members.

## Two new Orchids from the Solomon-Islands,

DESCRIBED

BY BARON FERD. VON MUELLER, K.C.M.G., M.D., Ph.D., F.R.S.

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### *Bulbophyllum Luckraftii.*

Pseudobulbs truncate-conical, bluntly triangular; leaves solitary, nearly oblong, provided with a very short petiole; flowers rather large, on long and single pedicels; upper lobe of the calyx arched, narrow-lanceolar, channelled; lower lobes broadly adnate to the column, falcate-semilanceolar, convergent, nearly as long as the upper lobe, purplish towards the base and yellow towards the summit; inner lobes linear-lanceolar, purplish-red almost throughout, somewhat shorter than the others and of more tender structure; labellum tongue-shaped, somewhat arched, smooth, not lobed, three or four times shorter than the outer lobes of the calyx, oscillating on a very short unguis, and peltately protruding beyond the latter at the truncated yellowish base; pouch or spur none; column without wings or teeth, free only at its summit; anther very much smaller than the stigma; pollen-masses ovate, the two portions of each very coherent and nearly of equal size; ovary slender.

In the Solomon-Group; Lieut. Luckraft, R.N.

Rhizome creeping; the vaginating scales finally disintegrating into bristles. Pseudobulbs about an inch high. Leaves 3-5 inches long. Odor of flowers peculiar, reminding of that of rhubarb-root. Peduncle obliterated; pedicel rather strong, 2-3 inches long, enclosed at the base by two short cylindrical bracts. Floral bract none. Outer lobes of the calyx about an inch long and somewhat rigid. Column only slightly dilated upwards. Fruit not seen. Shape of leaves and pseudobulbs much like those of *B. Neilgherrense*; the stalklet of the flower similar to that of *B. capillipes*, in which species the inner lobes of the calyx are also not much shorter than the outer; labellum resembling that of *B. (Cirrhopetalum) albidum*; only a slight turgescence indicating the saccate protuberance, usual in the flowers of *Bulbophyllum*, a protrusion wanting also in other species, thus among Australian in *B. Elisæ*. Adopting the genus in the extended scope, given to it by G. Reichenbach and latterly still more so by Bentham, the new orchid here described becomes a congener of *Bulbophyllum*. I owe to Arthur King Esq., son of the justly celebrated Admiral Ph. Park. King, the opportunity of rendering known this pretty and remarkable plant, he having received a living specimen from the unfortunate officer, whose life recently was sacrificed on the field of duty and not far from the place where he obtained the plant now commemorating his name in botanic science also.

### *Eria Kingii.*

Pseudobulbs elongated, consisting of several joints; leaves long, narrow-lanceolar, glabrous, placed in a pair terminally; raceme long, solitary from the base of the pseudobulb, thinly grey-brownish velvet-downy, with very numerous small flowers; pedicels inclusive of ovary considerably longer than the calyces and about three times as long as the ovate lanceolar bracts; upper lobe of the calyx semilanceolar; lower lobes equal in length to the upper, almost deltoid, by their broad adnate and protruding base rendering the calyx short-gibbous; inner lobes glabrous, tender-membranous, reaching the height of the others, lanceolar, these on both sides, the other three on the inner side pale-yellow; labellum a little shorter than the outer calyx-lobes, membranous, glabrous, trifid, its middle lobe roundish-renate, yellow, without any crest or gland, but slightly recurved, its lateral lobes rather conspicuous, semielliptical, shining, pale, ascendant, twisted back by a single longitudinal fold, its lower portion semiovate and smooth; column upwards slightly dilated; pollinia club-shaped.

In Boneta, one of the Solomon-Islands; Lieut. Goldfinch, R.N.

Pseudobulbs several arising together, 6-8 inches long, towards the middle 1-1½ inch in diameter; leaves of similar length, fully an inch wide. Raceme about 9 inches long, small flowered as in *E. polyura*; but the nearest affinity of this new species is with *E. profusa* and *E. pulchella*. I have gladly dedicated it to Mr. King, from whose conservatory the materials for these notes were supplied.

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## Definitions of some new Australian Plants,

BY BARON FERD. VON MUELLER, K.C.M.G., M.D., Ph.D., F.R.S.

(Continued.)

*Lasiopetalum Fitzgibbonii.*—Leaves very short, linear-cylindrical, blunt, scantily beset with short stellate hairs; peduncles very thin, bearing 2-5 cymous or racemous flowers; the whole inflorescence irrespective of its thin starry indument also spreadingly glandular-hairy; bract minute, linear, solitary under each calyx; the latter membranous, cleft nearly to the base, its segments almost linear, gradually pointed, inside nearly glabrous; anthers sessile, blunt; style from repressed fascicular hair densely silky; ovary very thinly downy.

In the back-scrubs of the country at King George's Sound; G. Maxwell.

It has long been the wish of the writer to place publicly on record his high regards for the gentleman who, as executive functionary of the Corporation of Melbourne, was for very many years identified with the rise of our great city, and who invariably exercised his extensive influence in also promoting scientific objects in our midst. In choosing a plant of remarkable rarity and of modest beauty, to bear the name of Mr. Edmund Fitzgibbon, it is thought that thus, as well in the annals of Science as in the precincts of Horticulture, a lasting token of homage could most aptly be bestowed.

*L. Fitzgibbonii* belongs to the section *Corethrostylis*, and approaches in the structure of its flowers somewhat *L. bracteatum*, but introduces an unwonted heath-like habit into the genus.

*Ptychosema trifoliolatum.*

Procumbent, scantily hairy; leaves on capillary stalks, consisting of three leaflets; stipules comparatively large, lanceolar, persistent;

leaflets very small, cuneate-obcordate, without any conspicuous lateral nerves; peduncles long, exceedingly thin, one-flowered, jointed and bracteolated near the summit; lips of the calyx about as long as its tube; teeth of the upper lip deltoid; segments of the lower lip semi-lanceolar; upper and lateral petals yellow, lower petals dark-purplish and rather longer than the latter; ovary broad-linear, with several ovules.

On the Upper Murchison-River; Gale.

In the absence of fruit this neat and delicate little plant is retained in the genus *Ptychosema*, although the leaves are trifoliolate and the leaflets not visibly ribbed. When the fruit shall become known perhaps a distinct generic position (as Galæa) will have to be assigned to this herb. *P. pusillum*, *P. anomalum* and *P. trifoliolatum* differ all in the color of their petals, those of the former being all dark-purplish.

*Mezoneuron Scortechinii.*

Stem cylindrical, greenish, covered with a slight mealy tomentum; leaves consisting of fourteen or less pairs of pinnæ; general rachis very slightly downy, beset with broad somewhat decurrent recurved opposite prickles but generally only at the base of the pinnæ; racheoles rather densely short-hairy, the lowest with 8-10, the others with 14-18 leaflets; the latter obovate or verging into an elliptic form, rather small in size, of thin structure, on very short stalklets, inequilateral towards the base, above nearly glabrous, beneath paler and beset with very short and appressed hairs; racemes many-flowered, constituting a long panicle; the raches, bracts, and stalklets clothed with a short brown tomentum; stalklets not much shorter than the calyces, jointed below the summit, about as long as the narrowly semi-lanceolar finely acuminated bracts; calyces anteriorly very oblique and almost truncated at the base; lateral and upper segments of the calyx oblong, somewhat shorter than the lower canalicular-cymbiform blunt segments, all short-hairy at the back; petals yellow, hardly longer than the calyx, bearded inside towards the base, their lamina obovate, the unguis of the upper petal rather elongated, of the others very short; stamens short-exserted; filaments bearded along their lower half; anthers ovate; style and ovary glabrous; ovules two; pod almost flat, obliquely rhomboid-orbicular, obtuse, of somewhat cartilagineous consistence, bordered along the ventral suture by a broadish-linear firm membrane; seed solitary, on an exceedingly short funicle, orbicular, opaque-greenish.

Known from the forest-regions between the Logan-River (Scortechini), Wide-Bay (Bidwill), and the Burnett-River (F. v. M.).

Bentham from imperfect material mixed two species as *M. brachycarpum*; the name given may be retained for the one, of which he described the flowers; but his account of the fruit refers to *M. Scortechinii*. The credit is due to the rev. gentleman, whose name the second Australian *Mezoneuron* now bears, in having first noticed the differences, while observing plants of both in the jungles of South

Queensland, though he saw of one only the fruits; those of *M. brachycarpum* (as now understood) are very much smaller still than those of the other species; besides they are rhomboid-ovate and acute; further differences,—as pointed out by Mr. Scortechini,—exist in the stem of *M. brachycarpum* being lined by 3 or 4 or occasionally only 2 corky angular prominences, the tomentum of the inflorescence being yellowish and the flowers evidently of lesser size; irrespective of all this I notice the pinnæ to be less in number, the leaflets considerably smaller, the prickles also smaller and not merely accompanying the bases of the pinnæ, but to occupy not rarely also other spaces on the leaf-raches and to occur likewise often along the racemes. Possibly the leaves may be sensitive as in some other congeners. The genus *Mezoneuron* might readily be reduced to *Cæsalpinia.*

*Justicia Bonneyana.*

Shrubby, rather dwarf, all over subtle-downy; branchlets numerous, spreading, finally somewhat spinescent; leaves very small, oblong-linear, blunt, the floral leaves much abbreviated; flowers small, as well terminal as in the upper axillas, very few to each branchlet, almost sessile; bracteoles, minute; calyces deeply 5-cleft, their lobes equal in length and form, lanceolate-linear, not membranous at the margin; upper lip of the corolla semilanceolar-deltoid, bi-denticulated; middle segment of the lower lip oval, lateral segments oblong; two adnate lines decurrent from the upper lip and bearded at the base, indicative of staminodia; fertile filaments rather short; lower anther-cell much longer than its appendage; ovary and lower part of the style subtle-downy; fruit somewhat club-shaped, the lower third of the valves attenuated and solidified; seeds flat, orbicular, sharply rough; retinale upwards dilated, considerably shorter than the seed.

In valleys of hills near Mount Murchison; F. Bonney.

This species conforms rather with the characters of the section *Gendarussa,* than with those of *Rostellularia.*

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## TO SECRETARIES OF SOCIETIES.

It will be observed that we appear this month without our usual reports of several meetings of societies. We must impress upon secretaries and members of the various scientific societies throughout the Colonies the necessity of forwarding to us with regularity their several reports, as it will be obvious that their record gives additional value to our pages.

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## NOTES AND QUERIES, EXCHANGES, &c.

Another means of adding to the usefulness of our journal is afforded by the space devoted to Notes, Queries, Exchanges, &c., to which we invite interesting contributions, which will be inserted gratis. We request our friends, however, to practice brevity, consistent with the importance of their communications.

# On Recent Improvements in Microscopy.

By W. M. Bale.

[Read before the Microscopical Society of Victoria 30th March, 1882.]

If we compare one of the books on the microscope published twenty years ago with the recent work on "Practical Microscopy" of Mr. Davis, or examine the old catalogues of opticians side by side with those lately issued, we cannot fail to be struck by the great difference between the instruments of the present day and those of the earlier period. When the first editions of Carpenter and Hogg's works were published, the Ross model was generally adopted; the stages were square and massive, their cumbrousness generally increasing in proportion to the general complexity and pretensions of the instrument; and the sub-stage bearing was always rigidly fixed in a position perpendicular to the stage. All this is now changed, and it may not be uninteresting to glance at the principal modifications which have become generally adopted, and some of which are not yet familiar, except to readers of special microscopical literature.

The all-essential part of a microscope is of course the objective, and it is to improvements in it that we must look mainly for any increase in the capacity of the instrument for real work. Assuredly we need not be dissatisfied with the progress made of late years in this direction. The application of the water-immersion principle was a great advance, though its full importance was not recognised nor understood for years after it came into general use. Mr. Stephenson's happy suggestion that objectives should be constructed for use with an immersion fluid having the same refractive index as crown glass has been of the very highest value, objectives made on this principle, and known as homogeneous-immersion lenses, being proved capable of better work, where great defining power is required, than could possibly be performed with any other system; and, what is of no small importance, they are much more convenient to work with, not even requiring a collar-adjustment in ordinary cases, and working with facility through thick cover-glasses. Immersion objectives, moreover, have not only been of great value in themselves, but the study of the results obtained by their use has been mainly influential in leading to a better apprehension of the laws of microscopic vision; the admirable researches of Professor Abbe in particular having shown that the perception of minute objects under the highest powers of the microscope is a diffraction-phenomenon, and consequently differs in its nature from ordinary vision, requiring for its study the application of entirely different optical laws. It would be impracticable to give in the present paper a detailed account of the manner in which the immersion system acts; I will merely point out that a pencil of 82° from a balsam-mounted object expands to 180°, or the full hemisphere, on its emergence into air (all rays beyond the 82° not emerging at all), and that the pencil of 82° represents, and is of the same optical value as, the full angle of 180° which would be given out by the object if it were dry and in air. Now as no objective can be of a greater angle than 180°, it follows that no dry objective can take up a pencil of more than 82°, (measured in the balsam) from a balsam-mounted object. But the balsam-mounted object gives out rays to the full angle of 180°, and by interposing a homogeneous-immersion fluid between the objective and the cover, a pencil of rays can be taken up amounting theoretically to nearly 180° in balsam; and homogeneous-immersion objectives have actually been constructed capable of admitting from a balsam-mounted object a pencil of 150°, or 68° more than the equivalent of 180 in air, these 68° consisting of rays which would have had no existence if the object were mounted dry, and which, if it were in balsam with air above the cover instead of the immersion fluid, could never emerge from the cover, and would therefore be lost. As it is shown by Professor Abbe's researches that these oblique extra rays are of the highest importance in delineating the minute structure of an object, the great value of the homogeneous-immersion system is apparent. The water-immersion objective acts similarly, but in a less degree. A pencil of 82° in balsam expands to 97° in water, and a water-immersion lens of that angle takes up all the rays that could enter a dry objective of 180°. It will thus be seen that 180° air-angle, 97° water-angle, and 82° balsam-angle are optically equivalent, and either of these is now spoken of as 1·00 numerical aperture, according to a formula invented by Professor Abbe, the numerical aperture being deduced from the actual angular aperture taken in conjunction with the medium used between objective and cover.

Several opticians (principally in the United States) have lately devoted their attention to producing objectives of all powers with the greatest possible angle of aperture, one of them having constructed a 1in. with an angle of 50°, but the expense alone would prevent such objectives from ever coming into general use, the 1in. alluded to costing £9, or more than a first-class English $\frac{1}{8}$; while such a glass is not nearly so well adapted for ordinary use, especially with the binocular, as one of lower angle.

The increase in the apertures of low-power objectives requires for its full utilization a wider opening at the back of the objective than can be obtained with the Society screw, and a new screw has been adopted in America for use in such cases. The objective screws directly into the lower end of the microscope tube, and when not in use is replaced by an ordinary nose-piece with the Society screw. The new screw is known as the Butterfield broad gauge, and is fitted to the instruments of several makers.

It has been pointed out that the alteration of the collar-adjustment to suit the varying thickness of cover-glasses causes a variation in the magnifying power of the objective, which, when increased by the ocular, may amount to as much as 100 diameters with a high power. This is said to be obviated in the method adopted by the Bausch and Lomb Optical Company, who supply a $\frac{1}{4}$ in which the compensation is effected by varying the thickness of an internal film of glycerine.

The alteration in magnifying power caused by varying the distance between the different lenses of an optical combination has been made to serve a useful purpose by Mr. Zeiss, who has constructed an object glass which can be changed from a 2in. to a 5in. by merely turning the screw-collar, thus giving a range of from 10 to 25 diameters with the A eye-piece alone. Similar glasses are made by Wray and Zentmayer, and will doubtless be constructed by other opticians, as they possess the obvious advantage over separate 2in. and 5in. powers that the change in magnification can be made without removing the glass from the microscope-body, and that any intermediate power can be obtained.

It will interest those who are not possessed of a binocular microscope to learn that binocular eye-pieces are now constructed which, to some extent, supply the place of the double tube.

With regard to illuminating apparatus, the principal fact which meets our notice is a tendency to discard the elaborate achromatic condenser, and substitute for it a non-achromatic and much simpler form, the old theory that for perfect illumination it is requisite to have the condenser as accurately corrected as the objective, being declared without foundation. An oil (homogeneous) immersion condenser has been brought out by Messrs. Powell and Lealand, which is united to the slide by means of a drop of the same immersion fluid as that used with the objective, and this condenser is said to give the best results yet obtained.

A simple but very effective form of condenser, invented by Mr. Wenham, has attracted considerable attention. It consists of a small half-disk of glass with the semicircular margin turned to a particular curve, and the straight edge left flat for attachment to the slide. Several forms of mounting have been devised for this little illuminator, but it is said to work best when merely attached to the lower surface of the slide by a drop of glycerine. Mr. Wenham says that with its aid he succeeded in resolving the striæ on *Amphipleura pellucida*, which he had always previously failed in doing with other appliances.

Passing now to the mechanical part of the microscope, the first point that attracts our notice is the general adoption of the Jackson or crane-arm model of stand, and the corresponding diminution in popularity of the Ross model. Many years ago Dr. Carpenter stated his preference for the Jackson model, on which most of Smith and Beck's instruments were made, and which has been followed in the construction of most of the American microscopes. Some years since, Mr. Ross adopted it for one series of his instruments, and it is said that the firm have now abandoned the old model in its favor. It has also replaced the Ross model in Collins' Harley Binocular; and Swift, Crouch, Browning, and most of the other well-known makers now give it the preference. The editors of the *Journal of the Royal Microscopical Society* state, in a recent number, that the principal reason advanced in favor of the Ross model was that the position of the fine screw at the end of the transverse arm gave a great length of leverage, but they add that the invention of new modes of fine adjustment have obviated the necessity of placing the fine screw at such a distance from the body, and that the superiority of the Jackson model is now fully established. There can be no doubt that of two instruments, made on the different systems, and equal in weight and quality, the Jackson model will be superior to the Ross in steadiness and durability, but it may be noted as one advantage of the latter that it may be separated and packed into a case little more than half as large as would be required for a Jackson stand of the same size. It is to be regretted that all, or nearly all, the better-class microscopes hitherto made in this colony are on the Ross model.

In the excellent "Working Microscope," made originally by Mr. Wales, the limb supporting the body and the stage is nearly semicircular, and has curved grooves cut in each side of about 90° in arc, into which fit shorter curved jaws projecting from the inner side of the upright portions of the foot. By this method the body when inclined towards the horizontal is also carried forward, and the centre of gravity is consequently retained in nearly the same position as when the instrument is vertical. I believe that small microscopes on this model are, or have been, made in the Colony.

Most opticians now supply a solid foot instead of one composed of several parts screwed together, but Messrs. Ross have recently adopted the two upright pillars as in Beck's largest stand, in order to allow of the use of the swinging sub-stage when the microscope is in a vertical position.

In a new form of stand patented by Messrs. Watson, the body swings at the side of a single pillar as in the old "universal" microscope of Smith and Beck, but in the new form the stage is so arranged that an object placed upon it will be in the axis on which the body swings, and will therefore only suffer a movement of rotation when the inclination of the body is changed. The mirror may be detached from its ordinary position and fixed on the foot of the instrument immediately below the stage, and, the light being directed upon the object, the body is inclined from the vertical towards the horizontal position, the object being kept in view at the same time. As the position of the mirror, and consequently the direction of the light, remain unchanged, the object is illuminated by rays which increase in obliquity exactly in proportion as the body is inclined. There is one consideration which seems to me to detract from the value of this mode of illumination. If any observer will take an ordinary microscope and incline it gradually from a vertical position to one nearly horizontal, keeping the eye to the eye-piece while doing so, it will, as a rule, be found necessary to assume a standing attitude at first, with a gradual stooping till the head is nearly at the level of the table; and one trial will probably convince the observer that these are not exactly the best conditions for delicate observations. However, the arrangement may prove useful in some cases, and the instrument is perfectly well fitted for use in the ordinary way, except that the upright pillar, being at the side of the stage instead of behind it, would prevent the left hand having free access to the object.

Crossley's microscope, also made by Messrs. Watson, provides for the continued illumination of the object during changes in the position of the body on its horizontal axis, by means of an arrangement of prisms, but the instrument is noticed principally on account of its unrivalled ugliness.

With respect to the stage, the main improvements which have been made consist of the general introduction of the concentric rotating plate, and the substitution of a stage of moderate thickness in place of the enormous metal scaffolding which composed the mechanical stage of former years. The concentric rotating movement was strongly recommended by Dr. Carpenter some years ago, and is now applied to all microscopes of any pretensions, with or without the rectangular motions. Mr. Swift makes a centering nose-piece for the objective, enabling it, by means of screws and opposing springs, to be moved slightly in any direction till its axis is exactly concentric with that of the stage rotation. With the adoption of the concentric motion, the shape of the stage has changed from square to circular, the corners being of no service, and preventing all-round access to the edges of the rotary plate.

When the advantage of the use of very oblique light came to be fully appreciated, it was found that the complicated mechanical stage was far too thick to allow full use to be made of this kind of illumination, and hence arose a demand for thin stages, which has been so completely responded to, that stages are now produced fitted with rotary and rectangular movements, and not exceeding one-fourth of an inch in thickness. The inconvenience caused by the projecting milled heads of the rectangular movements preventing the complete rotation of the stage has been lately remedied by the plan (introduced by Mr. Tolles) of placing these milled heads in a position horizontal to the stage and within its circumference, and Messrs. Watson have improved upon Mr. Tolles' design by placing both milled heads on one axis (on the Turrell principle), the stage thus constructed being the most perfect form yet devised. While on the subject of the mechanical stages, I may express the opinion that, though they are no doubt necessary with high powers, they are in other cases simply nuisances. After using a stage fitted only with a top plate sliding smoothly in all directions, I find it intolerably tedious to use a mechanical stage with its limited movements; and while working with powers not higher than the quarter-inch, I would prefer to be without it, unless, indeed, it were provided with a sliding plate moveable freely in any direction by the fingers.

The last subject to which I shall allude is the swinging sub-stage and the sectoral traversing illuminator, by either of which the illuminating apparatus can be swung laterally in an arc concentric with the object on the stage, furnishing a ready and convenient means of obtaining light of varying obliquity. In some forms, the range of motion is sufficient to allow the sub-stage apparatus, or the mirror alone, to be brought above the stage and used in that position. By means of a graduated arc, it is easy to register the exact position which is suitable for the resolution of any particular test, and to secure the same result whenever required. A fierce battle has been waged between rival opticians in the United States on the question of priority in this invention, but investigation has shown that it was made in Great Britain and Europe long before its re-invention in the United States, and that it was patented by Mr. Grubb, in Dublin, as far back as 1853. Mr. Nachet's form was peculiar in swinging from back to front instead of laterally, and still more in possessing a piece of mechanism by which the light from the prism was kept constantly directed upon the object while the prism itself was swung through its whole range, a much more convenient means of viewing an object under varying obliquity of light than that afforded by the Watson microscope mentioned above.

Though swinging sub-stages have already come largely into use for microscopes of all classes, opinion is divided as to their utility, and it has been urged that, as the widest possible angle of illumination can be obtained by the use of the oil-immersion condenser, they are superfluous, and not so convenient as the rigid form. It is difficult to see, however, why the radial motion should be disadvantageous, since it is an easy matter, at least in that form in which the sub-stage support travels in a grooved arc, to clamp it in the axial position when the lateral motion is not required.

We have passed in review only the most important of the recent modifications which have been introduced into the construction of the microscope, and cannot even glance at the many minor inventions which are constantly brought forward. Every number of the *Journal of the Royal Microscopical Society* teems with descriptions and illustrations of new microscopes, apparatus, and processes for preparing and mounting objects; and the student who requires information on any of these subjects can refer to it in the assurance that nothing of real importance, wherever published, will fail to receive due notice in its pages.

## Families of Coleoptera, or Beetles.

By W. H. Wooster,

Member of the Microscopical Society of Victoria.

### PART VI.

Rhipiphoridæ (or, more correctly, Rhipidophoridæ).—*Shape*, narrow, arched, narrower behind, firm. *Head*, vertical, rests on fore coxæ, narrow-necked. *Jaws*, without membranous plate, which is present in *Mordellidæ*. *Eyes*, large, entire, or notched. *Antennæ*, 11 or 10-jointed, insertion various, pectinate or flabellate in male, generally serrate in female. *Thorax*, as wide as elytra at base. *Elytra*, cover abdomen, or short and dehiscent. *Legs*, longish. *Hind feet*, 4-jointed, rest 5, penultimate joint entire. *Claws*, mostly pectinate or dentate. *Abdomen*, of 6-8 segments. *Size*, ¼ to 1 inch. *Colors*, mostly obscure, some spotted. Found on shrubs. Fifteen species are named in Masters' catalogue, two of them Victorian.

Stylopidæ.—*Females*, wingless and larviform. *Males, head*, prominent, vertical, transverse, produced laterally. *Eyes*, prominent, very coarsely granular, on side-projections of head. *Oral organs*, rudimentary, except the jaws and a pair of palpi. *Antennæ*, inserted within the base of said projections, 4-7-jointed, forked. *Metathorax*, very large. *Elytra*, very small and narrow. *Wings*, very large and fan-like. *Legs*, moderate, weak. *Feet*, 2-4-jointed, with cushions below and no claws. *Abdomen*, of 7-9 segments. These are very minute, and parasitic upon bees. In older systems they formed a separate order, STREPSIPTERA.

MELOIDÆ (CANTHARIDÆ of most authors).—*Shape*, oblong, often narrow, rather soft. *Head*, sloping, dilated behind eyes, abruptly necked, free from thorax. *Eyes*, mostly large, notched or entire. *Antennæ*, 11-jointed, seldom less, inserted laterally and before eyes (except *Phodaga*), of various form. *Thorax*, narrower than elytra. *Elytra*, generally flexible, imperfectly clasping the body. *Shanks*, spurred. *Hind feet*, 4-jointed, rest 5, penultimate mostly simple. *Claws*, depressed, split, lower part generally slender, seldom replaced by a tooth. *Abdomen*, of 5 or 6 segments. *Colors*, much variegated, some metallic. *Length*, ¼ to 1¼ inch. Found on plants, &c. Many are medicinal, used for blistering, &c. Masters records 18 species, two Victorian, though I have taken more.

ŒDIMERIDÆ.—*Shape*, long and narrow or elongate-ovate. *Head*, gradually narrowed behind, and ending in a snout of various lengths, seldom a rostrum. *Antennæ*, 11 or 12-jointed, mostly filiform, not covered, inserted before eyes, and at a varying distance from them. *Thorax*, narrower than elytra, which clasp the abdomen imperfectly behind. *Hind feet*, 4-jointed, rest 5, penultimate joint of hind feet generally sub-bilobed. *Claws*, simple. *Abdomen*, of 5 or 6 segments. *Hind thighs* of some males much thickened. Found on flowers, and hedges, and under bark. *Colors*, dull to lively. *Length*, ¼ to ¾ inch. Nineteen species appear in the catalogue, three as Victorian, but I have secured a dozen or more.

CURCULIONIDÆ.—*Shape*, oblong or oblong-oval, often narrowed before, in some linear, firm. *Head*, nearly always produced into a long rostrum, with the oral organs at the end. No *upper lip*; rest of the oral organs complete. *Antennæ*, inserted on snout, 8-12-jointed, mostly elbowed at end of first joint, and clubbed at tip. *Eyes*, various. *Feet*, generally spongy below, and sub-pentamerous, *i.e.*, with a rudimentary joint at the base of the claw-joint; 3rd joint mostly bilobed. *Abdomen*, with 5, seldom 6 segments. *Body*, often scaly. *Colors*, dull to superb. *Length*, $\frac{1}{12}$ to 1½ inch. Found on trees, shrubs, and herbs, and under bark, stones, &c., and in granaries. Many are injurious to grain, seeds, &c. This is one of the most numerous families, over 850 Australian species being catalogued; a large number inhabit our Colony.

SCOLYTIDÆ.—*Shape*, oblong to oval or sub-cylindric, convex and rounded above, firm. *Head*, various in form, mostly with a short snout deeply sunk in the thorax. *Antennæ*, inserted on side of snout, or between the eyes and jaws (except Phlœotribus), short, elbowed, pectinated in some with apparently 3-12 joints, the last a club of various form. *Eyes*, mostly large and transverse. *Shanks*, compressed, generally denticulate at outer edge. *Feet*, sub-pentamerous, filiform, not spongy below, 3rd joint entire or bilobed, never wide. *Abdomen*, of 5 segments. *Colors*, obscure, under ½ inch long. Found in timber, which they destroy very extensively. Only 9 species appear in Masters' list, none being set down to this Colony, though a few kinds are found in it.

BRENTHIDÆ.—*Shape*, very long, narrow, often linear, firm. *Head*, mostly produced into a very long rostrum, especially in the males, with the oral organs at its end, chin-plate generally very large, hiding the maxillæ and their palpi. *Upper lip*, absent. *Antennæ*, straight, inserted on rostrum, 11-jointed, seldom (Urocerus) 9-jointed. *Eyes*, round. *Feet*, mostly spongy below, sub-pentamerous, 3rd joint entire or bilobed. *Abdomen*, with 5 segments, first 2 (except *Nothogaster*) very long. *Colors*, black or brown, with red or yellow spots or lines. Found on felled trees, under bark, in ants' nests, &c. Masters mentions 10 species, and allows 2 to Victoria, but 4 or 5 have already been taken.

ANTHRIBIDÆ (Anthotribidæ of Masters' Catalogue).—*Shape*, oblong, firm. *Head*, produced into a long or short rostrum, always more or less robust. All the *palpi* with the last joint elongated and attenuated at end. *Jaws*, more or less prominent. *Upper lip*, distinct, rounded and ciliated in front. *Antennæ*, inserted on rostrum, straight, 11-jointed, filiform, or with a club of 3 to 5 joints. *Eyes*, large, notched or entire. *Thorax*, with transverse keel at or near base, re-ascending on the sides. *Shanks*, truncate at ends, never mucronate or spined. *Feet*, 4-jointed, 3rd joint mostly very small and hid between the lobes of the 2nd. *Claws*, free, with a tooth below. *Abdomen*, of 6 segments, *Pygidium*, uncovered. Found on old wood, tree-trunks, flowers, and fungi. *Colors*, dull, with darker patches. In some males the antennæ are twice or thrice as long as the body. *Length*, $\frac{1}{4}$ to 1 inch. Eighteen species appear in the catalogue, only 2 for Victoria, where they seem to be rare.

BRUCHIDÆ.—*Shape*, oval or oblong, firm. *Head*, sloping, with moderate rostrum, truncate at end. *Palpi*, with last joint sub-cylindric or sub-ovate. *Upper lip*, distinct, transverse, rounded and ciliated in front. *Antennæ*, inserted before and near the eyes, uncovered, seldom on sides of rostrum, with 11 joints, super-foliate, serrate, or pectinate, seldom with 3-jointed club. *Eyes*, large, notched. *Feet*, 4-jointed, spongy below, 3rd joint bilobed. *Claws*, with an appendage. *Abdomen*, of 5 segments, 1st longest. *Pygidium*, uncovered. Found on plants, mostly of the order *Leguminosæ*, of which the larvæ eat the seeds.

## NATIVE PLANTS OF THE GRAMPIANS AND VICINITY.

Arranged generally under the direction of

BARON FERD. VON MUELLER, K.C.M.G., Government Botanist.

BY D. SULLIVAN.

[Read before the Field Naturalists' Club of Victoria 23rd January, 1882.]

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### PART II.

#### (6.) VIOLACEÆ.

*Viola hederacea*—(LABILL).—Humid places from the lowlands to an altitude of 3,000 feet on the mountains.

*betonicifolia*—(SMITH).—On moist grassy flats, and on wet slopes of granite ridges, not common.

*Hymenanthera Banksii*—(F. v. M.).—On Mount Ararat and other granite ridges of the district.

#### (7.) PITTOSPOREÆ.

*Bursaria spinosa*—(CAVANILLES).—Scrub ridges throughout the district. A variety on Mount Ararat assumes the dimensions of a small tree, and is almost free of spines.

*Marianthus procumbens*—(BENTH.).—Lower ridges of the Grampians, rare.

*bignoniaceus*—(F. v. M.).—Twining among shrubs and small trees in most of the gullies of the Grampians, especially those of Mount William.

*Billardiera cymosa*—(F. v. M.).—Banks of rocky rivulets of the Grampians, also on the summit of the Black Range, not of common occurrence.

#### (8). DROSERACEÆ.

*Drosera Whitackeri*—(PLANCHON).—In all parts of the district.

*spathulata*—(LABILL).—Abounding over the entire district, and ascending the mountains to a height of 1,200 feet.

*binata*—(LABILL).—About mountain streams, not common.

*peltata*—(SMITH).—Generally distributed through the district, but more abundant on heaths.

*auriculata*—(BACKHOUSE).—Throughout the district, including the heath-grounds.

*pygmæa*—(D. C.).—On humid heath-ground about Mount William and a few other mountains. This little plant is possibly more widely distributed than is generally thought, being so very minute that it is easily overlooked.

*glanduligera*—(LEHMANN).—On sandy soils, not common.

*Menziesii*—(R. BR.).—On scrub-hills and heaths, widely diffused over the district.

### (9.) Hypericineæ.

*Hypericum japonicum*—(Thunberg).—On the mountains and lowlands, common.

### (10.) Polygaleæ.

*Comesperma calymega*—(Labill).—On heaths and sand-hills over the whole district.

*polygaloides*—(F. v. M.).—Low-lying lands, not common.

*defoliatum*—(F. v. M.).—On springy slopes at an elevation of 1,500 feet on Mount William.

*retusum*—(Labill).—Consociated with *C. defoliatum*, both being found on a few spots only.

*volubile*—(Labill).—Twining among bushes along the water-courses of Mount William, and less frequently on the arid ridges of the other ranges.

### (11.) Tremandreæ.

*Tetratheca ciliata*—(Lindley).—Common throughout the entire district, reaching to the sub-alpine summit of Mount William.

*pilosa*—(Labill).—On heaths in a few places about the various ranges, nowhere abundant.

### (12.) Rutaceæ.

*Correa æmula*—(F. v. M.).—In all the gullies of Mount William and less frequently in those of the adjoining mountains.

*speciosa*—(Andrews).—Scrub-country and on the ridges of the Grampians. The mountain variety has narrow leaves, and is generally taller than the lowland variety.

*Lawrenciana*— (Hooker).—On the summit of Mount William. Height, only 2-4 feet.

*Zieria Smithii*—(Andrews).— Rare on the western slopes of the mountains.

*Boronia polygalifolia* — (Smith.)— Common on the ridges of the mountains to 1,000 feet.

*pinnata*—(Smith).—Summit of Mount William only. Height 2-3 feet.

*cærulescens*—(F. v. M.).—Very rare on some of the ridges of the Grampians.

*arborescens*—(F. v. M.).—Gullies of the western side of the Grampians, rare.

*Eriostemon Hillebrandi*—(F. v. M.).—About the streams, in the gullies, and on the ridges of the mountains to a height of 1,000 feet. Height, 2-3 feet.

*lepidotus*—(Sprengel).—On the Grampians near Rose's Gap, rare.

*verrucosus*—(A. Richard).—On Mount Zero, rare.

*Eriostemon pleurandroides*—(F. v. M.).—On the Serra and Victoria Ranges, rare. It abounds more on Mount Sturgeon than anywhere else.

### (13). Geraniaceae.

*Geranium dissectum* — (Linne). — Throughout the entire district, reaching some of the gullies of the Grampians.

*Pelargonium Australe*—(Willd.).—From the lowlands to a height of 3,000 feet on the mountains.

*Erodium cygnorum*—(Nees).—Granite ranges near Mount William, Black range, Mount Ararat, and sparingly scattered over the interjacent country.

*Oxalis corniculata*—(Linne).—Everywhere throughout the district, and ascending the mountains to a height of 2,000 feet.

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## The Carenums of Mulwala.

By Thomas G. Sloane.

[Read before the Field Naturalists' Club of Victoria 13th February, 1882.]

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PART II—(Concluded).

In the first part of this paper, read before the Field Naturalists' Club at the October meeting, I mentioned six genera as forming the *Carenum* group of Scaritidæ found at Mulwala. These were *Carenum* —the central genus of the group,—*Philoscaphus*, *Eutoma*, *Carenidium*, and *Conopterum*,—genera very closely allied to, and dependent on, *Carenum*,—and *Euryscaphus*, a genus on whose position there has been some discussion. The late Count de Castlenau merged it in *Scaraphites;* and Mr. McLeay—the founder of the genus,—in opposition to that opinion, declared that "the *Euryscaphi* are gigantic *Carenums*, and are as far removed from *Scaraphites* as are any two genera of the family" (*Scaritidæ*). Without attempting to define their position in regard to *Scaraphites*, I may say that I fully concur in Mr. McLeay's opinion that the *Euryscaphi* are very near relatives of the *Carenums*.

In the present paper, I have a modification to make in the above list of genera, for, since writing the first part, I have come to the conclusion that the beetle I had then considered a species of *Carenidium* cannot be so; and I now, though with doubt, place it in *Neocarenum*, a genus connecting *Eutoma* with *Carenum*.

6. *Philoscaphus carinatus*—(McLeay, W.).—I have no doubt this species is *P. carinatus*, as it agrees in all essential points with Mr. McLeay's description of that beetle. *P. carinatus* is, as far as I know, a species by itself; it may easily be distinguished by its curiously marked elytra, which have a strong costa extending from each shoulder to near the apex, considerably within the margin, and parallel to it. The elytra between these costæ are flat and covered with transverse wrinkles; the dorsal line is faint. Its colour is entirely black. The fore tibiæ are tridentate. The length is 8 lines, the breadth 3 lines.

This is an extremely rare insect; I only know of two specimens having been taken here, and those in different years, but in exactly the same spot. Its range is considerable, as Mr. McLeay's specimens were taken near Goulburn. My specimens were taken on a sandhill, one in September, the other in October.

7. *Philoscaphus tuberculatus*—(McLeay, W.).—This is the typical species of the genus; it is a large insect, being 14 lines long, and 5 lines broad. The color is dull black, the elytra are covered with rows of flattish tubercles, and the fore tibiæ are tridentate. This beetle invariably lives in a hole, being the best digger of its tribe hereabouts. The hole is made under a log, and the beetle lies hidden in it all day, coming out by night to look for food. From its very fossorial habits, it is difficult to find; besides, it is not at all a common insect, though very widely distributed, its habitat, according to Mr. McLeay, "extending from East to West from the Murrumbidgee to South Australia, and probably having an equally wide range from North to South." It is taken here from August to December, but I do not think the perfect insect is developed before the middle of October, as all the specimens I have taken before that month showed, by their battered appearance and worn mandibles, that they had lived through the winter; yet I have never found this beetle in the autumn —most likely from not looking carefully for it at that time of year. This season I got an immature specimen as late as the 21st November. It lives in sandy soil: the best place to find it is along the margin of a sand ridge.

8. *Neocarenum*?—(Sp.)—The position of this species is evidently between *Carenum* and *Eutoma*, and its general shape seems to be that of a *Neocarenum*; so I have placed it in that genus. To receive it, however, the genus would require some modification of its characters, as laid down by Count de Castlenau: he describes the palpi of *Neocarenum* as "maxillary ended by one article, long, narrow, arched, and rounded at its extremities." Now, in the present species, the palpi are very securiform, even more so than in *Eutoma*; and the antennæ are slight, and do *not* get thicker towards the end. The name of the species is unknown to me, but there is no probability of its being one of those given in Masters' Catalogue; so it is very likely new. It is a narrow beetle, and its body is very cylindrical. The head is light, almost square, and narrowed behind; the facial grooves slant obliquely inwards from behind the eyes to the clypeus. Before reaching the clypeus, each sends off a branch sharply towards the anterior angles of the head, enclosing a punctiform impression. The thorax is slightly convex, and has a distinct margin—not reflexed; its sides are parallel, and its base rounded; the medial line is lightly marked. The elytra are quite smooth, and have a glossier appearance than the thorax and head; they are rather narrower at the base than towards the apex; the shoulders are prominent; each elytron is very much rounded thereby, rendering the dorsal line very distinct. At the apex they are produced into a strong and blunt tooth, which is a most conspicuous feature in this beetle. The length is 12 lines, breadth 3 lines. Of its habits I know nothing. The present specimen (the only one I have

ever seen) was taken in October 1879, under a log; and, although I have searched for it a great many times since, my efforts have been without success.

9. *Eutoma*—(Sp.).—The genus *Eutoma* is distinguished by its linear form and cylindric shape; it has the fore tibiæ bidentate, and the palpi very securiform. The present species shows the typical form of the genus. It is a very pretty beetle, the elytra being of a fine purple color, while the head and thorax are shining black. Its size varies from 7 to 10 lines in length; the smaller specimens having the elytra of a much more vivid purple than the larger ones, some of which appear almost black. This species is found about here wherever the soil is sandy; specimens being easily obtained during the months of September, October, and November. The observations I have been able to make, when collecting, show that this beetle does not live in a hole made by itself, like most of its congeners; but it merely hides away under logs. It seems to have a taste for white-ants, being often found beneath pieces of wood infested with these insects. I remember once seeing a *Eutoma* catch and masticate two white-ants while I looked on, after turning the stick which harboured both the "ants" and it. The *Eutoma* did not seem to notice immediately that its cover was gone, but caught an ant and chewed it up (extracting the juice and casting away the hard parts in a very short time), then it caught another. After finishing the second, it either became alarmed, or was satisfied; for it showed no disposition for more; so, being in want of specimens, I transferred it to my collecting bottle.

10. *Conopterum?*—(Sp.)—This is the largest of the *Carenum* tribe found at Mulwala. It is, I believe, a species of *Conopterum*, a genus I know very little about. The specimen shown was found lying dead, exposed to the force of the sun, towards the end of last November. It is quite black, with the exception of a thin margin of violet round the elytra. I had not, previous to finding this specimen, taken it since October 1879, when I got several examples: these differed in colour from the one now shown, the thorax and elytra being broadly margined with bright green, while a greenish tinge pervaded the disc of the latter. The loss of the green colour, which was so noticeable in my former specimens, I attribute, in the present instance, to the action of the sun. This is a big specimen,—the length is 16 lines, the breadth 5 lines. The head is large, being, without the jaws, nearly as long as the thorax; it is narrower than the thorax, the facial grooves are oblique and deeply cut, and the jaws are very strong. The thorax is broader than long, rounded at the sides, the base being truncate; the disc is covered with fine transverse striolæ, and the medial line is distinct. The elytra are broader than the thorax, and more than twice the length. They taper off from a little behind the shoulders to the apex, the shoulders being rounded off towards the base, which is truncate. They are without impressions except along the margin. The antennæ are slight, and thinner towards the end. The palpi (which are wanting in the present specimen) are larger, and more hatchet-shaped, than in any Carenum I have examined. The fore tibiæ are bidentate. All I know of its habits is, that my

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specimens, taken in 1879, were found under logs, on sandy ground. Its distribution seems to be general in this neighbourhood.

The next genus is *Euryscaphus*, the only one treated of in this paper, which cannot, in my opinion, be called a *sub-genus* of *Carenum*. It is very nearly allied to *Carenum*; the affinity of the present species is, I would say, both in habits and form, towards the group *Carenum* represented by the species numbered 3 in my former paper, and in the collection now shown.

11. *Euryscaphus*? — (Sp.).— Length 14 lines, breadth 6 lines. Colour, shining black. The thorax is transverse, with a strong reflexed margin: it is circular behind, with the base slightly lobate. The elytra are broad, scooped out at the base, convex, and strongly margined, the margin being reflexed, especially at the shoulders. This beetle is a very good digger, nearly always living in holes, though, in a dry season like the last was, those developed after the early rains do not seem to burrow so much, for, while almost all the specimens I found last Spring, before the middle of October, when the ground was moist, were dug out of their holes, nearly all those found after that time were without holes; this was, no doubt, caused by the unfavorable nature of the ground, owing to want of rain. I do not know if it lives for more than one season; the earliest specimens I have taken in the month of August were always newly developed. It is found from the middle of August to the end of November. Its habitat is among sandhills. I got a great many specimens last Spring, all about one place, on sandy ground, and over an area not exceeding one hundred acres. This place is situated in the midst of a group of sandhills several miles long; yet the *Euryscaphus* is not found throughout the sandhills, but only in one spot. Most of the specimens were found in a cultivation paddock, on part of it that had not been ploughed: here these insects might be taken under nearly every stick lying on the ground. The reason for this preference seems to be, that the herbage in the cultivation paddock is not destroyed by stock during half the year; and, as a consequence, caterpillars and grubs are more plentiful there than in places where the stock are always grazing. As grubs probably form the chief food of these beetles (I remember once unearthing one from its hole where it was feasting on a large grub), the conservation of grass in this paddock, in all likelihood, renders it a more suitable place for *Euryscaphi* than the barer surrounding sandhills. I first found this beetle in the Spring of 1879, before which time I had not paid much attention to collecting the *Scaritidæ*. Since then it has increased greatly in the one spot, to the apparent disadvantage of *Carenum interruptum*, the common *Carenum* of these sandhills. Last year and the year before, *C. interruptum* was quite a common beetle in the cultivation paddock; but this season, though plentiful enough outside, I did not get a specimen in the paddock.

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# Oology of Australian Birds.

By A. J. Campbell.

## Part v.—Order—INSESSORES.—(*Continued.*)

### Family—*Saxicolidæ.*—(Continued.)

170. Amaurodryas vittata—(Dusky Robin). *Locality*—Tasmania and King's Island. *Egg*—Differs in color from those of every other member of the genus, but more nearly assimilates in tint and markings to those of *Melanodryas cucullata* than of any other. It is of a light greenish blue, freckled and spotted with indistinct markings of brown. Length $10\frac{1}{2}$ lines; breadth 8 lines. It is rather remarkable that, out of every clutch, one egg is generally more greenish than the others.

174. Drymodes superciliaris—(Eastern Scrub-Robin). *Locality*—North Australia. *Egg*—Regular oval shape, and of a very light stone-grey thickly covered with small umber blotches, increasing in size, and more thickly placed at the larger end. Length 1 inch; breadth $8\frac{1}{2}$ lines.

175. Eopsaltria australis—(Yellow-breasted Robin). *Locality*—New South Wales and Victoria. *Egg*—Bright apple-green, speckled, and spotted all over with chestnut brown and blackish-brown, the latter tint being much less conspicuous than the former. Length $9\frac{1}{2}$ lines; breadth $7\frac{1}{2}$ lines.

176. Eopsaltria griseogularis—(Grey-breasted Robin). *Locality*—South and West Australia. *Egg*—More lengthened in form than those of *E. Australis*, and of a wood-brown, obscurely freckled with yellowish red. Length 10 lines; breadth $7\frac{1}{2}$ lines.

### Family—*Menuridæ.*

179. Menura superba—(Lyre-Bird). *Locality*—New South Wales. *Egg*—Not described in Gould's work, nor do I possess one in my collection, but I noticed one in the Macleayan Museum, Sydney, which appeared exactly similar in shape, size, and coloring to that of the *M. Victoriæ*. The three species of this extraordinary genus only lay a single egg each in a season.

180. Menura Victoriæ—(Queen Victoria's Lyre-Bird). *Locality*—Victoria. *Egg*—Ground-color, dark purplish-grey, with numerous spots of umber or chocolate, about as many spots of dark violet or a darker hue of the ground-color appearing beneath the surface of the shell, both classes of markings being more thickly blended about the top of the egg, where they are inclined to form a belt, other specimens, instead of being spotted, are blotched or smudged. Character of the shell: surface, somewhat rough, depressed all over with pin-point-like indents, and with, sometimes, little ridges like the fibrous ribs of a leaf. An egg taken at Warragul measured—length $2\frac{1}{2}$ inches; breadth $1\frac{5}{8}$ inches. Another from Wood's Point district—length $2\frac{3}{8}$ inches; breadth $1\frac{5}{8}$ inches.

There is a curious fact, not hitherto mentioned, in connection with the nidification of this bird, that if its nest be discovered when building, it will desert or destroy the partly-formed structure, and commence operations elsewhere; or if the egg be laid, and be handled, and replaced in the nest, the bird will immediately forsake it.

181. MENURA ALBERTI—(Prince Albert's Lyre-Bird). *Locality*—Queensland and New South Wales. *Egg*—Deep purplish chocolate, irregularly blotched and freckled with a darker color. Length barely $2\frac{1}{4}$ inches; breadth $1\frac{3}{4}$ inches.

182. PSOPHODES CREPITANS—(Coach-whip Bird). *Locality*—Queensland, New South Wales, and Victoria. *Egg*—Greenish-white, sparingly dotted with black and greyish-black, the latter color appearing as if beneath the surface of the shell, and the spots being most numerous at the large end. In some specimens the markings assume the form of commas, small oblique dashes, and crooked Hebrew-like characters. The egg is lengthened and elegant in form. Length 1 inch 1 line; breadth $9\frac{1}{2}$ lines.

184. SPHENOSTOMA CRISTATUM—(Crested Wedge-Tail). *Locality*—New South Wales, Victoria, and South Australia. *Egg*—Like that of *Psophodes crepitans*, lengthened and elegant in form, ground-color, delicate greenish-blue, thinly sprinkled with purplish black specks, particularly at the larger end. In some instances these purple-black specks and markings assume forms similar to those described as occuring on the egg of *P. crepitans*. Length $11\frac{1}{2}$ lines; breadth $7\frac{1}{2}$ lines.

# PROCEEDINGS OF SOCIETIES.

## THE FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Field Naturalists' Club of Victoria was held in the Royal Society's Hall, on Monday evening, 13th March, there being a very good attendance of members. Mr. H. Watts occupied the chair.

A ballot was taken for Messrs. Lilley, H. J. Hellicar, and E. Petherick, who were duly elected members of the Club.

Mr. Thos. G. Sloane, of Mulwala, New South Wales, who, although one of the oldest members, only now made his first appearance, read the concluding part of his paper on the Carenums of that neighbourhood. It comprised the genera *Philoscaphus*, *Neocarenum*, *Eutoma*, and *Conopterum*, of which he not only gave an accurate description, but related many interesting particulars of their habits, &c.

Mr. J. R. Y. Goldstein, whose contributions are always most attentively listened to, read the third part of his "Elementary Studies in Biology," the subject, on this occasion, being the *Amœba*, which is one of the lowest forms of animal life.

Two freshwater plants, viz., the *Azolla*, of a very pretty fern-like form, and *Volvox globator*, both taken in the swamps near Heidelberg, and exhibited alive, enabled Mr. H. Watts to entertain the meeting with a graphic account of their manner of reproduction.

The exhibition of specimens was an exceptionally good one. Mr. C. French exhibited a magnificent lot of Paradise and other rare birds from New Guinea, also a box of fine Coleoptera from New Caledonia; and an interesting series of sixteen Australian and two New Zealand Robins, by Mr. T. A. F. Leith; 123 species of Australian Carenums and 23 of Scariphites, by F. Du Boulay; Egg of *Parra gallinacea*, very rare, by A. J. North; New Victorian Shells of the genera Leiopyrga and Trophon; specimens of *Lepidopterus antiquis* and *L. picturata* from Sydney Harbour, and a very useful form of collecting-boxes, by J. F. Bailey; a young Alligator, probably only a day or two old, from Port Darwin, by F. G. A. Barnard; Coleoptera and Lepidoptera, by J. E. Dixon and T. Hyland, the former showing an apparently new Longicorn, and the latter one of the rare *Æsiotyche favosa.*

A successful meeting was brought to a termination by the customary conversazione.

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## THE MICROSCOPICAL SOCIETY OF VICTORIA.

The ordinary meeting of this Society took place on Thursday evening, 30th March, at the Rooms, in Collins street east. The Rev. J. J. Halley occupied the chair, and there was a fair attendance of members.

The Rev. J. J. Halley gave a very interesting account of a visit to the Zoological Station at Naples, presided over by Mr. Anton Dohrn; and also described the magnificent work in course of publication there on the Marine Fauna and Flora of the Mediterranean.

Mr. W. M. Bale read some notes on recent improvements in Microscopy, giving a general *resumé* of the principal changes in the construction of the microscope which have been generally adopted by opticians within the last few years.

A number of interesting specimens were exhibited, among which some Polycistina, from the *Challenger* dredgings, shown by Mr. Halley, attracted special attention.

Dr. Ralph, the President, having recently left on a visit to England, it was resolved that the Secretary should write to him, in the name of the Society, expressing their hope that he would have a pleasant trip.

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# Correspondence.

## A CORRECTION.

*To the Editor of the Southern Science Record.*

Sir,—In a late number of this Journal, mention is made by Mr. W. R. Guilfoyle of *Duboisia Pituri* (Bancroft). Such appellation must by all means be deprecated. The plant, which Dr. Bancroft calls *Duboisia Pituri*, is in all respects identical with *Duboisia Hopwoodii* of Baron von Müeller. The specific description and name given by the Baron date as far back as January 1876, and the name and *no* description of Dr. Bancroft is posterior by over three years—September 1879. There was no warrant for this change, even if many new therapeutic qualities inherent to this plant had been discovered by the Doctor. It was a clear breach of the laws of botanical nomenclature, and, unfortunately, then it passed unnoticed. As the error now again creeps into a scientific journal, and, if perpetuated, might lead to confusion, it is well to raise the voice against arbitrary changing of scientific names, in the interest of Science, whose progress would by it be greatly impeded.

Queensland, 14th April, 1882. B. Scortechini.

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# NOTES, MEMORANDA, &c.

The Proceedings of the Linnean Society of New South Wales, part 4, vol. vi, contains a more than usually varied and extensive series of contributions. It comprises three further instalments of the Rev. Dr. Woolls' paper on the Plants of New South Wales, with notes by the same author on *Palmeria,* on the New South Wales species of *Alsophila,* and on Popular Nomenclature. Mr. E. P. Ramsay contributes papers on the occurrence of *Pseudophycis breviusculus* in Port Jackson, on a new species of Honey-eater from New Guinea, and on the Zoology of the Solomon Islands, with descriptions of some new birds; also a description of a supposed new species of rat from the interior of New South Wales, a note on the range of *Pycnoptilus floccossus,* Gould, and *Pachycephala olivacea,* Vig. and H.; one on a new species of *Therapon,* and another on a new species of *Eurystopodus.* Mr. W. A. Haswell describes a new *Apseudes* and several new Australian Decapoda. Other papers are the Fructification of the Bunya, by the Hon. Jas. Norton; The Botany of the Springsure district, by P. A. O'Shanesy, F.L.S.; Australian *Octopodidæ,* by J. C. Cox, M.D., F.L.S., etc.; Two new species of plants from New South Wales, by Baron von Müeller; Descriptions of two new species of Snakes, by the Hon. Wm. MacLeay, F.L.S.; A List of *Cypræidæ,* from New Caledonia and Loyalty Islands, by Richd. C. Rossiter; and On the existence after parturition of a direct communication between the median vaginal cul-de-sac, so-called, and the urogenital canal in certain species of Kangaroos, by J. J. Fletcher, M.A., B. Sc. The report of meetings includes the retiring address of the President, Mr. J. C. Cox, M.D., F.L.S. This Journal merits the highest praise, and its perusal makes us regret extremely that this Colony can boast of no similar institution to the Linnean Society of New South Wales. Our Royal Society almost totally ignores the biological sciences; the Microscopical Society, though doing good work, is of course limited in its range, and is, moreover, not supported as it should be; and the Field Naturalists' Club, though most valuable in its own sphere, can never supply the place of a Society such as the one under notice: it is much to be wished, therefore, that our scientific leaders would, by associating themselves together in such a Society, emulate the worthy example set them by their brethren in the older colony.

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The seventh Decade of Professor McCoy's Prodromus of the Palæontology of Victoria is to hand, and is fully up to the standard of its predecessors. The first three plates are devoted to the illustration of fossil skulls and teeth of the Dingo and the Tasmanian Devil, proving the existence of these animals in the Pliocene and Pleistocene eras, contemporary with the extinct gigantic marsupials, the Diprotodon, the Nototherium, and the Thylacoleo. The next five plates make known several extinct species of sea-urchins from the Miocene Tertiaries, and the ninth and tenth plates illustrate the teeth of the two-toothed whales from the Geelong quarries of the same period, and the sacrum of the Pliocene Wombat. The author alludes, in his introduction, to the "three remaining Decades required to complete the work." This will, we think, be unexpected news to the subscribers, as we are not aware of any previous announcement that the work was to be limited to *ten* decades. If such is the case its value and usefulness will be comparatively small, and this remark will apply with still greater force to the Zoological Decades, if the same plan be carried out in regard to them. The scope and duration of these works have certainly never been so definitely announced as they should have been, but we imagine that no one reading the titles would suspect that it was intended while commencing everything to complete nothing, and we think that if it was originally designed that the works should consist merely of a few isolated fragments of Natural History, the announcement should, in common fairness to the subscribers, have been made at the beginning.

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In the second number of the *New Zealand Journal of Science* (March, 1882), Captain Brown's useful paper on the Preservation of Coleoptera is concluded, as is also Mr. Maskell's account of a visit to the Weka Pass Rock-paintings. In the latter paper the author discusses the origin of these paintings, dealing very severely with Mr. Cameron's theory that they were executed by Buddhist immigrants, and also differing from Dr. Haast's opinion that they were the work of shipwrecked Cingalese sailors. Mr. Maskell expresses his belief that these paintings are of Maori origin, and destitute of any symbolical meaning. "A Plea for the Stars," by the Rev. Thos. Roseby, L.L.D., is an eloquent appeal on behalf of the study of Astronomy. The author considers that "for one well-educated man who is able to tell the story of *Gamma Virginis,* there are a score in our community who know the life history of *Volvox globator,* and fifty who can identify the various species of *Hymenophyllum*;" and he proceeds to point out the rich field for work in the Southern Hemisphere which is open to observers provided with instruments of even moderate capability. Mr. Roseby concludes thus—"I have no wish to speak unkindly of *Volvox globator*. I would not have anybody know less of the fructification of the *Equisetaceæ*: but I should be glad if the effect of this paper shall be to induce some to raise their eyes from Earth to Heaven, and behold the beauty, contemplate the remoteness, and realise the wonder, the glory, and the mystery of the stars." There are a number of general notes on New Zealand Zoology and Botany, with notices of some new species of Mollusca, and a valuable feature is the reproduction from the English scientific journals of specific descriptions and other matter relating to the Fauna and Flora of the colony. The meetings of the various scientific societies are reported, including the very interesting address delivered by Mr. G. M. Thomson, the retiring President of the Otago Institute, on the "Origin of the New Zealand Flora." Mr. Alex. Purdie, B.A., contributes a few "Entomological Notes" describing the eggs and larvæ of a number of native *Lepidoptera*; and a few articles of minor importance complete the number.

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## NOTES AND QUERIES.

About the middle of the present month (March), whilst walking near the Yarra, in the neighbourhood of the Kew Asylum, my attention was devoted to several (over a score) rather large birds, which, although I often visit the spot, I don't recollect having ever before noticed. A friend, to whom I endeavoured to describe them, tells me he thinks they must be the Black-faced Grauculus; but Gould's representation of this bird seems to be of an altogether darker color than those I saw. Perhaps some of your readers may have also seen them, and, if so, be able to inform me, through your columns, whether my friend is right in his surmise, and whether they are of common occurrence so near to Melbourne.—Observer.

During several mornings, at the beginning of March, I noticed large flights of a small species of Parrot wending their way northwards. As they flew very high, I am unable to more accurately describe them, but fancy they must be either the little Lorikeet (Glopsitta pusilla), or Musky Parrakeet (G. australis); can any of your readers furnish me with the desired information?—By the way, in view of the present exceptionally dry season, is it not rather strange they should commence their flight so early, and before the descent of rain?—Enquirer.

### EXCHANGES.

Will exchange Victorian Coleoptera for Australian Hymenoptera; or will purchase species he does not at present possess. D. Best, 201 Brunswick Street, Fitzroy.

A. J. Campbell, of H.M. Customs, Melbourne, has over 100 species (many very rare) of Australian eggs in duplicate, and seeks correspondents interested in that particular branch of Natural Science, with a view to exchanging.

Wanted to exchange some beautiful geological specimens of Fern impressions, from Queensland, for a variety of shells and marine specimens (not seaweeds). May be seen at the Field Naturalists' Club Rooms, Royal Society's Hall. J. F. Roberts.

C. French, of the Botanic Garden, Melbourne, having a large collection of rare duplicates of named Australian and Exotic Coleoptera and Lepidoptera (including those from New Guinea and the Malayan islands), would be glad to exchange same for rare Australian Coleoptera, or showy Exotic Lepidoptera.

## New Polynesian Orchids.

DESCRIBED

ɪ Baron Ferd. von Mueller, K.C.M.G., M.D., F.R.S., F.L.S., F.G.S., F.R.G.S., C.M.Z.S., H.F.R.H.S., &c.

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*Bulbophyllum sciadanthum.*—Stems compressed and at least their :pper joint gradually broad-dilated and flattened; leaves narrow- nceolar, elongated; umbel 8-10 flowered, sessile; stalklets very ›ng, bearing at the articulated summit a minute thinly acuminated ract; lobes of the calyx rose-colored; the upper lobe ovate-lanceolar; ›wer lobes deltoid-semilanceolar, connate into a short almost semi- vate base; inner lobes lanceolar, not much shorter than the outer, ightly longer than the labellum; the latter somewhat thicker than ne other portions of the calyx-limb, ovate-lanceolar, towards the base ightly dilated, but not distinctly lobed, above the base callous from vo depressed incrassations, thence upward smooth, at the margin mewhat membranous, at the base provided with a very short nguis; free part of the column extremely short, not prominently enticulated; tube of the calyx slender, twice or three times as long s the lobes, at first bent downward.

On the summit of ranges at the sources of the Waimasse-River in he Island Upolu of the Samoan Group; Betche.

An epiphyte; pseudobulbs not seen. Leaves attaining a length f nearly one foot and a width of about one inch; their consistence ot very thick. Umbel partly clasped by the base of an elongated eaf and generally supported also by several diminutive leaves. talklets $2\frac{1}{2}$-$3\frac{1}{2}$ inches long. Height of the calyx-limb hardly above of an inch. Ovary narrow as in Sarcochilus, measuring about one nch. Pollinia dropped from all flowers which came under dissection. 'he labellum not being very carnulent, this plant might be transferred o Dendrobium, if indeed any difference of the pollen-masses may ot remove it into another generic group. In flower during No- ember and December.

*Dendrobium Johnsoniæ.*—Racemes conspicuously stalked, glabrous, earing several very large white flowers; bracts deltoid or lanceolar- vate, much shorter than the stalklets; outer three lobes of the calyx emi-lanceolar, narrowly acuminated, of about equal length, the two ower of these with their adnate base forming a short deltoid-saccate rolongation; the two inner lobes nearly twice as long as the outer, longated-rhomboid, attenuated into a narrow wedge-shaped base, ointed into an acumen at the summit; labellum (labial lobe) some- what shorter than the inner lobes, but exceeding the outer in length, idged along the median line of its lowest portion by a narrow callous ertical straight plate with a free and blunt end; lateral lobules of the abellum nearly semi-orbicular, from one-third to half the length of he plainly membranous almost ovate but slightly acuminated main (upper) portion; column adnate up to the stigma, terminated by two short recurved tooth-like lobules; anther emarginate at the summit; fruit truncated-pear-shaped.

Eastern peninsula of New Guinea; Rev. James Chalmers.

Had it not been my particular desire to accede to a wish of the enterprising discoverer of this magnificent orchid, that it should be named after the "daughter of the Rev. Mr. Johnson of Surrey-Hills, New South Wales, a young lady, who materially had assisted the New Guinea Mission," I should have hesitated to describe this plant for publication, no leaves being transmitted with the flowers. Of the latter from 10-12 in the racemes received, pure white (to judge from the dried specimens) except a rosy tinge of the labellum, particularly over its lateral lobules. Inner lobes of the calyx tender-membranous, remarkably large, thus attaining a length of nearly $1\frac{1}{2}$ inches. Pollinia dropped from all flowers examined. Semi-mature fruit already half an inch thick, about as long as its stalklet. *Dendrobium Johnsoniæ* differs essentially from *D. macrophyllum*, near which it will have to be placed systematically, in not downy racemes, in less elongated pedicels, in very much shorter bracts, in the not yellowish flowers, in double the size of the inner calyx-lobes (though similar in form, unless more dilated), in their being very distinctly extended beyond the other portions of the calyx, in the more elongated and less roundish upper part of the labellum and in the elongated basal ridge of the latter.

Along with the flowers of *D. Johnsoniæ* I received those of a species, allied to *D. undulatum* and *D. Johannis*, which new congener I should like to distinguish in honor of the finder as *D. Chalmersii*; it differs from both already by the lobes of the calyx being more pointed, the inner of them decurrent, the basal pouch shorter and the labellum proportionately longer with a comparatively broader summit; *D. Chalmersii* agrees with *D. Johannis* in minute bracts and also almost in the size of the flowers, but has the terminal part of the labellum still broader, so much so as to exceed considerably the width of the lower portion, the reverse taking place in *D. undulatum*. Leaves not obtained. Racemes 3-4 inches long, glabrous; color of the flowers faded in the transmitted dried specimens, perhaps yellowish. Stalklets fully as long as the flowers, if not longer. Lobes of the calyx twisted-and wavy-crisp, narrowly accuminate, the 3 outer semi-lanceolar, the lateral somewhat smaller and not attenuated at the base, but narrowly decurrent from the upper lobe along a portion of the column to the two lower lobes, the latter adnate only to form the short basal roundish-blunt prolongation, thus the lateral lobes not so distinctly interior as usual. Labellum measuring about half an inch, slightly longer than the other portions of the calyx, its terminal lobe in outline almost renate, much crisped, somewhat folded back, hardly shorter than the lower portion of the labellum, which is roundish semiovate, produced at the junction with the upper lobule into a short blunt tooth at each side, and raised along the axis by three slightly elevated lines; column at the apex deltoid-bidenticulated; pollinia clavate-oval.

*Dendrobium fililobum.*—Glabrous; stems very slender, not jointed arising from a fibrous root, enclosed in elongated membranous scales at the base, terminated by a single linear-lanceolar rather long flat leaf; peduncle very thin, about as long as the clasping lanceolate-linear rather elongated and rigid bract, bearing seemingly only one or two pale-yellowish flowers; stalklet about twice as long as the calyx, the five lobes of the latter tender-membranous, from a broadish base narrowed almost to hair-like thinness, the inner lobes somewhat shorter than the outer, but all in proportion to their narrowness extremely long, the lower two produced at the base into an oblique semiovate-conical prolongation; labellum purple, about three times shorter than the calyx-lobes, narrow-linear, acute, glabrous, dark-colored, at one-third of its height produced into two minute violet-colored, decurrent lobules, the median line raised; free part of column very short; ovary slender.

On trees at the sources of the Waimasse-River in the island of Upolu of the Samoan Group, at an elevation of about 2,000 feet; Betche.

Stems yellowish, 6-10 inches high. Pseudobulbs none. Leaves 5-7 inches long, $\frac{1}{2}$-$\frac{2}{3}$ inch broad. Floral bract yellowish, nearly one inch long, complicated. Flowers resembling those of *Eria* (*Mitopetalum*) *speciosa*, but the lobes still narrower. Stalklets $1\frac{1}{2}$-2 inches long. Outer lobes of the calyx slightly exceeding one inch in length. Pollinia already dropped from the only flower available for dissection. Fruit not seen. Flowering in December. Allied to *D. tipuliferum* (G. Reichenb., in the *Gardener's Chronicle* 1877 p. 72), from Fiji; leaf not vaginated, outer lobes of the calyx not much broader than the inner, nor dark-purple, labellum except the solitary tooth-like lobule on each side quite entire at the margin. Other species with very narrow lobes of the flower are *D. biflorum*, *D. camaridiorum*, *D. acuminatissimum* and *D. longicolle*. Anomalous in the genus as regards the inarticulated stems.

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## Definitions of some new Australian Plants,

BY BARON FERD. VON MUELLER, K.C.M.G., M.D., Ph. D., F.R.S.

(Continued.)

*Tetratheca aphylla.*—Leaves undeveloped; branches thick, cylindrical and slightly rough; stalklets a little longer than the calyx and as well as this shortly glandular-downy; sepals 5 lanceolar, about three times shorter than the petals; filaments rather thick, very short; tubular summit of the anthers black-purplish, by about one-third shorter than the cells; ovary scantily glandular-downy, its cells bearing one ovule.

West Australia; from the late Mr. James Drummond's collections, in which no indication of the precise locality of this plant is given. Nearest in affinity to *T. efoliata*, but the branches stouter, neither twisted nor (as far as the fragmentary state of the specimens allows to judge) anywhere velvet-downy, anthers not rough, their tubule not quite so long and not pale-colored, ovules solitary;—fruit unknown.

*Chenopodium rhadinostachyum.*

Erect; general vestiture of short spreading jointed but not very glandular hair; leaves small, in outline ovate-or rhomboid-lanceolar, with several short rather acute tooth-like lobes, the base gradually tapering into the leafstalk; flowers exceedingly small, clustered into minute glomerules and these again arranged into axillary and terminal simple or branched and soon interrupted spikes; floral leaves reduced to bracts, hardly longer than the clusters, broad towards the base, acute at the apex; sepals deeply concave, but not keeled (while young); stamens one or more in each flower; filaments at length exceeding the sepals; ovary vertical.

Near the Finke-River; Rev. H. Kempe. An annual, pleasantly scented herb, from a few to several inches high. Largest leaves measuring about one inch in length, but most of them smaller. Longest spike attaining four inches, others variously shorter, especially the secondary spikes. Young flowers similar in size and structure to those of *C. carinatum,* but none seen in an advanced state.—The leafless almost paniculate spikes much like those of *C. ambrosioides* and of *Dysphania plantaginella.*

*Bertya oppositifolia.* — (F. v. M. O'Shanesy.) — Tall; leaves large, opposite, oval-or oblong-elliptical, slightly recurved at the margin, above quickly glabrous, beneath as well as the branchlets grey-velvet-downy; flowers of both sexes singly sessile; segments of the calyx four, oval, nearly glabrous, three times as long as the four thereto opposite persistent ovate bracts; column of stamens as long as the calyx; anthers but little longer than broad; styles 3 or oftener 4, dilated at the base, deeply cleft into 2-4 rather long stigmatic lobes; ovary 3-4-celled; fruit ovate-globular, 1-2-seeded, velvet-downy.

At the base of Expedition-Range, Thozet and Kilner; on sand-ridges near the Nogoa-River, rare; *P. O'Shanesy.*

Length of leaves as great as that of *B. Findlayi* and *B. pedicellata,* but width much greater; general vestiture as well as the flowers similar to those of *B. oleifolia*; division of calyx quaternary as in *B. quadrisepalea*; position of leaves different from that of any congener, although occasionally opposite leaves may occur in *B. oleæfolia* also; augmentation of ovary-cells to four likewise exceptional in the genus.

*Bertya dimerostigma.*—Glabrous; leaves small, scattered, linear, somewhat acute, at the margin refracted to the broad and flat midrib; flowers axillary, sessile, solitary; bracts three times shorter than the calyx, broad-linear, persistent; segments of the calyx five, nearly lanceolar, overlapping at the base, hardly half as long as the fruit; style scarcely any, stigmas 2-3, short, each cleft to the base into only two divisions; fruit ovate, slightly pointed, glabrous.

In desert-country near Victoria-Spring; Giles.

Differs from *B. Cunninghami* in verrucular not angular branchlets, in shorter pale-green leaves, in absence of distinct stalklets of the flowers, in at the whole lesser stigma-lobes and possibly also in the staminate flowers and seeds, which hitherto remained unknown.

(To be continued).

# On some Beetles collected by Colonel T. B. Hutton.

By D. Best.

[Read before the Field Naturalists' Club of Victoria 17th April, 1882.]

Colonel Hutton, having for some time been collecting Coleoptera about Dandenong, sent to the Club, by Mr. Goldstein, a portion of the collection, to ascertain if there was anything amongst them of special importance. Dandenong is situate about 20 miles from Melbourne in an easterly direction, and, had it not been that I have myself collected there on two or three occasions, I should, from the nature of the country, have certainly expected the bottle handed to me by Mr. Goldstein to contain some rare specimens. I was not, however, disappointed in finding they consisted almost exclusively of the commoner kinds, the best, perhaps, being a fine Elater (*Chrosis illita*). The specimens comprised a total of 49, and may be classified as 5 Elaters, 1 Curculio, 20 Longicorns, 1 Dynasteni, 2 Rutelini, 8 Malacodermidæ, 7 Plinidæ, 2 Tenebrionidæ, 2 Lucanidæ, and 1 Buprestidæ. The last-named must, I think, have been put into the bottle by mistake, it being the well-known and beautiful West Australian *Stigmodera Roci*, and, if occurring at Dandenong, would certainly be a fact well worth noting, as I have no knowledge of its ever before being taken in Victoria. Probably Colonel Hutton will enlighten us upon this point. Of the Elaters the only one, as previously stated, of any value, is the *Chrosis illita*, which is general in most parts of the Colony, being taken in the parks around Melbourne, also at Ballarat and other places; the remaining four are procurable all through the Summer under the bark of the gum-trees or flying about in the dusk of the evening. In the Longicorns we have one specimen of a by-no-means common variety of *Symphyletes pulverulens*; one *S. decipiens*, plentiful enough on the wattle, in which it also breeds, during the Summer months; five of *Hebecerus marginicollis*, to which the same remarks apply; four of *Stenoderus suturalis*, an even more common insect; and a rather fine specimen of *Stephanops nasuta*. There are also 7 specimens of *Epithora dorsalis*, which I have taken in every part of the Colony where I have been collecting, but some that I got last January in the Western district differed from the present ones by being decidedly larger and of a much darker color. It was, however, beyond all question, the same insect, and this leads me to recommend collectors, in arranging their collections, to label separately the specimens of all insects they may get from different localities, as they will not only serve to show the many varieties occurring, but will be useful in determining the limits of their habitats, &c. The one specimen of Dynastini is a male of *Chiroplatys latipes*, and is common about Melbourne, as are also the two Rutelini; one being *Anoplognathus analis*, and the other *A. olivieri*. The former was in my younger days well known to all boys as the common Cockchafer, and common indeed it was, as we had only to go over to what is now Carlton, and at the first gum-tree in flower we could always secure them by dozens.

It may still be frequently taken on the gum saplings about the Yarra in the neighbourhood of the Asylum or Heidelberg. The 8 Malacodermidæ consist of 5 *Metriorrhynchus atratus* and 3 the name of which I do not know; the former may be taken in numbers from off the *Leptospermum lanigerum* and *L. scoparium* when in flower, and is generally a very common insect. Of Tenebrionidæ the only two specimens belong to the genus Pteroheleus, whilst the two Lucanidæ are both males of *Ceratognathus niger*. The name of the one specimen of Curculio is unknown to me, but although I have it in my collection I do not think it is by any means of common occurrence.

Before concluding, I would express the hope that the example set by Colonel Hutton, in collecting and forwarding to the Club specimens for examination, will be followed by many others over the whole Colony, as it is through such collections, humble in themselves though they may be, that a great deal of valuable information is derived. So far as lies in my power I will be only too pleased to furnish information, and in both Entomology and the other branches of Natural History I have no doubt we possess several members who entertain the same feelings as I do on this subject.



# PROCEEDINGS OF SOCIETIES.

## THE FIELD NATURALISTS' CLUB OF VICTORIA.

### ORDINARY MEETING.

The usual monthly meeting of this Club was held at the Royal Society's Hall, on Monday evening, the 17th April, the attendance being good, and Mr. H. Watts occupying the chair. After the preliminary business, which consisted of several nominations for membership, and the promise by Mr. D. Le Soüef of a paper on Snakes, was dispatched, the reading of the papers in the programme was proceeded with. These consisted of, first, a few notes by Mr. D. Best, on some Coleoptera collected in the vicinity of Dandenong by Colonel Hutton. The specimens, for the most part, comprised the commoner kinds of beetles to be found around Melbourne, the majority being Longicorns, with a few Elaters and some of the less numerous families.

Dr. T. P. Lucas followed with a further contribution of his essays on Geology, and his remarks relative to the origin of mineral veins and the occurrence of gold provoked an animated discussion, many members taking part therein, the majority appearing to dissent from the views expressed by the writer.

The Rev. J. J. Halley, one of the Vice-Presidents of the Club, at the invitation of the Chairman, offered a few observations on his recent visit to Europe, alluding to the interest shown in anything Australian by the Zoological Institute at Naples and by the various Microscopical Societies in England. He promised to give, on a future occasion, for the benefit of the Club, a more detailed account of what he had seen and learned during his visit.

The exhibition of specimens, which always follows the reading of papers, was an interesting one, comprising some fine exotic Curculio and Longicorn beetles shown by Mr. C. French. A rare bird of the genus Knot, undescribed by Gould, by A. J. North. Some rare shells, notably *Cypræa madagascarensis* and *Cypræa decliris*, also *Conus betulinus* and *Corbula truncata* the latter, a shell recently found in Victorian waters, and not hitherto known as inhabiting them—by Mr. J. F. Bailey. Some fine birds, viz.,—Fairy Prion, Crescent-marked Oriole, Painted Quail, and Allied Dottrel, by T. A. F. Leith. A Queensland Alligator's Egg, by Mr. J. E. Dixon, and by Mr. F. Spry, Lepidoptera collected by him since previous meeting.

After a pleasant conversazione the meeting was brought to a termination.

## *ANNUAL CONVERSAZIONE.*

That the Second Annual Conversazione of this Club should have attracted so large an audience as crowded the rooms of the Royal Society's Hall on Wednesday evening, the 26th April, is evident proof of the growing popularity of this deserving young Club, and must have been a source of great gratification to its members. It was certainly a disappointment that the retiring President, Professor F. McCoy, F.G.S., &c., was unable, owing to a severe attack of bronchitis, to be present; but his valuable address lost none of its interest in the hands of the Rev. J. J. Halley, one of the Vice-Presidents, who, at short notice, kindly undertook the reading of it. The address, which appears further on, detailed the proceedings of, and the useful papers contributed by, members of the Club during the past twelve months; but the portion most deserving of attention was that referring to the intention of the Club to offer to the scholars attending the schools in and around Melbourne prizes for the best collection of and essays on Natural History, the same to be sent in prior to the next Annual Conversazione. This announcement was received with considerable applause, and is certainly a step in the right direction. The address was immediately followed by a Lecturette entitled "Beauties and Curiosities of Protophytes, a first form of Plant Life," by the Rev. J. J. Halley, who treated this so instructive a subject, illustrated as it was by diagrams, in his usual genial and comprehensive manner. A second Lecturette on a somewhat similar subject, entitled "Microscopic Life around Melbourne," was delivered by Mr. H. Watts.

The exhibits as a whole were unusually good, but the palm must be given to the Birds, the display of which was greatly superior to that of the previous year. Especially noticeable were the Paradise Birds, Pigeons, &c., from New Guinea, shown by Mr. C. French, as was also Mr. T. A. F. Leith's very handsome case of Australian Birds; and Mr. A. Coles, of Kyneton, is to be complimented upon the superior manner in which his exhibit of Wading Birds and Flying Gurnet was mounted. Mr. D. Le Souëf had a fine specimen of the gorgeous Himalayan Argus Pheasant, also one of Imperial Pheasant, and a very nice little collection of Indian and other Butterflies, Snakes, Lizards, &c. The conchological specimens (principally shells of the genus Cypræa) of Mr. J. F. Bailey proved very attractive, more especially as the exhibitor devoted most of the evening to affording visitors every information in connection with them. Mr. Bailey had also a fine lot of Minerals and Fossils collected during the past twelve months, as well as several cases of Insects. Deserving of mention also was Mr. W. R. Guilfoyle's exhibit, comprising four vols. of dried plants indigenous to the Colony, all arranged in their natural orders, and these, with his large photos. of the *Wellingtonia gigantea*, or mammoth tree, and Miss Guilfoyle's collection of Fish, &c., in alcohol, formed a most interesting group. Australian Insects were exceedingly well represented by portions of the cabinet collections of Messrs. D. Best and C. French. The former includes 350 species of Longicorn and 230 of Buprestis Beetles, as also a fine case of Hymenoptera, or Wasps;—the latter comprised a varied collection of four drawers Buprestis and one of Cetonia Beetles, a case each of Butterflies, Hawk-moths, and timber-feeding Moths, amongst all of which were many exceedingly rare and beautiful specimens. Mr. French had also a fine case of large Longicorns containing 52 species of the genus Batocera. In the case of beetles shown by Mr. F. H. Du Boulay were some rare species of some of the best families of Australian Coleoptera: this exhibitor had also a case of Butterflies. The sole exhibitor of Marine Algæ, Hydrozoa, and Bryozoa was Mr. H. Watts, whose carefully-prepared specimens, which were hung on the wall, attracted a good share of attention. Occupying a table by itself was a most interesting collection of 64 species of Victorian dried Ferns, very carefully mounted, and shown by Mr. F. Pitcher. Mr. J. E. Dixon's two cases representing Insect Architecture showed some of the many curious forms of habitation adopted by our hymenopterous and other insects, and evidently proves Mr. Dixon to be a close observer of their habits. A case containing a select series of the eggs and nests of the Australian Falconidæ was shown by Mr. A. J. Campbell, and Mr. P. Dattari exhibited a large case of very fine exotic Beetles. On a screen were hung a number of Native Weapons, &c., from Cape York and New Ireland, sent in by Messrs. T. G. and W. Sloane; and adjoining them were several Zulu assegais, from Mr. J. H. Matthias, who also showed specimens of the blue clay in which the diamonds are found at the South African fields. Mr. F. Wisewould had a number of Victorian Snakes, and the young of Native Bears and Opossums in various stages of development; and Mr. C. French, jun., had a very creditable case of Victorian Insects of his own collecting. Mr. J. F. Roberts exhibited two very curious plants, one being the rare *Amorphophallus zebrina*, and the other the equally rare orchid *Cypripedium superbum*. The complete collection of dried Epacridæ of the Grampians, recently presented to the Club by Mr. D. Sullivan, of Moyston, also formed an interesting exhibit. The Rev. J. J. Halley had in the kindest manner brought with him one of his Microscopes, but owing to his being so occupied with the Address and his Lecturette, he unfortunately had but little time to devote to it. A pleasing feature in connection with the exhibits was the collection of rare live ferns and other plants kindly lent for the occasion by Messrs. Law, Somner, and Co.

THE PRESIDENT'S ADDRESS.

"Another pleasant year has passed, and we again meet to celebrate our usual annual 'commencement,' as the University men say, by a Conversazione on the second recurrence of the anniversary of our opening day.

"The Field Naturalists' Club of Victoria now has on its Roll one hundred and forty ordinary members, including nearly all the best known Victorian lovers of Nature, and of the out-of-door exercise which is inseparable from the working of a Field Naturalists' Club, and which gives it both its great healthy attraction and its peculiar usefulness. This substantial increase on the number of last year is a very satisfactory proof of the favor with which the Club is viewed, and gives promise of increased prosperity and usefulness in the future. Amongst the Honorary Members, as you know, are the most distinguished Naturalists in every department of Natural Science in this and the other Australian Colonies.

"The papers read at the regular meetings during the year have embraced almost every branch of practical Natural History, and were as interesting as they were varied.

"The first paper of the year was a highly valuable one, by Mr. F. C. Christy, on the 'Lepidoptera of Japan.' Mr. Christy is a very old colonist, well known in the old time for his knowledge of English Lepidoptera, of which he had a considerable collection of his own taking or breeding, and who had begun to work well upon our Victorian Lepidopterous Fauna. He was thus well qualified, on going to Japan, to commence the study of the Lepidoptera of that country, and to quickly recognise the curious fact, which had struck previous observers, of the great resemblance of the Lepidopterous Fauna of Japan to that of Europe; many of the species even being identical. In this instance the great curiosity is that the near resemblance to the European Lepidopterous Fauna is much more striking than in many of the intervening countries at a less distance. Both the Moths and Butterflies show this curious agreement, and it is not at all confined to species which could in any probable way have been imported.

"Mr. H. Watts, who for many years has been well known as an industrious and successful investigator of our shore Fauna and Flora, has at several of the meetings exhibited and described many fine and interesting species of Sea-weeds, and that group of minute molluscoida, the *Polyzoa*, of which group our shores exhibit a greater variety than probably any other part of the world.

"Our illustrious colleague, Baron von Müeller, has contributed no less than three papers, during the year, on new or rare plants recently discovered,—one of them being the rare Orchid *Pterostylis vittata* found by members of the Club near Brighton. And, as of the Baron it may well be said that he adorns every subject which he touches, our transactions will have a lustre in his subjects for which we are all much beholden to him.

"Mr. W. H. Wooster, of Springfield, Goldie, has entered upon a series of interesting papers detailing his observations on the animals of his district. And here I might point out that the most interesting and important observations in every branch of Zoology hitherto published, at home and abroad, have been of the nature of local Faunas; as, similarly, the best works, containing the most valuable observations on living plants, are of the nature of local Floras. There is so much to observe everywhere, which has not yet been duly set down upon paper, that any persons confining themselves to the local natural productions of their own parish or township might write in time a most useful treatise which would last, like White's 'Natural History of Selborne,' or Paget's 'Natural History of Yarmouth,' or Macgillivray's 'Natural History of Dee-side,' as standard highly valued field contributions to knowledge for all time. It is astonishing also how little technical knowledge is necessary to begin such works or series of observations with, as one may see by noting the early life and mental condition of those charming describers of the natural objects of their districts under the greatest difficulties, Hugh Miller, of Cromarty, and Peach, of Cornwall. Mr. Wooster has already given us his observations on the Native Bear (*Phascolarctos*), Opossums, Bandicoots, &c., and is understood to be preparing early continuations of his observations on the lower animals of his locality for the Club. Observations such as these on the habits in a state of Nature of even our commonest animals are highly desirable, as so few of the observations made are accurately recorded; and nothing is more calculated to make our Club really useful to Science, as genuine field observations on any of the living inhabitants of our country.

"Our excellent Secretary, Mr. Best, has continued his papers on the 'Longicorn *Coleoptera* of Victoria.' These wood-eating beetles are wonderfully numerous in Australia, and although the grand series collected by that excellent Melbourne Entomologist, the late Dr. Howitt, never fails to excite my astonishment, yet not only Mr. Best but my excellent assistant in this department of the National Museum, Mr. W. Kershaw, have added to the series enormously, and new species are being added every year. Considering the injury done by the larvæ of these beetles, as well as those of the many wood-eating *Lepidoptera*, to the timber of our forest trees, it is astonishing that their natural enemies in other countries, the Wood-peckers, should be entirely absent from Australia.

"Another of our Entomological colleagues, Mr. C. French, has chiefly added to our transactions during the year by his papers on those favorite plants, our Native Ferns, his monograph on which will be completed in one more paper, already promised.

"Mr. D. Sullivan, of Moyston, has given two interesting papers of great value, as showing to our members the true type of a Field-Club paper, namely, local Fauna and Flora of the immediate neighbourhood of the dwelling-place of the observer. In this case, Mr. Sullivan has added greatly to the interest of that mountain range by giving us a 'Census of the Grampian Plants,' If we had such a census of the natural products of many other restricted localities in Victoria, we should be showing the great value of our Field Club, not only in making known many new species, but, what isstill more valuable, noting and recording the habits and geographical distribution of species already known. His second paper adds to his reputation as a most diligent and observant collector in the same district of a very restricted group of plants representing in Australia the Heaths of similar latitudes in South Africa,—it is his monograph of the '*Epacridæ* of the Grampians.' It is to be hoped that Mr. Sullivan, Mr. French, and our other botanical observers will give of their superfluous stores to form an Herbarium to be kept in the rooms of the Club for reference, and as a help and incentive to the other members desiring to attain a knowledge of the native plants of our Colony.

"Mr. J. F. Bailey, who has often added to our knowledge of Victorian Conchology, has given three papers on general Conchology during the year. And, similarly, Dr. Lucas has treated of general Geology, with the object of aiding the members who may be desirous of making field observations on the Geology of our locality.

"Mr. Goldstein, who is so practised an observer, and so skilful in preparing objects for the microscope, has given very interesting demonstrations of the 'Yeast-plant,' and the changes of the *Protococcus*.

"One of the most valuable and interesting of all the essays we have had contributed to our meetings is the admirable paper on the 'Marine Fauna of the Eastern coast of Australia,' by that accomplished comparative anatomist, Mr. W. A. Haswell, whose studies under the best observers of Germany and England render his settlement in this part of the world a lucky chance; for the working out of many problems concerning our Marine Fauna required just such skilled and well-trained observations as he is so well fitted to make and contribute to our literature from time to time.

"Mr. Le Souëf, the indefatigable Honorary Secretary of our Zoological and Acclimatisation Society, exhibited living specimens of the two largest serpents of our warm Northern frontier, namely, those Great Rock Snakes, the Carpet Snake (*Morelia variegata*), and the true Diamond Snake (*Morelia spilotes*), which are by some considered distinct species, and by others to be only varieties of the one. They are the peculiar Australian generic representatives of the Rock Snakes or Pythons of South Africa and India, and the Boas of South America.

"Two pleasant papers on the 'Carenums of Mulwala,' New South Wales, were contributed by Mr. Thomas G. Sloane, of that place; and the last for the year was by Mr. W. R. Guilfoyle, on the '*Pituri* plant and its curious effects on the functions of animal life.

FIELD-DAYS.

"The Excursions of Members of the Club into the country on the 'Field-days' have been as well carried out and planned as formerly, and, considering the difficulties which most of the members, who are nearly all busy men, find in leaving their business by day, they have been fairly well attended. In all cases they have been productive of great enjoyment to the members, who, after reaching the locality chosen for the meeting, break up into little groups of twos or threes according to their particular studies; and, on re-uniting, the results have always been the acquisition of many rare and, of course, in a new field like this country, innumerable "new" or undescribed and unnamed species. The collections made during these excursions, when properly prepared, have usually been exhibited at the general conversaziones which are held at the end of each of the ordinary monthly meetings of the Society, and are a source of great enjoyment to all lovers of Nature, and show the advantages of a Field Club in bringing the natural products of a district under notice in a very striking and satisfactory way. The members are thus enabled to exchange their duplicate species of one locality for those of another, and every object suggests an interchange of observations and experiences of the collectors, which is so interesting and valuable that I am sure, if informally recorded in a kind of common-place book belonging to the Club, we should soon have a delightful volume which would be eagerly read both here and at home.

"A new interesting movement of practical utility for enabling the younger observers to learn the methods of preserving and setting up specimens of Birds, Fish, Insects, and Plants, &c., has been commenced during the past year with excellent results, and the information and instruction given at the meeting held for the purpose was so highly appreciated that several other meetings of the same kind will be held from time to time.

"A good commencement of a Natural History Library has now been made, and, in addition to various standard works furnished by the members and friends to the cause, the Club subscribes to several of the more important English periodicals on Natural History subjects.

THE FUTURE.

"Amongst the projects for the future it is intended to offer prizes to the pupils of the State Schools in the various parts of the Colony for the best collections of specimens of the natural productions of their locality, with papers relating to them; the papers and specimens to be sent in in time for the Annual Meeting and Conversazione next year. When we remember the great good which followed from my old friend, the late Rev. Professor Henslow, encouraging by prizes the formation of collections of Plants and Insects, and papers on their places of occurrence, &c., by the school children of his parish; and recall the delightful evidence which he has given of the growth of intelligent habits of observation and orderly records of facts in plain, clear, truthful language, by these young people of both sexes in Suffolk—the children often adding great varieties, and sometimes entirely new additions to the previous scientific records of the country, in which they often anticipated the Professor (to his great delight) in recognising—and remembering his evidence on the influence for good of such occupations on the character and habits in after-life as those children grew up, I think the Club is not only deserving of commendation for setting such an object before it, but that probably the Government, through the Education Department, might be inclined to lend a helping hand to the good work.

"I may now make a few suggestions for the next year's work. In the first place, so little is known and so much is ready to hand which, if carefully and accurately observed and recorded, would be a real addition to human knowledge, that every member of the Club may be assured that he can do really good work without any great sacrifice of time or money. Field observations are the main things wanted of members of the Club, and as I know that many a good observer is stopped on the threshold by not knowing the name of the object he desires to write about, and as a large proportion of the natural objects about us actually have no names, or are at present undescribed, I will mention an excellent plan to overcome this difficulty. In all cases, if you can get a specimen of the object, preserve it and designate it in your journal or note-book by a number; having distinguished it in this way, all your observations can go on unchecked. If you send such a numbered specimen to be preserved in the Museum of the Club, all the future observations on A, B, No. 1, or No. 50, &c., can be referred safely to the right species when that is determined, and each further observation on the given species might refer always to it under the same number, an index being made as you go on to show at what pages of your journal entries concerning No. so-and-so are to be found. In this way the observer need not stop to determine the species at first, and many a good observation may be saved that might otherwise be lost.

"The habits of few of our native quadrupeds are as yet well recorded, and anything added is worth having. The Birds are much better known than those of most countries, but of several species the nests and eggs are not well described. Of Reptiles, the Snakes are pretty well known, but the Lizards and their habits have been little observed. Of Frogs, the exact sounds uttered by the different kinds are scarcely recognised, although with a lantern in country gardens on Summer nights the determination of which sound belongs to which frog is easy. The metamorphoses and early habits of the immature young of the Sand-frogs and the Tree-frogs are scarcely known. Of all fishes, the time and seasons of coming, and going, and of spawning, have yet to be recorded in successive years by many observers. Of *Mollusca*, the males of our so-called Paper-Nautilus have not yet been found, and the habits of most of the other Cuttle-fishes would form an interesting record. The tongues, with their patterns of teeth, have yet to be figured for most of our univalve shells. And the general distribution of the bivalves, and especially the soft Ascidian Molluscoids, have yet to be recorded. The soft compound Ascidians, which abound on our shores after storms, or which are easily dredged, have often the most strikingly beautiful colors when fresh, which disappear shortly after death; and the record of these, either by description, or, better still, by the aid of a box of moist colors, would be good work for a Field Naturalists' Club, and which none other can so well be expected to do. Very few of the Worms, either of land or sea, are yet known of their proper living colors, and these, with their habits and distribution, are to be noted. Of Insects, the multitude unknown is almost unlimited. The late Dr. Howitt here, and his friend, Mr. Bakewell in London, working together, have done wonders with the Coleoptera or Beetles: and his collections bequeathed to the University are now under my care, and available to the members of the Club for reference; but the other orders have been little worked, and I have many hundreds of new species of *Neuroptera*, *Diptera*, *Lepidoptera*, *Hymenoptera*, and the lower types, as well as of the *Arachnida*, or spiders, from the neighbourhood of Melbourne. The chief good work for the members of our Field-Club in connection with these is the observation and record of habits, the breeding and noting the larvæ with their food, habits and cocoons of the Lepidoptera, and the habits and colored drawings from life of the Spiders, with their webs, trap-doors, and other food-catching or dwelling structures. The attempt to describe the new species without the means of referring to the great European Collections, and the extensive literature of every group in all the languages of Europe, is only likely to burden the subject with useless synonyms. The Zoophytes, or Corals, and *Hydroida*, as well as the *Echinodermata*, or Sea-Urchins, and Star-fish, are pretty well-known from dried specimens, but their colors when alive, and particularly of the Sea-Anemones, are only partially known. From time to time the Decades of the Zoology of Victoria, which I am publishing for the Government, will give some help in identifying many objects on which further field observations may well be made; and the *Southern Science Record*, published by some members of the Club, affords a vehicle for publication which will give zest to the coming year's labors.

"And now, with many hearty good wishes for the success of the Club, I must again thank you for your kindness in enabling me to address you a second time as President."

The audience, having enjoyed a pleasant evening's entertainment, gradually dispersed, and the second Annual Conversazione of the Field Naturalists' Club of Victoria terminated shortly after 10 o'clock.

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## THE ROYAL SOCIETY OF VICTORIA.

The ordinary meeting of this society was held on the 20th April, Mr. R. L. J. Ellery, the President, in the chair. A number of new members were elected.

Mr. James Stirling read a paper on "The Phanerogamia of the Mitta Mitta District," in which, he gave an interesting description of flora found in that neighbourhood.

A paper was read by Mr. W. W. Culcheth, C.E., on "Notes on Irrigation," which occasioned some discussion, in the course of which, Mr. Kernot expressed a doubt whether successful irrigation was not impracticable in this country, on account of the high price of labor. Mr. Culcheth said, he thought, the labor difficulty might be overcome, and he knew of no conditions which would render an irrigation scheme impracticable here.

## THE MICROSCOPICAL SOCIETY OF VICTORIA.

The usual monthly meeting of the Microscopical Society of Victoria was held on the 27th April. The Vice-President (Rev. J. J. Halley) occupied the chair, and there was a fair attendance of members.

Mr. G. Matthews, of Ballarat, was nominated as a country member.

The Acting Secretary acknowledged receipt of the February number of the Journal of the Royal Microscopical Society, and the Proceedings of the Linnean Society of New South Wales, vol. vi, part 4.

Mr. Bale submitted a design for a Stage-micrometer, in which a plate bearing the slide is moved across the stage against an opposing spring by a fine screw with graduated head: the eye-piece being furnished with a single cobweb, or silk fibre, the screw is turned till one extremity of the object is coincident with the cobweb, then turned further till the image of the object has completely crossed it; the number of the divisions of the screw-head which have passed an index point giving the diameter of the object. This system of micrometry does not appear to be in use in England, but in some German microscopes it is applied to one of the screws which control the stage-movements.

Mr. Allen exhibited an interesting Lichen, found in the Cape Otway forest, belonging to the genus *Cladonia*, and known as the Coral Lichen.

Mr. Halley described his visits to the principal Microscopical Societies of England, and gave an interesting account of the Royal Microscopical Society and the Quekett Club, also of the Leeuwenhoek Club, of Manchester, which is limited to seven members, who meet at each other's houses in rotation.

Among the exhibits were some sections of Australian plants, double-stained very successfully by the Rev. T. Porter, also a variable low-power objective by Zeiss, shown by the same gentleman, and *Synapta spicules*, *Trichina spiralis* in human muscle, *Meridion circulare*, a species of *Schizonema*, and other diatoms, shown by Mr. Halley.

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## THE ROYAL SOCIETY OF NEW SOUTH WALES.

The annual meeting of the Royal Society of New South Wales was held on 3rd May, in the Society's large hall, Elizabeth street. There was a good attendance, and Mr. H. C. Russell, the president, occupied the chair.

Several new members were introduced.

Mr. P. N. Trebeck moved, and Mr. W. G. Murray seconded, the adoption of the following report, which was taken as read :—

"It affords the council much pleasure to report that the affairs of the Society show increasing prosperity. The number of new members elected during the year was 46; one name was restored to roll. The Society lost by death 3 members, by resignation 6; 10 were struck off the roll for non-payment of the annual subscription; the election of 5 new members was cancelled on account of non-payment of the entrance-fee and subscription. The actual increase is therefore 24, and the total number of members on the 30th April, 1882, 475. The Society's Journal, vol, xiv, for 1880, has been duly distributed to all the members entitled to it, and it is expected that vol. xv will be ready shortly. At the council meeting held on March 22nd, 1882, it was unanimously resolved to award the Clarke medal for the year 1882 to James Dwight Dana, LL.D., Professor of Geology and Mineralogy of Yale College, New Haven, United States of America, in recognition of his eminent work as a naturalist, and especially in reference to his geological and other labours in Australia when with the United States Exploring Expedition round the world in 1839. During the past year the Society has received 645 volumes and pamphlets as donations; in return it has presented 531 volumes to various kindred societies. The council has subscribed to 39 scientific journals and publications, and has made important additions to the library, notably 90 volumes of 'The Philosophical Transactions of the Royal Society of London,' thus completing the series from the year 1801 to the present time. In all, the sum of £206 19s. has been spent upon the library during the past year. During the year the Society has held eight meetings, at which 13 papers were read; and three of the sections have held regular monthly meetings. A conversazione was held in the great hall of the University on the 28th September last, which was attended by about 600 members and their friends. The council reports that during the past year the mortgage upon the building has been reduced from £2,000 to £1,500, and during that period the sum of £25 4s. has been received towards the building fund, of which £10 10s has been paid by those members who have kindly promised an annual subscription of one guinea; the amount now standing to the credit of this fund is £35 12s. 3d. The council hopes that during the ensuing session the members will make an effort to greatly lessen, if not entirely clear off, the debt upon the Society's premises. During the past year the sum of £23 18s. was received by the hon. treasurer, from thirteen members of the Royal Society of New South Wales, towards the Biological Laboratory, Watson's Bay, which, together with a contribution of £25 from the Society's funds, making £48 18s., has been handed over to that institution. At a meeting held by the council on the 26th October, it was resolved that the Society should offer prizes of £25 each for the best communication containing the results of original research or observation upon certain subjects to be set forth from time to time. A circular containing eight subjects, and the conditions to be observed in competing, &c., has been freely distributed throughout the Australian Colonies, Europe, and America. The Bill for incorporating the Society was approved by the Parliament of New South Wales on December 16, 1881; the thanks of the Society are due to Mr. G. H. Reid, member for East Sydney, for introducing the Bill; the Hon. Professor Smith, C.M.G., for taking charge of it in the Council; and to Mr. Heron, the Society's solicitor, for the preparation of the draft, and for his attention to all legal matters connected with its passage through both Houses."

The balance-sheet showed that the receipts for the year, including a balance in the Union Bank of £8 15s. 7d., were £1,018 0s. 3d., while the expenditure was £987 7s. 10d., leaving a balance in the bank of £60 12s. 5d. The building fund account showed a balance in hand of £35 12s. 3d., and the Clarke memorial fund account, £218 2s. 3., which is placed in the Oriental Bank as a fixed deposit.

The motion was put, and adopted unanimously.

The ballot for the election of the officers and council was taken, and the result afterwards announced as follows:—President, Mr. Chr. Rolleston, C.M.G : Vice-Presidents, Messrs. Robert Hunt, F.G.S., and F. N. Manning, M.D.; Hon. Treasurer, Mr. H. G. A. Wright, M.R.C.S.E., and L.S.A., Lond.; Hon. Secretaries, Professor Liversidge and Dr. Leibius; members of council, Messrs. H. C. Russell, B.A., F.R.A.S., W. A. Dixon, F.C.S., C. S. Wilkinson, F.G.S, Charles Moore, F.L.S., G. D. Hirst, W. G. Murray.

The following new members were also elected:—Messrs. Samuel Cornwell, jun., Fletcher Dixon, Alfred G. Milson, James Milson, Alexander James O'Reilly, B.A., (Cantab.), Alfred Shewen, Mark W. Trail, Sydney A. Want.

Reports from the sectional committees were read, showing that the following officers had been elected for the session:—Microscopy: Chairman, H. G. A. Wright, M.R.C.S.E.; Secretary, P. R. Pedley; Committee, Dr. Ewan, F. B. Kyngdon, G. D. Hirst, H. O. Walker. Medical: Chairman, Dr. P. Sydney Jones; Secretaries, Dr. H. N. Maclaurin, Thomas Evans, M.R.C.S.E.; Committee, T. C. Morgan, L.R.C.S., Edin., A. Roberts, M.R.C.S.E., Dr. Mackellar, G. Bedford, M.R.C.S.E., Dr. Craig Dixson, Dr. Ewan.*

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## THE LINNEAN SOCIETY OF NEW SOUTH WALES.

The monthly meeting of this Society was held on Wednesday evening, 26th April, at the Free Public Library, the President, Dr. James C. Cox, F.L.S., in the chair. Dr. William Williams, Darlinghurst-road, was elected a member of the Society. The following donations were acknowledged:—*Southern Science Record*, vol. 2, No. 3, March, 1882; Eucalyptographia, 8th Decade, by Baron Ferd. von Müeller, K.C.M.G.; Journal of the Microscopical Society of Victoria, vol. 1, No. 4, vol. 2, No. 1; Results of Rain and River Observations in New South Wales during 1881, by Mr. H. C. Russell, Government Astronomer; Catalogue of the stalk and sessile-eyed Crustacea of Australia, by Mr. William A. Haswell, M.A., &c., from the Australian Museum. The following papers were read:—1. Botanical Notes in Queensland, part 2, by the Rev. J. E. Tenison-Woods, F.L.S. 2. Description of a new Gobieso from Tasmania, by Mr. E. P. Ramsay, F.L.S. 3. Descriptions of Australian Micro-lepidoptera, No. vii., by Mr. E. Meyrick, B.A. 4. Notes on a species of fly (Stomoxys) said to have caused the death of several persons in New Caledonia, by the Hon. William Macleay, M.L.C. Mr. Brazier exhibited part 4 of the

* The President then read his annual Address, which, through pressure on our pages, we are compelled to hold over.

French "Journal de Conchologie," 1881, with a plate showing a splendid figure of his *Bulimus Rossiteri*, described in page 586 of vol. vi of the Proceedings of the Linnean Society of New South Wales. Also a specimen of his new *Partula Layardi*, from Havanah Harbour, Vate, or Sandwich Island, New Hebrides, and an albino variety of the species from the same locality. Dr. Cox exhibited and read a descriptive note on a stone hatchet from Barranjoey, Broken Bay. The Curator of the Australian Museum exhibited collections illustrative of the fauna of Lord Howe Island, which had been recently obtained there by Mr. Alexander Morton, including the following:—Birds: *Porphyris melanotus*, *Strepera crissalis*, *Porphyria melanotus*, *Procellaria Gouldii*; *Halcyon vagans*, *Dactylositta trivirgata.* Echini: *Strongylocentratus* (sp. ?), *Hipponæ esculentus*, *Echinometra lacunter*, *Breynia Australasiæ.* Geological specimens: 20 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*, *Ostrea cucullata*; *Tridacna elongata.* Corals: *Tulipora* (sp. ?), and a large reef-coral. Fishes: two species of *Serranus*, and about 10 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. A special vote of thanks was accorded to Dr. R. R. Read for his donation of a very rare and valuable book, "Figures of Molluscous Animals, selected from various authors, etched for the use of students, by Mrs. Maria Emma Gray." This example was a presentation copy from Mrs. Gray to T. P. Woodward, and contains a large number of MS. notes and corrections.

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## ROYAL SOCIETY OF SOUTH AUSTRALIA.

At the usual monthly meeting of this Society, held on Tuesday evening, May 2, there was a good attendance of members, His Honor Chief Justice Way occupying the chair as President.

The Hon. Secretary announced a long list of donations to the library; also that the Waterworks Department had forwarded specimens of the strata gone through in the well-boring at the Waterworks Yard on the North-East Park Lands.

Mr. D. B. Adamson showed a very ingenious planetary map of the Southern Hemisphere, whereby the position or time of rising or setting of any indicated star or planet may be discovered almost instantaneously, and at any time of the day or night.

Professor R. Tate directed attention to a pseudo-morphid of quartz after calcite, forwarded by Mr. J. G. O. Tepper from Clarendon. The same gentleman had also forwarded a piece of fluor spar and a presumed fossil in slate from Field's River.

Mr. S. Pollitzer mentioned that during an excursion to the neighbourhood of Field's River in search of the traces of the glacial period in this colony, some time ago discovered by Professor Tate, he had found a large block of granite, quite distinct from the prevailing geological character of the district; and Professor Tate stated, in reply, that Mr. Stirling Smeaton had also found traces of the same erratic character further north.

Dr. E. C. Stirling exhibited and explained Williams's Freezing Microtome, intended for making large sections of animal tissues for microscopical purposes by the medium of ice and gum solution. The instrument may be popularly described thus:—A cylindrical wooden box, about six inches diameter and six inches high, having a metal cylinder in the centre, is filled with equal parts of ice and salt. This is then covered with a glass lid, having in the centre a small round or square metal plate. On this plate the tissue to be operated upon is gummed after being saturated with highly concentrated gum solution. This metal plate comes into contact with the cylinder, passing through the middle of the iceand salt mixture, and the gum above is consequently frozen; but as it freezes in its natural state without undergoing crystallization, it enables the razor to cut the frozen tissue without fracturing it. The razor is mounted in a frame, regulated by set-screws, enabling the operator to shave off a section $\frac{1}{600}$ of an inch in thickness, or even thinner. Dr. Stirling exhibited several large sections of animal tissues, mounted for microscopical purposes, as made by the use of this instrument, and remarked that one possessed an historical interest. He explained that when in England lately he made application to the Home Secretary for licence to try some experiments upon dumb animals, with a view to testing the virtues of ligatures made from the sinews from kangaroo-tails, which he believed to be far superior to those made of "cat-gut," so-called, because the latter, being made by a process of partial decomposition, were liable to melt away within twenty-four hours when used as a ligature around an artery, and thus occasion great danger to the patient; but the sinews from the kangaroo tails, being in a natural state, would last for many days, and in the meantime a proper closure of the artery would take place, and the ligature would in time be absorbed. The Home Secretary, in his wisdom, refused the application, and he was obliged to wait for an opportunity to try the experiment upon a human subject. This opportunity occurred, and proved to be eminently successful, though the patient died. The death, however, occurred through other causes, and the ligature was then examined, after a lapse of ten days, and it was found that the artery was properly closed, whilst the ligature was in process of absorption, as shown by the section of the artery now exhibited by him. Some discussion followed upon this, and in answer to questions, Dr. Stirling said he considered the sinews made ligatures far superior to any others known.

Professor Tate mentioned that whilst in the Northern Territory he had seen Mr, Foelsche, who had shown him the several plants used by the natives there medicinally, including the *Sarcostemma australe*, which, it had been stated, was used by the natives as a remedy for small-pox. As the disease supposed to be small-pox had not prevailed amongst the natives there since the occupation by the present white population, there were no means of ascertaining the reputed virtue of the plant, which extended as far south as the vicinity of Port Augusta, or even further, and during one period of water famine had supported horned cattle for some time by milky juice, when eaten by them.

The President asked if it was known when the last epidemic of supposed small-pox occurred in South Australia, and the Assistant Secretary stated that in the early part of 1839, when he arrived here, many of the natives were much pitted with marks, which they ascribed to a visitation just previous to the advent of the white men on these shores. Other speakers followed, and it was mentioned as a curious circumstance that the disease, which appeared to be so fatal to the aborigines, seemed never to have been communicated to the white settlers; but it was also pointed out that the epidemic in South Australia occurred before its settlement by Europeans, whilst that in the Northern Territory occurred after the abandonment of Port Essington, and before the advent at Port Darwin of the present settlers.

The Assistant Secretary mentioned that he had noticed great quantities of blood exuding through the skin and at the caudal extremities of some Port Jackson sharks which he had caught and carefully abstained from wounding in any manner. The body on the softer parts assumed a red blotched appearance, and the blood seemed to come out like a perspiration whilst the sharks were dying.

The Hon. Secretary stated that Mr. W. L. Wragge, one of the members, had received the gold medal of the Scottish Meteorological Society for a valuable series of observations taken during several months on Ben Nevis, Mr. Wragge taking the higher station, and Mrs. Wragge recording at the lower one at Fort Willian.

The paper upon "Diurnal Lepidoptera of Balhannah District," being almost purely technical, was taken as read, Professor Tate giving a brief *résumé* of its contents; and the same course was adopted with Mr. J. G. O. Tepper's paper upon "Some South Australian Lizards."

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## THE ROYAL SOCIETY OF TASMANIA.

A monthly meeting of this Society, the first of the present session, was held at the Museum, on Monday, April 17, Mr. Justin McC. Brown in the chair.

Mr. W. F. Ward, Government Analyst, who had previously been nominated by the Council, was balloted for, and declared unanimously elected as a Fellow of the Society.

The Hon. Secretary (Mr. Barnard) brought forward the usual returns.

The Secretary called special attention to the extent and value of the donation (No. 10), from the Trustees of the Australian Museum, as an act of great liberality, especially coupled with the promise of a future gift of skins of New Guinea Birds, whenever mounted specimens are available for the purpose. "In exchange, the Trustees would be glad to receive skins or skeletons of Thylacines (Native Tigers), and skulls or skeletons of small Whales; also fresh-water Fishes and Crustaceans."

The Secretary read a letter from Baron F. von Mueller, K.C.M.G., with a short paper, entitled, "Remarks on the Vegetation of King's Island."

Mr. R. M. Johnston, F.L.S., followed with a "Note and Description of the first discovered representative of the Genus *Pupa* in Tasmania," with a drawing of the Shell.

The meeting closed with a vote of thanks to the writers of the papers, and to the donors to the Museum, making especial mention of the presentation of Birds from the Australian Museum, and of Shells from Miss Lodder.

At 8 o'clock the members adjourned to the upper rooms of the Museum, when an exhibition of the telephone took place, at which a number of ladies were present by invitation. Mr. R. Henry, the superintendent of telegraphs, conducted the proceedings, and commenced by giving a lucid and interesting description of the construction and uses of the instrument. Communication was made with Pearson's Point, Mount Nelson, and Battery Point; the extreme distance traversed being about 20 miles. The experiments were very successful, and afforded much gratification to those who witnessed them. Twelve telephones were employed on the occasion, by which means the various messages and replies were made audible to a number of persons simultaneously. In addition to conversation held between the several stations, music and singing were introduced, the airs being distinctly heard in the room.

In conclusion, Mr. Henry gave explanations of the working of the phonograph and microphone, which were attentively listened to.

# NOTES, MEMORANDA, &c.

## THE LATE CHARLES DARWIN.

A great man has just passed away from amongst us. The enthusiastic naturalist, Charles Darwin, whose patient industry and invariable candour won him the goodwill even of his enemies, has joined the great majority, at the ripe age of 73, after a life, as a scientist, of almost unparalleled activity, and the propounding of a theory which may fairly be said to have resulted in a revolution of thought throughout the learned world, from San Francisco to Nagasaki, and from Cape Town to Archangel.

It was the development of this latter idea, perhaps, that created more enemies for Darwin than did any other of his voluminous writings. The theory of Evolution is by no means a new one. It was hinted at by Lucretius in his celebrated poem, in which he enunciates the hypothesis that all the material Universe is the result of a fortuitous concourse of atoms. These atoms, he tells us, originally moved forward in parallel lines, and when reminded that if so the atoms would move on in that direction for ever, since parallel lines never meet, straightway suggested that a slant was, by some mysterious means, given to their original course. Had Lucretius known of the law of gravitation, at that time unheard of, he might have answered the objection in a much more satisfactory manner. Similarly, the same writer was in ignorance of thousands of facts connected with biology, and only recently demonstrated by modern science, and, therefore, utterly incapable of dealing with that "mystery of mysteries," the variety of animal and plant life. His hypothesis, therefore, was regarded as the idle dream of a visionary philosopher, an atheist withal, an eloquent poet, but knowing far less concerning natural history phenomena than the school boy of the present day who has read through the educational primers upon botany, zoology, and animal physiology. The theory of evolution was at a much later day advocated by Lamarck and others, and still later by the anonymous author of the "Vestiges of Creation." In these cases, however, although the rough hypothesis might have been characterized by a great deal of truth, the *vera causa* assigned was by no means backed up by phenomena. The respective writers, therefore, received most unmerciful castigations from Hugh Miller, Prof. Sedgewick, and others, and the Lamarckian *cum* Vestiges theory fell into disrepute.

It remained for Darwin not only to revive the theory, but to place before the world a reasonable *modus operandi* by means of which changes in species and gradual evolution, from the simplest to the most complicated organisms, had been brought about. His theory (which, by the way, is altogether misunderstood by thousands of his admirers) is, that all species are prone to vary by almost imperceptible degrees; that in some cases the variations are in favor, surrounding circumstances being taken into consideration, of the animal; that there is almost invariably a superabundance of births and a consequent struggle for existence; that in such struggle the individuals of a species possessed of any advantage of structure will be more likely to live and bring forth offspring than are their less fortunate *confreres.* Hence the idea of the survival of the fittest, and by a series of these gradual changes and destructions, after thousands, it may be myriads, of centuries, a new species altogether dissimilar to the members of the original stock. It is notable that Darwin did not touch upon the origin of life. How the primal germ came into existence he did not venture to assert. In this respect he appears to have been possessed with all the modesty of Newton, who, when asked to give a reason for the force of gravitation, straightway replied, "I know of none save that it is the will of the Creator."

The views of Darwin, however, in his "Origin of Species," and more especially in his "Descent of Man," were considered hostile towards the popular interpretation of Genesis, and, as a consequence, drew down upon him a good deal of clerical opposition, which was all the stronger from the circumstance that the new theory was as hotly combated by men of science as by priests and bishops. It is doubtful, however, whether the worst foes of the great naturalist were not rather his most enthusiastic admirers than those who openly professed to be his opponents. The propositions put forward by Darwin with the utmost diffidence, and so unassumingly that no one could take offence at the language, even if differing from the idea, were brought forward as if fully demonstrated, and in language that, as Professor Mivart says, "was positively insulting" by scientists such as Vogt and Hæckel. "I think," were the modest words used by the originator. "We know," was the dogmatic dictum of many of his followers. "If such a thing is, then I imagine such a thing may be" is an almost stereotyped expression characteristic of the writings of this great philosopher. "Such things are, therefore such things must be" is the dictatorial *ex cathedra* utterance of many of the least worthy disciples of the master.

The publication of the theory has brought the doctrine of evolution prominently forward, and caused it to be studied by persons who, otherwise, would have paid no attention whatever to the subject. Even clergymen of the most orthodox school, as witness the late Canon Kingsley, are firm Darwinians to a certain extent. There is no doubt whatever that gradual variations, and the law of the survival of the fittest, have played a most important part in the history of the organic world, and that sexual selection, a sort of supplementary theory of Dr. Darwin, has played a most important part also. But as the originator added a supplement, so other investigators may add still further supplements. It may be, as Professor Mivart appears to think, that there was appointed from all eternity, by an all-wise Creator, a law by which, at a given time, new species shall arise by natural birth from their progenitors. And other causes may, by patient investigation, be brought ultimately to light. Meanwhile, those who seek to unravel the mystery must take an example from the life-long conduct of him who has lately departed from this earthly scene, who, being dead, will not be forgotten, and with regard to whom, let us hope, the most virulent of his adversaries will say, in all humility, "*Requiescat in pace*: the good that thou hast done live after thee, and if, peradventure, thou hast inadvertently done evil, let the grave hide it,—let the dust cover it."

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The "Catalogue of the Australian-stalk and sessile-eyed Crustacea," by Mr. W. A. Haswell, has been printed by order of the Trustees of the Australian Museum, Sydney, and is, according to the preface, intended as the first of a series of works of a similar character. It is a volume of over 300 pages, and contains descriptions of all the known Australian Malacostracous Crustacea, amounting to 540 species, and including many which have not previously been recorded as occurring in Australia. It also gives very many new Australian localities for species already known as natives of our shores. A very large proportion (over 200) of the species were originally described, and in many cases figured, by Mr. Haswell in a series of papers running through the last three volumes of the journal of the Linnean Society of New South Wales, and necessarily representing a vast amount of careful and most valuable scientific work.

Mr. Haswell has, moreover, extended and improved most of the specific descriptions of older authors in those cases where the species have come under his own observation, thereby greatly facilitating the identification of specimens. The introduction gives a concise account of the general structure of the orders included in the Catalogue.

The publication of this work places the student of the *Malacostraca* in a more advantageous position than that occupied by observers in almost any other department of Australian Natural History, summarizing as it does the whole body of information obtainable on the subject and presenting it in a compact form. We sincerely trust that the expressed intention of publishing similar works on other classes will be carried into effect as soon as practicable, and that the selection of authors for the work will be as well made as in the present instance. We should like also to see our own Museum following the good example set by the Sydney institution, so that each Museum could be occupied at the same time with a different class, to the manifest advantage of scientific workers. We may instance the *Bryozoa* as a class of which a synopsis is much wanted and could readily be prepared from the large amount of material available.

In conclusion we may take some slight exception to the title given by the Museum authorities to the work under consideration. Doubtless the *Edriophthalmata* have been conventionally known as the "Sessile-eyed Crustacea," still the term is wanting in scientific accuracy, since the vast group of the Entomostraca are just as truly sessile-eyed Crustacea as those to which the term is applied in the Catalogue. The title "Australian Malacostraca," with which Mr. Haswell heads his pages, should therefore, we think, have been adopted as the title of the book in place of the inexact and possibly misleading one actually made use of.

## NOTES AND QUERIES.

Having occasion recently to pass through the Botanical Gardens and Domain, my attention was arrested by what to me appeared a new feature of insect life. I observed a cluster of the common red ant on one of the branches of a young eucalyptus engaged, as I at first thought, dismembering some unfortunate insect victim which had fallen a prey to them; but, on closer inspection, I was surprised to notice that they carefully avoided injuring the insect, and, indeed, seemed to be going through a sort of "caressing" motion with regard to it, while the object of their attentions made efforts to disengage itself from their embraces. The insect, which in body, was about the size of a pea, and semi-transparent, exuded at intervals from the anus a milk-like fluid, upon each of which occasions there was a rush of the ants, who immediately sucked it away. I shall feel glad if any one can enlighten me upon this certainly interesting phase of insect life, which may be no novelty to others, but is so to me. I am aware that the ant is known to milk the "aphidæ," and squeeze them for the sake of a kind of saccharine fluid which they yield; but I was not previously aware of any other insect being used by them for a similar purpose until the above mentioned incident came under my notice.—ALPHA.

# The Vanishing Boundary between the Animate and the Inanimate.

By Alexander Sutherland, M.A.

[Read before Section A of the Royal Society of Victoria 25th May, 1882.]

Nature has made no rigid lines of demarcation. It is only man who has set arbitrary bounds between class and class, to suit his own convenience in naming the objects around him; while, in reality, class glides into class, so that the whole is absolutely continuous.

Though this fact is well known and fully recognised, in so far as it applies to the organic world alone, it is not allowed, or only partially allowed in the case of many things outside of the organic world. To this class belongs that old division of things into the "animate" and the "inanimate"—a division which must be as old as the human mind itself, which has an abundant utility to justify its continuance, but which conveys to those who use the words the idea of a distinction far more radical and far more sudden than any that really exists; for no distinction can be more definite, no chasm can be more complete, than that which in the popular mind separates living matter from dead matter; and yet, as will be seen, the gap between them is by no means great. It will need some generations to divest the words of their unreal significance, and cause them to be used with a more correct appreciation of the truth. But this is an age of revolution, and we have seen many similar changes take place during the century: for instance, thirty years ago, the text-books of chemistry all stated dogmatically that compounds were divided into inorganic and organic, of which the latter were exclusively the products of living beings. Organic compounds, we were told, could not be formed by the chemist in his laboratory by the agency of "inanimate" forces. They required the intervention of "vital force," which was a mysterious and unknown property of living beings. But no educated man now holds these ideas. One after another the so-called organic compounds have been manufactured by the chemist, and vital force is shown to be a myth. So complete is this revolution that the humblest text-book now-a-days refers to these same bodies not as organic compounds but as the "carbon compounds;" they all go under the same category, and the living body is seen to be only a chemical laboratory of a particular kind. If the name organic is retained at all, it is only to remind us of the greater complexity of that class of compounds.

A similar revolution is in progress in regard to the division into animate and inanimate. So long as men confined their attention to what was easily obvious, and contrasted the inertness of a stone with the activity of a tree, or a horse, that division was not likely to be interfered with; but it is always by pushing enquiries to the confines that new discoveries are made. In this manner the essential unity of plant life and animal life was made manifest. So long as men contrasted only the higher plants and the higher animals, no distinction would appear to be better founded, but when the microscope pursued its investigation among beings of excessive minuteness, and discovered crowds of objects which could not easily be assigned to one class rather than to another, suspicions were aroused as to the truth of the previously recognized distinction.

So with the division of bodies into animate and inanimate. It is disappearing in proportion as scientific men turn their attention to the sufficiently minute. It is only of late years that anything definite has been discovered as to the nature and properties of the atoms and molecules which constitute all matter. But now, after the profound researches of Clausius, König, Clerk-Maxwell, Helmholtz, Thomson, and others, we can follow with certainty the motions and actions of these minute objects, and the more we study them the more arbitrary and unreal seems the term "dead matter." No matter is "dead," in the sense of being inert. Every particle is replete with energy, and has in itself all the forces which, under other circumstances, we should call "life."

When Tyndall used his much discussed expression, "I discern in that matter which we in our ignorance have hitherto covered with opprobrium the promise and potency of every form and quality of life," he made an allusion to the truth, but by no means gave an accurate statement of it. One would gather from these words that Tyndall was expressing his belief in the theory of spontaneous generation, a theory that is absolutely without facts to justify it. But the truth is, that in what we call "inanimate matter" there is not merely the "promise and potency" of life—there are all the elements of which life is made up; indeed, unless we use the word "life" in a restricted sense, there is life itself.

The labours of molecular physicists have conclusively established these propositions. *First;* that the atoms of all matter, however "inanimate" it seems to the human eye, are forever in a state of inconceivable activity. *Second;* that they are possessed of energy which, though individually minute, is yet stupendous when compared with the forces that ordinarily come within our experience. *Thirdly:* that these atoms have a directive power, in regard to the way in which they unite to form molecules. They have what we call in the living beings "instincts." *Fourthly;* it is demonstrated that these atoms have also a directive power, another sort of instinct, in fact, by which they build up forms quite as characteristic and definite as those of the lower species of plants and animals. Now these properties form the elements of life, and are sufficient to account for all vital phenomena. For the features which are supposed to be distinctive of that which is called a "living thing" are the possession of a specific external form; a constant activity in the transformation of unstable compounds into stable compounds, or *vice versa*; and the development of force by the object as a whole.

That the difference between what is called animate and what is called inanimate matter is by no means an essential one will be made plain by the comparison of two microscopic objects. As in the case of the boundary between plants and animals, the more minute the specimens we contrast the less decided is the difference. Two of the most beautiful appearances that can be viewed upon the microscope slide are the formation of a crystal of salt from its solution, and the mazy wanderings of a crowd of bacteria in a drop of putrid water. In the case of a crystal, we take a nearly saturated solution of any salt, place a drop upon a warm slide, and slip it under the microscope; let evaporation continue till a point is reached a little below saturation, then tap on the table, and from all sides the invisible atoms of the salt rush together and build up their characteristic crystal—a crystal which is often exquisitely shaped and always of a fixed pattern. The crystal thus formed seems to the bodily eye motionless and inert. To the student of molecular physics it consists of innumerable molecules all swinging with measured beat, the activity of the whole being far beyond the grasp of imagination.

What is seen in the case of the bacterium? Only the same phenomena carried on with molecules of a much more complex character. The bacterium has a form not more definite and not more characteristic than the crystal. The bacterium is formed of molecules whose activity is great and constant; but not greater or more constant than that of the molecules of the crystal. The fact is that the two objects are distinguished from one another by only one circumstance; that whereas the molecule of the crystal consists of atoms so joined as to give a stable union, the molecule of the bacterium consists of atoms in an unstable union. The atom of the crystal, when it swings from its place, swings back into it again and repeats the same movement over and over to all eternity unless interfered with by some external force. But the atoms contained in the molecule of a bacterium are so unstably joined that when they swing away from one another they never return to the same combinations, but resolve themselves into two or more new molecules of less complex character. This is the whole difference between animate and inanimate matter.

These two microscopic views are not the most strikingly suggestive; an amœba is much more inert than a *bacterium*, and a diatom is still less active. To observe a yeast plant and note the whole history of one of the cells which form a distintc plant, and then view the grains of finely divided indigo suspended in water, will be apt to suggest to the thinking mind the arbitrariness of the line between the "animate" and the "inanimate," and show that what we call the inanimate is, in its own way, quite as "animate" as the lower forms of what we call life.

There is no doubt a real and tangible distinction between what we call living matter and that which is termed dead. But that it is not one of so decided a kind as is ordinarily supposed will be made clear by following the history of a group of atoms from their existence in the inorganic state to their final elimination from the body of an animal as waste products.

In the air certain atoms form the molecules of carbon dioxide, in the moist earth other atoms constitute molecules of water, and that water contains, in solution, the salts of many metals whose molecules contain each its own atoms. Now all these are stable compounds, answering to what we call inorganic compounds. The Sun exerts a compelling force which joins these stable compounds up into new and unstable ones, only to be formed by the agency of an external power; and ready to dissolve again on receiving the least impulse to disintegration. The bacterium receives these unstable compounds into its body; they there receive the initial impulse: the highly complex molecule disintegrates into the series of less complex molecules which we call the waste product of the animal, and during this process of disintegration all the potential energy which the Sun stored up in forming the unstable compound is given up in the shape of the heat and force which the animal possesses. It is evident that in all this there is nothing present but the internal energies of the atoms and the external energy of the Sun; with the exception of what I have called the initial impulse, similar to the tip which overthrows the first of the series of unstable balanced pins, and so causes them all, one after another, to topple over.

It is in regard to this initial impulse that the principle of generation enters. A barrel of gunpowder is an unstable enough compound, but it will be long enough in quietness if fire never touches it: but let the tiniest spark reach it, and molecule transmits the impulse to molecule till the whole leaps high in air. Now, in the case of what are called animated beings, this initial impulse, this spark, is handed down from one individual to another. Whence the original spark came is not material to this enquiry: all I desire you to consider is that, given these unstable compounds and the initial impulse, from whatever source derived, the whole process then reduces itself to one of molecular activity. Now the crystal of salt is also endued with atomic activity, but stable in character. The living being contains the same atomic activity, but through the intervention of the Sun's compelling rays it is of unstable character, and tends to revert to original forms, that is to say, the so called animate and the so-called inanimate exhibit precisely the same nature, and precisely the same forces acting under different circumstances. There is, therefore, no such thing as "inanimate matter"; for all matter is animated by forces which exhibit in a rudimentary form the quality known as "instinct." If the names "inanimate matter" and "animate matter" are, for convenience, retained to distinguish these bodies, in which the action of these forces is of a simple character, from those in which it is more complex, it should, nevertheless, be carefully borne in mind that there is no such line of demarcation between them as is popularly supposed to exist. They are both animate, the main difference being that one is more obviously so to the eye than the other.

It will be observed that I speak only of life. When we enter upon the facts of consciousness, we are treading upon altogether different ground. Whether a material origin will ever be demonstrated for the phenomena of thought, will, and sensation, it is useless at present to speculate. No one has the faintest notion as to how it can be be done. Whatever Science meets with these phenomena, in the course of its investigations, stands powerless before the impenetrable mystery that still enshrouds them. But with the phenomena of life it is not so; they are all fully explained by the well-known properties of ordinary matter.

Vital force is, after all, only a combination of the forces with which the chemist is familiar, and "living" matter differs from "dead" matter, improperly so called, in containing a certain amount of potential energy derived from the Sun, and the phenomena of life all depend on the constant liberation of that potential energy.

It will be apparent, I think, that this distinction does not constitute the impassable chasm popularly supposed to exist between the animate and the inanimate.

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## NOTES ON SOME TERRESTRIAL ORCHIDS RECENTLY FOUND IN VICTORIA.

BY BARON FERD. VON MUELLER, K.C.M.G., M.D., Ph. D., F.R.S.

[Read before the Field Naturalists' Club of Victoria 8th May, 1882.]

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### *Caladenia fimbriata.*

In 1852, and on some few occasions afterwards, I noticed the leaves of this rare and most interesting plant very sparingly in the vicinity of Brighton, and I believe to have seen leaves likewise belonging to this Orchid in a few spots near St. Vincent's Gulf between 1848 and 1851, but never succeeded in getting a flower there. This desideratum has been happily supplied by Mr. C. French, of the Melbourne Botanic Gardens, who, in his entomological excursions never loses a chance of adding also to the knowledge of our floral treasures. It blooms soon after the last Autumnal Orchid (*Eriochilus autumnalis)* has passed away, and before many of the Spring-Orchids push forth their blooms: thus this interesting *Caladenia* was so long overlooked. (But here it may be remarked that this Orchid fits better into the genus *Eriochilus*, of which it has the habit and the glandless but downy surface of the labellum.) It stood on record only from South-West Australia, it being sent as a novelty nearly fifty years ago to Sir William Hooker, from Swan River, by the late Mr. James Drummond. Professor Lindley, in his famous work "Genera and Species of Orchideous Plants" (by which *opus* the foundation verte was laid to Universal Orchidology), referred this *Caladenia*, with *C. Menziesii*, to a separate genus designated, on account of the elongated erect and narrow inner lobes of the calyx, *Leptoceras*, a term used sectionally already for *C. Menziesii* by R. Brown. Professor Reichenbach transferred *L. fimbriata* to *Caladenia*. The lobes of the calyx are pale purplish, but the labellum (or sixth lobe) is dark purple and (what is abnormal in the genus) devoid of the glands, which suggested the generic name *Caladenia*. Out of Western Australia, the locality near Melbourne is the only one where this singular Orchid has as yet been found—at least flowering. Other terrestrial Orchids, which, in consequence of their very early blooming in the season, are apt here to be missed (besides those already mentioned) are *Prasophyllum Archeri*, found by Mr. Wooster at Mount Macedon, and by Mr. McKibbin on the Loddon), *Pterostylis* *acuminata* (also in Mr. McKibbin's collection from the Loddon) *Pterostylis parviflora*, *P. vittata*, and perhaps *Lyperanthus Burnetti* which Mr. Wooster obtained, for the first time outside of its Tasmanian home, at Kardinia Creek, Narree Warren. The Tasmanian *Prasophyllum dispectans* of Sir Joseph Hooker is also one of the very earliest of Spring Orchids. We have it not yet from Victoria, but Mr. Tepper discovered it flowering near Mount Lofty, Adelaide, in the beginning of May of this year.

*Pterostylis obtusa*—(R. Brown).—Three specimens, one of which shows the separate tuft of broad radical leaves, from which off-shoot the next year's flowering stem will proceed. It is a small-flowered variety, and was found for the first time near Melbourne by Mr. French, viz., at Brighton. This species is more independent in the time of its flowering than most others of *Pterostylis*, as Mr. C. Walter gathered, in midsummer (January), this plant blooming in the Dandenong Ranges, the different clime there, compared to that of Port Phillip, accounting to some extent for the difference also in the time of flowering. I have not wished to spoil the only flower by dissection. The name "*obtusa*," inaptly given to this plant, refers solely to the labellum, the calyx-lobes being remarkably acute. *P. obtusa* was not known from Victoria till recently, though it has a rather wide range through New South Wales and Tasmania. It was figured last year in Mr. Fitzgerald's superb work on Australian Orchids.

*Pterostylis aphylla*—(Lindley) :—Until lately only known from Tasmania, having probably been missed on account of its very early flowering in the season. It is not absolutely aphyllous, as a tuft of minute leaves precedes the development of the flowering stem. It is nearly akin to *P. parviflora*, and has been discovered by Mr. French at Gipsy Village, near Brighton, in the vicinity of Port Phillip Bay. Any amateurs who may be eager to contribute locally to the material for the Australian Flora should fix their attention prominently on the Orchids among phanerogams, as plants of this tribe have many rare species among them which only most scantily make their appearance, and pass away quickly, at least so far as each individual plant is concerned. That many species have a much wider range than hitherto anticipated is demonstrated by the fact that Mr. Robert Fitzgerald, in his recent Orchidologic tour to Western Australia, found there also our rare Victorian *Thelymitra Mackibbinii*, as I recognize it described anew among numerous Orchids (as *T. rubra*), of which the distinguished Orchidologist of Sydney has, as the result of his last journey, given an account quite lately in the *Gardener's Chronicle*, of London.

## Native Plants of the Grampians and Vicinity.

Arranged generally under the direction of

Baron Ferdinand von Mueller, K.C.M.G., Government Botanist.

By D. Sullivan.

[Read before the Field Naturalists' Club of Victoria 23rd January, 1882.]
[Continued.]

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### (14). Lineæ.

*Linum marginale*—(A. Cunningh.)—Sparsely distributed over the district.

### (15). Sterculiaceæ.

*Lasiopetalum dasyphyllum*—(Sieber).—Very rarely to be met with on the western slopes of the mountains.

### (16). Euphorbiaceæ.

*Poranthera microphylla*—(Brogn.).—Heath-grounds to the summit of Mount William, 4,500 feet.

*Pseudanthus ovalifolius*—(F. v. M.).—Western lower slopes of the Grampians.

*Amperea spartioides*—(Brogn.).—Everywhere about the mountains, ascending to 2,000 feet.

*Phyllanthus thymoides*—(Sieber).—On the Ranges generally, ascending to an elevation of 4,000 feet.

### (17). Urticeæ.

*Parietaria debilis*—(G. Forster).—On the margins of rocky streams, and among loose rocks to an elevation of 1,500 feet.

### (18). Sapindaceæ.

*Dodonæa viscosa*—(Linne).—On the lower rocky ridges of the mountains.

*procumbens*—(F. v. M.).—About the Serra Range, not common.

### (19). Stackhousiaceæ.

*Stackhousia linariifolia*—(A. Cunningh.).—On the heath-grounds in profusion.

*viminea*—(Smith).—Wet grassy places about Mnt. William, rare.

### (20). PORTULACEÆ.

*Claytonia Australasica* — (J. HOOKER).— Water-holes, swamps and lagoons, common.

*calyptrata*—(F. v. M.).—On and about rocks, reaching to the summit of Mount William.

*pygmæa*—(F. v. M.).—On mountain rocks to a height of 2,000 feet; also on sand-hills, and on sub-saline flats; (the leaves in the latter case become extremely succulent). A variety with less conspicuous flowers and less succulent leaves occurs about logs on poor sandy soil.

### (21). CARYOPHYLLEÆ.

*Spergularia rubra*—(CAMBESSEDES).—On sub-saline flats near Mount William, and on gravelly soil near Moyston.

*Sagina procumbens*—(LINNE).—Gravelly soil, not common. In this district it seems to have a predilection for cultivated soil.

*apetala*—(ARDUINO).—Sub-saline flats near the mountains, not common.

*Stellaria pungens*—(BROGNIART).—On the heath-grounds, and at considerable elevations on the mountains.

*glauca*—(WITHERING).—Sparsely distributed over the district.

### (21). CARYOPHYLLEÆ.

*Stellaria flaccida*—(HOOKER).—Among loose rocks on the mountains, reaching the summit of Mount William.

*multiflora*—(HOOKER).—On sand-hills about the mountains, not common.

*Polycarpon tetraphyllum*—(LINNE).—Sandy and gravelly soil, not common.

### (22). SALSOLACEÆ.

*Chenopodium carinatum*—(R. BR.).—Dry, gravelly soil, very sparingly distributed. Seems to have a predilection for cultivated soil.

### (23). AMARANTACEÆ.

*Ptilotus erubescens*—(SCHLECHT.).—Widely diffused.

*spatulatus*—(POIRET).—Pastures, very rare.

*macrocephalus*—(POIRET).—Sparingly represented in many parts of the district.

### (24). FICOIDEÆ.

*Mesembrianthemum æquilaterale*—(HAWORTH).—Sand-hills, rare.

*Australe*—(SOLANDER).—Among granite rocks on the Black Range.

### (25). Polygonaceæ.

*Polygonum strigosum*—(R. Br.).—Banks of streams near Mount William, rare.

*lapathifolium*—(Linne).—Swampy flats near Mount William, rare.

*hydropiper*—(Linne).—Same as last.

*prostratum* —(R. Br.).—Wet clayey banks of brackish creeks, rare.

*Rumex Brownii*—(Campdera).—Swampy places, rare.

*bidens*—(R. Br.).—Same as above.

### (26). Casuarineæ.

*Casuarina quadrivalvis*—(Labill).—Generally diffused.

*distyla*—(Vent.).—Heath-grounds, ascends the Grampians to 1,500 feet. Height, 3-5 feet.

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## Notes on a Botanical Trip to Brighton.

By a Member of the Field Naturalists' Club of Victoria.

Taking advantage of a holiday on the occasion of Her Majesty's birthday, a sort of trial trip was made by a couple of members of the Field Naturalists' Club, and a youthful collector, to the heath country about Brighton. A somewhat unfavourable and uncertain looking morning caused rather a late start, On arriving at the scene of operations, we at once commenced to keep a sharp look out for Orchids and other minute plants, For the benefit of the younger and less experienced members of the Club, it may be mentioned that the requirements to make a good collector are, first, a knowledge of what he is going, or expects, to find, quick perception, and genuine enthusiasm; and without these qualities no one need expect to become a successful collector in any one branch of Natural History, no matter what branch he may choose. Taking our course towards Cheltenham, we came upon a fine patch (in flower) of *Caladenia fimbriata* and *Pterostylis aphylla*, the two species, it will be remembered, which were found, for the first time in Victoria, by a member of the Club, on the occasion of the Club's first excursion to Brighton. Proceeding on, a fine plant of the rare and curious fern *Schizæa bifida* was found by our juvenile companion. This species is now becoming very scarce, and, it is to be feared, will soon become extinct near Melbourne. As we neared Cheltenham, we met with a few plants of *Caladenia Menziesii*, an Orchid which in this district seems rather local; the plants were small ones, and were just above ground, and at some little distance from them another patch (not in flower) of the first-mentioned species. Scrubs were crossed, and the pretty and ever-welcome Epacris *E. impressa* was noticed as just expanding its beautiful wax-like flowers. Many years ago, the pink and rose-colored varieties were common here, but now the finding of these is considered to be somewhat of a rarity—at least in this district. *Monotoca scoparia*, a plant belonging to the Epacridæ, was here in profusion, but one solitary specimen was all that was seen in flower, it being too early for the generality of Winter-flowering native shrubs. Another handsome plant, *Persoonia juniperina*, with its golden green foliage, attracted our attention, this plant, in common with many of the indigenous Proteaceæ, being rather difficult of removal, and thus seldom seen growing under cultivation. A mass of yellow flowers in the distance proved, as was anticipated, to be *Acacia suaveolens*, a most beautiful and, as its specific name implies, a sweet-scented species; and specimens of this were also taken for the Herbarium. A few plants of the charming little heath fern *Lindsaya linearis* were next met with, and the curious obcordate fleshy leaves of *Lyperanthus nigricans*, a most beautiful Orchid, were just showing above ground. As it was now noon, a halt was made for luncheon, and, being well provided for a "Brighton appetite," we sat down on the ground, and did justice to our frugal meal: while so engaged one of the party noticed a singular little plant (then no larger than the point of a pin), *Phylloglossum Drummondi*, belonging to the natural order Lycopodiaceæ, the morphology of which is now occupying the attention of scientific botanists in many parts of Europe and elsewhere. This was speedily dug up as a prize and consigned to the collecting bag. After a long and patient search were found a few fine plants of *Pterostylis vittata*, a beautiful and rare Orchid, discovered, as will be remembered, last year by one of our members, it being then new for Victoria; and specimens of this were collected, both for drying and for cultivation. A solitary plant of a rather common Orchid, *Acianthus exertus*, was here met with in flower, and, close to it, two specimens (also in flower) of *Eriochilus autumnalis*, a pretty little Orchid, rare here, but common in the Berwick and other districts, and well known as the real herald of the earlier flowering Orchids. Large patches of a very pretty though common species, *Pterostylis concinna*, were here growing in abundance, but, not being in flower, it was left for a future occasion. The pretty little native cranberry *Astroloma humifusa* was here in profusion, and the charming and singular Droseras, or Sun-dews, were just showing above ground. *Isopogon anemonifolius* was also common, and just coming into bloom. *Banksia integrifolia* was well in flower, and attracted quantities of Meliphagidæ, or Honey-eaters, who, with their long bills, seemed to be enjoying themselves amazingly, and apparently not heeding the attention of two sad-looking youths who, with a gun, were vainly trying at a distance of a few yards to shoot them. Consulting our watches we found that the day was fast drawing to a close; so we hastened to retrace our steps, and faced homewards. Directing our course towards the fossil beds we worked for some distance along the sea-shore, turning over a few stones occasionally, and finding many quaint-looking objects under them, which, from an ignorance of this particular branch of Zoology, were unrecognized by us. Turning again inland, the pretty and favourite little daisy *Brachycome graminifolia* was seen peeping its modest little head from amongst the ti-tree scrub which lined the coast here. A find was here announced, viz., an Orchid just coming into flower, and since proved by Baron von Müeller to be the rare *Pterostylis obtusa*, now found for the first time (and again by our young companion): this was dug up for cultivation. It may be mentioned that, according to the Baron, this species has been found before on one occasion in Victoria, viz., by Mr. C. Walter, on the Dandenong Ranges, some years ago. Not far from here a great rarity was found, viz., a solitary specimen of the narrow-leaved variety of *Acacia leprosa*, a plant almost exclusively confined to the mountain regions of the Colony; and how it came here was a puzzle to those present. Little or nothing was attempted in the Entomological line, and, with the exception of a few specimens of the large Dung Beetle' *Onthophagus Kershawi*, a Carenum, *C. loculisum*, a Carab., *Helluo carinatus*, and a small Curculio, nothing else was captured, the season not being sufficiently advanced for the generality of entomological specimens.

Before closing these few short notes, it may be remarked that it would be well if our young friends who propose making collections were to commence at once, as every year reduces the field for operations in this and the other districts around Melbourne.

This conclusion has been arrived at after nearly 25 years' collecting in many branches of Natural History around Melbourne; and where, formerly, all around was natural and beautiful, ominous signs of advancing settlement present themselves daily. Great notice-boards announcing sales of large areas, surveyors' pegs, landmarks, and snobbishly-worded notices regarding trespassers, all justify the conviction that the once famous Brighton heath-grounds will shortly become a thing of the past. The collector will therefore do well to keep what specimens he finds, and the writer of these notes can, with confidence, assert that collecting-grounds of equal value to those of the Brighton, Cheltenham, and Caulfield districts do not exist in the colony; and in a few years, as I have already said, these districts will be to the collector as a sealed book: the only remnant left will be for the collector of Marine objects, whose domain will possibly last in the future as in the past, viz., for all time.

## Oology of Australian Birds.

By A. J. Campbell.

### Part vi.—Order—INSESSORS.—*(Continued.)*

Family—*Luscinidæ.*

185. Malurus cyaneus—(Superb Warbler). *Locality*—Queensland, New South Wales, Victoria, and South Australia. *Egg*—Delicate flesh-white, sprinkled with spots and blotches of reddish-brown, which are more abundant, and form an irregular zone at the larger extremity. Length 8 lines; breadth 5½ lines.

186. Malurus longicaudus — (Long-tailed Superb Warbler). *Locality*—Victoria, South Australia, and Tasmania. *Egg*—Similar character, but proportionally larger than that of *M. cyaneus*, of a flesh-white, blotched and spotted with markings of reddish-brown, particularly at the larger end, where these form an irregular zone. Length nearly 9 lines; breadth 6¼ lines.

188. Malurus splendens — (Banded Superb Warbler). *Locality*—West Australia. *Egg*—Delicate flesh-white, thickly blotched reddish-brown, especially at the larger end. Length 8¼ lines; breadth 6¼ lines.

189. Malurus elegans—(Graceful Superb Warbler). *Locality*—West Australia. *Egg*—Delicate flesh-white, freckled with spots of reddish-brown, which are much thicker at the larger end. Length 8 lines; breadth 6 lines.

190. Malurus pulcherrimus—(Blue-breasted Superb Warbler). *Locality*—West Australia. *Egg*—Resembles those of the other species of the genus, but the blotches very much larger.

194. Malurus leucopterus—(White-winged Superb Warbler). *Locality*—New South Wales and Victoria. *Egg*—Flesh-white, finely freckled with reddish-brown, forming a zone at the larger end. Length 7½ lines; breadth 5½ lines.

201. Stipiturus malachurus —(Emu Wren). *Locality*—Australia except North. *Egg*—Sprinkled all over with minute dots of a light reddish brown, particularly at the larger end, where it is blotched with the same color. Some specimens are minutely freckled all over. The ground-color is a delicate white, with a blush of pink before the egg is blown. Length 6½ lines; breadth 4½ lines. I have a pair of eggs taken in Tasmania measuring in length 7½ lines; breadth 6 lines.

203. Spenura longirostris— (Long-billed Bristle-bird). *Locality*—West Australia. *Egg*—Ground color, dull brownish white, blotched and freckled with purplish brown, some of the blotches appearing as if beneath the surface, particularly at the larger end, where they are most numerous.

207. Pycnoptilus floccosus—(Downy Pycnoptilus). *Locality*—Victoria. * *Egg*—Very rare. Shell thin and brittle, ground color,

Eggs marked thus * not previously described.

of a uniform light chocolate or drab, with a slight blended band of a darker tint of the same color around the top. Length 1 inch; breadth 9 lines.

212. CISTICOLA RUFICEPS—(Rufus-headed Grass-warbler). *Locality*—Australia except West.* *Egg*—Ground color, beautiful bright bluish-green, sparingly blotched with comparatively large patches of red; other specimens are more finely speckled, especially about the top of the egg. Length 7 lines; breadth 5½ lines.

213. SERICORNIS CITREOGULARIS — (White-throated Sericornis). *Locality*—Queensland and New South Wales. *Egg*—Much elongated in form, vary considerably in color, the most constant tint being a clove brown, freckled over the larger end with dark umber, frequently assuming the form of a complete band or zone. Medium length 1 inch; breadth 8 lines.

214. SERICORNIS HUMILIS—(Sombre-colored Sericornis). *Locality*—Victoria and Tasmania. *Egg*—Large for the size of the bird, of a reddish-white, curiously freckled and marked all over with reddish-brown, particularly at the larger end, where the markings assume the form of a zone. Length 10½ lines; breadth 8 lines.

215. SERICORNIS OSCULANS—(Allied Sericornis). *Locality*—Victoria and South Australia. **Egg*—Ground color, of a warmish wash, very finely freckled with purplish-brown spots, which gradually thicken and blend towards the larger end, where they form a zone. Length 9½ lines; breadth 7 lines.

216. SERICORNIS FRONTALIS — (White-fronted Sericornis). *Locality*—Queensland, New South Wales, Victoria, and South Australia. *Egg*—Dull flesh-white, freckled and streaked with purplish-brown, particularly at the larger end. Length 10 lines; breadth 7½ lines.

218. SERICORNIS MACULATUS — (Spotted Sericornis). *Locality*—New South Wales, Victoria, South and West Australia. *Egg*—Reddish-white, minutely freckled and streaked with reddish-brown, particularly at the larger end. Length 9 lines; breadth 7 lines.

219. SERICORNIS MAGNIROSTRIS — (Large-billed Sericornis). *Locality*— Queensland and New South Wales. *Egg* — Ground color, varies from bluish white to dull white, with the larger end sparingly washed, freckled, and streaked with dark brown; large for the size of the bird. Length 9½ lines; breadth 7 lines.

# PROCEEDINGS OF SOCIETIES.

## THE FIELD NATURALISTS' CLUB OF VICTORIA.

The second annual meeting, of the Field Naturalists' Club was held at the Royal Society's Hall on Monday evening, 8th May, 1882. There was a large number of members present, and the Rev. J. J. Halley, one of the Vice-Presidents, occupied the chair. After the minutes of previous meeting had been read and confirmed, a ballot was taken for the election of Messrs. McLean and G. M. Freneke, the result being the unanimous election of these two gentlemen. The following nominations for membership were received, viz. :—Messrs. J. A. Cantor, C. Thompson, A. Thie, F. Longmore, J. Whitfield, and H. Henderson. After the adoption of the annual reports and balance sheet, the election for office-bearers for the ensuing year resulted as follows, viz. :—President, Professor F. McCoy, F.G.S.; Vice-Presidents, the Rev. J. J. Halley, and Mr. J. R. Y. Goldstein; Treasurer, Mr. E. Howitt; Secretary, Mr. D. Best; Assistant Treasurer and Secretary, Mr. J. H. Matthias; Librarian, Mr. H. Watts. Committee: Messrs. C. French, J. F. Bailey, Dr. Lucas, T. A. F. Leith, and F. Pitcher.

Some discussion took place relative to the proposal to offer prizes to the schools throughout the colony, and it was finally agreed to leave the matter entirely in the hands of the Committee.

The Librarian acknowledged the receipt of some scientific publications, viz., two recent numbers of the Journal of the Microscopical Society of Victoria.

The business of the evening being greater than usual, no papers were read, but the usual conversazione and exhibition of specimens took place: amongst which may be mentioned a very fine series of African Longicorn Beetles (sub family), Lamidæ, by C. French; some interesting species of *Natica*, and other Mollusca, also a cluster of *Vermetus*, from West Australia, by T. Worcester; fossils collected from carboniferous shale, in the vicinity of Lorne, by A. O. Sayce; eggs of 11 varieties of Sternidæ, by A. J. North; 4 species of Victorian Buprestidæ, and 5 of Longicorn Beetles, by F. G. S. Barnard; recent gatherings of Marine Algæ, at Queenscliff, by H. Watts.

After a very enjoyable evening had been spent, the meeting closed.

## THE MICROSCOPICAL SOCIETY OF VICTORIA.

The ordinary monthly meeting of the Microscopical Society of Victoria was held on the 25th of May, at the rooms in Collins-street, the Rev. J. J. Halley, Vice-President, occupied the chair.

The Secretary acknowledged the receipt of the following publications, viz., the "Prodromus of the Palæontology of Victoria," Decades

2, 4, 5, and 6, from the Secretary for Mines and Water Supply; the "Bulletin of the Societé Belge de Microscopie" for Jan., Feb., and Mar., 1882, from the Society; two papers by the Rev. J. E. Tenison-Woods, on the "Natural History of New South Wales," and "The Hawksbury Sandstone," from the author; and parts 19 and 20 of Schmidt's Atlas of the Diatomaceæ.

Baron von Müeller and Mr. Geo. Matthews were elected members of the Society.

Mr. Barnard read a paper on "The Minute Structure of some of our Cereal Grains," and illustrated it by a series of sections, some of them stained. He also agreed, at the request of the members present, to continue the subject on a future occasion.

Mr. J. R. Y. Goldstein sent a number of flukes obtained from the liver of a pig, and presented by Col. Hutton.

Among the other exhibits were some transverse sections of Eucalyptus, Native Honeysuckle, Wattle, and other Australian plants, very successfully double-stained by the Rev. T. Porter.

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## THE ROYAL SOCIETY OF NEW SOUTH WALES.

[Continued.]

### THE PRESIDENT'S ANNUAL ADDRESS.

The Chairman then read his annual address as follows:—"By a sort of tradition, the president of a Society like ours is expected to make his annual address a compressed history of the science of the year, but our distance from the metropolis of science, and our rules, place your President at a disadvantage; for all the new things of science reach him through published papers, which are equally accessible to all the members, and the date of our first meeting, so long after the commencement of the year, gives time for all the kindred meetings to be held in Europe, and gives us full reports of what has been said by the happy Presidents whose duty has been to select the best out of a superabundance. I confess I cannot feel happy in going over ground which has been so well "prospected," nor could I do so if I felt as competent as those who have preceded me. I hope, therefore, you will not be alarmed at the innovation if I do not follow the traditional path, but endeavour to occupy your attention for a short time with some remarks upon matters, one of which is of increasing local importance, and the other of great scientific importance. The report of the council has been placed before you, and I will not waste time by reference to it, except on one or two matters, which I think the council has not made so prominent as it should have done. And first, with reference to our own work during the past year, the report or the address should, I think, contain a list of the papers read, as evidence of our work. The list of papers read before the Royal Society of New South Wales, session ending December, 1881, is as follows:—May 4, "Anniversary Address," by the Hon. J. Smith, C.M.G., M.L.C., M.D., LL.D., &c. June 1, "The Climate of Mackay, Queensland," by H. Ling Roth, F.S.S., F.M.S.; "Notes of a Journey on the Darling," by W. E. Abbott. July 6, "On Smilax Glycyphylla," by C. R. A. Wright, D.Sc., and E. H. Rennie, M.A., B.Sc.; "On New Zealand Kauri Gum," by E. H. Rennie, M.A., B.Sc.; "Astronomy of the Australian Aborigines," by the Rev. Peter M'Pherson, M.A.; "The Spectrum and Appearance of the Recent Comet," by H. C. Russell, B.A., F.R.A.S., F.M.S. August 3, "On the Inorganic Constituents of some Epiphytic Ferns," by W. A. Dixon, F.C.S.; "On New Double Stars and Measures of some of Herschel's," by H. C. Russell, B.A., F.R.A.S., F.M.S. September 7, "On Comet II., 1881," by John Tebbutt, F.R.A.S. October 5, "On the History, Varieties, Qualities, and uses of Wool," by P. N. Trebeck. November 2, "Census of the Genera of Plants hitherto known as Indigenous to Australia," by Baron Ferd. von Müeller, K.C.M.G., F.R.S., &c. December 7, "On the Transit of Mercury," by H. C. Russell, B.A., F.R.A.S., F.M.S.; "On the importance of a Comprehensive Scheme of Water Storage and Canalization for the future welfare of this colony," by F. B. Gibbs, C.E.; "The Influence of Australian Forest Trees on the Vaporization of Water," by T. W. Shepperd. I suppose it is right to accept with some degree of satisfaction the financial report for last year. We have paid off a part of our debt, and we have bought some books in addition to the periodicals; but I think, upon reflection, you will agree with me when I say that we ought not to be in debt at all. With a roll of nearly 500 members, a debt is the last thing that we should allow to hamper us. Even now we have to pay £75 a year as interest upon our liability, while a moderate effort would at once set this money free, and enable us to apply it to many purposes of great value to the members. Last year a number of members agreed to double their subscription on condition that the addition went to the building fund. If we all joined in this, our liability would grow rapidly and beautifully less, especially when the 10s. given to us by Parliament is added to every pound subscribed. This premium upon our liberality ought to be effective as an inducement to wipe out the building debt. I hope the members will feel with me in this matter, and then our indebtedness will speedily cease. Closely connected with the building debt is our inability to publish our transactions. Were we free of the one we could begin the other, and it ought to be done. We all know that in the present day, when there are so many workers in science, it is often difficult to decide the priority of discovery, and publication is the only final appeal. Now our papers are read months before they are published, and it is well known that many valuable papers which ought to see the light here, for the credit of the Society and of the colony, are published first in the old world. We ought to make an effort to prevent this, and thus secure to the Colony the credit for all its intellectual activity, and to authors the advantage of immediate publication. We have no right to expect that authors will give up their right to suit our convenience. So soon as our papers are read they should go to the printer, and be in type within a few days. We can do this if we try, and I hope there is a sufficient number of members personally interested in this matter to take up the idea and carry it through. I am sure we should at once get many valuable papers that, under the present arrangements, we should lose. You will observe in the council's report that our contributions to the biological laboratory at Watson's Bay amount to £25 from the Society, and £23 18s. from individual members, making a total of nearly £50. The contribution from the Society has given us the right to nominate a worker, who will be received into the laboratory, with right to use all its appliances free of charge. This is a fine opportunity, and should not be lost. Any member wishing to take advantage of it should send in his application to the secretaries. Some of the criticisms upon the last volume of our "Transactions" have contained strictures upon the Society for the small amount of work done by the sections. Our critics have evidently misunderstood the purpose for which our sections were formed. In kindred societies elsewhere the sections work much as independent societies devoted to one branch of science, and get through as much work as they can. Our sections do not stand in the same relation to the Society. They were formed, as the rule says, "to allow those members of the society who devote attention to particular branches of science fuller opportunities and facilities of meeting and working together, with fewer formal restrictions than are necessary at the general monthly meeting of the Society," and when any member has prepared a paper it is understood, though not contained in the rules, that he is not to hide his light by reading it to a small section, but to the general monthly meeting of the Society, for the information of the members there assembled, who are interested in all the work done by members. Hence the Society and not the section is credited with it in the annual volume. In the British Association a section is formed of members who band themselves together with the object of doing a certain work. In ours the member incurs no such liability as compulsory work, and it is probable that there would be fewer members of the sections if they had to accept such a responsibility when they joined. The experiment which we are now making by offering small prizes for essays, or papers upon subjects which we have named, gives promise of success; inquiries have been made by many intending competitors, and some essays have been already sent in. It must be highly satisfactory to the members present to learn that so many students of science have received the Society's announcement in the spirit in which it was made. We did not intend the money prize as the inducement to work, for we know that the science worker is a true philosopher in the literal meaning of the term, and his work brings its own reward, first in the consciousness that he his adding to the sum of human knowledge, and secondly, as a means of obtaining the first place amongst the competitors. Now, in these matters, it is, as it ever was, the philosopher is often poor, and without some patron to lend a helping hand in the expense of experiments, his work cannot go on. It is just this place of "patron" that the Society is trying to take, and when we get the essays we are prepared to undertake the expense of publishing those that may be deemed worthy. Some day, when the Royal Society attains the power which we are all working for, we may offer more valuable rewards; but I will not believe that "money" is the greatest inducement we can offer to scientific workers. Turning now from these matters affecting the operations of the Society, I wish to speak for a short time upon two scientific questions which concern us particularly, owing to local circumstances. Astronomers looked forward to the transit of Venus in 1874 for a solution of one of the most difficult questions—what is the distance of the Sun? It was thought by those most competent to offer an opinion that there had been so many advances since 1769 in the quality of instruments, in the means of determining positions on, and dimensions of, the Earth, and such an advantage in the use of photography, that the error in the solar parallax would not exceed 0·01 of a second. The result, as we all know, did not come up to the expectation. The experience of the observers of 1769, which was made the text-book for those of 1874, proved misleading, and the phenomena observed were so unexpected that it was in many cases impossible to tell the times of contacts within many seconds. And the photographs from which so much had been expected proved a failure, for, owing to the irregular distortion of the pictures taken with the English photoheliograph, it was found impossible to measure them with anything like the required accuracy. For a time the idea of using a transit of 1882 as another means of finding the solar parallax was almost given up, so great was the disappointment at the comparative failure of the methods used in 1874; but when the first surprise was over, and a calm estimate of the work of 1874 made, it was found that the English and Australian contact observations gave a better value of the parallax than had been obtained before, and there had been a real gain as to the parallax, and very much learned about the phenomena of the transit which will be of immense value to those who observe the next, although it is acknowledged that atmospheric conditions so largely affect the phenomena that the old estimate of possible accuracy must be given up. In 1881 the result of the measurements of the American photographs was published, and it is said they give a good result. The publication of the result from the American photos., and the discussion which has been going on in Europe and America, has thrown much light upon the question at issue; and within the last few months (February, 1882) statements have been made as to the accuracy with which photos. can be measured, which may materially alter the intentions of those charged with arranging the work of observing the coming transit. Professor Pritchard has published in the Observatory for February, 1882, his experience as to the "admissibility of photography among other means of accurate measurement of celestial phenomena." The results of his experiments made at the Oxford Observatory, in measuring the diameter of the Moon, are as follow:—7 photos. were taken, and the extreme difference between the values of the Moon's diameter derived from these was only 0·71, and the photos. are so small that one second of arc is only 1·1700 of an inch (0·0006), and the probable error of determining the position of any point on the photos. is only 0·35, and he remarks: "When such are the results of the Oxford lunar photos. and the American solar ones, it seems to me a matter of regret that the International Committee, assembled in Paris recently, determined not to adopt the photographic method in European expeditions. And in a paper by D. P. Todd, assistant in the office of the American Nautical Almanac, published in June, 1881, he discusses the value of the American photographs as a means of determining the solar parallax, and arrives at the conclusion that the probable error of a single photograph is only 0·88, and the probable error of the parallax derived from the whole number (213) is 0·034, and the parallax is 8·883. The same photographic instruments which were used by the American observers of the transit of Venus were used again at the transit of Mercury in 1878, and 119 photos. were taken; and Professor Harkness, in an investigation of these as a test of the possible accuracy to be obtained from photographs, found that the probable error of the position of the planet, found in this way, was only 0·553, or considerably less than that found for the photos. of the transit of Venus. As the photos. may be taken all through the transit, and contact observations can only be taken once, and that once perhaps interrupted by a passing cloud, Professor Harkness urges the use of this method, and thinks it would prove as good as the contact observations where the acknowledged uncertainty amounts to 0·15. He says,—"The photographic method cannot be defeated by passing clouds, is not liable to any uncertainty of interpretation, seems to be free from systematic error, and is so accurate that the results of a single photo. has a probable error of only 0·553. If the Sun is visible for so much as 15 minutes, 32 photos. of the Sun can be taken: these will give as accurate a result as the observations of both internal contacts. In view of these facts, can it be doubted that the photographic method offers as much accuracy as the contact method, and many more chances of success." The suggestions made by Professors Harkness and Pritchard have been strengthened by a paper read before the Royal Astronomical Society by Mr. Maunder, who suggests, as a method of avoiding the uncertainty in the measures of the photos., that they should be so taken as to show all the details of the Sun's surface, and then Venus could be referred to a spot or other markings; in fact, that the distance measured on the photo. should be as small as possible. The idea was well received in the Society, though it does not seem to entirely avoid the difficulty, for the position of the spot must be determined, and this is almost impossible with the English instrument, as stated above. The American photoheliograph is nearly free from distortion of the field; and if at this eleventh hour it should be decided to make use of it, it will be too late for Australia to send to Europe for the instruments, and we should have to be content with the one I have, which is on the American plan, but has a longer focus, and would therefore give a larger and better picture. With reference to the probable value of the solar parallax, I take the following from an important paper published in November, 1881, by Professor Harkness, in which he discusses the relative accuracy of all the different methods of determining the solar parallax. He classes them all under three heads: —I. Trigonometrical, such as transit of Venus; II. Gravitational, such as that by Le Verrier, who obtained the mass of the Earth from its effect upon Venus and Mars; III. The phototachymetrical, that is, by the measurement of the velocity of light; and he has collected together a great number of the determinations which have been made. After a most elaborate discussion of these, he gives the following tabular statement, which shows the probable limits of the value of the parallax according to each method:—

I. Trigonometrical: Meridian observations of Mars, 8·84"-8·96"; diurnal observations of Mars, viz., observing as it rises and sets, 8·60"-8·79"; asteroids, 8·76"-8·88"; transit Venus, 1769, 8·55"-8·91"; transit Venus, 1874, 8·76"-8·85".

II. Gravitational methods: By the mass of the Earth, 8·80"-8·94"; parallactis inequality, 8·78-8·91"; lunar inequality, 8·66"-9·07".

III. Phototachymetrical: Velocity of light and equation, 8·72"-8·89"; velocity and aberration, 8·73"-8·90".

In addition to these, we have the value derived from the American Transit of Venus photos. in 1874, which is 8·883; but no value derived from the American contact observations has yet been published. We have also the results of meridian observations of Mars in 1877 published by Professor Eastman, combining—Washington and Melbourne gives 8·971; Washington and Sydney, 8·885; Washington and Cape of Good Hope, 8·896. I may mention here that the Sydney observations of Mars, used in the above determination, were the first important ones made with the new transit instrument: and it is satisfactory to see that they give a value of the parallax nearer to the probable value than the others. As to the value of the parallax, you will see that the range is from 8·55hh to 9.07, *i.e.*, from 90 to 95½ millions of miles. Mr. Harkness says:—"We only know that the parallax seems to lie between 8·75 and 8·90, and is probably about 8·85. Now, 8.846 (92,400,000 miles) is the final value of the parallax derived from the English and Australian observations by Captain Tupman, and accepted by Sir George Airey. Reference has already been made to the International Conference of Astronomers which was held in Paris, in October, 1881, for the purpose of securing concerted action in observing the coming transit of Venus. Eleven European and three American States were represented at the conference; but the United States were not represented, although it is known that extensive preparations for observing are being made there. Mr. Stone, who represented England, stated that England would have 16 stations—the principal centres being: 1. The Cape, with three stations. 2. Australia, with the observatories of Sydney and Melbourne. 3. New Zealand. 4. Jamaica and Barbadoes. 5. Madagascar and, possibly, the Falkland Islands. He added that England would do little or nothing with photography, for, although the American photos. had turned out better than was expected, the results had been published too late to give time to get the instruments made, and adopt their method. It was announced that France would have eight stations, placed as follow:—Florida, Cuba, Martinique, Mexico, Santiago, Santa Cruz, Rio Negro, and Port Desiré. Each station will have two equatorials, an 8 and a 6-inch, but photography will only be employed at two, which are not yet named. That Germany would have four stations, and would not make any use of photography, two stations would be in North America—one in the

Argentine Republic, and one in the Falkland Islands. That the Danish Government would send a party to St. Thomas; the Netherlands would send a party to Curaçoa, or St. Martin: Portugal would have parties at Lisbon, Coimbra, and perhaps one of the Portuguese colonies; Austro-Hungary will send a party to South America: Spain will send parties to Porto Rica and Cuba: Brazil will have three parties—one at Rio Janeiro, one on the hills 6,000 feet high, and one at Pernambuco—in all, 39 stations. The conference agreed to instructions for observers, which were based upon the proposals of the British Commission, as to the phenomena to be observed at the contacts. It is therefore evident that the astronomical world is determined to make good use of the transit of 1882, and will spare neither money nor time to ensure a better result than that obtained in 1874. One of the strongest proofs of this is the concerted action that has already been taken. But I will not detain you now by quoting the instructions which have been issued. I hope to have another opportunity of placing them before the members. You will have noticed that England counts the observatories of Melbourne and Sydney into her list of stations; and I should like to detain you a few moments by saying what response Sydney is likely to make. Provision was liberally made by Parliament last year to enable the colony to respond to this new call of Science, and a sum of £500 has been placed at my disposal for this purpose. With this I shall be able to provide four high-class 6-inch equatorials, exactly similar to those which are to be used by the European observers, also two $4\frac{1}{2}$ inches. We have remaining from the last transit of Venus one equatorial of $11\frac{1}{2}$ inches, one of $7\frac{1}{4}$ and one of 5 inches, one of $4\frac{3}{4}$ inches, and one of $4\frac{1}{4}$ inches. With these I hope to be able to take up four stations, in addition to the observatory, and place two observers and two telescopes at each point. I cannot yet decide as to the use of photography, for it is of little or no use here without corresponding observations on the other side of the world; but I have ready, if they are called for, one English photoheliograph, and one of the American pattern. In Australia along the East coast, we shall occupy the position which Sir George Airey thinks the best, viz., one where the Sun is about 15 degrees above the horizon at the time that Venus makes egress. This gives the largest value of the parallax factor consistent with such an altitude of the Sun as will probably admit of accurate observation. If it were not for atmospheric interference, or difficulty in seeing distinctly, the best position would be that from which the Sun would be seen to be rising at the time Venus made egress; and that point is in the centre of Australia. The gain in parallax factor in such a position, however, does not compensate for the uncertainty caused by the atmospheric defects close to the horizon. In order to make the best of our chances, I have selected elevated points on the East coast of New South Wales, where the observers, being from 1,500 to 5,750 feet above the sea, may fairly expect to have a clearer view of the Sun an hour after sunrise, or when the egress takes place, than they would have if observing near the sea-level; and the elevation will give a slight increase in the value of parallax factor. In observing the transit of Mercury in November last, the observers were stationed at

Bathurst, Katoomba, and Sydney, places which I thought far enough apart to secure different weather; but to my surprise the weather was practically the same at all places at the same hour; this led to unpleasant reflections. It might be cloudy all along the coast on the 6th of December, and I was therefore glad to take advantage of the visit of the recent commission to Lord Howe Island to get Mr. Conder to make some inquiry as to the suitability of that island as a station for observing the transit of Venus; and I am glad to say he thinks it very suitable. An elevated spot is easy of access, and the weather at the hour and season is almost sure to be fine. I will not detain you with further details; I think I have said enough to show you that an effort is being made to make the best possible use of the opportunity and of the means at our command; and, from the active part the Royal Society took in assisting me with certain portions of the work of preparation for the last transit of Venus, I am sure that this information will be at least interesting to the members here present. In this bright land of ours we sometimes get too much of the sunshine, and our recent experience, indeed the present state of some parts of the colony, is such that I am sure I need make no apology for introducing some considerations which may help us to form a correct opinion as to the possibility of producing rain artificially. From time to time the rain-doctor appears, not with the old "tom-toms," it is true, but with certain modern counterparts of them. He works with nitro-glycerine, with cannon, with electrical machines, with kites, &c. Now, I hope to be able to show you that, in the opinion of the highest authorities, there may still be a place left for the rain-doctor, if he works reasonably, but not otherwise; he must not pretend to pull down the clouds with a wire, or to frighten them with a few crackers; there must be a correct understanding of cause and effect if he is to retain his place in the modern social scale. One or two points in the history of this subject are instructive, showing as they do how circumstances alter cases. M. Arago tells us that finding the practice of firing guns common in some of the Departments of France, he had tried to trace the origin of the custom, which probably began in 1769,

# NOTES, MEMORANDA, &c.

The Royal Society of Victoria has just issued Vol. xviii of its Transactions and Proceedings. The Transactions occupy 122 pages, and comprise 21 papers, 6 of which, however, are only represented by their titles. Of the papers printed the first is a description by Dr. James Stirton, F.L.S., of *Trichocladia Baileyi*, a new genus of Lichens found in Queensland near Brisbane, having affinity with *Cladonia*. Then follow two short articles by the late lamented Mr. F. J. Pirani, M.A., the first being "On a Modification of Mance's Method of Measuring the Resistance of a Battery," being specially suited for measuring the resistance of an electric arc. The second describes a new and simple form of Tangent Galvanometer for measuring powerful currents. Then follows a valuable paper by Mr. A. W. Howitt, F.G.S., "On the Diabase Rocks of the Buchan District," showing the geological age of this group as Middle Devonian. We can hardly give too much praise to this paper as being the result of long, close, and careful study of the group, conducted in a truly masterly manner. The next paper is by Mr. J. R. Y. Goldstein, on "Some New Species of Bryozoa from the Marion Islands, with Notes on *Bicellaria Grandis*," being a valuable contribution to the Natural History of a comparatively little known class. This paper is accompanied by two plates from drawings by the author. There is another article by C. M. Maplestone, "Observations on Living Polyzoa" (Bryozoa). The next article is by R. E. Joseph, on "Electric Fire Alarms," wherein the author suggests for use in Melbourne a system based on what is known in Glasgow and elsewhere as "Bright's System." Mr. Joseph claims for his system that it is simple, cannot get out of order, and can be constructed at little expense. It is to be regretted that Melbourne still lags behind other large cities in not having adopted some such scheme as that now proposed, and Mr. Joseph must be complimented for thus offering the benefit of his large experience for the good of the community. A paper by John Booth Kirkland details some experiments with Faure's Secondary Batteries. Mr. W. W. Culcheth, M.I.C.E., in a paper on "The Drainage of Melbourne," deals with certain defects in the Prize Essay on the subject. Mr. H. Moors, in a paper "On the Sea-cell as a possible source of danger in Torpedo Experiments," gives a series of calculations, tested by practice, to prove his case. Mr. Culcheth gives also a valuable paper on "Floods on the River Barwon," dealing in a scientific manner with the evidence in a recent law case against the Crown. Mr. James Stirling contributes an interesting paper on a very interesting subject, "The Physical Features of the Australian Alps," referring more particularly to the Mitta Mitta source basin, its topography, geological structure, and botany. Mr. H. Sutton's paper "On a new form of Secondary Cell for Electrical Storage," details the author's valuable experiments and discovery in this, at present, all-absorbing subject. It is in this direction we must work to enable us to adequately store electrical energy for future use. Mr. Sutton's generosity, in thus making public his valuable discoveries, has been most favourably commented on by leading electricians in England. Dr. Macgillivray adds one more to his list of papers "On Australian Polyzoa," (Bryozoa), giving "Descriptions of New, or Little-known Polyzoa," and adds a list of some 30 species of *Membranipora* said to occur in Victoria. The concluding paper is a short one, by Mr. H. Sutton, describing a new form of vacuum apparatus for the rapid production of high vacuum, suitable for electric lighting by the incandescent system, &c.

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The May number of the New Zealand *Journal of Science* commences with Prof. Hutton's opening address for 1882 at the Canterbury College, University of New Zealand. The subject is "Biology in our Arts Curriculum," and the author treats it in a philosophical manner, "explaining the importance of the study of Biology in politics and in ethics by demonstrating the constant action in all human affairs of the principle of selection." Professor T. Jeffrey Parker supplies a short account of "Recent Researches on the Cilio-flagellata," principally those of the Danish zoologist, Mr. R. Bergh, who has published an elaborate monograph on the subject. Baron von Müeller has a technical paper on "Plurality of Cotyledons in the genus Persoonia;" and Mr. Robert Paulin contributes a very interesting account of "A Trip to Lake Hauroto," an almost unexplored region among the wild and beautiful scenery of the south-west corner of the South Island. The descriptions of the New Zealand Copepoda of the *Challenger* Expedition (from Mr. Brady's monograph), are continued, and some descriptions of New Zealand Micro-lepidoptera are extracted from Mr. Meyrick's paper in the Journal of the Linnean Society of New South Wales. There are also a number of interesting miscellaneous notes, etc., with an extract on Flowers and Folk-lore from an address delivered in Sydney by Dr. Geo. Bennet, F.L,S., and an appreciative notice of Charles Darwin, by the Editor.

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## EXCHANGES.

Will exchange an old work, dated 1776, on Zoology—principally birds, by Peter Brown, for Longicorns or Buprestidæ. Mr. D. Best, 201 Brunswick Street, Fitzroy.

Coleoptera.—Have a considerable number of duplicate Coleoptera (mostly Victorian), and wish to correspond, for exchange of specimens and information, with collectors in New South Wales, Queensland, and South Australia. T. G. Sloane, Mulwala, New South Wales.

Mr. C. French, of the Melbourne Botanic Garden, offers Australian or Exotic Coleoptera and Lepidoptera in exchange for Fossils (Vegetable preferred.)

Sea-weeds.—For specimens of Claudea, Martensia, Porphyra, or Corallina Officinalis, will exchange any Victorian sea-weeds or microscopic objects. H. Watts, No. 20, Wellington Street, Collingwood.

## The Distinction between the Living and the Not-Living.

By a Member of the Field Naturalists' Club.

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The present article was suggested by Mr. Sutherland's paper, in the June number of this Journal, on "The Vanishing Boundary between the Animate and the Inanimate." Firmly believing that the doctrines stated therein are not warranted by our present scientific knowledge, knowing that they are at least not proven, and knowing also that they are still firmly combated by many of our best authorities on Biology, I think it may not be out of place to lay before the readers of the Journal a few reasons for dissenting from the author's conclusions.

Mr. Sutherland's paper is devoted to the enunciation and illustration of the theory that the gap between the living and the not-living is by no means great—that it is, indeed, a "vanishing boundary," and is "disappearing in proportion as scientific men turn their attention to the sufficiently minute." If these expressions mean anything, they mean that the gap between the animate and the inanimate is not only small, but that there is a probability or a possibility of its being narrowed down to nothing, and of a continuous gradation being demonstrated from the one to the other form of matter, a supposition which seems to me in the highest degree improbable. Mr. Sutherland, indeed, admits that "there is a real and tangible distinction between what we call living matter and that which is termed dead," though "not one of so decided a kind as is ordinarily supposed," but this proposition is obviously incompatible with the idea of a "disappearing" and "vanishing boundary." The most important point, of course, is not the width of the gap, but the possibility or otherwise of bridging it, or of making it disappear. Here Mr. Sutherland's analogy with the breaking-down of the distinction between the animal and vegetable kingdoms is at fault, for we have found by actual observation that the lower groups of organisms contain forms which combine the characteristics of both kingdoms to such an extent that it is difficult, if not impossible, to decide where to place them,* while with regard to the animate and the inanimate no such doubt can occur.

Alluding to Tyndal's often-quoted expression respecting the existence in matter of "the promise and potency of all terrestrial life," Mr. Sutherland goes beyond Tyndal, and asserts that "in what we call inanimate matter there are all the elements of which life is made up; indeed, unless we use the word 'life' in a restricted sense,† there

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* The bacteria mentioned by Mr. Sutherland are an apt illustration of this: he alludes to them as animals, though they are usually ranked among the lower Protophytes.

† In using the word "life" with a signification which excludes anything like the mechanical activity of atoms and molecules, we are not employing it in a restricted, but in its usual and normal sense; it is in making it include these forms of energy that Mr. Sutherland uses it in an extended sense, and gives it a meaning entirely foreign to that usually assigned to it.

is life itself;" this assertion being founded on the known facts regarding the atomic and molecular activity of matter, and the directive powers possessed by the atoms, in regard to the way in which they unite to form molecules, and also to build up characteristic and definite forms such as crystals,—these directive powers being spoken of as instincts. "These properties," says Mr. Sutherland, "form the elements of life, and are sufficient to account for all vital phenomena;" an assertion, I venture to say, totally unsupported by evidence. There is no analogy between the directive powers of the atoms—which belong to them by a fixed necessity, and are coeval with their existence, and unalterable—and the instinct of an animal, which has been gradually acquired (usually for the sake of some advantage derived from it), and which is always liable to change under varying circumstances, and develope into an instinct of a totally different nature.

Mr. Sutherland compares the appearance presented by a crowd of bacteria, and by a salt crystallizing from its solution, as seen under the microscope, and also contrasts the life-history of a yeast-cell with the energy exhibited by the particles of finely-divided indigo suspended in water; and considers that these phenomena exemplify the arbitrariness of the line between the "animate" and the "inanimate," and prove that the boundary between the two is by no means an essential one. I confess that I can see no analogy between the processes, and I cannot comprehend how any one who sees through the microscope the phenomena of crystallization, or of so-called "molecular motion," compared with the growth and movements of bioplasm, or living matter, can see any similarity between them. As to the Brownian motion, or Pedesis, its cause is still doubtful; it has no connection, so far as is known, with true molecular energy, and is supposed by many to be due to forces operating in the fluid, and outside the suspended particles; it may be at once dismissed as bearing no relation to the movements of living matter, and presenting only a very superficial resemblance to them. And what true resemblance can be seen in the formation of a crystal to the life-history of a bacterium, or even a yeast-cell? The "growth" of a crystal, as some writers are never tired of calling it, is not growth at all, but aggregation, strictly comparable to the accumulation of sediment at the bottom of a lake; the crystal is, in fact, a sediment left by the evaporation of the fluid in which it was dissolved, and differs from any other sediment only in its being deposited in a symmetrical and constant form. How entirely different is the phenomenon of true growth presented by the lowest organisms,—for instance, this same yeast-cell, of which Dr. Beale writes as follows:—"One of the simplest living things is a microscopic fungus, the yeast plant, for example, which is a small oval body about the 3000th of an inch in diameter. Each circular or oval particle is colourless and tolerably firm, but if pressed hard between glass, the membranous capsule or envelope may be caused to burst, and then soft colourless matter will be squeezed out. This soft material will break up into very minute particles, and each of these, if placed under favorable circumstances, will *grow*, that is, it will take up some of the constituents around it, and will convert these into matter like itself. Not only so, but on the surface of the little particle a change of another kind will occur. A thin membrane will be formed which is closed at all points. By this, the growing matter within will be protected, while the dissolved food will pass through it, although there are no visible openings or pores." This "growth," this power of taking up foreign substances, and assimilating them, is a characteristic that belongs to living matter, and to no other, and would of itself suffice to draw a sharp distinction between the living and the not-living; but when to this are added the spontaneous movements of bioplasm, and the other phenomena of vital existence, the gap which divides the two forms of matter is seen to be great indeed. No man is better qualified to speak on this question than Dr. Beale, the foremost of living histologists, who first brought the highest powers of the microscope to the investigation of living matter; and he states that "the idea of gradual and progressive change from the non-living to the living is very generally assumed by a certain class of teachers, and accepted by their pupils as true, but it is the purest fancy to suppose that a single fact can be adduced in favor of the conjecture." "No substance in Nature manifests movements at all like those of living matter." "The difference between the living and the not-living is absolute. There is no transition, neither is there any true analogy between any form of non-living matter and any form of living matter. The line is clear, sharp, and defined. The gulf that intervenes is at this time impassable. It has not been and it cannot be bridged over." Professor Huxley says "there is no parallel between the actions of matter in the mineral world and in living tissues," and again, "the chasm between the living and the not-living the present state of knowledge cannot bridge."

Mr. Sutherland tells us that vital force is shown to be a myth. But where is the proof to be found? *Assertions* to that effect are plentiful enough in the works of many philosophical writers, but the statements are certainly not the result of proof, but rather of "the scientific use of the imagination." Our present knowledge of this subject is concisely summarised by Professor Nicholson in the following extract:—

"If, in conclusion, it be asked whether the term 'vital force' is any longer permissible in the mouth of a scientific man, the question must, I think, be answered in the affirmative. Formerly, no doubt, the progress of Science was retarded and its growth checked by a too exclusive reference of natural phenomena to a so-called vital force. Equally unquestionable is the fact that the development of Biological Science has progressed contemporaneously with the successive victories gained by the physicists over the vitalists. Still no physicist has hitherto succeeded in explaining any fundamental vital phenomenon upon purely physical and chemical principles. The simplest vital phenomenon has in it something over and above the merely chemical and physical forces which we can demonstrate in the laboratory. It is easy, for example, to say that the action of the gastric juice is a chemical one, and doubtless the discovery of this fact was a great step in Physiological Science. Nevertheless, in spite of the most searching investigations, it is certain that digestion presents phenomena which are as yet inexplicable upon any chemical theory. This is exemplified in its most striking form, when we look at a simple organism like the Amœba. This animalcule, which is structurally little more than a mobile lump of jelly, digests as perfectly—as far as the result to itself is concerned—as does the most highly organised animal with the most complex digestive apparatus. It takes food into its interior, it digests it without the presence of a single organ for the purpose; and, still more, it possesses that inexplicable selective power by which it assimilates out of its food such constituents as it needs, whilst it rejects the remainder. In the present state of our knowledge, therefore, we must conclude that even in the process of digestion, as exhibited in the Amœba, there is something that is not merely physical or chemical. Similarly, any organism, when just dead, consists of the same protoplasm as before, in the same forms, and with the same arrangement; but it has most unquestionably lost a something by which all its properties and actions were modified and some of them were produced. What that something is we do not know, and perhaps never shall know; and it is possible, though highly improbable, that future discoveries may demonstrate that it is merely a subtle modification of some physical force. In the meanwhile, as all vital actions exhibit this mysterious something, it would appear unphilosophical to ignore its existence altogether, and the term "vital force" may therefore be retained with advantage. In using this term, however, it must not be forgotten that we are simply employing a convenient expression for an unknown quantity, for that residual portion of every vital action which cannot at present be referred to the operation of any known physical force.

"It must, however, also be borne in mind that this residuum is probably not to be ascribed to our ignorance, but that it has a real existence. It appears, namely, in the highest degree probable that every vital action has in it something which is not merely physical and chemical, but which is conditioned by an unknown force, higher in its nature and distinct in kind as compared with all other forces. The presence of this 'vital force' may be recognised even in the simplest phenomena of nutrition, and no attempt even has hitherto been made to explain the phenomena of reproduction by the working of any known physical or chemical force."

This is a strictly accurate statement of the case, and until it can be controverted we may rest assured that, in maintaining (at least provisionally) the existence of a vital force, we are strictly in accord with scientific fact as at present known.

In describing the phenomena of life, Mr. Sutherland says "The bacterium receives compounds into its body; they there receive the initial impulse: the highly complex molecule disintegrates into the series of less complex molecules which we call the waste product of the animal, and during this process of disintegration all the potential energy which the Sun stored up in forming the unstable compound is given up in the shape of the heat and force which the animal possesses. It is evident that in all this there is nothing present but the internal energies of the atoms and the external energy of the Sun,—with the exception of what I have called the initial impulse, similar to the tip which overthrows the first of the series of unstable balanced pins, and so causes them all, one after the other, to topple over.

"It is in regard to this initial impulse that the principle of generation enters. A barrel of gunpowder is an unstable enough compound, but it will be long enough in quietness if fire never touches it: but let the tiniest spark reach it, and molecule transmits the impulse to molecule till the whole leaps high in air. Now, in the case of what are called animated beings, this initial impulse, this spark, is handed down from one individual to another. Whence the original spark came is not material to this enquiry: all I desire you to consider is that, given these unstable compounds and the initial impulse, from whatever source derived, the whole process then reduces itself to one of molecular activity."

Now, seeing that the capability of giving this "initial impulse" is an attribute of living matter, and of no other; seeing, further, that it is handed down from one individual to another, and that it is not producible by any transmutation of physical forces acting on other matter, and, moreover, that it is the prime agent in all vital phenomena, I think it may reasonably be asserted that this power is nothing more nor less than vital force passing under another name, and limited (by Mr. Sutherland) to a much smaller province than that usually assigned to it.

If vital force is, as asserted, "only a combination of the forces with which the chemist is familiar," it should be practicable to infuse life at least into dead organic matter, in other words, to produce spontaneous generation.

Mr. Sutherland expressly excludes the facts of consciousness from the phenomena which he thinks explicable by the operation of ordinary physical forces. But it must be remembered that, whether or not a material origin will ever be demonstrated for psychical phenomena, whether or not it will be proved that "brain secretes thought as liver secretes bile," it is certain that sensation and mental operations are connected and co-ordinated in some mysterious way with living matter, and with that only.‡

‡A most striking instance of the existence of instinct of no mean order in connection with animal organisms of the lowest class, consisting of apparently structureless sarcode, and totally devoid of anything like differentiated nervous matter, is found in the arenaceous Foraminifera, of which Dr. Carpenter writes as follows:—"There is nothing, as it seems to the author, more wonderful in Nature than the building-up of these elaborate and symmetrical structures by mere 'jelly-specks,' presenting no trace whatever of that definite 'organization' which we are accustomed to regard as necessary to the manifestations of conscious life. Suppose a human mason to be put down by the side of a pile of stones of various shapes and sizes, and to be told to build a dome of these, smooth on both surfaces, without using more than the least possible quantity of a very tenacious but very costly cement in holding the stones together. If he accomplished this well, he would receive credit for great intelligence and skill. Yet this is exactly what these little 'jelly-specks' do on a most minute scale; the 'tests' they construct, when highly magnified, bearing comparison with the most skilful masonry of man. From the same sandy bottom, one species picks up the coarser quartz-grains, cements them together with phosphate of iron secreted from its own substance, and thus

I would also cite the facts of variation as an instance of the difference between living and inorganic matter. Evaporate a solution of a given salt under the same conditions any number of times, and the result will always be crystals formed after the same type. Mix two salts, and forms will be obtained differing from those produced by either salt alone, but the same mixture always gives a definite result. Now, living beings are not subject to the same rigid conditions. The humblest organism, which appears a mere structureless speck of bioplasm, is liable at any time to produce offspring differing more or less from itself, and the distant descendants of these offspring may again vary, and so on indefinitely. Is it not all but universally acknowledged by biologists, and, indeed, by the majority of educated people, that all the varied forms of animal and vegetable existence which we see around us are the results of gradual development from some of these same "physiological units," which, indeed, differ in no visible characteristics from the separate particles which make up the true living matter of any animal or vegetable organism? But who would suggest the possibility of variation by Natural Selection, Psychogenesis, or other form of development, arising and becoming perpetuated in the mode of action of molecules or the crystallization of a salt?

Living matter is distinguished from all other matter by the peculiar and apparently spontaneous movements of which it is capable.

It is the only substance exhibiting true "growth" or the power of assimilating foreign materials, and increasing itself at their expense.

It is derivable only from other living matter, and cannot be produced directly from its constituent elements, nor even by re-vitalization of matter formerly living.

It is capable of variation, causing progressive or retrograde development, and thus producing all the multitudinous forms of organic nature.

It may be correlated with the phenomena of sensation, will, and reason.

The gap between the living and the not-living is clear and absolute, and must continue so until spontaneous generation can be demonstrated (which at present seems almost impossible), or till some intermediate form of matter can be discovered.

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constructs a flask-shaped 'test' having a short neck and a single large orifice. Another picks up the finer grains, and puts them together with the same cement into perfectly spherical 'tests' of the most extraordinary finish, perforated with numerous small pores, disposed at pretty regular intervals. Another selects the minutest sand-grains and the terminal portions of sponge-spicules, and works these up together – apparently with no cement at all, but by the mere 'laying' of the spicules into perfect white spheres, like homœopathic globules, each having a single-fissured orifice. And another, which makes a straight many-chambered 'test,' the conical mouth of each chamber projecting into the cavity of the next, while forming the walls of its chambers of ordinary sand-grains, rather loosely held together, shapes the conical mouths of the successive chambers by firmly cementing to each other the quartz-grains which border it.

# Definitions of some new Australian Plants,

by Baron Ferd. von Mueller, K.C.M.G., M.D., Ph. D., F.R.S.

[Continued.]

*Acacia Dietrichiana.*—Branchlets viscid, slender, not angular; phyllods much elongated, linear, one-nerved, almost straight, short-pointed, bearing a gland close above their base; flowerheads solitary, small, globular, somewhat viscid on a stalk of twice or thrice their length; sepals five, spatulate-linear, soon free, not fringed, about half as long as the nerveless petals, not much longer than the rhomboid-laminated but otherwise very thin bracts; ovary glabrous, blunt.

Lake Elphinstone; Mrs. Amalia Dietrich.

Distinct from *Acacia Murrayana* in dark-colored not angular but clammy branchlets and flower-stalks, in much smaller singly distributed flowerheads and most likely also in fruit, the latter remaining as yet unknown.

*Acacia amblyophylla.*—Branchlets somewhat angular towards the summit; phyllods falcate-oblong, blunt, one-nerved, anastomosingly veined, gradually much narrowed into the base; gland near the middle of the margin; stipules obliterated; flower-stalks short, axillary, with one or oftener two flowerheads, secondary stalks slightly grey-silky; pods elongated, rather broad, not much curved, conspicuously constricted between the seeds, almost smooth outside; seeds placed longitudinally; funicle extending along the seed, expanded into a short strophiole.

Near Shark-Bay; F. v. M.—Allied to *A. neriifolia.* Flowers unknown.

*Acacia plagiophylla* (F. v. M. in the Journal of the Linnean Society, III, 131; *A. undulifolia* var. humilis, Bentham, Fl. Austr. III, 356).—Shrubby; branchlets slightly angular, scantily short-downy; stipules almost obliterated; phyllods small, glabrous, deltoid-semiorbicular, shining, one-nerved, the lower margin extended into a straight prickle, the nerve slightly curved, passing into the margin at some distance from the terminal point; a minute gland at the extremity of the blunt upper angle of the phyllode; veins obliterated; flowerstalks axillary, solitary, one-headed, glabrous, little or doubly longer than the phyllodes; flowers 10-20 in the heads; bracts bearded-fringed, linear towards the base, rhomboid towards the summit, about as long as the calyx; petals 5, neither hairy nor streaked, at least twice as long as the bluntly toothed short-bearded calyx; pods curved-oblong, flat, suddenly contracted into a stalk-like base, at both extremities rounded-blunt, smooth outside; seeds placed transversely.

Near Durval and Biroa, Dr. Leichhardt; vicinity of the Brisbane-River, F. v. M. and W. Hill; Maroochie, Bailey. Belongs to the series of Triangulares. Ripe fruit unknown.

*Acacia sclerosperma.*—Glabrous; branchlets somewhat angular; phyllods long, linear, pale, prominently one-nerved, not pointed nor distinctly veined; their gland at some distance from the base; stipules obliterated; pods broad, with thick and hard valves, constricted between the seeds; the latter large, very turgid, globose-ovate, brownish black, much shining, with ample but only faintly marked areoles; strophiole brown, dimidiate-ovate, nearly three times shorter than the diameter of the seed; funicle short; testa very thick and of bony hardness.

Near the Gascoyne-River; Oliver Jones.

Flowers unknown. Semi-mature fruit-specimens from Nickol-Bay may belong to the identical species. Foliage resembling that of *A. dentigera* and *A. pycnophylla*; but the seeds are highly characteristic, and bear no close resemblance to, those of any other species in this vast genus.

*Acacia macradenia*—(Bentham in Mitchell's Trop. Austr. 360).—Glabrous; branchlets angular; phyllods much elongated and narrowly falcate-lanceolar, one-nerved, shining; their veins very spreading and somewhat distant from each other, with reticular veinlets between; gland large, oblong, near the base of the phyllods; stipules linear-semilanceolate, seceding, not spinescent; flowerstalks axillary, either solitary or two together or oftener several arranged into a raceme; flowerheads small; calyx more than half as long as the petals, with five bearded short lobes; petals somewhat downy; pods narrow, rather long, compressed, slighly curved, attenuated into a very short stalklike base; seeds oval, black, placed lengthwise, with large areoles; funicle simply half refracted, extending on one side along the seed, gradually passing into the livid narrow-cymbeous strophiole.

Near Mount Pluto; Sir Thomas Mitchell. Expedition-Range; Thozet and Kilner. Other localities in the Leichhardt-District; Bailey.

The fruit described by Bentham in the Flor. Austr. belongs to *A. fasciculifera.*

*Acacia estrophiolata.*—Glabrous; branchlets slightly or not angular; phyllods linear, flat, three-nerved, gradually pointed but not pungent; gland minute, at some distance from the base of the phyllode; stipules obliterated; flowerheads small, axillary, solitary or in pairs, about as long as their stalks; bracts peltate, ciliolated, thin-stalked, shorter than the flowers; sepals free, spatulate-linear, slightly bearded at the summit, not much shorter than the glabrous and streakless petals; pods flattened, not quite narrow; seeds black-brownish, considerably compressed, nearly ovate, shining; funicle exceedingly thin; strophiole none.

Near the Finke-River; Rev. H. Kempe.

Strophiole absent as in *A. siculiformis* and a few other congeners; the species otherwise allied to *A. heteroclita.*

*Acacia lachnophylla.*—Branchlets densely downy; phyllods short, linear, somewhat turgid, downy, one-nerved, irregularly crowded, gradually narrowed into the base, slightly wrinkled longitudinally, terminated in a curved acute but not pungent point; gland and stipules obliterated; peduncles axillary, solitary or in pairs, nearly as long as the phyllods, bearing single small flower-heads; bracts exceedingly thin, except at the dilated summit, not bearded, about as long as the calyx; sepals 5, free, spatulate-linear, glabrous, hardly half as long as the streakless petals; ovary downy.

Between Esperance-Bay and Fraser's Range; Dempster.

Habit almost of *A. brachyphylla* (Drummond, 37); in characteristics fluctuating between the sections Calamiformes, Pungentes, and Uninerves, but systematically best placed in the latter series, and to be associated there with *A. triquetra.*

*Acacia dissoneura.*—Glabrous; branchlets angular; phyllods elongated, sickleshaped, but rather blunt, two-nerved, thinly veined; glands 2 or 3, lateral, minute, distant, occasionally evanescent; stipules obliterated; peduncles axillary and terminal, corymbous from near the base; flowerheads small, about half as long as the secondary stalks; flowers longer than the peltate ciliolated bracts; calyx short-lobed, of about two-third the length of the petals, slightly bearded on the margin.

In the vicinity of Port Darwin; Schultz, 336. Near the Liverpool-River; B. Gulliver.

To be placed near *A. Simsii.* Fruit unknown.

*Acacia Tayloriana.*—Dwarf, downy; leaves pinnate, conspicuously stalked; stipules membranous, lanceolar; pinnae 1-3 pair; leaflets flat, obliquely lanceolar-ovate, 3-nerved, distinctly veined, dark-green on both sides; peduncles axillary, solitary, several times longer than their globular flowerhead; bracts lanceolar, not bearded; calyx acutely 5-toothed, three times shorter than the one-nerved semiconnate petals, glabrous.

Near the Blackwood-River.

Named in honor of Campbell Taylor Esq. of Albany, who has contributed to my collections of Museum-plants since some time. Nearest to the variety obscura of *A. strigosa.* Flowering in an herbaceous but then perhaps only young state. Fruit unknown.

*Bauhinia Gilesii*—(F. v. M. and Bailey).—Unarmed; leaves simple by the confluence of two leaflets, thus nearly obverse-renate, ashy-grey and also scantily glandular-dotted beneath, their radiating nerves 7-9; tendrils none; corymbs on short stalks, with rather small flowers; stalklets hardly half as long as the calyces and as well as these slightly rustbrown-velvety; bracts as also the stipules minute, acute; flower-buds blunt; tube of the calyx valveless, deltoid-toothed, irregularly bursting lengthwise, much attenuated at the disk-bearing base; petals slightly protruding beyond the calyx, cuneate-spatular, outside scantily hairy; stamens ten, all fertile, glabrous and shorter than the petals; ovary silky, with free stalklike base; style at first very short; stigma peltate; pod rather long, comparatively narrow, pointed at the summit and base, closely veined.

In the vicinity of Port Darwin; Alfred Giles.

Nearest to *B. Malabarica*; leaves still paler on the lower page, flower-stalklets not conspicuously longer than the calyx nor augmented to such a number as to form racemes, pod shorter. The material of the new species is too imperfect to trace any further differences.

*Swainsona Oliverii.*—Procumbent, beset with very short appressed hair; stipules semilanceolar; leaflets in 3-6 pairs, very small, oblong-or ovate-cuneate, slightly bilobed at the summit, terminal leaflet similar to the others; peduncles bearing only 1-3 flowers, as long as the leaves or somewhat shorter, very thin; flowers minute; lobes of the calyx semi-lanceolar, rather shorter than the tube; upper petal orbicular, with narrowed base, devoid of callosities; lateral petals considerably shorter than the others; lower petals quite connate, fully as long as the upper one, not pointed nor twisted, membranous throughout, all perfectly glabrous; style hooked, bearded only near the stigma; pods lanceolar-ellipsoid, channelled along the upper suture, not conspicuously narrowed into a stalklike base; seeds 9-15, brownish.

Near Port Eucla; John Oliver.

Quite a miniature in the genus and possibly annual, reminding of *Ptychosema.* Stems 2-4 inches long. Leaflets $1\frac{1}{2}$-3 lines long. Flower-stalks $\frac{1}{2}$-1 inch long. Calyx about $\frac{1}{8}$-inch long, its tooth-like lobes nearly equal in form and size. Petals blue towards their summit when dry. Upper and lower petals inclusive of their stalklike base only $\frac{1}{6}$ inch long. Style very short. Ovary silky. Pod from $\frac{2}{3}$ to nearly 1 inch long, about $\frac{1}{6}$ inch wide. Seeds measuring about one line, with a rather conspicuous sinus.

Systematically to be placed next to *S. microphylla* and *S. unifoliolata.*

*Eriochilus fimbriatus.*

*Leptoceras fimbriatum*, Lindl. Bot. Regist. xxv, append. 53, 1839; *L. pectinatum*, Lindl. l.c.; *Caladenia fimbriata*, G. Reichenb. Beitr. zur syst. Pflanzenkunde, 65 (1871).

Glabrous; leaf basal, ovate-or narrow-lanceolar, rather large, fully 3-5-nerved, purplish beneath, developed at the time of flowering; stem bearing an empty bract below the middle; flowers one to three; inner lobes of the calyx somewhat longer than the upper one, erect, linear, slightly dilated upwards; lower lobes pendent, narrow; label-lum almost sessile, cuneate-semiorbicular, downy on the surface, fringed in front and there faintly three-lobuled, rather longer than the column, but not fully half as long as the lower and the inner lobes of the calyx.

Near Swan-River; J. Drummond. Various places of S. W. Australia; R. Fitzgerald. In the vicinity of Mount Lofty; O. Tepper. South-eastern side of Port Phillip on heathy ground; C. French.

An early vernal plant, flowering about June, whereas *Eriochilus autumnalis* bears blossoms from January to April, seldom continuing to flower into May, indicating the past season, whereas *E. fimbriatus* initiates the new one.

*(To be continued.)*

## Native Plants of the Grampians and Vicinity.

Arranged generally under the aid of

Baron Ferdinand von Mueller, K.C.M.G., Government Botanist.

By D. Sullivan.

[Read before the Field Naturalists' Club of Victoria 23rd January, 1882.]

[Continued ]

### (II). *Choripetaleæ Perigynæ.*

1. Leguminosæ.
2. Saxifrageæ.
3. Rosaceæ.
4. Crassulaceæ.
5. Onagreæ.
6. Lythraceæ.
7. Halorageæ,
8. Myrtaceæ.
9. Rhamnaceæ.
10. Araliaceæ.
11. Umbelliferæ.

### (1). Leguminosæ.

Sub-order—I. *Papilionaceæ.*

*Gompholobium Huegelii*—(Benth.).—Heath-grounds and lower ridges of the mountains, not rare.

*Sphærolobium vimineum*—(Smith).—Heath-ground, not common.

*Viminaria denudata*—(Smith).—Heath-swamps and mountain streams, not common.

*Daviesia corymbosa* — (Smith).— Sand-hills and heath-ground, not rare.

*var. mimosoides*—Grampians. Height of shrub up to 15 feet.

*ulicina*—(Smith).—Heath-ground and scrub-hills. In one var., which ascends to 3,000 feet on Mount William, the leaves are reduced to spines.

*brevifolia*—(Lindley).—Heaths and ridges of the mountains. Height, 3-4 feet.

*Aotus villosa* —(Smith).—Heath-ground near Mount William, rare. Height 2-3 feet.

*Pultenæa scabra* —(R. Br.).—Gullies of the mountains, especially of the Serra Range. Height 3-5 feet.

*daphnoides*—(Wendl.)—On granite ridges near Mt. William, also about Mt. Abrupt. Height 4-6 feet.

*pedunculata* —(Hooker).—On gravelly scrub-hills, not rare. In habit prostrate and rooting from the joints.

*viscosa*—(R. Br.).—Mount William, at a height of 3000-4000 feet; also on the other mountains at a less elevation. Height 3-4 feet.

*Pultenæa villifera*—(SIEBER).—On all the heath-grounds, and occasionally ascending the mountains to an altitude of 1000 feet. In habit somewhat procumbent, but sometimes erect, and attaining a height of 2 feet.

*juniperina*—(LABILL.).—On some of the shady slopes of the mountains, not very common. Height 5-7 feet.

*subumbellata*—(HOOKER).—On some of the streams from Mount William. Not found on the mountains, rare. Height 4-6 feet.

*mollis*—(LINDLEY).—On the lower ridges of the mountains, common. Height 5-8 feet.

*Benthami*—(F. v. M.).—About the streams in ravines, and rarely on rocky ridges of the mountains. Height 6-9 feet.

*rosea*—(F. v. M.).—On the summit of Mount William, to which it is exclusively restricted. Height 2-3 feet. This charming plant was discovered by Baron von Müeller, about 27 years ago, when he was exploring those mountains. Other plants, which were then noticed on the summit, have made their way down the mountains, but this queen of Pultenæ still maintains her lofty position as of yore.

*Dillwynia floribunda*—(SMITH).—Very common from the heath-grounds to the summit of Mount William. Except *Epacris impressa*, this is one of the most widely diffused plants about the Grampians. Height 2-3 feet.

*ericifolia*—(SMITH).—Sand-hills and wet heath-ground, rare. Height 3-5 feet.

*var. glaberrima*—(SMITH).—Rocky spurs of the mountains, ascending to about 3000 feet. Height 2-3 feet.

*hispida*—(LINDLEY).—Sand-hills, scrub-lands and heaths. Habit straggling. Height 1-2 feet.

*Platylobium obtusangulum*—(HOOKER).—Widely distributed over the heaths, and on ridges of the mountains. Height 1-2 feet.

*Bossiæa prostrata*—(R. BR.).—Scrub-hills and heath-grounds, common.

*cinerea*—(R. BR.).—About streams and on the slopes of the ranges, reaching the altitude of 2000 feet. Height 3-5 feet.

*riparia*—(A. CUNNINGH.).—Wet heath-ground, between the lower ridges of the Grampians, rare. Height 1-1½ feet.

*Swainsona lessertiifolia*—(D. C.).—Grass flats about the ranges. Habit weak and straggling. Height 1-1½ feet. Poisonous.

*procumbens*—(F. v. M.).—Clayey wet flats, not common. Height 8 inches to 1 foot.

## A few Remarks on Cetotolites, or Whale Ear Stones.

By J. F. Bailey.

[Read before the Field Naturalists' Club of Victoria 12th June, 1882.]

In the red crag formation of England were found, in a very fragmentary condition, the fossil remains of those huge leviathans of the deep—portions of ribs, entire teeth, and ear-bones, all bearing evidence of the former existence of those animals. Our tertiary strata at Cheltenham, near Mordialloc, correspond in every respect with the crag of England. Whales' teeth, ear-bones, and large fragments of whalebone prove the existence of such animals in the seas of that period, the older Pliocene. Some of the fossils found in the crag formation were appropriately named by Professor Owen "Cetotolites," or whale ear-stones, and formed the harder portion of the entire ear-bone, the two elements having always been rudely torn asunder from each other by the rubbing, rolling, and erosion of oceanic currents: they exhibit the characteristic conchoidal form, like a half-grown cowry shell, and have an extremely dense texture. There appears to have been a great variety of these tertiary whales; seven species have been described from the English beds, and Professor McCoy has determined at least three species of Cetotolites from the Miocene Tertiary beds at Geelong, but we have no data by which to distinguish their skeletal peculiarities.

Professor Owen, in his description of Cetotolites, referred them to the genus "*Balæna*" in his work on "British Fossil Mammals," and to "*Balænodon*" in his work on "Palæontology." Professor McCoy, in his work on "Victorian Fossils," says it is not possible satisfactorily to refer them to the true genera from such materials, and proposes to use the word "Cetotolites" only as a generic term; and as our whale ear-bones are generically distinct from the English species, his opinion is that they belong to the Ziphoid Whales; and the long flat bones found with the ear-bones are the remains of the snouts of those creatures. A drawing of the snout of a Ziphoid Whale, as shown, will give you a good idea of the quantity of bone they contain, also showing the position of the two teeth of these creatures.

The Cetotolite I exhibit was discovered by me at the same spot where I previously obtained the large tooth of an extinct species of Whale, which was described by Professor McCoy as a new genus—*Physetodon*, species (*Baileyi*),—no other similar specimen having as yet been found.—(" Palæon. Victoria," pl. 45, fig. 1-2.

From the descriptions (given by Professor McCoy) of the Cetotolites, discovered in the Geelong beds, as belonging to *Ziphius*, and the recently described tooth from the same beds, I have no doubt but the specimen I have discovered in the older Pliocene beds is a new species, as it differs considerably from those previously described, and may be found to belong to the same class of Whales as the previously discovered tooth of Physetodon.

# PROCEEDINGS OF SOCIETIES.

## THE ROYAL SOCIETY OF VICTORIA.

The ordinary meeting of the Royal Society of Victoria was held on 8th June. There was a good attendance. The President, Mr. R. L. J. Ellery, occupied the chair.

Messrs. D. B. W. Sladen, B.A., Oxon., and T. Shaw were elected new members; Mr. John Booth, C.E., was elected as an associate.

Mr. W. C. Kernot read a paper entitled, "Some Remarks on the Barwon Flood of 1880," in which he corroborated the views expressed by Mr. W. W. Culcheth in his paper read before the Society in December last. He concurred that the Railway works were responsible for from 3ft. to 4ft. in the depth of the flood-water at the Victorian and Barwon cloth factories. To show this some experiments were made causing water to flow over a plaster model. The Railway Department, in originally adopting 16·53ft. as the high flood-level of the river, had, he contended, accepted a datum altogether irreconcilable with well-known trustworthy works higher up and lower down the stream, and the comparison of the original flood-level of 16·53, with a trustworthy mark one and a-half miles up stream, gave so enormous a discharge that the velocity of the water at the Railway-bridge would need to be 20 miles per hour in order to deliver it. The allegation of the witnesses for the defence, that there was 735ft. of water-way at the Railway Works, was characterised as incorrect, the true water-way being only 290ft., and that so surrounded by obstructions as not to be fairly equal to more than 200ft. of clear unobstructed water-way. In conclusion, Mr. Kernot insisted on the importance of thorough scientific investigation when designing engineering works, and characterised the popular idea, that scientific theory was to be set aside and practice taken as the only guide, as a delusion, besides leading to the most serious and deplorable results.

Mr. Culcheth, in a paper upon the above subject, expressed the opinion that till some experience had been gained on a small scale, it was not likely that large irrigation works would prove a financial success. Those who advocated irrigation in Victoria were too prone to overlook the failures in this direction, and laid too much stress upon those works which had good results. The great difficulty to be met in Australia was the high price of labour, but if, profiting by the mistakes of older countries, errors were avoided, irrigation might be remuneratively carried on. Government assistance would be needed by small estate-holders to water their country by artificial means. Large irrigation projects undertaken as commercial speculations were not likely to turn out well in Australia for some time to come, as the data on which extensive operations might be based were wanting. The conditions of the colony were so peculiar that, despite the knowledge gained elsewhere, the effect of local circumstances could only be surmised. Irrigation might often pay indirectly, just as a railway, which was not itself remunerative, would improve the value of the property through which it passed. For these reasons, while a judicious system of irrigation might be highly advantageous, the progress of the work should be step by step.

Mr. Jamieson read a paper on the subject of "Influence of Light on the Development of Bacteria."

Mr. Rudall addressed himself to "Remarks on Railway and Marine Signals, and the necessity of accurately testing the sight of all signal and look-out men by land or sea." He pointed out how necessary it was, in the interests of the public safety, that engine-drivers, mariners, and others in similar positions of responsibility, should have a clear perception of the difference between various colours and the kind of signals employed. He submitted that signals used at sea should be resolved into an international code, and should be in relation with the faculty of sight and of colour-sense, as determined by modern investigation. As colour-blindness was quite common, all signal-men should be tested by law, according to the method recommended in the resolutions adopted on the subject by the International Medical Congress of 1881.

In the discussion which ensued respecting the necessity of taking the steps that Mr. Rudall had advocated, the suggestion was thrown out that the collision between the Nelson and the Julia Percy, which took place at the beginning of the year, and the cause of which had never been satisfactorily explained, may have been due to colour-blindness on the part of one or both the men at the wheel or on the look-out at the time. It was resolved that Mr. Bosisto, M.L.A., should be written to asking him to inquire in the Assembly whether engine-drivers are tested to prove that they are not colour-blind.

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## THE FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Field Naturalists' Club of Victoria was held at the Royal Society's Hall, on Monday evening, 12th June. There was a good attendance of members, and the Rev. J. J. Halley, one of the Vice-Presidents, occupied the chair.

The following gentlemen, proposed at last meeting, were duly elected as members, viz.:—Messrs. J. Cantor, C. Thompson, A. Thie, F. Longmore, J. Whitfield, and H. Henderson; and the following nominations received, viz.:—Dr. L. L. Smith, Messrs. J. Bosisto, A. Elliott, R. L. Ievers, and G. Coghill.

The papers promised for next meeting were the concluding part of Mr. C. French's paper on "Victorian Ferns and their Habitats," and on "Geology," by Dr. Lucas. The first paper read was one by Mr. H. Watts on the "Weeds in the Albert Park Lake." Considerable discussion followed, in which the Chairman, Mr. F. C. Christy, Mr. Duerdin, and others took part. The next consisted of notes, by Baron von Müeller, on some terrestrial orchids recently found by Mr. C. French near Brighton, these being new for Victoria. Mr. J. F. Bailey followed with an interesting description of some new cetotolites, or ear-bones of a fossil whale, found by him at Cheltenham.

The Hon. Librarian acknowledged the receipt of several new scientific journals as donations to the Library of the Club.

Mr. F. C. Christy offered a few remarks on the poisoning of some doves by the fruit of a Solanum, which was said to be *S. nigrum*, or black nightshade, a plant which has unfortunately made itself quite at home in Victoria, and which no doubt is of a highly poisonous character.

The usual exhibition of specimens followed, amongst which may be mentioned: By Mr. C. French, two specimens, measuring nearly 11in. across the wings, of *Attacus Atlas* (the Atlas moth), from Assam; also growing specimens, in flower, of the three Orchids found by him at Brighton. Mr. J. F. Bailey and the Rev. J. J. Halley exhibited some very interesting specimens of new Cetotolites, or ear-bones of a fossil whale, from Cheltenham beach and from Hamilton. The former gentleman also showed some rare fossils from Brighton beach, including snout-bones of fossil Ziphoid Whales, and drawings of *Ziphius Sowerbyensis*, a recent species illustrating his paper. Mr. H. Watts sent some exhibits of Bryozoa and Hydrozoa, collected by him at Queenscliff. From Mr. Sayce came specimens of limestone fossils, collected by him near Lorne. Mr. A. North showed fourteen specimens of birds' eggs, many being those of rare families. Seven of robins' eggs were exhibited by Mr. Campbell, and some Victorian insects by Messrs. F. Pitcher, Barnard, and Spry.

The usual *conversazione* brought a very successful meeting to a close.

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## THE MICROSCOPICAL SOCIETY OF VICTORIA.

The Ordinary meeting of the Microscopical Society was held on Thursday, 29th June. There was a large attendance of members, the Vice-President, the Rev. J. J. Halley, occupying the chair. The Acting-Secretary acknowledged the receipt of a number of journals and other publications.

The Rev. J. Porter read a paper describing his method of preparing and mounting double-stained sections of vegetal tissues, founded on directions given in *Science Gossip* for January, 1880. He illustrated the paper by a series of specimens, stained principally with carmine and aniline green, which were remarkable for their brilliancy of coloring and clearness.

Mr. Barnard also forwarded a number of fine sections of native and other plants, mostly stained with carmine and picric acid, which were much admired.

Mr. Allen exhibited a recent microscope by Hartnack, with binocular eye-piece, and full set of accessories and objectives.

The Rev. J. J. Halley described and exhibited a modified turn-table, designed by himself, to furnish a ready means of clamping the slide in either a central or eccentric position.

Mr. Halley also made some remarks on the uses of starches as adulterants, etc., and exhibited a number of mounted specimens of various starches, of which he presented a series of seventeen slides for the Society's cabinet.

Mr. J. F. Bailey distributed among the members present a quantity of valuable and interesting microscopic material, comprising Foraminiferous sand from Bermuda and North Australia, and various samples of Diatomaceous, Radiolarian, and Globigerina ooze, dredged by the "Challenger" from depths of $3\frac{3}{4}$ miles and less.

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## THE LINNEAN SOCIETY OF NEW SOUTH WALES.

The monthly meeting of this Society was held on Wednesday evening, 28th June, at the Free Public Library. The President, Dr. James C. Cox, in the Chair. The Rev. Joseph Campbell, M.A., was elected a member.

Donations were announced as follows:—"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 Naturwissenchaftlichen Vereine 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 Müeller, 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.

The following papers were read:—1. From the Rev. B. Scortechini, entitled "Half Century of Plants new to South Queensland." This paper was to some extent a continuation of a previous paper by the same author, and contained the results of further researches on the Flora of that part of the country. Among the plants enumerated were many hitherto regarded as strictly tropical, while others had not previously been observed in such warm latitudes. 2. "Contribution to a Knowledge of the Fishes of New Guinea," by the Hon. William Macleay, F.L.S., &c. This paper gives a list of 120 species of Percoid Fishes collected by Mr. Andrew Goldie, at Port Moresby and

Cuppa-Cuppa, in New Guinea. They are, with few exceptions, species which have been described by Dr. Bleeker as being found on the Northern shores of that island and throughout the Netherlands India Archipelago generally. The new species described are *Serranus Goldiei, Serranus magnificus, Genyoroge bidens, Mesoprion rubens, M. parvidens, M. Goldiei, Diagramma Papuense, Lethrinus aurolineatus.* The remainder of Mr. Goldie's collection is to form the subject of a future paper. 3. Mr. W. A. Haswell, M.A., B.Sc., read a paper entitled "A Monograph of the Australian Aphroditacean Annelids." The first part of the paper was occupied by an account of various points in the anatomy and physiology of the group—the chief being a description of the structure of the elytra, the demonstration that the structures described by Ehlers and Williams as segmental organs are portions of the intestinal cæca, and the description of a pseudohæmal system in various species of Polynoidæ, in which family it had previously been supposed to be absent. The second part contained a description of thirty-two species, most of them new, from tropical Queensland, Port Jackson, and Victoria. 4. Two papers were read by Mr. E. P. Ramsay, F.L.S., Curator of the Australian Museum, one containing a description of a new species of *Phlogænas (P. Salamonis)* and of a new species of *Dicrurus* (proposed to be called *D. longirostris)* from the Solomon Islands; the other containing a description of a new species of *Coris* from Lord Howe's Island.

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.

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 occurrence 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 re-discovered 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 ox-hide 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 honor 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.

## THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

The usual monthly meeting of the Royal Society of South Australia was held in the Institute on Tuesday, 13th June. Mr. T. B. Adamson presided. Several literary donations were received as additions to the library.

Dr. H. Whittell, M.D., Messrs. R. B. Robin, T. W. Harris, G. E. Farrar, J. W. Tyas, and F. W. Davis were balloted in as ordinary members, and Mr. Maurice Holtze, Curator of the Botanic Garden, Palmerston, was accepted as a corresponding member.

Professor Tate directed attention to some examples of honey-bearing ants, similar to some submitted to the Society on two previous occasions. They were the remarkable honey-bearing ants, which had been described by Sir John Lubbock, and stated to come from Adelaide, but it is now known that the locality is Barrow's Creek in tropical S. Australia. One of the Society's corresponding members (Mr. Chandler) had sent down specimens of the ant, and of a second species from the same locality.

Mr. Smeaton remarked that although ants fed upon the Mexican honey-bearing ant while it lived, yet when it died they made no attempt to open the abdomen, where the honey was secreted.

Professor Tate exhibited a small orchid (*Pterostylis mutica*) forwarded by Mrs. Richards, of Fowler's Bay. This discovery shifts the western limits of the species several hundred miles.

The Secretary exhibited a specimen of quartz crystal from the roof of the bed-rock at Inglewood, Victoria, at a depth of 80 feet from the surface. It seemed to have included in it what appeared to be tufts of grass. Professor Tate expressed the opinion that the appearance was due to radial fracture.

Professor Tate read the following paper upon the winter-flowering state of *Hypoxis pusilla* (Hooker) :—

"Pastoral lands on slaty hill-slopes and loamy flats are abundantly adorned in the months of August and September with the bright yellow star-like blossoms of *Hypoxis pusilla*, (Hook, J.); but on the 26th of May, while making close search for the florets of the lowly *Lagenophora emphysopus* (J. Hooker), which I detected in numbers on the pasture slopes of the slaty hills near Belair, overlooking the Adelaide Plain, I was attracted by the matured capsule of a minute lily-like plant. Further exploration revealed the fact that the scanty herbage was largely constituted of the filiform leaves of this species, which presents the salient characters of *Hypoxis pusilla*; but not one of the very many plants examined exhibited expanded flowers; in all stages of flowering the perianth segments were closely adpressed to form a green erect column to the ovary. A few days later I examined the North Adelaide Park Lands at spots which I knew to be yellow with the flowers of this species at a more advanced season, with similar results. These early flowering examples are evidently cleistogamous, the floral envelopes never expanding, and their self-fertilizing power is attested by the abundance of seeds in every capsule. Similar phenomena are exhibited by *Salvia verbenacea*, which has become a trouble some weed, far beyond the limits of the city, during the last five years. A few questions arise, which I shall endeavor to answer as opportunities for observation offer. These, however, may present sufficient interest to justify my submitting them to you at this time. First, is the plant distinct from *Hypoxis pusilla*? It certainly does present a few differential characters, but of such a trivial nature as not to be of specific value; they, however, must be regarded as racial, and for designation I use the name *hyemalis*, a description of which I now give. * * * * * Baron F. von Müeller refers *H. pusilla* to *H. glabella*, a much larger plant, with one bract on the scape, and the stamens of equal length. Mr. Bentham adds another character, from the shape of the ovary, globular in the former and oblong in the latter, but which is not borne out by my examination of many specimens which otherwise agree with *H. pusilla*. The trivial characters which distinguish the var. *hyemalis* are:—Smaller in all its parts, short scape, and in having not less than two leaves. The conditions of soil and moisture are the same in the two cases, but not of temperature. A second question is, will the var. *hyemalis* produce leaves and flowers at a later season than the typical *H. pusilla*? And again, is var. *hyemalis* only the adolescent stage of growth of which *H. pusilla* is the senile form of this perennial plant, or *vice versa*? I may partly answer this by stating that I found the corms of different sizes, some almost rotted away, whilst others showed traces of varying number of scales, from which I conclude that the specimens differed materially from one another in age, and therefore that the characters are permanent."

A communication from Mr. H. Tietkens, F.R.G.S., was received in reference to a previous discussion on the subject of small-pox amongst the natives of Australia. He stated that the Rawlinson Ranges were situated in S. latitude 24° 30′, E. longitude 127° 42′; were visited by Ernest Giles and himself in 1873. The range, situated quite in the heart of the continent, was surrounded on all sides by a vast extent of uninhabited country quite of a desert character, waterless, and covered with dense scrub of mallee and mulga, and only under the most favorable circumstances could it be traversed by the natives, and until he and his companion went there it certainly had never been visited by whites. There they found a people quite isolated from the rest of the world, breathing the pure dry air of the interior, who wandered in small communities from place to place, who seldom camped or remained a whole day in one place, deeply marked with small-pox. What measures they took to prevent contagion or alleviate their sufferings, or how many were carried off, would probably be never known. Of fifteen or twenty men who visited the camp, eight were unmistakably marked with small-pox. Professor Tate, while at Palmerston, was shown a plant which the natives of that country, it was supposed, used as an antidote. In the list of plants by Baron von Müeller, collected upon the expedition, the *Sarcostemma australe* was mentioned as having been found upon the Rawlinson Ranges. The germs of the disease that it was said might be found in the particles noticed in the sunbeams might, in densely populated countries, propagate contagion, but those would be destroyed by the hot winds and Summer's Sun in crossing such tracts of waterless and uninhabited country. If, then, a people were found under such circumstances who were subject to the disease, how could we expect immunity who were at times somewhat negligent, the writer asked. Mrs. Richards on this subject wrote that, at the end of 1866 and the early part of 1867, the natives at Streaky Bay and Fowler's Bay had what was supposed to be small-pox, great numbers of them dying. A few of the affected were still living and very much pitted, more especially an old lubra who was blind; although constantly with them no white person was known to have taken the disease.

Professor Tate said Mrs. Richards mentioned the fact that Dr. Gething was sent by the Government to attend to the natives at Streaky Bay. He had been in communication with Dr. Gething on the subject, who had informed him that he was not prepared to deny that it was small-pox. The natives at Streaky Bay declared that the disease came to them from the North. He had hoped to have had dates to go upon, but there was not sufficient data to enable him to trace the line of the dissemination of the disease or settle the question whether it was an endemic disease or had been introduced by the Malays.

A communication from Mr. O. Tepper was read concerning some new plants. He said three plants had been mentioned as not before known to occur in South Australia; the first was a cyperaceous plant, growing in clefts of rock where a spring of water was oozing out; the long narrow leaves, 6-9 feet, growing in large tufts, gracefully draped the precipice and fallen boulders where it was found. Its scientific name was *Cladium trifidum* (F. v. M.), hitherto known from Tasmania, and occurred, to the writer's knowledge, only at one very picturesque spot on the Onkaparinga River south of Clarendon. The second plant was a small orchid, *Prasophyllum despectaris* (J. Hooker), which had not been known before out of Tasmania. It seemed here very rare in the scrub of the hills. The third was a *Drosera* or Sundew, seemingly quite new, which sent its flower-stalk from the dry hard soil and flowered a month before the leaves appeared. Baron von Müeller considered it a close relation to, but not identical with, *Drosera squamosa*, a West Australian species.

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## THE ROYAL SOCIETY OF TASMANIA.

The usual monthly evening meeting of this Society was held on Tuesday, 13th June, Mr. T. Stephens, M.A., Vice-President, in the chair.

The following gentlemen, who had previously been nominated by the Council, were balloted for and declared duly elected:—As Fellows of the Society—Mr. William Knight, M.A., and Mr. Patrick Mackay. As a corresponding member—Mr. George McIntyre, of Christchurch, New Zealand.

The Hon. Secretary brought forward the usual monthly returns.

The Chairman read an elaborate and interesting paper on the remains of Trilobites from the Mersey River district, and on other fossils from the boulders in the conglomerate beds near Table Cape, with figures and descriptiens, communicated to the Society by Robert Etheridge, jun., F.G.S., etc., of the Museum of Natural History, London, and a Corresponding Member of this Society.

Mr. Stephens said that the specimens which formed the subject of the paper consisted of a collection of Trilobites and other fossils sent to England by himself several years ago, and comprising representatives of all the forms which have yet been discovered in the Silurian rocks of the Mersey district. Mr. Etheridge having very kindly consented to examine and describe them, a large collection of similar specimens was contributed by Mr. Hainsworth, who also furnished several specimens from the boulders near Table Cape. The result is that two entirely new Trilobites belonging to the genera *Concephalites* and *Dickelocephalus* are described and named by Mr. Etheridge, and six others noticed, which are too imperfect to be described, together with an *Ophileta*, and the internal cast of a bivalve; the fossils identified from the Table Cape conglomerate being a new *Pentamerus*, a *Tentaculites*, an *Orthis*, three species of *Spirifer*, and some doubtful forms. The Trilobite beds might now, in Mr. Etheridge's opinion, be confidently classed as Lower Silurian, and some at least of the Table Cape boulders as Upper Silurian. The arduous nature of the task which Mr. Etheridge had so kindly undertaken might be imagined by any one who had seen the refractory matrix in which the fossils were found, and he (Mr. Stephens) was sure that a cordial vote of thanks would be unanimously accorded for his valuable paper.

Mr. R. M. Johnston stated that the paper read was one of very great importance, as the determination of the horizon of the Caroline Creek beds at Latrobe, with their included Trilobites, and the fossiliferous conglomerate at Table Cape, will materially help Tasmanian geologists in relating the undetermined ancient rocks which are found largely distributed all along the western part of the island from North to South. Mr. Johnston further pointed out that the Crassatella bed of the Table Cape Tertiary series, which was formerly described by him rested immediately upon the conglomerates referred to. Much credit was due to Mr. Stephens for the careful selection of fossils made by him in order to have the positions of these important geological horizons truly determined. The members of the Society were under deep obligation to Mr. Stephens, as well as to the able palæontologist, Mr. Etheridge, for this very valuable contribution to the Society's papers.

A communication was received from Mr. Aug. Simson, of Launceston, announcing his discovery at "Brady's Look-out," Swansea, of a plant (*Helipterum exiguum*), new to the flora of Tasmania, and its identification by Baron von Müeller.

A special vote of thanks having been unanimously accorded to Mr. Etheridge for his admirable paper, the proceedings closed with the usual acknowledgment to the donors of presentations.

such a means of protection. Arago tells us that in tracing the history of the use of cannons he found that bells, especially church bells, had preceded them; and it was at one time firmly believed that the vigorous ringing of church bells was sufficient to dissipate dangerous storms; and he says, "Savage nations in all parts of the Earth send forth deafening clamours to terminate eclipses and destroy dangerous storms," and the habit seems to be still ingrained in human nature. It is evident, therefore, that up to 1810, or later, the popular idea was that storms might be destroyed or prevented by fire or guns, and I have been unable to find any reason for the complete change to the opposite opinion which has taken place since then, unless it be that the wants have changed. Australia, like Africa, wants the rain-doctor to make rain, not drive it away. It is not only in Australia, however, that the belief in the artificial production of rain exists. In America, during the Civil War, it was a matter of common observation that rain followed the great battles, and the belief in this became so general that farmers began the practice of making large heaps of brushwood on each farm, and when they wanted rain, lighting them all together. I cannot find any reference to the results of this system in the Smithsonian publications, in which almost every subject of this kind is dwelt upon; but the practice seems to have been given up.

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## ELECTRIC LIGHTING EXHIBITION.

As a scientific exhibition of no little merit, the Electrical Exhibition held in the large hall of the Athenæum, during the early part of June, deserves more than passing notice. The exhibition was mainly promoted by the Directors of the Australian Electrical Company, who, in their laudable endeavors to introduce the new system of lighting to this colony, had just imported a large number of the celebrated Swan's Incandescent Lamps of the newest form of light. It was, doubtless, to see these that the large crowds flocked to the exhibition, daily and nightly, during the week it was open. The arc light, long used for open air purposes, was far too brilliant and expensive for household purposes. Electricians, therefore, tried every means to divide the arc light, but without success. The incandescent system has, however, come to the rescue, and now it is possible to get electric lighting of almost any degree of brightness or dulness that may be desired. To those amongst the visitors who had paid any attention, previously, to the difficulties of the problem, the exhibition of the incandescent lamps was an unqualified success, but to the general mass of the visitors the new lamps were very disappointing. They had expected to see an impossibility, a light as brilliant as the arc light, but of some eight or ten candle power. There were many amongst the crowds who could not realise the fact that electric light of the same power as

## THE ROYAL SOCIETY OF NEW SOUTH WALES.

### THE PRESIDENT'S ANNUAL ADDRESS.

[Continued.]

It appears that a retired naval officer, who at sea had seen water-spouts destroyed by cannon-shots, made his home in a district that suffered from violent rain and hailstorms, and he determined to try the power of shot and shell upon these new foes, and, setting up his battery, he fought his battles o'er again with such success that the district was protected from the violent storms; they could not face the cannon, and the practice became popular in France, and up to the year 1806, and even later, many communes kept a battery of small guns for this purpose, and the commune of Fleury even went so far as to get a cannon that used a pound of powder for each discharge. M. Arago could not trace what the effect had been, but he at least was not convinced that it had any good effect, and after a time the practice became obsolete, in spite of the apparent success which had given rise to its general adoption. Volta's biographer says that "it is well known that Volta thought a possible advantage might be found in having large fires during thunderstorms." He does not give his reason, but it was probably that the smoke of a large fire would serve as a conductor for the electricity, and so prevent dangerous discharges. And Arago mentions the fact that near Cesena, Romagna, there is a parish which had suffered severely from hailstorms, throughout the extent of which, by the Curé's advice, the peasants placed, first mounds of stone every 50 feet, and on these heaps of straw and brushwood, which they set on fire all over the parish as soon as a storm was seen approaching, and for three years they had no hailstorms, while their neighbours, who made no fires, had their crops destroyed by hails as usual. To test the effect of the discharge of artillery on the weather, Arago examined the weather record in the Paris Observatory for many years, especially on and before and after the days on which the regular gun-practice took place in the fort situated 3,280 yards from the observatory. The firing took place at this fort on certain days in the week, and from 7 to 10 a.m., and about 150 shots were fired. Now if these discharges really had the effect then attributed to them it must be visible in the weather records, and he found that out of 662 days preceding the practice 128 were cloudy; out of 662 days of practice 158 were cloudy; and out of 662 days following practice 146 were cloudy, which, he thinks, goes to prove that the discharge of heavy artillery does not seem to have the effect attributed to it, *i.e.*, of dissipating the clouds. Arago, at one time struck by the amount of destruction caused by hailstorms, proposed to draw off the electricity by means of wires carried up to great elevations by captive ballons; but it was seen, as soon as he came to the practical consideration of the scheme, that each balloon would protect no more than perhaps a thousand square yards—a mere speck of France, and no Government could endure the expense of keeping up such a number of balloons as would protect the whole country, even if they were of any use, for it is evident that in a storm, when they would be most wanted, the wind would blow them down, and in latter years he was led to doubt the value of ordinary gas-light is a boon of priceless value, freed, as it is, from all that renders coal-gas so obnoxious. These could only see that in appearance the Swan light was as yellow and dingy as gaslight. The purity of it they could not see, yet this was particularly noticeable in the pretty drawing-room fitted up in the latest style of ornamental art: here the various colors were to be seen as truly as in the daylight. The blues and greens were perfect, although the light from the chandeliers, containing five Swan lamps, was even less than would have been obtained from the same number of gas-jets.

There can be no doubt that the softness and purity of the new light will be universally admitted, when the public have become better acquainted with it as it gradually comes into general use. We understand that the Company above referred to has obtained contracts for lighting the Royal and Victoria Arcades, and other places of business in Bourke Street. Probably, the Theatres, Town Hall, and other places of recreation, will soon adopt the same means of lighting, to the manifest advantage of their audiences, from a hygienic point of view.

## LIST OF EXHIBITS.

Australian Electric Co.—Circuit-closers, Field Test Tables, Resistance Coils, Firing Keys with novel safety appliance invented by Mr. Joseph, the electrical engineer to the Company. Shutter apparatus for torpedo purposes and various subsidiary contrivances, all constructed in the company's factory, Russell Place, and fully equal in finish to the imported article. The Company also exhibited a number of imported Swan Lamps, which were shown in action, superseding the use of gas in the hall, and which, when enclosed in frosted globes, were by some persons mistaken for gas. These lamps give out very little heat, and do not vitiate the atmosphere by any products of combustion. Also several Brush Arc Lamps, one of which was placed outside in Collins Street. The electric current for the lamps was brought by wires from the Company's factory, where a steam engine of special construction, capable of working up to 97 horse power, and several powerful electric generators, were placed. An engineer's turning-lathe driven electricity was also exhibited to illustrate the electric transmission of power. power.

Mr. Paterson exhibited a fine collection of lamps for railway, steamboat, and street purposes, some of which were fitted with electric lights.

The Telegraph Department showed telegraph instruments, a new form of galvanometer, and a new and very inexpensive galvanic battery invented by Mr. Alfred R. Bennett of Glasgow, also a novel sounder invented by Theiler.

Felton, Grimwade, & Co.—Medical electrical appliances of all kinds.

Slater & Co.—Telegraph instruments, telephones, electric bells, &c.

W. Johnson, of St. Kilda.—Educational electric apparatus.

Briscoe & Co.—Electric exploders for blasting purposes.

Cullis Hill & Co.—A drawing-room elegantly furnished, illuminated with electric light—a very agreeable effect.

Alcock & Co.—Billiard table, with electric marker and electric lamps.

Douglas & Sons.—Brackets and chandeliers fitted with electric light.

T. Webb & Co.—Exhibit of artistic glassware arranged as a dining table, and illuminated by electric light.

One peculiar exhibit was a Swan Electric Lamp under water in the midst of a globe of gold fish.

Short lectures and explanations were given by Messrs. Kernot, Selby, Joseph, and others, upon the various applications of electricity. It was pointed out that in a hot climate electric lights were far more conducive to comfort and health than any other. That the cost would probably not exceed that of gas, that by means of electricity motive power could be conveyed without very serious loss over great distances, and that it was possible that water-power of rivers, and tidal power, at present going to waste, might be thus utilized, and steam, with its unpleasant concomitant, smoke, dispensed with.

## NOTES, MEMORANDA, &c.

The Transactions and Proceedings of the New Zealand Institute for 1881, vol. xiv, issued in May of the present year, is a bulky volume of 600 pages. The Transactions comprise 78 original articles, supplied by members, all of which are valuable contributions to Science. We congratulate New Zealand on the possession of some forty authors who can devote so much of their time to the description of new facts, and the elucidation of old mysteries, connected with that wonderful country. We cannot praise too highly the articles by Mr. W. Colenso, F.L.S., on the Maori Race, its traditions, character, and many curious customs, on the fine perceptions of colors common amongst Maoris, and other strange peculiarities of this wonderful people. A very suggestive paper by Mr. Robert Hall Bakewell, M.D., etc., "On the production of Inflammatory Action in detached portions of dead Animal Bodies," narrates the results of many careful experiments conducted by the author, tending to prove that molecular life exists with a vigor, and for a length of time, hitherto unsuspected, after somatic death has taken place. About twenty articles are on miscellaneous subjects, the remainder being pretty evenly divided between Zoology, Botany, Chemistry, and Geology: all are valuable, and we regret that we cannot afford more space to particularise some of these most interesting contributions. We can only add that the careful manner in which the work has been edited, by Dr. James

Hector, C.M.G., leaves nothing to be desired, while the industry displayed in the Proceedings of the Institute enables us to anticipate a continuance of good work.

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"On the Natural History of New South Wales" is the title of an essay by the Rev. J. E. Tenison-Woods, containing in the first part a brief *résume* of the Literature of Australian Natural History, and in the second a general sketch of the knowledge we at present possess of the Natural History of New South Wales, much of which applies equally well to the other colonies. The author regrets that important omissions in the essay in regard to the *Tunicata*, *Annelida*, *Arachnida*, and other groups, are due to an almost total absence of information on these subjects, but trusts that, in view of the steady labors of the Linnean Society of New South Wales, this want will be remedied at no distant date. We quote from the author's general conclusions as follows:—

1. The Continent of Australia differs in many of its animals and vegetables from other countries.

2. This difference is, however, restricted to minor peculiarities of structure, always remarkable and singular, but not entitling the Continent to be considered as more than a province in the animal and vegetable world.

3. This provincial character becomes more marked as we ascend the scale of life, and best seen in the mammalia.

4. As we descend in the scale of organization, both in the animal and vegetable kingdom, our fauna and flora become less peculiar, and more largely shared by other countries, until in the lowest forms we find little or no specific distinction.

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Crouch's Microscopes.—The celebrated maker, Henry Crouch, of London, has appointed Messrs. Rennick, Kemsley, and Co., of 55, Little Collins Street West, his agents in this city, and a selection of his Microscopes, including his No. 1 Students', and some of the cheaper sorts, may be seen at their offices. These instruments have already been examined by Dr. Porter, and other members of the Microscopical Society of Victoria, who have expressed approval of their quality and moderate price. In a few months Messrs. Rennick, Kemsley, and Co., will be supplied by Mr. Crouch with a stock of accessory apparatus. It is the intention of Messrs. Rennick and Co. to study the requirements of Microscopists and Students in this respect.

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We are compelled to hold over our usual report of the monthly meeting of the Royal Society of New South Wales. We, however, continue the Report of the President's Annual Address. Much other interesting matter stands over, notwithstanding that we appear this month with four additional pages.

# DEFINITIONS OF SOME NEW AUSTRALIAN PLANTS,

BY BARON FERD. VON MUELLER, K.C.M.G., M.D., Ph. D., F.R.S.

[Continued.]

*Eucalyptus Todtiana.*—Arborescent, but not tall; leaves rather small, rigid, narrow-lanceolar, slightly curved, almost equilateral, shining on both sides, scarcely paler beneath; veins pinnately spreading, much immersed, the circumferential vein only slightly removed from the edge; oil-pores concealed; flowerstalks axillary, rather long, not much compressed, bearing from 4 to 7 flowers; stalklets none or exceedingly short; calyces longitudinally streaked; their tube semi-ovate, attenuated at the base, somewhat longer than the hemispheric lid; stamens all fertile, with exception of some of the outermost inflexed before expansion; anthers nearly heart-shaped, anteriorly dehiscent with longitudinal upwards confluent slits; stigma not dilated; fruits rather large, nearly globular or truncate-ovate, their margin thin; valves three, enclosed, very short; sterile seeds mostly broad; fertile seeds expanding laterally into a transparent membrane.

Near the Greenough- and Arrowsmith-River on sandy ridges, F. v. M.; near the Moore-River, J. Forrest. Allied as well to *E. buprestium* as to *E. patens.* Named in honor of Mr. Emil Todt, through whose artistic talent numerous species became illustrated for the "Atlas of Eucalypts."

*Eucalyptus Howittiana.*—Branchlets angular; leaves on stalks of moderate length, scattered, ovate- or elongate-lanceolar, dark-green above, much paler beneath, of rather rigid consistence; their lateral veins pinnately spreading, numerous, very subtle, the circumferential vein at a slight distance from the edge; oil-pores concealed; panicles axillary and terminal, their ultimate branchlets rather stout, short, angular, bearing generally 3-6 flowers without any separate stalklets; fruits very small, ovate-globular, truncated, quite smooth, somewhat shining, distinctly contracted toward the narrow terminal margin; valves 3-4, minute, almost deltoid, inserted near the orifice; sterile seeds extremely short; fertile seeds very small, almost ovate, neither considerably angular nor provided with any membranous appendage.

At Lake Lucy near Rockingham Bay; Dallachy. Flowers unknown.

Among the few other species with minute flowers (namely *E. brachyandra*, *E. crebra*, *E. hæmastoma var. micrantha*, *E. microtheca*, *E. populifolia*, *E. Raveretiana* and *E. stellulata*), this new one is well marked already in its foliage, which is not unlike that of *E. Cloeziana*; but the flowers of the last are umbellate, therefore not strictly capitate in the panicles, the calyces are remarkably open, not indicating a subsequent fruit much closed like that of *E. Howittiana*, while the young valves are inserted much below the orifice; ripe fruits of *E. Cloeziana* remain still unknown.

This species is dedicated to A. W. Howitt, Esq., F.L.S., F.G.S. who, amidst the duties of a responsible judicial position in Gippsland has still found moments to elucidate much of the geology and oryctognosy of his district, and to aid in rendering more known there the distribution of the eucalypts also.

*Brachycome cheilocarpa.*—Erect, slightly hairy; stem-leaves pinnatisected; segments rather long, linear or subdivided into 2 or 3 narrow lobes; bracts forming the involucre broad towards the base gradually attenuated into the narrow summit; receptacle semi-ovate ligules comparatively long; fruitlets all compressed, surrounded by a narrow and slightly fringed membrane and terminated by two nearly semiorbicular likewise membranous lobules; pappus radiating into many minute bristles.

Near the Gascoyne-River, J. Forrest, Esq., F.L.S., F.R.G.S.

Allied to *B. ciliaris*, but a larger plant, and distinct from that species as well as from all other congeners in the two curious scales, which almost enclose the pappus, and remind of the terminal membranes of the fruitlets of *Calatis cuneifolia*, *C. dentex*, and *C. glandulosa.*

*Pentatropis Kempeana.*—Glabrous; leaves linear, recurved or revolute at the margin, sometimes flat; umbels few-flowered, on rather short stalks; corolla from a greenish color turning to dark-purplish; its lobes about twice as long as the tube, ovate-lanceolar, not bearded; divisions of the staminal corona hardly or slightly pointed, saccate-turgid at the base, almost touching the somewhat five-curved basal disk.

Near the Finke-River; Rev. H. Kempe.

With the other species of this genus readily transferable to *Dæmia.* The exact specific demarcations of the Australian congeners have yet to be more fully traced.

*(To be continued.)*

# Victorian Ferns and their Habitats.

By C. French.

[Read before the Field Naturalists' Club of Victoria 10th July, 1882.]

## PART VII.

### *Polypodium*—(Linnæus).

Rhizome creeping in all the Australian species, with small brown scales. Fronds simple, pinnate, or compound. Sori orbicular, rarely oblong, variously dispersed over the under surface without any indusium.

*Polypodium Australe*—(Mettenius).—A well known and pretty little fern found growing on stems of tree-ferns in most of our mountain gullies. The fronds are entire, linear, usually 2 or 3 inches in length, but in some districts much longer. This species may be easily recognized from any of the other indigenous kinds, approaching in growth only *P. grammitidis*, from which, however, it is easily distinguished, the latter having pinnatifid fronds, and the sori much less spread over the under surface of the fronds. In the fern gullies near Waterloo, on the main Gippsland line of Railway, this singular little fern may be seen in perfection, growing on stems of Pomaderris or Native Hazel, from the ground upwards to a height of 20 feet. It is of little use for cultivation excepting for Wardian cases, and other miniature ferneries. *Grammitis Australis*, *G. Billardieri*, and *Polypodium diminutum*, are synonymous with this species. Found in Queensland, New South Wales, Tasmania, also in New Zealand, and the extreme south of America.

*Polypodium grammitidis*—(R. Brown).—Another small and pretty species, found rather common in fern gullies throughout the colony. In appearance it is unique, as far as the form of the fronds is concerned, from any of its Victorian congeners. At Waterloo, Arthur's Seat, Fernshaw, Macedon, and other gullies this species may be seen perched up on the stems of tree-ferns, Native Musk *(Aster argophyllus)*, on the Hazel, and on many other trees to be found in and near the fern gullies. The fronds are pinnatifid, and often twice pinnatifid, and grow from 3 to 6 inches in length and even longer in favoured spots. For cultivation it is of little use, although if tastefully arranged on blocks or pieces of fern-stem and placed in a cool sheltered part of the Fernery, it looks very pretty. Found, according to Bentham and others, in Tasmania, and in New Zealand. I may mention that *Grammitis heterophylla* and *Xiphopteris heterophylla* are identical with this species.

*Polypodium punctatum*—(Thunberg).—We come now to a very beautiful though common species, and found in all, or nearly all of our mountain districts. This is a most variable species; no less than three distinct forms can be seen at any time growing within a few yards of each other. The one is of a robust hairy nature, approaching in growth very closely to the typical *Hypolepis tenuifolia*, the second a very soft though vigorous kind, and the sori thickly covering the under portion of the frond. The third is a somewhat limp form, and very smooth in the stipes. For cultivation this species is most desirable, being easy of removal, and can be cultivated with very little trouble. To grow it well, some wood ashes should be mixed with the soil (which should be good stiff loam). A little shade and plenty of water is all which is required. For dwarfing effect in artificial fern gullies, it is very useful and should be more universally grown than at present. In or near the gullies of the Lang-Lang, inland from Drouin, on the main Gippsland line of Railway, there are specimens to be seen which I am sure could not have been less than 6 feet in height, and some very stout and robust. Mr. Bentham ("Flora Australiensis," vol vii, p. 765) remarks that it requires some care to distinguish the specimens from those of *Hypolepis tenuifolia*, especially when the fructification is old. (I have, however, pointed out the above difference when describing the latter fern in a former number of this paper). Found in Queensland, New South Wales, Tasmania, and, according to Bentham and others, extending over the tropical and southern extra-tropical regions of the old world, reaching northwards to Japan.

*Polypodium serpens*—(Forster).—A curious little fern, and one which is somewhat rare in Victoria. This species, which was formerly known as *P. rupestre*, grows on the surface of basaltic and other rocks in the sub-alpine districts of East Gippsland and elsewhere. In New Zealand it is very common, and the specimens which I have had from there seem to be more robust than the Victorian ones. The fronds are small, and the whole plant "peels off" the rocks somewhat after the fashion of some of our common mosses or lichens. It is a very pretty species for cultural purposes, being easily grown in a pan or trough filled with broken bricks or sandstone, and the rhizome pegged firmly into the compost with wire pegs. Very little water is required, and, owing to the densely pilose covering with which the fronds are clothed, the water should not be poured over the fronds more than can be avoided. Found in Queensland, New South Wales, also in New Zealand and the South Pacific Islands. *P. rupestre*, *P. confluens*, *Niphobolus rupestris*, and *Niphobolus confluens* are synonymous with this species. Height from 1 to 2 inches, the fertile fronds somewhat longer.

*Polypodium pustulatum*—(Forster).—A well known and beautiful species, long known to fern collectors as *P. Billardieri*. In the deep dark gullies of all mountain districts this species may be found growing luxuriantly, scrambling up the tree-ferns and other plants to a height of 20 or 30 feet or even more. Many years ago Melbournites will remember some robust specimens of this plant which were growing in the crevices of the wall of a shop in Bourke-street near Swanston-street (now occupied by Mr. Kleiser, jeweller). These came up quite unexpectedly, and were no doubt carried thither by the wind blowing the spores from some of the fronds brought down for decoration at the Christmas festivities. I remember some 22 years ago seeing a fine patch of this fern growing in the fork of a red-gum tree near Toorak, at a height of over 50 feet from the ground. It will be quite unnecessary for me to describe this well-known and favourite fern, further than to make mention of a very beautiful crested form which has been introduced by my friend Mr. Chas Merton, of Messrs. Law, Somner, & Co., of this City, and found by him in the Dandenong Ranges. I saw the place from whence the specimens were taken, but could not find a second one of the kind. Found, according to Bentham, in New South Wales, Tasmania, New Zealand, and perhaps in New Caledonia.

*Polypodium scandens*—(Forst. not of *Labillardiere*).—A somewhat rarer species than the former, although I must confess my inability (from, I suppose, a lack of Botanical knowledge) to detect any appreciable difference between this and the preceding species. In the description given by Mr. Bentham, he says that the fronds are much narrower in outline, and mentions some other differences. If this be a distinct species I do not think that I have ever found this fern myself, although I have seen the former species in a vast number of forms from the narrow frond of not more than ½ an inch in width and entire, to the rank and dark green pinnatifid frond of 3 to 4 inches in width and a foot or more in length. Mr. Sullivan, of Moyston, has sent me a specimen of this species collected by him on the Grampians, but I am still at a loss to detect the difference from some of the forms of *P. pustulatum.* As a plant for cultivation, I should think it an inferior plant to the preceding species, which may be used in many ways by being fastened on stems of tree-ferns, &c., for the decoration of the hardy Fernery. *P. pustulatum* of Schkuhr and *Pleopeltis pustulata* are identical with this species. Found in Queensland, New South Wales, also in New Zealand and the South Pacific Islands.

### *Notholæna*—(R. Brown).

Rhizome tufted. Fronds usually small, once twice or thrice pinnate. Sori small at the end of the veinlets.

*Notholæna distans*—(R. Brown).—A pretty and rare little fern found by F. Mueller on the Snowy River in East Gippsland. I have never found this species myself, but from dried specimens which I have seen, it would appear to be not unlike some small an hirsute form of *Cheilanthes tenuifolia*, so well known over our basaltic country. For cultivation it would, I imagine, be of little use, excepting perhaps for minature fern shades, where it could be grown in company with *Cystopteris fragilis*, *Grammitis leptophylla*, and other slender-growing species. Height from 1 to 4 inches. Found in Queensland, New South Wales, South Australia, West Australia; also in Norfolk Island, New Caledonia, and New Zealand. *Cheilanthes distans* of A. Braun is identical with this species.

*Acacia vomeriformis* — (A. CUNNINGHAM). — Heath-grounds, rare. Height 1½-2½ feet.

*aspera* — (LINDLEY).— On the summit of Mount Abrupt. Height 4-6 feet.

*retinodes*—(SCHLECHT.).—About the bases of the mountains, and on water-courses. Height 9-15 feet.

*myrtifolia*—(WILLD.).—About the bases of the mountains in many places.

*verticillata*—(WILLD.).—Wet places about the mountains. Height 9-12 feet.

*armata*—(R. BR.).—On the mountains generally to a height of 1,000 feet.

*pycnantha*—(BENTH.).—Throughout the whole country from the Pyrenees to the Grampians.

*melanoxylon*—(R. BR.).—Sparsely distributed over the district generally.

*decurrens*—(WILLD.).—About the mountains, and in a few places through the district besides.

*Mitchelli* — (BENTH.). — Heath-ground and ridges of the mountains about the Grampians. This species never extends to the ranges in the direction of Mount William, but confines itself to what is known as the Grampians proper, and opposite them on the heath-ground about the Black Range. Height 2½-3½ feet

There are seven other Acacias in the district.

## THE AUSTRALIAN MUSEUM.

We extract the following from the Report of the Trustees of the Australian Museum, Sydney, for 1881:—

1. The Museum has been open continuously to the public throughout the year; from 10 to 5 in Winter and 10 till 6 in Summer, except on Sundays, when the hours are from 2 till 5, and except on Mondays, when the Museum is necessarily closed. The number of visitors was 115,655, being an increase of 3,192 on the number for 1880. The number who attended on Sundays was 41,660, being an increase of 8,963 on the number for 1880, while the attendance on week-days decreased by 5,771. The average daily attendance on week-days was 281, and on Sundays 801. The conduct of visitors has been, without exception, decorous and orderly.

## Native Plants of the Grampians and Vicinity.

Arranged generally under the aid of

Baron Ferdinand von Mueller, K.C.M.G., Government Botanist.

By D. Sullivan.

[Read before the Field Naturalists' Club of Victoria 23rd January 1882.]

[Continued ]

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### (1). Leguminosæ.

Sub-order—I. *Papilionaceæ.*

*Hovea heterophylla*—(Vent.).—Scrub-land and heath-grounds, not rare. Height 1-2 feet.

*longifolia*—(R. Br.).—Deep ravines of Mount William, not common. Height 9-12 feet.

*Goodia lotifolia*—(Salisb.).—About rivulets between the lower spurs of the mountains. Height 5-7 feet.

*Lotus corniculatus*—(Linne).—Common about the base of Mount William.

*Australis*—(Seringe).—About the Wannon.

*Indigofera Australis*—(Willd.).—About the base of Mount William and a few other places. Height 4-6 feet.

*Glycine clandestina*—(Wendl.).—Climbing among shrubs about the base of Mount William, and in a more humble form on pastures throughout the district.

*Kennedya prostrata*—(R. Br.):—Everywhere over the district, both on the mountain ridges and on the low-lands.

*monophylla*—(Vent.).—On the lower spurs of the mountains, not rare.

*Templetonia Muelleri*—(Benth.).—Clayey banks of creeks, rare. Habit prostrate.

*Eutaxia empetrifolia*—(Schlecht.).—Clayey banks of creeks, not common.

[The tribe or sub-order Cæsalpinieæ is not represented anywhere in the vicinity of the Grampians, although specimens of species of Cassia have been sent to me from places not far distant to the north-west of those ranges.]

Sub-order iii.—*Mimoseæ.*

*Acacia oxycedrus*—(Sieber).—Heath-ground, and reaching a height of 2,000 feet on the mountains. Height 5-8 feet.

*longifolia*—(Willd.).—About the base of Mount William. Height 9-12 feet.

*linearis*—(Sims).—About the base of Mount William. Height 7-10 feet.

2. The collections made during the dredging excursion to Port Stephens in November, 1880, were, in some orders and families, very extensive, but they have not yet been entirely worked out. A list of those which have been determined during the year will be found in Appendix XII. The crustacea have been determined by Mr. Haswell, and the mollusca (shells) by Mr. Brazier. The vertebrates are all well known species, excepting some small deep-sea fishes. Most of the specimens were obtained within Port Stephens itself; and, with some differences in detail, they represent a fauna very similar to that of Port Jackson. The northern limit of this zoological zone must be further north, probably towards the confines of the tropics. Dredging outside the heads of Port Stephens was much impeded by stormy weather; but on two days, when the weather was sufficiently fine, a great number of specimens were obtained. These include a large proportion of new species, and represent a fauna distinct from that of Port Stephens or Port Jackson, and are the most valuable results of the excursion. The total number of species (invertebrata) procured may be roughly estimated at 700. Of these the mollusca, chiefly of minute kinds, comprise 450 species (1,500 specimens), forty-seven of which are new to Science. There were obtained also many fine specimens of sponges, of species hitherto unrepresented in the Museum. The duplicate specimens of polyzoa, about fifty species, have been sent for determination to Mr. Goldstein, of Melbourne, who states that the collection contains several new species and genera. The hydroid-zoophytes have not yet been worked out. Among the corals there are several rare species, and some are new. The echinoderms obtained were few, with the exception of the ophiuridæ, of which a large series was secured. The annelids were not numerous, comprising only about a dozen species, but most of these are new to the Museum. There are about eighty species of crustacea, of which twenty are new to Science.

3. A large number of donations from persons in this Colony, and Australia generally, have been made to the Museum, and some valuable specimens from the South Sea Islands have been presented by officers in Her Majesty's ships of war on this station.

4. The Trustees were enabled, through the kindness of Commodore Wilson, R.N., and Commander Bruce, R.N., to send a collector, the Assistant Taxidermist, to the Solomon Islands, where he obtained a number of species not previously in the Museum. A collection of fossil bones was obtained from the Darling Downs, Queensland, by a collector sent there; and a collector was recently sent to the interior of New South Wales, but not being successful he was recalled.

5. The system of exchanging specimens with foreign Museums has been extended mainly through the opportunities afforded by the Melbourne International Exhibition, notably with India, Japan, Belgium, America, Germany, and the Netherlands. From the South Australia and Melbourne Museums the Trustees have received moulds of numerous interesting and rare fossils. The collection of food-fishes sent to the Melbourne Exhibition proved of great interest. Many of the specimens were, at its close, sent in exchange to the

Wellington, N.Z., and Melbourne Museums. From Austria, France, China, and Poland many valuable specimens of birds, mammals, and shells have been received, collections of a similar kind being sent to the above-mentioned places in exchange. The number of specimens received as exchanges exceeds that of the previous year by 827, and the number sent away in 1881 was larger by 2,261 than that sent in 1880.

6. Among the collections purchased have been many very valuable ethnological specimens from the South Sea Islands, of a kind which it is daily becoming more difficult to obtain. A collection of fishes from New Guinea was also purchased.

7. The maps purchased with funds provided by a special vote from Parliament have arrived, and been displayed in the Garden Palace.

8. A portion of the anatomical collection, for teaching purposes (also provided for by special vote), has arrived, and will be displayed as soon as the show-cases for their reception (for which money has been specially voted) are completed.

9. The large collection of fossils purchased in Germany, with funds provided by Parliament, has arrived, and Mr. F. Ratte, Civil Mining Engineer, Officier d'Académie (Paris), has been specially engaged to arrange the collection for exhibition. This work will be completed, it is hoped, in March next.

10. Large additions have been made to the Museum Library, and a further supply of books is daily expected.

11. Show-cases have been provided, with money voted by Parliament, for the collection of fossils, and cabinets have been obtained for the reference collections of birds' skins.

12. The erection of a new workshop has been of great advantage to the Institution generally, by giving more space and greater facilities for work to the Taxidermist and his Assistant. The office accommodation, however, is still inadequate to the ever-increasing operations of the Department. This inconvenience must remain until the rooms occupied by the Curator shall be given up by him to the general purposes of the Museum.

13. The Trustees are about to publish a Catalogue of the Crustacea of the Australian Seas. This work has been prepared by Mr. W. A. Haswell, M.A., B.Sc., and will be of great scientific value, containing, as it does, descriptions of all known Australian species, many of which are new to Science. A catalogue of the collection of fossils (referred to in paragraph 9) has also been prepared. Both of these will shortly leave the printer's hands. Mr Brazier has been engaged in cataloguing the collections of shells.

14. The By-laws and General Rules of the Institution have been carefully revised, and in several respects amended. A copy has been transmitted to the Minister of Public Instruction, for submission to His Excellency in Council, as required by the Act of Incorporation.

16. The most important work undertaken by the Trustees during the year has been the renewal of the exploration of the caves of the

XI. Particulars of the work done by the Taxidermists and Articulator; XII. A list of such of the specimens obtained during the dredging excursion to Port Stephens in November, 1880, as have been determined; XIII. A list of the most important bones discovered at the Wellington Caves, and fishes obtained in the Richmond River.

# PROCEEDINGS OF SOCIETIES.

## THE ROYAL SOCIETY OF VICTORIA.

The monthly meeting of this Society was held on Thursday evening, 13th July, Mr. R. L. J. Ellery, the President, in the chair. There was a moderate attendance of members. Messrs. H. Sutton and C. E. Oliver were unanimously elected country members, and Mr. H. Cornell was elected an ordinary member.

A report was presented by the hon. Librarian (Dr. Neild), stating that the accommodation for the large number of works and scientific publications the Society was regularly receiving from all parts of the world was proving insufficient; and, as the funds were in a very healthy condition, he considered himself justified in recommending some little expenditure in this direction. Their library, though of a miscellaneous character, was very valuable, and contained works that could not be obtained elsewhere in the Colony, every modern language being, he believed, represented on its shelves. He also considered that the time had arrived for the addition of a library of scientific reference, which, he need hardly say, would be found very useful to members.

Dr. McGillivray read a brief paper entitled "Notes on new Australian Polyzoa," which was illustrated by lithographs drawn by the author.

A paper contributed by Mr. D. W. Barker on "The Storms of High South Latitudes" was read by the Chairman and discussed by the meeting.

Mr. Barker gave a description from personal observation of the cyclonic disturbances that not unfrequently occur in the region intervening between the 39th and 60th parallels of south latitude. The prevailing winds in this direction were westerly, and a steady swell from that quarter was observable just before the cyclonic disturbances set in.

Mr. Kernot reported on a proposal submitted to the Council by Captain Griffiths relative to the propulsion of steamers without machinery. The plan of Captain Griffiths was to place the cylinder fore and aft, and use the steam in the same manner as a rocket mixture, taking the forward thrust as the propelling power, without the intervention of machinery. In order to secure efficiency by the application of such a principle, Mr. Kernot said it would be necessary that the forward motion of the vessel should be equal to the reaction

Colony; for which object a special sum of money was voted by Parliament. Mr. Jenkins, of Yass, was engaged to explore the caves at Coodradigbee. The bones obtained there are all of recent origin, belonging to still existing species of the kangaroo, wallaby, wombat, opossum, &c. The Siluro-Devonian fossils, however, obtained by him from the limestone rocks are of considerable interest, and will form a valuable addition to the Museum collection. The exploration of the caves at Wellington was superintended by the Curator, who frequently visited the locality, leaving in charge of them, during his absence, one of the Museum employès. The first cave examined was found to contain several feet of water on the floor, and could not be worked without very great expense. The second cave showed no signs of bone breccia, consequently the search was discontinued. The third cave, known as the Breccia Cave, was next examined. Here above 1,000 specimens were obtained, many of them of great interest; among others an almost perfect ramus of a Thylacoleo with the articulating condyle; and the toe-bones of a large species of Echidna. The fourth cave examined was the large one situated at the summit of the ridge. Photographs were taken by magnesium light of the walls of this cave. At first no bones were discovered, but on sinking a shaft through the floor the tooth of a Diprotodon and some bones of small marsupials were found. In some other shafts the bones were larger and more perfect than those in the Breccia Cave. Among the most important discoveries were portions of the pelvis of an immense kangaroo, caudal and cervical vertebræ; jaws of large marsupials, especially five rami of Thylacoleo nearly perfect, and many good teeth. The Curator inspected all other caves in the district, but found only two, on the Nanima Estate, 6 miles east of Wellington, which showed any signs of bones. A list of the most important specimens discovered is contained in Appendix XIII.

17. The exploration of the Rivers of New South Wales (provided for by special Parliamentary vote) was undertaken by the Assistant Taxidermist, who was sent to the Richmond River with a boat, nets, and all necessary outfit. This exploration was so far successful that nearly all the kinds of fish hitherto known to frequent the fresh-water rivers were obtained, in addition to other interesting species, some of which are new to Science. The cod found is scarce, and similar to that obtained in the Macquarie River. No fishes in any way allied to the Ganoidei, Sirenoidei, or Dipnoi, were found, and it is proposed to search for these fish during 1882 in the Queensland rivers. A list of the various species obtained will be found in Appendix XIII. A detailed report of the exploration of the caves and rivers will be published during the year 1882, when the numerous specimens shall have been determined.

18. The Trustees add to this their Report the following Appendices:—I. The annual balance sheet; II. A list of books purchased for the Museum Library; III. A list of books acquired by donation; IV. Attendance of visitors; V. Attendance of the Trustees; VI. A list of donations; VII. A list of specimens acquired by exchange; VIII. A list of specimens sent away by exchange; IX. A list of specimens purchased; X. A list of specimens collected;

of the steam, but, as this was practically unattainable, he could not venture to hope that the scheme submitted by Captain Griffiths would supersede the present mode of propulsion.

After several other members had spoken on the subject, the meeting terminated.

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## THE FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Field Naturalists' Club of Victoria was held at the Royal Society's Hall on Monday, 10th of July. About sixty members attended, and the Rev. J. J. Halley, one of the Vice-Presidents, occupied the chair.

The minutes of the previous meeting having been read and confirmed, the following gentlemen were duly elected members of the Club:—Messrs. J. Bosisto, A. Elliott, R. L. Ievers, G. Coghill, and Dr. L. L. Smith. The following gentlemen were also nominated for membership:— Messrs. G. H. Ievers and — Edgington.

Papers for the next meeting were promised as follows:— "The Club Mosses of Victoria," by Mr. C. French; "The Sun-Dews of Victoria," by Mr. D. Sullivan; and "The Acacias of Victoria," by Mr. J. G. Luehmann.

Mr. French read the concluding part of "Victorian Ferns and their Habitats," and was complimented by the Chairman, who expressed a hope that the whole of the papers on the subject would be published separately, and with illustrations. Mr. J. F. Bailey followed with a most interesting paper on the "Geology of the Cheltenham district, in which he fully described the various formations, and the fossils described therein. Both of these papers were illustrated with specimens. Dr. T. P. Lucas then read another of his series of papers on "Geology," and, in a clear and practical manner, explained many interesting facts in illustration of his subject. The two latter papers provoked considerable discussion, in which the Chairman and Messrs. Bale and Watts took part.

Several scientific periodicals, which are taken regularly for the information of the members, were laid on the table by the Librarian.

The exhibition of specimens on this occasion was both large and varied, amongst which were eighteen species of Australian Buprestids (genus Chalcophora). These included *C. superba, C. gigas, C. vittata,* and other rare and little-known species. There were also exhibited by Mr. C. French two specimens of a very fine variety of Hawk Moth. Mr. W. H. Wooster sent a specimen of *Lyperanthus Burnetti,* an orchid found by him for the first time in Victoria. From Mr. T. A. F. Leith came specimens of seven species of Meliphagidæ or Honey-eater; these were well prepared and in excellent condition. An interesting case of fossils was shown by Mr. J. F. Dixon, collected by him near Cheltenham. Mr. H. Watts showed some very fine Anoplura collected by himself. Mr. A. J. Campbell exhibited (for the first time here) a collection of eggs, being three species of Megapodidæ, including the rare *M. Brenchleyi*, from the Solomon Islands. Mr. A. J. North contributed an interesting series of eggs of the family Meliphagidæ; and Mr. Coghill showed eggs (one blue and the other brown) of the Wild Turkey. Mr. J. F. Bailey had an exhibit of some very interesting fossil shells, amongst which were specimens of *Haliotis Flemingtonensis*, *Cypeaster Gippslandicus*, and *Trigonia semi-undulata*, also a new Cetotolite, or whale ear-stone. Mr. J. F. Roberts sent some fine Orchids, one being a species of *Epidendrum*, from India; and a curious stone, supposed to be an axe-head of some tribe of aboriginals, dug up while trenching at Kew. Mr. J. H. Matthias showed dried specimens of *Trichomanes reniforme*, or kidney-shaped fern of New Zealand. Mr. Barnard exhibited specimens of nine species of Hemiptera, including *Cicada moerens*, collected near Kew. Several collections of insects, &c., were brought to the meeting for the purpose of being named.

It may be mentioned, as showing the increasing popularity of the Club, that the attendance on this occasion was, with one or two exceptions, the largest since its formation. The usual conversazione and examination of specimens brought a most enjoyable and successful meeting to a close.

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## THE MICROSCOPICAL SOCIETY OF VICTORIA.

The ordinary monthly meeting of the Microscopical Society was held on Thursday, 27th July, in the rooms, Collins Street West, Mr. Maplestone occupying the chair.

Mr. M. J. Allan was elected a member of the Society.

The acting Secretary acknowledged the receipt of the Government scientific publications from the Government Printer, and of seven parts of the Proceedings of the Linnean Society of New South Wales, completing the series to date, from the Society.

Mr. Bale read "Notes on Diatoms in Hobson's Bay," describing the forms most commonly found in dredgings, shore-gatherings, &c., a large proportion of which are referable to well-known species.

Mr. Gabriel exhibited a series of fossil Bryzoa mounted dry, and Dr. Phillips exhibited a number of miscellaneous objects, including some sheep-flukes preserved in glycerine, displaying the anatomical details very distinctly.

## THE ROYAL SOCIETY OF NEW SOUTH WALES.

The monthly meeting of the Royal Society of New South Wales was held on Wednesday, 5th July, in the Society's house, Elizabeth-street. Mr. H. C. Russell, B.A., one of the Vice-Presidents, occupied the chair. The minutes of the previous meeting were read and adopted. The following gentlemen were then balloted for and declared duly elected members of the Society:—Dr. C. U. Carruthers, Dr. A. Dückershoff, Dr. G. Hurst, Dr. P. H. M'Gillivray, M.A. (Sandhurst, Victoria), Dr. E. Sinclair, Messrs. Sydney Moss, D. Porter, W. H. Rothe, H. E. Russell, and the Rev. William Webster, of Wilcannia.

The Chairman said that they had received during the past month 58 volumes from various American societies, and 29 from foreign sources. It was not usual for them to read the list of volumes received, but on this occasion it happened that several of the volumes were more than ordinarily interesting, especially some of those received from America. It had been truly said that in America no expense seemed to be spared in the production of books. The first one he would refer to was entitled "Memoirs of the Boston Society of Natural History," which contained a number of beautiful photographs scattered through it, and was altogether a most valuable work. Then there was the report of the United States geographical surveys west of the 100th meridian, which was illustrated by beautiful photographs of various stone implements found in this survey, besides some coloured plates. There was also a valuable work there, "The Memorials of Joseph Henry," Secretary for so long of the Smithsonian Institute. There were many others, but these struck him as being specially worthy of notice.

The Chairman then said he thought all the members would know that the observation of the transit of Venus was one of extreme difficulty. We had really at the utmost two phenomena to observe. They occurred at very long intervals. It had been his fortune to see one, and he might be permitted to see the second, and then we should not have another for 100 years. But upon these observations matters of very grave importance depended, and they were extremely difficult. The atmospheric effects that came in made it almost impossible to see distinctly what the observer desired to see. Some astronomers in Europe appeared to think that no geometrical contact at the transit of Venus had ever been seen, but he felt convinced that many observers in Australia in 1874 were favoured with such a clear atmosphere that they did see geometrical contact, and were not troubled by the atmospheric effects. In order to make the most of these observations, and to provide for probable atmospheric disturbance, he had had designed an eyepiece for observing it which afforded the observer a number of lines for reference; so that, practically, he was enabled to see the transit several times instead of once. This was accomplished by having microscopic lines placed in the eyepiece at fixed distances. One of these was kept tangential to the Sun's edge, and, during the time that Venus passes, each of the lines was to be noticed by the observer.

An inspection of the instrument is requisite in order to comprehend its construction.

Mr. G. Butterfield then read a short paper on the orbit of the comet, as follows :—"To Dr. Lamp, of Kiel, is due the credit of determining the elements of the orbit of the comet now on a visit to our solar system. These elements having been calculated, it becomes a comparatively easy matter to show the shape of the orbit and successive positions of the comet therein. The shape and dimensions of the Earth's orbit are known, and the position in that orbit given in the "Nautical Almanac," and it thus becomes practicable to construct a model that shall show these orbits, and the positions of the bodies in them. Such a model I have constructed from Dr. Lamp's elements on a scale of $2\frac{1}{2}$ inches, equal to the radius of the Earth's orbit. By means of a half-inch scale, that which is accomplished more exactly by calculation may be roughly shown, viz., the distances of the Sun and of the Earth from the comet, the daily motion of the two latter, as also the apparent position of the comet as seen from the Earth, and also with regard to the Sun. The computation of the orbit is a laborious and complicated operation, notwithstanding that tables have been published to expedite the work. Although we may not enter into so abstruse a calculation, nor even know the methods of working, we may see to a certain extent the accordance of the actual position of the comet with its observed place in the heavens. The apparent place of a planet or comet, and also of the stars, is usually given in right ascension and declination; these co-ordinates have reference to the equator, the plane of which is inclined to the plane of the ecliptic in an angle of $23\frac{1}{2}$ degrees. Knowing exactly this angle, it becomes a simple problem in spherical trigonometry to convert the position in right ascension and declination to longitude and latitude, the co-ordinates referred to the plane of the ecliptic. Any consideration of the subject before us requires, as a first step, that we adopt the latter co-ordinates in expressing the apparent position. The former co-ordinates are of little service. For instance, from June 10 to July 9 the comet was in north declination, although south of the plane of the Earth's orbit. Beginners, who have not learned spherical trigonometry, can, by plotting the position of the comet on a globe or stars map, see roughly the latitude and longitude by means of lines representing these co-ordinates. Generally, an object in north declination would be seen to better advantage from a station in the northern hemisphere; but at this season of the year, the Sun being in great northern declination spoils this advantage, and we from this south land obtain the better view of the comet from June 15, when it first became visible to us. For a few days before and after perihelion it was too much absorbed in the Sun's rays to be visible from any part of the Earth. To-night, 8th July, the apparent position of the comet is near to the bright star Regulus, the lucida of the constellation Leo the Lion, and any one may readily find it, by means of a small telescope or opera glass, in the same field and a little below and to the right of that star. About the 9th it crosses the ecliptic or plane of the Earth's orbit, from south to north, termed the descending node; and one feature which we may note here as useful in considering the subject—when the apparent position of a planet or comet is on the ecliptic, it is actually in that plane. At the present date the comet is above the horizon of London, and any place in equal north latitude, two hours after sunset, and it is probable that astronomers of Europe and America will observe it for some months with the aid of telescopes, and in order that they may do so, the elements of Dr. Lamp will be of great service in enabling them to compute an ephemeris of its apparent position. The Sun being in daily decreasing north declination, while the comet is daily increasing in north declination as well as north latitude, favours observations in the north hemisphere. Meanwhile, however, the comet is rapidly moving in a direction from us and we from it, as seen by the model. In October we shall pass the line of nodes of the comet, and then our motion will be not so much contrary to that of the comet, so that perhaps it might not be too much to expect that it may keep within the range of our powerful telescopes till we are round again to the ascending node in April, 1883."

Mr. W. MacDonnell then exhibited three different kinds of incandescent lamps, and described them as follows:—"Swan's Incandescent Lamp: The inventor has discovered a method of preparing from cotton thread very attenuated filaments of carbon. These extremely thin carbons are perfectly homogeneous throughout, and are so far from being damaged by use that the effect is, to a certain extent, an increase of their solidity and elasticity. The filament of carbon, bent round so as to form a spirally circular loop, is enclosed in a glass bulb about two inches in diameter. The bulb is hermetically sealed after having been exhausted by a Sprengel pump. The extremities of the filament are connected in an ingenious manner to two platinum wires, which pass outwards and terminate in binding screws, for connecting with the circuit. The light yielded by the Swan lamp is mild and steady, with an intensity depending, of course, on the current of electricity sent through it, which may be carried as high as 20 candles. At the exhibition of electrical apparatus in Paris in 1881, the Swan lamp received the gold medal as being the the best of its class. Maxim's Incandescent Lamps: The carbons for this lamp are prepared from cartridge paper, and the glass bulb containing a residual atmosphere of a hydro-carbon instead of air. It is claimed that by this the durability of the filament is increased, and the irregularities of the resistance at various points become equalized. This form of loop preferred by the inventor has four parallel vertical portions nearly like a capital M. The resistance of this lamp is stated to be more than twice that of Swan's lamp. The light given out may be carried to 50 candles. Fox-Lane Incandescent Lamp: The filament of this lamp is made from a string of flax, forming an oval loop of carbon bent into a horse-shoe form. The resistance of the Fox-Lane lamp is less than that of Swan's. These three forms of lamps will, without damage, bear a maximum current for a more or less prolonged period: their average endurance, or "life," has been stated, under favorable circumstances, to be 1,000 hours.

The flame given out by the Swan lamp was very much superior to that of either of the other two in brilliance.

Mr. MacDonnell then exhibited De la Reve's experiment, showing the rotation of the voltaic arc round an electro-magnet, and it was greatly admired.

Dr. H. C. Wright exhibited one of Tolle's erecting stereoscopic binocular eyepieces. He said it was one of the most perfect eyepieces for binocular vision. It could be used with the telescope as well as with the microscope, and with the highest powers of the microscope, even up to the 50th of an inch. He had only recently received it.

The members present examined the instrument, and expressed themselves as highly pleased with it.

Mr. G. D. Hirst exhibited Abbe's defraction platte, and explained the phenomena of refracted images, as seen through microscopic objectives.

Professor Liversidge laid on the table a copy of the Society's Proceedings for 1881. He said that last year was their thickest volume up to that time; but this year they had fortunately got another 60 pages added to it, and he believed the whole volume contained uncommonly good matter. Members who wished to do so could obtain their copies from the assistant-secretary, Mr. Webb.

The proceedings then terminated.

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## THE PRESIDENT'S ANNUAL ADDRESS.

[Continued.]

In 1870, Mr. Edward Powers, C.E., in a small volume entitled "War and the Weather, or the Artificial Production of Rain," endeavours to prove that rain can be produced by human agency, particularly by heavy discharges of artillery, and cites a number of instances in which great battles have been followed by a speedy downfall of rain. He mentions six cases of this kind in the Mexican war, 1846 and 1847; nine cases of battles or skirmishes followed by rain in the American Civil War of 1861, forty such cases in 1862, thirty in 1868, twenty-eight for 1864, and six for 1865. Eighteen similar cases from the great battles fought in Europe during the past century, making a total of 137; and he says if these facts are insufficient to convince, it would be vain to expect to do so with a greater number. The meteorological editor of *Silliman's Journal* in reviewing this book, justly says "that the writer has omitted to consider many necessary points in the proof, for in those parts of the Earth in which the battles cited were fought, rain falls upon an average once in three days, so that the average interval between rains would be about two days. Now, battles are seldom commenced during rain; generally some hours elapse to dry the ground before the battle begins. Rain ought, therefore, to fall within about one day after a battle. Mr. Powers takes no precise account of the length of the interval between the end of the battles and the commencement of rain. Nor does he attempt to show that the battle shortens this period; and, moreover, he says nothing of the cases opposed to his theory. In order to complete the proof a much more careful analysis of the facts is required. We are inclined to the opinion that battles *do* exert some influence in the production of rain; but we cannot accept Mr. Powers' discussion of the facts as proof." This opinion of the success of Mr. Powers' work is very valuable, because it comes from a very competent authority in America, where the majority of the cases are said to have occurred, and was within four or five years of the termination of the war, when the means of testing the facts would be within reach. The editor of *Silliman's Journal* evidently believes that there are so many facts in favor of the theory that it deserves careful investigation; and another leading writer on meteorological subjects in America, whose opinions on many such matters have had great weight, was firmly convinced not only that it was possible to produce rain, but that it might be done economically whenever it was wanted. He doubtless had what appeared to him to be sufficient reason for this opinion; but Professor Henry, secretary to the Smithsonian Institute, and perhaps at the time the most competent man in the world to express an opinion upon this subject, said, in reference to Espy's idea:—"I have great respect for Mr. Espy's scientific character, notwithstanding his aberration, in a practical point of view, as to the economical production of rain. The fact has been abundantly proved, by observation, that a large fire sometimes produces an overturn in the unstable equilibrium of the atmosphere, and gives rise to the beginning of a violent storm: but it was not wise in him to insist on the possibility of turning this principle to an economical use." In 1874 this subject was taken up by Mr. R. D. Belcher, who read a paper before the British Association on "The disturbances of the weather by artificial influence, especially battles, great explosions, and conflagrations." In it he gives many instances, from the siege of Valenciennes in 1793 to the Ashantee and Carlist wars of 1874, to prove that storms follow immediately upon battles. It is said Solferino was lost through a heavy thunderstorm which came on and prevented the officers from seeing the movements of the troops, and a similar storm occurred at Sadowa. Further, the sham fights at Aldershot on May 19, June 19 and 20, July 8, 20, 21, 27, and 29, 1874, were in every case followed by a thunderstorm. Referring to Mr. Belcher's paper, which the British Association did not think worth publication, Professor Everett, president of the Meteorological Society, said—"The subject (cannons and rain) was not a new one. In several parts of America, the farmers, in order to produce rain, gather a large quantity of wood and burn it on their respective farms on the same day. He believed that great battles and great fires tended to produce rain, but rain did not necessarily follow battles or fires." Not wishing to detain you over the multitude of observed facts, I have endeavored to give a condensed account of them, and of the opinion of some of the leading scientific authorities upon the possibility of producing rain artificially. It must, however, be borne in mind that the facts observed may easily mislead, and it would appear that the criticism of the editor of *Silliman's Journal* is justified; for there is a want of scientific accuracy in Mr. Power's investigation, and the matter is so difficult of proof that the mere collection of favorable instances, omitting the important element of the interval or time between the battles and rain, as well as all battles and explosions not followed by rain, cannot be considered satisfactory evidence.

(*To be continued.*)

## THE LINNEAN SOCIETY OF NEW SOUTH WALES.

The monthly meeting of this Society was held on Wednesday evening, 26th instant. The President, Dr. James C. Cox, F.L.S., &c., in the Chair. The following gentlemen were elected members of the Society:—Edwin Daintrey, Sydney; Thomas R. McDougall, Baan Baa, Narrabri; Edwin Haviland, 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.

After the usual announcement of the receipt of donations had been made, the following papers were read:—

1. By the Rev. J. E. Tenison-Woods, F.G.S., &c., "Botanical Notes in Queensland, part 3." This paper contained the results of the author's observations on the Mulgrave River, with a list of the species collected by him in that district.

2. Dr. Wools, F.L.S., "On the Forage Plants indigenous to New South Wales." The author gave an account of the principal native plants upon which stock depend in this country, including various kinds of Salt Bush and Winter Herbage. Mr. Wilkinson observed that one valuable grass, which was not mentioned as indigenous in Dr. Woolls' paper, had been described by Dr. Schomburgh, from South Australia, and pronounced to be one of the best fodder grasses to stand years of drought. This is *Panicum spectabile*, which, whether indigenous or not, has been successfully grown on the Talbragar River, fifteen miles from Dubbo, one of the hottest localities in New South Wales. The jointed stem of this grass runs along about six inches beneath the surface of the ground.

3. By Chas. W. De Vis, B.A., "Descriptions of three new Fishes of Queensland." The species described by Mr. De Vis are — 1. *Oligorus Goliath*, taken in Moreton Bay, a fish of gigantic size, seven feet long and two feet high. 2. *Synaptura Fitzroiensis*, from Rockhampton; and 3. *Engraulis Carpentariæ*, from the Norman River.

4. By Chas. W. De Vis, B.A., "Description of a species of Squill *Lysiosquilla Miersii*, from Moreton Bay." This Crustacean, which is found in Moreton Bay, differs materially, according to Mr. De Vis, from the two species of the same genus recorded in Mr. Haswell's Catalogue, which belong to Mr. Miers' second section of the genus, while the present species agrees with his first section.

5. By John Brazier, C.M.Z.S., "On *Cypræa citrina*, Gray, from Rowley Shoals, North West Australia." Mr. Brazier records the occurrence of this extremely rare shell on the North West Coast of Australia.

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 *Cycas* 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, *Zues 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."

6. By Mr. R. C. Rossiter, "On a variety of *Ovulum depressum*, from the Loyalty Islands."

7. By K. H. Bennett, Esq., "Notes on the Nidification of the Spoon-bill, the Heron, and the Night Heron." In this paper Mr. Bennett gives an interesting account of visits to the breeding places of the above-mentioned birds.

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 neighborhood 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 ROYAL SOCIETY OF SOUTH AUSTRALIA.

The ordinary monthly meeting of this Society took place at th Institute on Wednesday evening, July 5th. His Honor the Chie Justice occupied the chair. Messrs. W. Haache, Ph.D., James Mann L.R.C.P., L.R.C.S., Edin., and T. Ainslie Carterer, B.A., were electea Fellows of the Society.

Professor TATE referred to some articles forwarded by Mrs Richards, of Fowler's Bay, the only lady member of the Society and who was present. The exhibits consisted principally of article worked by the natives in wombat fur, the yarn being spun in a variety of little ornaments. Among other things were head-dresses, bags and socks, the latter being used when the natives wished to concea their tracks. Professor Tate said, so far as he knew it was an exhibition of skill in a new direction. It was pointed out by severa members that this was not so, but all agreed that the exhibit was a most interesting one. Mr. Lattorff forwarded a bone found in well-sinking, at a depth of 31 feet in sand and gravel, seventy miles north of Port Augusta. It was thought to be the lower part of the spine of some animal. Mr. T. Chandler exhibited a small collection of beetles from the Peake. Fossil wood and leaves, found by Mr. J. W. Jones, Deputy Surveyor-General, at a depth of 114 feet, in country between Lake Frome and Mount Brown, were also shown. The same strata had been met with in well-boring on the upper watershed of the Darling.

The following is an abstract of a paper read by Professor Tate:— "On the Land and Freshwater Shells of Tropical South Australia.— Only seven species of land shells are known to occur, and these are restricted to the 'basin of the northern rivers of Arnheim Land, not a single species having yet been detected in the vast area to the south. The species comprise two of Helix, one of Bulimus, and one of Stenogyra found about Port Darwin, and three of Helix discovered about the Liverpool River. With the exception of *H. pomum*, the land snails do not extend far beyond the sea-coast. All the Helices are peculiar to the country, though the *H. prunum* is closely related to a Timor species, and *H. pomum* with its near allies, *H meadie.* and *H. pseudomeadei*, constitute a group having a representative in Helix widely distributed throughout the coast tracts of tropical Queensland. *Bulimus Beddomei*, found near Palmerston, also occurs on some of the Islands in Torres Straits. *Stenogyra Tuckeri*, probably of American origin, which inhabits North-Eastern Queensland and South Pacific islands, is a recent addition to the molluscan fauna of Arnheim Land, and was found by Inspector Foelsche at Palmerston. The paucity of species and their alliances point to recent introduction, according well with the modern origin of the surface configuration of Arnheim Land. The species of freshwater shells number thirty-five, distributed in the following genera:—Melania, 6; Paludina, 6; Bithynia, 1; Limnæa, 3; Aplexa, 9; Physopsis, 1; Planorbis, 2; Ancylus, 1; Neritina, 1; Corbicula, 3; Unio, 1; and Mycetopus, 1. All the genera except Physopsis and Mycetopus are world-wide. The former is represented by a species in South Africa, in addition to the North Australian one. The latter belongs chiefly to tropical America, but there is one species

Siam and one in the Victoria River. With the exception of a Melania, all the species are endemic in Australia, many of which having a wide range. The little freshwater limpet, which I described from examples taken in the River Torrens, is now known from Victoria and North Australia (Victoria and Adelaide Rivers, and probably rivers flowing into the Gulf of Carpentaria). Three species new to Science are described—*Bithynia Smithii*, *Planorbis meniscoides*, and *Corbicula Arnhemica*."

The following is an abstract of a paper by Baron F. von Müeller and Professor Ralph Tate:—"Diagnosis of a new Plant from Arnheim Land.—The species which is named *Pachynema sphenandrum* resembles *P. junceum* of the same country; but the development of a coronula between the petals and stamens and the thickening of the stamens upwards renders this plant somewhat anomalous in the genus. The authors establish for it a separate section under the name Stemmatanthus, which appellation may serve if it should be deemed better to isolate the species generically. The new plant was collected at the Gorge, near Yam Creek, on granitic soil. Other phytological discoveries will be communicated to the Society as the characters of the new species are critically determined."

Dr. Whittell read an interesting paper illustrating Professor Abbe's exposition of extraordinary optical principles involved in the phenomena of microscopic vision, and their application to the construction of the microscope, as read before the Bristol Microscopical Society. The doctor explained Dr. Abbe's interpretation of the manner in which the microscopic image is formed, and of the appearance of certain details in this image, which he showed to be due to the diffractive influence of the internal structural constitution of the object examined upon rays of light transmitted through it. The members were delighted and astonished at the experiments, and a hope was expressed that the Society would have the doctor's assistance on another occasion.

## THE ROYAL SOCIETY OF TASMANIA.

The monthly evening meeting of the Society was held on Tuesday, 12th July, Mr. C. H. Grant in the chair.

The following gentlemen, who had previously been nominated by the Council, were balloted for and declared duly elected as Fellows of the Society, viz.:—Mr. William Lees, of the Union Bank; and Mr. C. W. Chapman, of Cascades.

The Hon. Secretary (Mr. Barnard) submitted the usual returns for the past month.

The following presentations were made to the Museum:—By Mr. R. C. Weeding, Mount Seymour—A splendid specimen of the Grey Flying Opossum (*Belidews Sciurius*) from that locality. By Mr. Thomas Ransom, Fingal — A specimen of the Owlet Nightjar (*Ægotheles Novœ Hollandiœ*. By Mr. A. Dowling, Melton Mowbray —A living specimen of the Chestnut-faced Owl of the colony (*Strix castonops*. By the Hon. the Colonial Secretary—A specimen of the particles of matter to run into symmetric forms. The very molecules seem instinct with a desire for union and growth. How far does their play of molecular power depend? Does it give us the movement of sap in trees? Assuredly it does. * * * * * * From the processes of crystallization you pass, by almost imperceptible gradations, to the lowest vegetable organisms."

Your contributor is evidently of the old school, who refer whatever is as yet inexplicable in physiology to an unknown something called vital force. I thought that that metaphysical entity had taken its place with "centrifugal force," and the "abhorrence of Nature for a vacuum," and all those other vague ideas which were invented to explain what was for ages beyond the reach of Science. The theory of the Conservation of Energy is now universally admitted, and that theory does not permit us to believe in "vital force." For if the sum-total of the energy of the Universe is constant, the appearance of a new animal possessed of "vital force" is not the appearance of a new force but only the transformation of old forces into a new form.

Your contributor says that if I admit that there is a real and tangible difference between what we call living matter and that which is termed dead, then I cannot consistently say that the boundary is vanishing. Why not? Is there not a real and tangible difference between our notion of animal life and our notion of vegetable life? And for very obvious purposes the names "animal" and "vegetable" are retained, and will probably always be retained, though the boundary between them has long ago vanished. So I fancy the name "animate" and "inanimate" will long be retained, even though the boundary be gone.

Is there any reason for maintaining this sudden gap that the world has for so many ages believed in, solely because the phenomena which lie immediately under men's eyes seem to fix so manifest a division between the living and the dead?

According to Clausius, Clerk-Maxwell, and others, there are about three hundred millions of millions of millions of atoms in a cubic inch of hydrogen at ordinary pressures. These atoms are flying about at the rate of over 6,000 feet a second, or about 4,000 miles an hour. This prodigious activity exists in what we call "inanimate" matter. It is indestructible, for all energy is indestructible. If, then, that cubic inch of hydrogen is compelled by what we in our ignorance have still to term "chemical affinity" (another of these metaphysical vaguenesses) to join with a certain amount of carbon and oxygen to form a particle of sugar, will there not be locked up in that particle a great store of energy only waiting a favorable opportunity of being exerted? And when the nitrogenous spark of a yeast-plant enters to begin the process, I think the energy present already is sufficient to account for all the changes that take place. The sugar resolves itself into alcohol and carbonic dioxide, a purely molecular process, while the constant depositing of a hydro-carbon compound to form the skin of a cell seems closely akin to the phenomena of crystallization, which are purely molecular.

buoyant mattress used in the Italian Navy, with letter from the Italian Consul, Melbourne, on the subject. By Mr. J. E. Baynton. A specimen of the Fan tailed Cuckoo (*Cacomantis flabelliformis*), shot near Mount Nelson on July 6. [The occurrence in the colony of this bird in the depth of Winter is remarkable.] By Mr. G. Innes. Specimen of Huon Pine (*Dacrydium Franklinii*) and Red Pine (*Athrotaxis selaginoides*), from Macquarie Harbour, in which locality an extensive bed of the latter timber has been discovered.

Mr. Barnard read "Some further Notes on the economic value of the aquatic plant *Tipha latifolia*," illustrating its utility as a material for stuffing buoyant and life-saving mattresses in the case of shipwrecks and disasters at sea.

Some conversation ensued, and an examination was made of the sample matress, with a general expression in favor of its introduction into the marine service, its value being recognised from the fact that it was in general use in the Italian Navy.

A vote of thanks having been accorded to Mr. Barnard for his paper, and to the donors of presentations, the meeting terminated.

## Correspondence.

### THE LIVING AND THE NOT LIVING.

*To the Editor of the Southern Science Record.*

Sir,—I have nothing but satisfaction to express at the courteous tone adopted by your contributor, "A Member of the Field Naturalists' Club," in his reply to my paper in a previous number. His opinions seem to me worthy of every consideration, and I fancy there is nothing hopelessly irreconcilable between his views and mine. Permit me, however, to make a few comments in reply.

He considers that the "doctrines stated in that paper are not warranted by our present scientific knowledge, and are at least not proven:" he also mentions that "they are still firmly combated by many of our best authorities on Biology." In these statements I agree with him. I was not stating that the boundary between the Animate and the Inanimate had yet vanished. I merely pointed out what seemed to me the process now going on by which the gap seems to be slowly disappearing. It requires no great gift of prophecy, it seems to me, to foretell the result that is coming.

The leading scientific men of our day look for the explanation of all the phenomena of life in purely physical conditions; many of them have more or less distinctly stated their belief in the complete continuity of Nature. I shall not multiply quotations, but take Tyndall's expression in his lecture on "Crystalline and Molecular Forces" (*Manchester Lectures*, 1873-1874, p. 150) as a specimen: "Everywhere throughout our planet we notice this tendency of the ultimate always with the sacrifice of a portion of the molecular energy he starts with, he cannot expect the same success if he tries the reverse process; to reach the highest and most complex combinations of all—those of living tissue—is manifestly beyond him.

Your contributor compiles a little table of differences between the living and not-living. It is very convenient to have the points thus placed seriatim for reply.

"Living matter is distinguished over all other matter by the peculiar and apparently spontaneous movements of which it is capable." The movements of a yeast-plant are limited, are apparently not spontaneous, and are only possible when a given amount of heat, — that is, of molecular agitation — is present. Place a bladderful of air in an atmosphere of hydrogen: it will swell, and burst, exhibiting a "peculiar and apparently spontaneous movement," also due to molecular agitation.

"Living matter is the only substance exhibiting true growth," or the power of assimilating foreign material and increasing itself at their expense. This difference is evident, and is the basis of the universally recognised division of "animate" and "inanimate;" still if the phenomena of this growth and assimilation are proved to be of molecular origin, then the gap between the two classes is shown not to exist; molecular actions such as dialysis and crystallization being closely similar to the assimilating process of the lower plants.

"Living matter is derivable only from other living matter, and cannot be produced directly from its constituent elements, nor even by revitalization of matter formerly living." Not with the resources at present at the command of chemists. It is not likely they ever will have such power; yet that does not affect the position that the processes of life are purely physical processes.

"It is capable of variations, causing progressive or retrograde development, and then producing all the multitudinous forms of inanimate Nature." Because the highly complex and unstable nature of its components makes it answer readily to the influence of every trivial external cause. But every variation is due to some external cause, which can be resolved eventually into molecular change.

"It may be correlated with the phenomena of sensation, will, and reason." But as a yeast-plant seems to have neither sensation, will, nor reason, I cannot see that these phenomena differentiate *it*—at all events from the inanimate bodies to which it lies so near.

Your contributor supports some of his views by quotations from Dr. Lionel Beale, an authority for whom I have much respect. But he belongs essentially to the conservative school, and is in himself a proof of the process for which I contend. The steady change in Dr. Beale's own views, the successive surrenders of positions he found no longer tenable, are an instructive lesson. Your contributor seems also a conservative in Science, and undoubtedly men of that class are wanted. Four fiery steeds going down hill need a brake on the wheel to steady the vehicle. Nevertheless the vehicle goes down hill. The conservative who objects and criticises does good service in

Your contributor says that "Pedesis has no connection, so far as it is known, with true molecular motion." Of course I never meant to assert that the particles of indigo are themselves the atoms, or that these motions are the molecular motions; but I certainly think it universally allowed that these motions are due to molecular action. Whether originated by heat or electricity, the fact is certain that it is the internal molecular activity of the particle that sets it in motion: and the utmost that can be said for a bacterium is that internal molecular activity sets it in motion.

Again much is made of the difference between a crystal and a yeast plant: of course there is a world of difference between them; but is it not true, nevertheless, that each is the outcome of chemical changes due only to "inanimate" molecular forces? The chemist can account for every particle of force used or developed in the formation of the yeast-plant as well as he can in the case of the crystal. The fact that the yeast-cell has a skin with soft matter within is nothing. The fact that each particle of this soft matter will start a new cell, if placed in a suitable fluid, and kept warm, is nothing. For there is no reason to believe that anything is present but molecular force, which is all I contend for.

Your contributor says, "If vital force is, as asserted, only a combination of forces with which the chemist is familiar, it should be practicable to infuse life at least into dead organic matter,—in other words, to produce spontaneous generation." I cannot see that it follows. Suppose a chemist shows that the main process in the life history of a plant, the breaking up of the carbonic dioxide of the air into its two constituents carbon and oxygen—keeping the former and expelling the latter—is a purely molecular process, dependent only on chemical change, would it be fair to retort upon him, "Then do so yourself,—show us how *you* would split up carbonic dioxide into carbon and oxygen?" He cannot do it, and yet he knows that his previous conclusion is true. Any school-boy can in an instant convert a pound of gunpowder into smoke and gases, but it would require a skilful chemist's long exertions to turn that smoke and those gases back into gunpowder. So the accomplished chemist in our day can in a few hours analyze for us any organic matter and present it in the form of its elements; but it will require the much abler exertions of the chemist of the future to turn these elements back into the more complex organic bodies. That he will be able to do so we have reason to hope, after seeing so many of the simple compounds so built up.

As for making a living organism, I cannot believe that it will ever be done, because the chemist can only proceed by employing superior forces to overcome inferior ones; while to ask him to form life would be equivalent to a demand to use the inferior forces of Nature which are at his command to overcome superior ones. The workman's wife can turn her husband's coat, when worn, into a coat for her little boy, but it would be impossible for her to turn the little boy's coat into a coat for her husband. So while the chemist can descend from the highest combinations he finds in Nature to lower ones, preventing hasty conclusions; and your contributor would be right to pounce upon me if I said that the gap between the "animate" and "inanimate" had been bridged over. But when I state my opinion that it is being bridged over, that is only a fair matter for argument. in which we are not discussing certainties but only probabilities, and nothing but good can come from the discussion.

I am Sir, Yours obediently,

ALEXANDER SUTHERLAND

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## NOTES, MEMORANDA, &c.

In the June number of the *New Zealand Journal of Science* Mr. A. K. Newman puts forward a proposition for the establishment of a New Zealand Association of Science, formed on the model of the British Association, and Captain T. Brown follows with some notes on the *Histeridæ* of New Zealand. On the use of Lignite or Brown Coal in the Blast Furnace is a paper read by Prof. von Tunner, of Australia, before the Iron and Steel Institute, at its Autumn Meeting, October, 1881. The abstract of New Zealand Micro-lepidoptera from Mr. Meyrick's paper is continued, and deals with the genera *Glyphipteryx* and *Phryganostola.* Dr. von Haast criticises unfavorably Mr. Maskell's paper in Nos. I and II on "A Visit to the Weka Pass Rock-Paintings." Descriptions are given of some mollusca omitted from Captain Hutton's Manual, also of the New Zealand *Pycnogonida* of the "Challenger" expedition. Mr. T. F. Cheeseman contributes some interesting notes on the Fertilisation of *Knightia*, the flowers of which are, he considers, adapted for cross-fertilization by the agency of honey-feeding birds. There is also a considerable amount of interesting matter in the form of general notes, correspondence, and reports of societies.

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We have also a paper, by the Rev. J. E. Tenison-Woods, on the Hawkesbury Sandstone, a formation which constitutes much of the Blue Mountains west of Sydney, and extends over a length of 140 miles with a width of from 40 to 80 miles. Various theories as to the origin of these beds have been advanced, but the author adduces a strong massof evidence tending to prove that they were originally formed by the consolidation of wind-blown sand-deposits, interspersed with lagoons and morasses, with impure peat, a conclusion arrived at after careful study of the beds themselves, and comparison with many similar formations known to be eolian, and illustrated by the author's actual observations of the daily accumulation of wind-blown sand on a coral island inside the Barrier Reef, and by experiments on a small scale with sand of different colors, in which a very good imitation was produced of the irregular lamination of the Hawkesbury beds.

REMARKS ON SOME VICTORIAN ORCHIDS,

BY BARON FERD. VON MUELLER, K.C.M.G., M.D., F.R.S.

Through Mr. Charles French, who, as well as his young and promising son, continue to gather plants also in their entomologic rambles, I received lately a fresh specimen of a terrestrial Pterostylis, which Mr. James Dixon had brought from a place near Oakleigh. This plant agrees precisely with the figure, given in Sir Joseph Hooker's Flora of Tasmania from a drawing of the late Honorable William Archer, as *P. nana* (Plate cxiv, B.). Mr. Bentham already recognized it as distinct from the genuine *P. nana* of R. Brown, observing that the illustration, as quoted above, might have been intended for *P. concinna* (Flora Austral. vi, 537). In this view I could not concur, for although the habit of the two plants is similar, we will always find the remarkable excision at the summit of the labellum in *P. concinna*, in which respect the latter approaches *P. ophioglossa*; moreover is flowering here as early as July. *P. concinna* has not the dark red-brown coloration of the upper portion of the flower, nor is the sinus between the two lower lobes of the calyx narrow and acute as in the orchid now under consideration; besides I notice in the fresh flower of the latter, that the long narrow ends of the lower flower-lobes are remarkably divergent. The true *P. nana*, which occurs on various places though not commonly in the vicinity of Port Phillip, is smaller in all its parts, has the flowers greenish and not papillular-rough, has almost a pointless upper lobe and a broad sinus with an inflexed denticular lobule between the lower lobes; the leaves are also less prominently veined and more rhomboidal in shape. Whether the West Australian *P. pyramidalis* is really distinct from *P. nana*, seems very doubtful, inasmuch as its difference mainly rests on the expansion of the lower cauline bracts into leaves, transit forms occurring at Port Phillip in this respect. In Hooker's Fl. Tasmaniæ is given alongside of the *Pterostylis*, now under discussion, also a figure as *P. pedunculata*, exhibiting a larger plant, with longer almost lanceolar leaves and less acute upper lobes of the calyx. Both may be extreme forms of one species, the coloration not being obviously different, whereas the leaves of *P. pedunculata* vary almost into a cordate form, the lanceolar leaves being exceptional. Both *P. pedunculata* and *P. nana* were described by R. Brown from dried specimens only, which he received from Colonel Paterson as collected in Tasmania. As R. Brown, in his rather protracted stay at Port Jackson in the beginning of this century, found neither of the two himself, it may be that they do not reach the east-coast of Australia, although I find Mrs. Calvert's specimens from the River Grose to belong really to *P. pedunculata*. This consideration makes it somewhat doubtful, whether the plant delineated in Mr. Fitzgerald's elegant work as *P. pedunculata* (part 5, Oct. 1877), is to be regarded as belonging to R. Brown's genuine species; the flowers towards the summit are intensely red and the sinus between the lower lobes is drawn as roundish. Indeed Mr. Fitzgerald's plant is nearer to *P. semirubr* (Fragm. Phytogr. Austr., viii, 249), described from specimens which Mr Charles Walter brought from Apollo-Bay, where this pretty plant grow almost as an epiphyte on stems of fern-trees; but when giving the firs record of *P. semirubra*, I quoted for it, as a synonym, what Archer ha illustrated as *P. nana*, thinking then that the dark brown color of th upper part of the flower might have been erroneously given, which now see is not the case. Mr. Fitzgerald's plant came as terrestria from the Blue Mountains, to which range at R. Brown's stay in New South Wales there was little access. Mr. Walter's plant has howeve an acute sinus between the two lower lobes. It may be added yet that the length of the flowerstalk above the floral bract in *P. pedun culata* is very variable, and that Mr. Walter found this species inland as far as the Upper Yarra, but always terrestrial. Its flowering tim is here towards the end of August and earlier part of September, thu simultaneous to that of *P. nana.*

This seems an apt opportunity for recording some new localities o Australian Orchids, recently ascertained.

*Dendrobium bigibbum*—(Lindl.).—Endeavour-River, Persieh. Inne sepals often rhomboid.

*æmulum*—(R. Br.)—Near Mount Dromedary, Miss Bate.
*Kingianum*—(Bidw.).—Tweed, Camara.
*gracilicaule*—(F. v. M.).—Richmond-River, Camara.
*teretifolium*—(R. Br.)—Severn, Hartmann; Endeavour-Rive Persieh.
*Mortii*—(F. v. M.)—Severn, Hartmann.

*Bulbophyllum minutissimum*—(F. v. M.).—Severn, Hartmann. Allied to *B. moniliforme*, Parish and G. Reichenbach in Transact Linn. Soc. xxx, 151 (1874).
*exiguum*—(F. v. M.).—Near Mount Dromedary, Miss Bate.

*Sarcochilus olivaceus*—(Lindl.).—Mount Dromedary, Miss Bate.
*Hillii*—(F. v. M.).—Mount Dromedary, Miss Bate.
*tridentatus*—(G. Reich.)—Mount Dromedary, Miss Bate.

*Dipodium punctatum*—(R. Br.)—var. Hamiltoni—(Bailey).—Moreton Bay. See proceed. Linn. Soc. of N. S. Wales vi, 140. (1881). Reduced by the Rev. B. Scortechini.

*Spiranthes australis*—(Lindl.).—Rivoli Bay in depressions of the Hummocks, Mrs. Dr. Wehl.

*Calochilus campestris*—(R. Br.)—Severn, Hartmann.

*Thelymitra aristata*—(Lindl.).—Mitta-Mitta, Miss Flora Campbell.
*carnea*—(R. Br.).—Mount Macedon, Wooster; Western Port, Musgrave; Loddon, McKibbin; Mitta-Mitta, Miss Campbell.

Here in flower towards the end of October and in the earlier part of November.

*Epiblema grandiflorum*—(R. Br.).—North as far as Swan River, Mrs. Forrest.

It may here incidentally be mentioned that the plant, found last year by Mr. Travers in New Zealand, evidently is different from the only Australian species; it has, according to an outline-sketch, received from Mr. John Buchanan, much narrower and more pointed lobes of the calyx (sepals). The species ought to be dedicated to its finder.

*Diuris punctata*—(Smith).—Mitta-Mitta, Miss Campbell.
*sulphurea*—(R. Br.).—Near Mount Lofty, Tepper.

*Prasophyllum despectans*—(J. Hook.).—Near Mount Lofty, Tepper. Bears flowers already in the beginning of May.
*Archeri*—(J. Hook.).—Mount Macedon, Wooster; Loddon, McKibbin. Bears flowers already early in May.

*Microtis atrata*—(Lindley).—Upper Yarra, C. Walter. Fresh flowers quite green.

*Pterostylis curta*—(R. Br.).—Mitta-Mitta, Miss Campbell. To this seems to belong *P. dubia*, J. Hook., fl. Tasm. t. cxv.
*acuminata*—(R. Br.).—Loddon, McKibbin. In flower already at the commencement of May; hence likely often missed by collectors.
*nutans*—(R. Br.).—Lower Yarra, Moffat. A variety, in which the leaves of a rosette become scattered, some ascending the stem.
*pedunculata*—(R. Br.).—Emu Bay and Flinders Island, Dr. Milligan; near Mount Lofty, Tepper.
*furcata*—(Lindl.).—Near Mount Macedon, Wooster.
*praecox*—(Lindley.).—Kangaroo-Island, Rogers; Loddon, McKibbin.
*parviflora*—(R. Br.).—Port Phillip, C. French. Commencing to flower already in April.
*barbata*—(Lindl.).—Loddon, near Sandhurst.
*mutica*—(R. Br.).—Near Fowler's Bay, Mrs. Richards; Mitta-Mitta, Miss Campbell.

*Acianthus caudatus*—(R. Br.).—Berwick, near Port Phillip, C. French. Flowers as many as 4. Blossoms in June.
*exsertus*—(R. Br.).—Loddon, McKibbin. Flowers as many as 14.

*Eriochilus autumnalis*—(R. Br.).—Severn, Hartmann.

*Lyperanthus Burnetti*—(F. v. M.).—Narre-Warren, Wooster.

*Caladenia coerulea*—(R. Br.).—Neilborough, Nancarrow; Loddon, McKibbin.

In conclusion, I would wish to request, that these lovely kinds of plants, of which many species are so local and so rarely flowering, should receive special attention from collectors, or be secured even by those, who are not engaged in botanic pursuits, but could not fail to take notice of the beauty and oddness of orchideous flowers anywhere, even close to homesteads.

granted in a science like Botany, in which all knowledge obtained is the result of careful and properly directed observation. I have often amused myself for hours at a time applying particles of sand, sticks, chalk, elytra of Coleoptera, worms, meat, &c., without ever being able to notice the slightest movement, or exhibition of irritability on the part of either leaves or hair. All these substances would adhere readily, owing to the viscid matter with which the leaves are saturated remaining on till washed away by the first shower. When flies or other small insects enter the cavities of the leaves, their legs coming in contact with the fringe of glandular hairs, and the head being directed towards the bottom of the cup-like cavity, every plunge the animal makes to extricate itself tends to involve it more and more, and, at the same time, to draw in the fringe as well as the upper margin of the leaf, leaving on the mind of the spectator the impression that it is, of its own accord, gradually closing in upon its victim. When the struggles of the insect are over the leaf again relaxes, and remains open till some other uninvited visitor makes its appearance. Matters go on in this way till the cavities of the leaves are quite full, hence the origin of the name "Fly-catchers" applied by bushmen to the various species of Droseraceæ. It will be easy to conceive, also, when it is understood that the leaves and fringe of hairs are *infolded in vernation*, that very little force, applied from within, will be required to cause them to assume their original position—in fact, they are always more or less inclined inward. Our American cousins have much more highly exaggerated notions with regard to the powers possessed by these plants than that which obtains among ourselves, as conveyed by the expressions "sensitive," "carnivorous," &c., adopted by some recent writers. A lady observer asserts that she experimented on a certain species with the extraordinary result that particles of mineral matters were, after the lapse of a short interval, rejected, while animal substances of any kind were firmly held and kept—shall we say in store for the future nourishment of the plant!

This notion appears to me too ridiculous to be seriously entertained for a single instant. We shall, probably, hear some day of vegetable lions, tigers, hyænas, &c., endowed with a higher degree of provident instinct than the corresponding species of the animal kingdom. Let us now, if you please, give up speculation, and state briefly the botanical characters of the genus *Drosera* as embodied in Robert Brown's *Drosera Menziesii.*

This *giant* of Victorian Sundews attains its maximum height about the Grampians, where it may be seen leaning against bushes, or growing up in their midst, its snowy-white flowers contrasting beautifully with their green foliage.

The *roots* are tuberous, pale, or pink, and irregularly globose.

*Stem* unbranched, slender, flexuose, flaccid, naked below, with a few minute scale-like leaves upwards, 1-3ft. in height.

*Inflorescence* terminal, paniculate.

*Calyx* inferior; sepals 5, free, often unequal, imbricate in bud, persistent.

## Droseraceæ—Sundews.

By D. Sullivan.

[Read before the Field Naturalists' Club of Victoria 14th August 1882.]

The very beautiful and interesting plants included under th general appellation of Sundews belong, as far as our Colony is con cerned, to the genus *Drosera.* The snowy white flowers of several o them, together with the sparkling, silvery appearance of the leave when saturated with rain or dew, render them attractive to all excep squatters and sheep-farmers, who entertain no kindly feeling toward them, from the belief that they are poisonous to their herds an flocks. Whether this opinion is ill or well founded it is difficult t say, for on this point "doctors differ," some asserting that the tuber ous roots of certain species are edible, while others maintain that th whole order contain deleterious properties.

It is a matter for regret that the appliances necessary t thoroughly investigate the properties of these and other suspecte plants have not been placed at the disposal of Baron Von Müeller whose decision would for ever after settle what at present must re main a question of doubt and uncertainty. My own observations apart from any knowledge of their chemical composition, have le me to the conclusion that all the species of Victorian Droseracea are poisonous. All the plants of the order with which I am ac quainted are avoided by cattle, sheep, and goats, and that, too, dur ing seasons when grass is very scarce. Any one travelling through the bush, especially in the region lying between Ararat, Stawell, and the Grampians, must have noticed the immense patches, sometimes ex tending to several acres, and including, probably, three or four species of Sundews, that have been left untouched by the various animals feeding in their vicinity, notwithstanding the fact that every vestige of the grass and herbage round the spots has disappeared. I have, on several occasions, in the neighbourhood of these patches, found goats and sheep in the agonies of death, which, by the symptoms, appeared to be from the effects of poison, and, on making a diligent search for the cause, found that the Sundews formed the most con spicuous feature of the vegetation of the place. It must be men tioned, however, that *Lobelia concolor* was, in one instance, present, and may have been the cause of the struggles of the unfortunate brutes. The mortality among sheep and cattle is much greater in the Spring, when these plants are hidden among the dense grass, than at any other season of the year.

Another interesting matter in connection with the Droseraceæ is the *supposed* irritability of the leaves and glandular hairs with which most of them are beset. The denial of the existence of this property by a mere amateur will, probably, be considered unpardonably presumptuous, particularly as it has been admitted by scientific men as an established fact; nevertheless, I do deny it as far as Victorian Sundews are concerned. Nothing, I think, should be taken for

*Petals* 5, distinct, hypogynous, slightly notched, white, membranous, withering.

*Stamens* 5, distinct, hypogynous, alternate with the petals; anthers 2-celled, dehiscing longitudinally, introrse.

*Ovary* superior; ovules numerous.

*Styles* 3, divided into many narrow lobes or segments.

*Capsule* membranous, dehiscing by 3 valves.

*Seeds* indefinitely numerous, black, not shining, irregularly cylindrical albuminous.

Distribution.—Victoria, Tasmania, South and West Australia, and New South Wales.

Let us now compare with this comparatively tall species the *dwarf* of the family, viz., Candolle's *Drosera pygmæa.* "What a contrast!" you will probaby proclaim. One leaf of a well-developed specimen of the former will be as large—including roots, leaves, flower-stalk, and flowers—as the latter. The parts of the flowers in this interesting little species are *quaternary*, the petals white or pink, the very minute sepals glabrous, styles undivided, and the seeds oblique-oval, brown, and shining. It is supposed to be rare, but this notion arises from the fact that collectors overlook it on account of its extreme minuteness. It abounds everywhere on the heath-grounds about the Grampians and other mountains of this district.

Labillardiere's *Drosera binata* is easily distinguishable from all other Victorian congeners by its forked or binate leaves, with long, narrow segments, long, glabrous peduncles bearing panicles of snowy-white flowers, and by its being always restricted to heath-bogs, margins of lagoons, and mossy banks of mountain streams. It ranges from 1-2½ feet in height according to the nature of the soil. Flowers during the months of November and December.

*Drosera spathulata*—(Labillardiere)—Is here an exclusively mountain species, being found only in the vicinity of springs on the lower ridges of Mount William and neighbouring mountains. The slender peduncle bearing at its extremity a raceme of small red flowers, all inclining to one side, will be a sufficient guide to distinguish it from any of the preceding.

The very common *Drosera Whitackeri*—(Planchon)—and (in this district) equally common *Drosera glanduligera*—(Lehmann)—resemble each other very much in every respect when not in flower, the rosette-like tuft of leaves in both plants being nearly similar in shape, and lying closely appressed to the ground. The former has a tuberous root containing a crimson dye, and always large white petals, whereas the roots of the latter are simply fibrous, and the flowers panicled, small, more numerous, and prevailingly scarlet. In this district I have lately found plants of the last-named species with white flowers, but they are of very rare occurrence.

The two next (and last of what may be fairly considered Victorian species of Droseraceae) are so like each other in height and general appearance that it will require a close inspection to determine at any time which plant you have before you. The principal distinguishing mark for ordinary observers lies in the calyx, which, in *Drosera peltata*—(SMITH)—is closely pressed in upon the flowers, fringed, and beset with glandular hair, while that of *Drosera auriculata*—(Backhouse)—is loose, with the sepals somewhat wavy and without hair of any kind. Both are to be seen sometimes side by side, but more generally the latter prefers heath-grounds and low-lying flats while the former adapts itself equally well to rich pasture land or elevated, barren hills. Height 6in. to 1ft. The ear-shaped leaves and erect habit will be a guide to the identification of either.



## VICTORIAN FERNS AND THEIR HABITATS.

BY C. FRENCH.

[Read before the Field Naturalists' Club of Victoria 10th July, 1882.]

### PART VII.

[Continued]

*Grammitis*—(SWARTZ).

Rhizome short and tufted, or creeping. Fronds pinnate or bipinnate. Sori linear or oblong, without any indusium.

*Grammitis rutæfolia*—(R. BROWN).—A very pretty and well known fern found growing in the crevices of basaltic rocks on the banks of creeks and rivers throughout the drier districts of the Colony. In former years this species was to be found plentifully near Melbourne, and on the banks of the Yarra and Merri Creek very fine and vigorous specimens were often to be met with. These times have passed away, and now one has to travel further from the metropolis and suburbs to find it at all. In appearance this little plant is quite distinct from any other indigenous species, being of a peculiar greyish sea-green color and very tomentose. The sori are linear, mostly about the middle of the pinna, and sometimes covering the surface. In favorable situations it sometimes attains the length of 4 or 5 inches, but is more commonly found from 1 to 3 inches. I have found it growing very sparingly in the crevices of the basaltic rocks on the banks of the Yarra near the site of the Horticultural Society's Gardens, but although it was not uncommon there 25 years ago, on the occasion of a visit to the same spot last year one solitary piece about half-an-inch in length was all which, after a patient search, could be found, and this was left as a relic of better days. Mr. Merton informs me that about Buninyong, this species grows in great numbers, and he showed me some very fine specimens of it from that place. For cultivation it is of some interest, being very pretty, and, with a little care as to compost (which should be the skimmings from the basalt) and watering, it may be grown into a very good specimen. It should be kept rather dry than otherwise, and not too closely shaded. Found in Queensland, New South Wales, Tasmania, South Australia, West Australia, also in South West Europe, Chili, and New Zealand. *Gymnogramme rutæfolia*, and *G. Pozoei* are identical with this species.

*Grammitis leptophylla*—(SWARTZ).—This elegant and cosmopolitan little fern is perhaps one of the least known of our Victorian species, being of annual duration, and fragile in its nature, and thus is easily overlooked by the ordinary or casual visitor to the districts in which it is found. In appearance, as regards shape only, it is not unlike a small and slender form of *G. rutæfolia*, but in most other respects it is quite different to that species. This welcome little plant is to be met with alike on dry hills covered with brushwood and on the face of dripping rocks of waterfalls, and in either place it seems to be equally at home, although the fronds are longer and more rigid when growing near cataracts. I have found it on the sides of hills in the Cape Schanck district, near the station of Mr. John Barker, where it was shown to me by Mrs. Barker, a lady who is well known for her great love for ferns, and to whom I am much indebted in years gone by for much local information and companionship in many a pleasant botanical ramble through the bush, both in this district and on the Dividing Range. In Hall's Gap, near Mount William, this species may be found growing in great abundance on the face of some rocks near which is a spring of pure water, which I am told is perpetually running. About Ballarat and Beechworth it is also often met with. Height from 2 to 4 inches. I have seen quantities of specimens of this fern from Europe and elsewhere, and can detect no difference excepting the usual one, viz., in the size. For cultivation it is of little use, excepting perhaps to grow under bell-glass ferneries, and if the conditions under which it (and other species) are found growing, when wild, be observed, success will follow. *Gymnogramme leptophylla* of Desvaux is synonymous with this species. Found in New South Wales, Tasmania, South and Western Australia, and widely distributed over the temperate and sub-tropical regions of the Old World, also in the Andes of South America.

*Davallia pyxidata*—(CAVANILLES).—A very beautiful species, which I am pleased to be able to place on record amongst Victorian Ferns. The fronds of this fine fern are of a beautiful bright green color, very rigid, and graceful, and are the most useful of any species which I know of for "making up" with flowers for button-hole bouquets now so much in request. I need hardly describe this species, as it has been long known as a show plant at horticultural exhibitions in the good old days. Since then, however, other and more elegant stove species have been introduced, and thus one seldom finds this old favourite in a stand of prize ferns. To grow it well it should be potted in rather a large pot filled with good strong loam and some chopped fibre and lumps of charcoal, as when in its native state it is, I believe, generally found growing either on old fallen logs or in damp strong places. It is a very useful plant, also, for cultivation in baskets, and as a specimen for any splash or other fancy work it has probably few equals. Height from 1 foot to 18 inches. This species may be easily distinguished from any other of the indigenous species by the thick and densely covered rhizomes and the totally different appearance of the whole plant above the surface of the soil. Found, according to Bentham and others, in Queensland, New South Wales, also in Norfolk Island and in New Caledonia, and now, on the authority of Baron von Müeller, in Victoria, on the Grampians.

*Asplenium nidus*—(LINNÆUS).—This fine and well-known species scarcely needs any description here, being seen in nearly every cultivated collection in the colony. The common name of Bird-nest Fern is a most appropriate one, the crown of the plant forming a compact nest or bed in which, doubtless, many a brood have been hatched. The fronds are simple, and entire, and from 1 to 6 feet in length; color bright green; the sori are placed along the upper or inner side of nearly all the veins of the frond, and reaching from the midrib to $\frac{1}{2}$ or nearly $\frac{3}{4}$ of their length. To grow it well, strong rich loam should be used with good pot-room and abundant drainage. The crown of the plant must be kept well above the soil, otherwise it is apt to "damp" and the fronds turn yellow and break off. To those who have artificial fern gullies, the practice of placing this fern perched up in the forks of trees is a good one, as being more in accord with their habit of growth while in a state of nature, those in the fern gully at our Botanic Garden being excellent examples of successful culture, in imitating Nature where possible to do so. As an exhibition plant it is thought by many of our leading horticulturists to be out of date, but I must confess that I do not share their views in this respect, as its totally distinct habit and general appearance should ensure it a forward place in any collection, no matter how rare or recent. Found in Queensland and New South Wales, widely spread over tropical Asia, extending to the Mascarene Islands on the one hand and to the Pacific Islands on the other. I have the authority of Baron von Müeller for stating that this fern has been found at Corner Inlet in this Colony. *Thamnopteris nidus* (of Presl.) is identical with this species.

*Aspidium molle*—(SWARTZ).—This is also a well known species and one of the easiest possible cultivation. Horticulturists will recognize this fern at once, as, sow what spores you may, up comes *A. molle*, even though no vestige of the species sown should be perceptible. The fronds of this fern are of a fine green color, but rather stiff in appearance, but for decoration in the hardy fernery it is a very desirable species. In Victoria this species is considered of rare occurrence, but it has, I understand, been found on the Murray River within the boundary of the Colony. I have never found it myself. The sori are very prominent on all the cultivated specimens which I have seen, and they also vary much in general appearance. Height from 1 to 3 feet. Found in Queensland, New South Wales, and is also spread over tropical Asia, Africa, and the Pacific Islands. *Nephrodium molle* and *Polypodium molle* are identical with this species.

In bringing this paper to a close, I have to correct an error or two into which I have fallen. Mr. R. Lucas informs me that I misunderstood him when I stated that *Trichomanes caudatum* was found by him first at Cape Otway, it having been found at Gembrook only, and on the stems of Alsophila, and not, as I have stated, on the *Dicksonia antarctica*. I have again to acknowledge the assistance which I have derived from the Flora Australiensis, many of the generic descriptions being taken nearly verbatim from that most excellent publication, and to announce the finding by myself of *Adiantum hispidulum* within 60 miles of Melbourne, and I have the authority of Baron von Müeller for saying that this is the first occasion when it has been found so far South, Geneva River, in East Gippsland, being the only Victorian locality given in "Bentham" for this beautiful fern.

[Concluded.]

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# PROCEEDINGS OF SOCIETIES.

## THE ROYAL SOCIETY OF VICTORIA.

At the monthly meeting of the Royal Society of Victoria, held in the Society's Hall on Thursday evening, 10th August, there was a fair attendance of members. The President, Mr. R. L. J. Ellery, occupied the chair.

A paper on the "Topography of Tasmania," written by the Rev. J. E. Tenison-Woods, was submitted and read by the Chairman.

Mr. H. McLean contributed a description of a new form of dredge crane, illustrating the subject by frequent references to a model and diagrams. One great objection to the dredging crane in ordinary use was that it had no means of disconnecting the bucket when it caught in any rocky projection at the bottom of a river. In such cases the only alternative was the sending down of a diver to open the bucket, a proceeding involving some trouble and expense. This defect was remedied in the improved form of dredge crane described by Mr. McLean, provision being made for the automatic opening of the bucket when it came in contact with a rocky obstacle. A dredge of this description had been recently constructed for the Harbour Trust from the design of Mr. McLean, and, according to official statements, it was pronounced to be a great improvement on the dredge in ordinary use. It was capable of raising three tons of silt per hour.

Mr. McLean's paper evoked an interesting discussion, after which the meeting adjourned.

## THE FIELD NATURALISTS' CLUB OF VICTORIA.

The usual monthly meeting of this Club was held at the Royal Society's Hall on Monday evening, 14th of August, Mr. J. R. Y. Goldstein, one of the Vice-Presidents, occupying the chair, and there being the customary good attendance of members. Messrs. Edgington and I. H. Ievers were duly elected members, and several nominations for membership were received. The Chairman's request for papers was responded to by Messrs. C. French (who promised a continuation of his paper on "The Lycopodiaceæ of Victoria"); J. F. McKibbin, on "The Orchids of the Maryborough District;" T. A. F. Leith, on "The Parrots of Victoria;" J. G. Luehmann, a continuation of his instructive paper on "The Acacias of Victoria;" and by D. Best, on "The Longicorn Beetles of Victoria."

The latter gentleman read Mr. D. Sullivan's paper on the "Droseras, or Sun-dews of Victoria," a class of plants which is generally supposed to contain poisonous properties, with which view the author coincided, — at all events, with respect to Victorian species, — mentioning several instances in support of his opinion. Mr. Sullivan, who on a previous occasion made a handsome donation of specimens to the Club's Herbarium, also presented the carefully prepared series accompanying the above paper. The first part of Mr. C. French's paper on "The Lycopodiaceæ of Victoria" was next read, describing and exhibiting nine species of Club-mosses, most of which are natives of the alpine or sub-alpine districts of the Colony. Amongst the specimens was a very good example of the rare *L. diffusum* from the Grampians. Mr. J. G. Luehmann followed with a description of some of the "Acacias of Victoria," explaining the various divisions under which they are classified.

The general exhibition of specimens included some finely preserved birds, shown by Mr. T. A. F. Leith, amongst them being the little Water Crake (*Porzana palustris*), Pectoral Rail (*Rallus pectoralis*), and collared-plain Wanderer (*Pedionomus torquatus*). Mr. C. French showed a case of timber-feeding moths, including *Zelotypia Staceyi*, the largest known Australian moth, being 119 lines across the wings, also *Schizorhina Mniszichi*, a very rare Australian Cetonia Beetle. Some very nice native Orchids, including the rare *Prasophyllum Archeri*, recently discovered at Maryborough by the exhibitor, and *Pterostylis præcox*, from the same district, were shown by Mr. J. F. McKibbin, who had also a living specimen of a remarkable Lizard unknown to any of the members present. Mr. A. J. North had a fine collection of Bird's Eggs recently received from the Darling. Mr. J. E. Dixon exhibited a Cetotolite, or whale ear-bone, from the fossil beds at Cheltenham, similar to the one shown by Mr. J. F. Bailey at the last meeting. Insects of different orders were shown by Messrs. Barnard, Strickland, and others. One of the most interesting exhibits, and which attracted a good deal of notice, was the orchids (seven species), and other plants, being the result of the Club excursion to Brighton on the previous Saturday.

The meeting terminated with the usual conversazione.

## THE MICROSCOPICAL SOCIETY OF VICTORIA.

The usual monthly meeting of the Microscopical Society of Victoria was held on Thursday evening, 31st August, the Rev. J. J. Halley being in the chair. Mr. J. Wing was unanimously elected a member of the Society.

The acting Secretary acknowledged the receipt of the "Bulletin de la Societé Belge de Microscopie" for May 1882, the "Journal of the Royal Microscopical Society" for June 1882, and the concluding part of Kent's "Manual of the Infusoria."

Mr. Gabriel then read a paper, contributed by Mr. W. H. Gregson, on "A Method of Making Wax Cells," and exhibited several specimens. The author did not claim the discovery of the method, but stated that his first acquaintance with it was made in an article read by Mr. H. J. Roper, F.R.M.S., before the Quekett Microscopical Club. The paper stated that the materials required were few and simple, consisting of —1, wooden slides, with holes of various sizes drilled in them; 2, some sheets of thin wax, such as are used in making wax flowers; 3, some paper covers; and, 4, a supply of labels and a pocketknife. The *modus operandi* was described as follows:—"To mount any easy opaque object,—for example, a portion of leaf with a parasitic fungus on it,—first cut a square of the wax and lay it over the aperture in the slide, press it firmly down, and it will line the whole cell smoothly and leave a margin of wax projecting all round the upper surface of the slide. Having made sure that the leaf has no foreign matter on it, cut it so as to nicely fit the sunken cell now lined with wax, and a very slight pressure with the finger will insure its adherence to the floor of the wax. Now take a clean covering glass, place it over the wax cell containing the object, and press it firmly but gently down, then remove with a penknife all superfluous wax close to the edge of the covering glass,—place over this the covering paper, not applying too much moisture round the central aperture, and the slide is complete, and can be labelled and placed in the cabinet at once."

Mr. W. T. Moffat read a paper on "How to display Bioplasm," and illustrated it by slides prepared according to Dr. Beale's method. In his paper the author remarked that bioplasm was the matter in which life manifested itself, and beyond which we could as yet see nothing. What life in its essence was the microscope could not reveal, but its *habitat*, mode of action in building up structure, its distributive power, we could by its aid study; and as the little bioplasts of sperm and germ united to form one growing mass, as this in its turn produced, when supplied with heat and pabulum, two masses, then four, then many, which, as they multiplied, spun and wove with unerring accuracy blood, bone, sinews, flesh, nerve, it was difficult to escape the conviction, try how we might, that there was in the life behind the bioplast a directive force, active, intelligent beyond description, and, name it as people pleased, as he gazed with wonder at its manifestation, it seemed to him the breath of God.

A No. 1 first-class microscope, by Henry Crouch, of London, was forwarded for exhibition by Messrs. Rennick, Kemsley, and Co., agents for the maker. This was a fine and well-finished instrument, with complete set of accessories, and was greatly admired by the members present. Among the other exhibits the most remarkable were some living specimens of *Branchipus* or *Cheirocephalus* (the Fairy Shrimp), sent by Mr. Goldstein. These curious and beautiful Entomostraca were collected in the Albert Park Lagoon, where they are said to be plentiful at the present time.

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## THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

The usual monthly meeting was held at the South Australian Institute on Tuesday, 1st August, Mr. D. B. Adamson, Vice-President, occupying the chair.

Several donations to the Library were announced by the Hon. Secretary.

Messrs. R. A. White, Superintendent of Signals, Railway Department, and Leonard Gilbert Browne, Two Wells, were nominated as Fellows.

Professor R. Tate, F.G.S., produced specimens of so-called *petroleum*, long known to have existed on the south side of Kangaroo Island, which has been analysed by Mr. Dixon, of New South Wales, and pronounced by him to be a pitch (but not a coal-tar pitch), which Professor Tate believed to be a waif from some wrecked vessel, and was a very good Stockholm pitch. Some resin had been forwarded from Fowler's Bay by Mrs. Ann Richards, and some beeswax and gutta-percha had been found by Professor Tate at the head of the Australian Bight, and these led him to the conclusion that all these substances were derived from the same source—the wreckage of a ship laden with chandler's stores.

A black mineral was forwarded under the impression that it was coal, and a statement accompanied it that the sender had submitted it to the Surveyor-General, who could not state what it was, and a large block of land had been taken up under the mineral regulations, with the idea that a coal mine existed there. The substance was stated by Professor Tate to be calc spar, colored with some carbonaceous substance.

Mr. H. Chandler forwarded a number of specimens from the Peak, Central Australia, which were reported on by Prof. Tate as comprising hæmatite, naturally-baked clay polished on one side, red ochre, hemisphere of agglutinated sand, simulating a peach-stone, common opal, quartz, and micaceous iron, said to contain gold (from the Peake), micaceous iron, and tourmaline in large crystals.

Mr. Hogarth sent specimens from a well-sinking, 260 feet deep, at Mombra Station, near Mount Browne, on the frontier of New South Wales, containing almost solid masses of iron pyrites and shells, determined by Prof. Tate to belong to the genus *Aucella*.

Baron Ferdinand von Mueller contributed a paper on "Some additional South Australian Acacias." They are 12 in number, which bring up the total number of 65 species now known to exist in the extra-tropical portion of the province. Additional localities of five species known already from South Australia were given.

A paper by Gavin Scoular, a corresponding member, "On the Geology of the neighbourhood of Gawler," was read, a brief abstract of which is as follows:—"Four geological epochs are represented by the rocks occupying the site of Gawler—Pre-silurian, Miocene (of two types), Pliocene, and Quarternary. The stratigraphical phenomena were described in detail, and their diversified formations were fully discussed in relation to agriculture and hydrology. In the last connection especial reference was made to the Government Well at Gawler, and the author remarked, *inter alia*,—'It is evident that the water supply obtained in the Government and private wells is chiefly derived from infiltration of the River Para waters as they pass over the thin superficial stratum of previous deposit at or near the junction of the Drift with the old rocks.' The supply is limited, as 'the South Para River ceases to flow for five months in the year over the Drift within a few yards of the Government Well. The supply of the town wells being derived from the same source, it is highly probable that the Government Well will partially drain them during summer droughts, and the inhabitants and factories will become dependent upon the 'waterworks' for a supply during those periods.'" An account of the economics of the formations are given, embracing gold, copper ores, petroleum, and building and road materials. The author concludes:—"Geologically speaking, Gawler and Western Barossa, though moderately provided with some of the necessaries calculated to advance a people in the general commercial pursuits of life, are not likely ever to attain great mineral prosperity. The soils—formerly of medium fertility—have already yielded their virgin treasures to continuous culture; and the mineral wealth, never proven to be great, has been steadily decreasing in the last decade. Seeing that both of these sources of wealth have passed the zenith of productiveness, at which the greatest possible return can be obtained for the least possible outlay, it now becomes a serious matter to consider, in an agricultural and horticultural sense, if artificial means can be applied to replenish in a day, or a year, the treasure which cost Nature thousands—probably millions—of years to provide."

The same author communicated, "Notes relating to the Geology between Burra and Farina," having reference chiefly to the water-bearing properties of the rocks at Farina, Redhill, Blackrock Plains, and Yarcowie, and to certain stratigraphical phenomena at Farina, Beltana, and Burra.

## THE ROYAL SOCIETY OF NEW SOUTH WALES.

The general monthly meeting of the Royal Society was held on Wednesday evening, 2nd August. Mr. C. Rolleston, C.M.G., President, occupied the chair, and there were about 40 members present.

The minutes of the preceding meeting having been read, the following gentlemen were balloted for, and declared duly elected ordinary members of the Society, viz.:—Rev. John Milne Curran, Mr. Haynes Lovell, M.R.C.S., Mr. Mark J. Hammond, Mr. George Thos. Hankins, M.R.C.S., Mr. Edward Palmer.

The Chairman read a letter from Professor James D. Dana, of Yale College, New Haven, Conn., U.S.A., acknowledging the award of the Clarke Memorial Medal. Professor Dana, who dated his letter from Newhaven, Conn., June 23, 1882, wrote:—"Your communication of the 17th ultimo, announcing the high honour conferred on me by the Royal Society of New South Wales, in the award of the Clarke Memorial Medal, has just been received, and with it the medal itself. The honour is specially grateful to me, because of my long friendship for the Rev. Mr. Clarke and delightful memories of geological excursions with him in Australia more than 50 years since. The medal is a remarkably beautiful one, and will be greatly treasured."

Sixty donations, received since the previous meeting, were laid upon the table and acknowledged.

The President announced that Professor Liversidge had been elected a Fellow of the Royal Society of London.

Mr. J. S. Chard read a paper on "A New Method of Determining the true North or South." The chief feature is the employment of a specially designed plane glass diaphragm in the telescope of a theodolite, on which are drawn circles and lines intersecting the centre thereof. When these circles are made to appear on two stars situated near the south pole, as explained by Mr. Chard, the centre points to the south pole. The direction of the true south and the latitude is, therefore, found almost mechanically, and saves much time when compared with the methods previously used, which require some hours' calculation. The true north or south is obtained by the various surveyors employed in this colony, in all, over 1,000 times per annum, and the saving of some hours each time should prove of great advantage.

Some discussion followed, and a vote of thanks to Mr. Chard was unanimously passed on the motion of Mr. W. J. Conder, seconded by Mr. H. C. Russell, both of whom spoke in highly eulogistic terms of the value of the method recommended by Mr. Chard.

### MICROSCOPICAL SECTION.

The monthly meeting of the Microscopical Section of the Royal Society was held in the Society's Rooms, Elizabeth-street, on the 17th August, there being present—Dr. Wright (in the chair), Rev. George Martin, Messrs. H. Sharp, G. D. Hirst, T. B. Kyngdon, R. Fraser, H. O. Walker, and P. R. Pedley, the Hon. W. M'Gregor, C.M.G., and Mr. Owen, a visitor.

Mr. Sharp exhibited a Tolles' camera lucida in the form of a truncated prism taking the place of the ordinary Wollaston prism. With this description of camera Mr. Sharp claims that it is much easier to delineate the internal structure than it is with the ordinary class of prism. He exhibited a series of drawings of various objects, in which the detail was far more perfectly depicted than is found possible with the Wollaston prism.

Mr. F. Kyngdon exhibited the following objectives made by Carl Zeiss, of Jena, Germany:—New variable low power objective, magnifying from six to 20 diameters; also 1-inch, $\frac{3}{5}$-inch, $\frac{2}{5}$-inch, $\frac{1}{6}$-inch, and $\frac{1}{8}$-inch (water immersion). These objectives were remarkable for their great beauty in performance, and compared most favourably with corresponding lenses by the best English opticians.

Mr. J. D. Hirst exhibited a gathering of some diatoms from Bondi, also a specimen of the *Nitella translucens*, showing the fructification.

The Rev. G. Martin exhibited Crouch's new $\frac{1}{5}$-inch objective, 140 degrees, the object being a *Navicula cuspidata*.

The Hon. W. M'Gregor, C.M.G., exhibited drawings showing the parasite of the tokolu (ringworm), and Mr. P. R. Pedley, injected preparations of the tongue and spinal cord of a kitten.

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## THE PRESIDENT'S ANNUAL ADDRESS.

[Continued.]

As it is impossible for me to fill in these details here, I have endeavoured to collect the records bearing upon this matter in Australia. Battles are supposed to be prime movers in such effects; fortunately, in one respect we have none to refer to; but it is unfortunate for our present discussion, because the climate of Australia is peculiar, and instances of the effect on the spot would have been very valuable. We can only refer to the mimic battle in April, 1881; when this is compared with previous occasions even, we got through a good deal of powder. For several days before the sham-fight the weather had been very wet, and on the morning of the day of the fight it began to clear, and the day became bright and fine as the firing went on, and although heavy rain had just ceased, which was proof of abundant moisture in the air, there was no return of the rain, except a little shower next morning, when 0·01 inches fell as the rain finally cleared off; our one battle, therefore, produced no rain. We come next to the great fires which have occurred in Sydney, and in examining these fires I have assumed that if a fire produced rain, the rain would fall within 48 hours. I think, in strictness, for reasons which will appear presently, the time allowed should be much shorter. I have gone back to 1860 (or 21 years), and I have not taken every fire, because many were so small that it would not have given a fair expression of our experience to include them. I have, in fact, only taken the large fires and serious explosions, and as I read over the following list you will remember that many of them were enormous conflagrations, causing a constant rush upwards of heated air for many hours in succession; and if a fire can upset the unstable equilibrium of the atmosphere by causing an uprush of air, some of these fires were just of the character to do it, confined as they were within four walls, and burning furiously for many hours. March 1, 1860, Dean and Co., auctioneers; no rain for days. October 3, 1860, Prince of Wales Theatre; light rain before and after, does not seem to have been affected by fire. January 24, 1861, Boylson's flour mill; no rain for days. June 20, 1861, Curran's furniture shop; no rain for many days. August 3, 1862, J. and E. Row, chemist; raining for two days before, and cleared off the night of the fire. June 20, 1865, St. Mary's Cathedral; no rain for many days. July 20, 1865, J. Frazer and Co.'s stores; the wind had been westerly for days, and changed before 3 p.m. to S. and S.S.E., and the humidity rapidly increased; the fire was announced at 8.30 p.m., and it began to rain at 9.30 p.m., and during the night and next day 0·60 inch fell. November 16, 1865, 2½ tons gunpowder exploded at Penrith; no rain at Sydney. December 14, 1865, Walsh, grocer, three shops; change of wind to south next day, and light rain at 6·30 p.m., or 14 hours after, evidently an ordinary change. December 23, 1865, Hill's furniture shop; no rain for days. January 16, 1866, Wearne's flour mill, no rain for two days afterwards, and then with change of wind to south: barŏmeter falling days before. March 4, 1866, explosion of nitro-glycerine in Bridge-street; no rain for two days, and then with a regular change. April 18, 1867, Sands' fire; no rain within 48 hours. March 1, 1868, Holdsworth's; no rain within 48 hours. January 5, 1868, St. Mary's Temporary Cathedral; no rain within 48 hours. February 9, 1870, Blackwall wool stores, great fire; no rain within 48 hours. September 20, 1870, six houses in Hunter-street; no rain within 48 hours. December 11, 1870, Pemell's mill; no rain within 48 hours. January 6, 1872, Prince of Wales Opera House and four houses in King-street; had been a showery afternoon; at 9 p.m., cleared up, and was fine weather; showers fell at 3·30 a.m. of the 7th, but this and the other showers together only measured 0·04 inch; no other rain fell for two days. May 17, 1872, Barker's tweed factory; shower at noon, clearing at 9 p.m.; showers after 4.30 a.m. of 18th; total 0·08 inches; rain hanging about on 16th and 17th. December 14, 1874, Booth's sawmill; no rain for many days. August 3, 1875, 11.40, p.m., Lane and Chester, large fire; rain 7·45 p.m. to 9 p.m., then no rain till 6.45, a.m. of 4th; clearing up, no rain for many days after. September 21, 1875 12·30 p.m., store and three dwellings, Kent-street North; hot wind all day, changed to S. at night, and next morning light rain; only 0·21 inch. October 1, 1875, extensive bush fire, Rose Bay hill; no rain for many days. November 2, 1874, Fairfield, Liverpool, large bush fire; railway station caught fire, and 1000 tons of wood were burnt, together with shed near railway station; no rain for many days.

*To be continued.*

## THE LINNEAN SOCIETY OF NEW SOUTH WALES.

The monthly meeting of this Society was held on Wednesday evening, 30th August. The President, Dr. James C. Cox, F.L.S., &c., in the chair.

Several donations were acknowledged.

The following papers were read:—

1. By the Rev. J. E. Tenison-Woods, F.G.S., &c., "Botanical Notes on Queensland, No. 4." This paper contained the author's observations on some of the Queensland species of *Myrtaceæ*, chiefly of the *Eucalypti.*

2. By the Rev. J. E. TENISON-WOODS, F.L.S., &c., &c., "On a Coal Plant from Queensland." This is an account of a fossil species of *Equisetum* found in the Ipswich Coal Beds, and provisionally named *E. rotiferum*, from the wheel-like shape of the diaphragm. No *Equisetum* had previously been found in the Australian Coal Beds.

3. By WILLIAM MACLEAY, F.L.S., &c., "Observations on an Insect injurious to the Vine." In this paper Mr. Macleay gives some details of the habits, &c., of a beetle, the larva of which had committed great injury amongst the vines in Mr. Holroyd's orchard, near Parramatta. Some hints are also given as to the best means of limiting their devastations. The name of the beetle is *Orthorhinus Klugii.*

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 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.* Mr. Ramsay also exhibited a collection of *Coleoptera*, which had recently been received from the Dawson River; and a remarkable horned lizard, from America, presented to the Museum by Mr. Webster. 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 has completely destroyed during the past season all the fig-trees 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 Halepesis* (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 Müeller 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.

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## THE ROYAL SOCIETY OF TASMANIA.

The monthly evening meeting of the Society was held on Monday, 7th August, Mr. C. H. Grant in the chair.

The Hon. Secretary, Mr. Barnard, brought under notice the usual returns.

The Hon. W. A. B. Gellibrand exhibited samples of a Seedling Apple, originally grown at Cleveland, and subsequently worked on stocks at South Arm, which were greatly admired.

Mr. Stephens read the following "Notes on Minimum Temperature at Hobart during the month of July":—

"A question having arisen as to apparent discrepancies in the records of minimum temperature during the month of July in various parts of Hobart, a few remarks on the subject may not be without interest. On the nights of the 28th and 29th July two unusually severe frosts were experienced. Mr. Leventhorpe Hall reports to *The Mercury* that at 7·45 a.m. on the 29th his thermometer registered 23deg. (Fahr.), and on the following morning at 7.30 a.m. 21deg. Comparing notes with the Rev. J. C. Whall, who had also been recording the temperature, he ascertained that the two observations for the night of the 29th July exactly tallied. About the same time it was stated that the minimum results registered by the instruments under the charge of Commander Shortt, R.N., the Government Observer, were 32·5deg. and 31deg. respectively for the two nights in question. A considerable variation may occur at any time in the readings of different instruments which are not periodically tested by the same standard. Commander Shortt informs me that of two minimum thermometers which have been in use elsewhere in the colony, and which he has compared with the standard, one is 3deg. 5min., and the other 5deg. out. This possible discrepancy must always be taken into account in comparing observations; but in the present instance the difference is mainly caused by registrations of temperature under widely different conditions of exposure. Mr. Hall's instrument is an ordinary mercurial thermometer, placed outside his house, and unprotected above, but sheltered from the Sun. It reads nearly 3deg. lower than the Museum thermometer, and if corrected to that extent, and placed "on grass," the result for the night in question would probably have been much the same as was actually recorded. Mr. Whall's is a self-registering instrument, of the type known as Six's Thermometer. It is placed about 18in. from the ground, without protection above or around it, and the general conditions of exposure are nearly equal to those under which the temperature "on grass" is usually ascertained. On the other hand, there is no thermometer in use at the barracks at present for recording the temperature "on grass," nor is there any place available for the purpose. The maximum and minimum thermometers are intended to record the temperature of the air under definite conditions of protection, and are kept, as nearly as present circumstances allow, under the conditions prescribed for all the meteorological stations in the intercolonial system. They are new instruments by Negretti and Zambra, and as they were obtained from Mr. Ellery, it is superfluous to say that they supply a better standard than is obtainable elsewhere in the colony. Their position, pending the completion of the instrument shed, is of course not satisfactory, and they will probably register both a higher and lower temperature when placed under it than they do now; but it must be remembered that the temperature of the air, as taken at a meteorological station, is a very different thing from the temperature "on grass." My own observations have necessarily been so irregular that they are of little value; but I believe that the lowest temperature yet noted in the colony was registered by a thermometer which I placed on the top of Mount Wellington several years ago, and which gave 16deg. as the minimum temperature for two consecutive winters. The minimum "on grass" in Hobart during the same period was 24deg.; but, for the present exceptional season, a record of 21deg., as the minimum temperature, is probably not far from the mark. But no meteorological statistics can be satisfactorily registered at Hobart until the station is properly equipped, and favourable conditions of observation permanently and effectually secured. Since writing the above I find that Mr. Shoobridge records, as the minimum temperature of the air at New Norfolk on the night of the 28th July, 29deg.; and on the following night 26deg.; a result which, if I may judge from experience of the winter temperature at the two places, agrees pretty closely with that obtained at the temporary station in the Barracks."

Mr. Johnston then read an elaborate and valuable paper, entitled "General and Critical Observations on the Fishes of Tasmania, with a Classified Catalogue of all the known species." The time was too limited to admit of more than the first two divisions of the subject being read, and the remainder, including the classified catalogue, was deferred until the next monthly meeting. Discussion on the portion read was also deferred until a future occasion, in order to admit of its being printed and circulated.

The usual vote of thanks was accorded to the contributors to the Museum, and also to the authors of the papers read.

## Correspondence.

### THE LIVING AND THE NOT LIVING.

*To the Editor of the Southern Science Record.*

SIR,—Kindly permit me a few remarks in reply to Mr. Sutherland's letter in your last issue. For the most part I am contented to leave the question as it stands, but one or two points, I think, require some comment, notably the argument that vital force cannot exist because the amount of energy in the Universe is constant, and the force possessed by living matter is only a transformation of other forces. But who denies this? I do not doubt for a moment that vital force is transformed energy and not a fresh creation, but it is this very power of transforming ordinary forces into a force of an immeasurably higher order that constitutes the difference between living and not-living matter which I have so strongly insisted upon. We do not deny the existence of heat because it is only a form of motion; still less should we deny vital force because the form of energy to which that term is applied is a transformation of lower forces. Even Dr. Beale, with all his conservatism, protests indignantly against the assumption that belief in vital force implies a denial of the law of conservation of energy.

And here I may remark that the very emphatic statements which I have quoted from Beale regarding the distinction between the living and the not-living can hardly be discredited on the ground of that author's conservatism, seeing that I quoted to precisely the same effect from Professor Huxley, who certainly cannot be accused of any prejudice in favor of the "Old School." His statements that "there is no parallel between the actions of matter in the mineral world and in living tissues," and that "the chasm between the living and the not-living the present state of knowledge cannot bridge," are as emphatic as Beale's, and may fairly be considered the text which my former article may, in the main, serve to enforce and illustrate.

Mr. Sutherland appears to hold the belief that as our knowledge increases we shall be able to lessen the chasm between the animate and the inanimate till it gradually fades into invisibility. This is purely a matter of speculation, and cannot now be proved one way or the other. For my own part I must candidly admit that I see no probability of such a result, and that in my opinion we are now no nearer any real knowledge of the nature of life than we were fifty years ago.

One of the most striking phenomena of life is its transmission from individual to individual, and this subject leads up to the question of how life originated, of how the *first* individual received the vital spark which has been transmitted through such a multitude of ever-varying forms. This question Mr. Sutherland does not touch upon; nevertheless I crave indulgence for a few remarks on a subject so intimately connected with the matter in debate. Manifestly there are only two ways in which life could have originated, viz., either by a creative act—a break in the chain of continuity—or by what we call natural processes, which term—disguise it as we may—means spontaneous generation. But the present leaders of scientific thought, who are the firmest upholders of the doctrine of continuity, absolutely deny that spontaneous generation occurs at the present day, though, in maintaining the origin of life by natural processes, they imply that it must have occurred at an earlier period in the Earth's history. This is an inconsistency of the gravest kind, of which, so far as I know, no explanation has ever been given, except vague talk about our inability to limit the possibilities on a cooling planet. The doctrine of continuity, having been once arrived at, is seen to necessitate belief in the spontaneous origin of life; nevertheless constant failure has attended all efforts to evolve the living from the not-living: it is therefore suggested that the conditions on the primeval Earth may have differed from those which now prevail in such a way as to admit of such evolution. It is needless to say that this is only an inference, and that no facts have ever been brought forward to support it. All scientific probability is against the theory that the primitive Earth was any better fitted for the spontaneous production of life than it is at present; on the contrary, the absence of pre-existing organic matter would, we might suppose, render such production more improbable than it is at present. This is so fully recognized, that experiments to test the truth or otherwise of spontaneous generation are always made with organic matter, and had the experiments of Tyndall and Pasteur resulted differently from the way in which they actually did, they would merely have proved that life could originate, *de novo*, in matter which had already lived, and it would still remain to be proved that the same effect could be produced with non-organic materials, such as alone existed before the introduction of life on our globe.

If, in spite of this, I were convinced that the evidences of continuity in Nature are so strong as to necessitate inferential belief in the spontaneous origin of life on the Earth, then I should certainly feel compelled to accept the further inference—at least as a probability of the strongest kind—that life may originate also at the present day, in spite of all negative evidence to the contrary.

The question then arises, whether we have really such evidence of the complete continuity of Nature as to justify us in accepting it in spite of minor difficulties—

"Believing where we cannot prove."

Now I maintain that we have not, for not only are we unable to prove that this endless chain of continuity exists, but we can go further and prove that it does not exist. This proof is supplied by our knowledge of the Dissipation of Energy, which shows us that the total manifestation of energy in the Universe is a finite process, that it will have an end, and that it must of necessity have had a beginning, and that the idea of eternal causation is a baseless dream. Since, then, it is proved that the inception of the present order of the Universe was an interruption of continuity, we cannot assume the impossibility of such a thing happening again, and it seems to me more reasonable to suppose that the origin of life was such an interruption than to hold, contrary to all the evidence at present before us, that life was introduced by means of what are called natural processes.

I am, Sir, Yours, &c.,

A Member of the F.N.C. of Victoria.

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## "DUBOISIA PITURI."

*To the Editor of the Southern Science Record.*

Sir,—Permit me to answer a letter from Rev. B. Scortechini, taking exception to my naming the above-mentioned most interesting plant.

For many years I took much interest in finding out the history and properties of Pituri, and transmitted, from time to time, to Baron von Müeller drawings and restorations of the broken-up Pituri of the Queensland aborigines. After Hodgkinson had given me more perfect specimens, the Baron discovered that he had the same plant, gathered by Burke and Wills, named doubtfully *Anthocercis Hopwoodii.* (Mr. Hopwood was a subscriber to the expedition of Burke and Wills.) It is now found, by specimens forwarded to me by residents in the west country, that Duboisia is the proper genus, and, such being the case, the title "*Duboisia Pituri*" meets the difficulty much better than *Anthocercis Hopwoodii* (F. Müell.) Our much respected botanists will admit this and waive their privileges, allowing the most interesting plant in Australia to have attached to it the name it must always carry.

I may further add that seeds of Pituri sent me by Mr. F. Barrington, of Sandringham, Western Queensland, have at last germinated, and I now have two little plants which look as if they would grow.

It is very singular that *D. Pituri* and *D. myoporoides* should contain alkaloids so dissimilar, and, what is more remarkable still, that the Indians of America and the Blacks of Central Australia should have found and adapted to their daily wants nicotine-bearing plants, the only ones as yet discovered.

I am, yours truly,

Brisbane, July 13, 1882. Joseph Bancroft, M.D.

[We have ascertained from Baron von Mueller, that Anthocercis and Duboisia differ generically only in fruit, and that when early in 1861 he described the Anthocercis Hopwoodii only flowering specimens were available, gathered near the River Darling by Dr. Beckler in 1860. Bentham in 1869 referred especially to the dubious position of this plant, and of A. Leichhardtii in the genus Anthocercis. In 1875 the Baron noted the occurrence of poison-properties in Anthocercis, the deleterious effect of A. viscosa being rendered known to him locally in

1867 by West Australian colonists. From fruiting specimens, obtained by the geographical explorer Mr. Ernest Giles in Central Australia, Sir Ferdinand transferred in January 1876 (fragm. x, 20) Anthocercis Hopwoodii to Duboisia, as he has done latterly with A. Leichhardtii. Not only would it be against all rules of scientific nomenclature to discard a correctly established name, upsetting all recognised principles in this respect, but it would in this instance be particularly unjust to our late fellow-colonist, Mr. H. Hopwood, to deprive him of the honor of having his name identified with this plant, especially as it was discovered in the expedition, towards the fund of which he made so large a contribution. When Dr. Bancroft entered on his very important and quite original therapeutic and physiological investigation of the Pituri, Baron Von Mueller, from fragments of this herb submitted to him by Dr. Bancroft and Mr. Bailey, traced it to Duboisia Hopwoodii, and *thus* it was, that the Doctor's attention became also directed to Duboisia myoporoides through the Baron, who urged at once that this old and well known plant, which is common enough near Brisbane, but does not occur in Victoria, ought also to be tested for medicinal purposes. The merit of having this done is due to Dr. Bancroft, while Mr. Staiger, the analytical chemist of the Queensland Government, has the credit of having first isolated the volatile alkaloids Piturin and Duboisin, the chemical differences of the former from Nicotin being probably first pointed out by Baron von Mueller and Mr. Rummel. Whether Piturin is actually identical with Nicotin needs further elucidation. Dr. James Rudall of this city and Baron von Mueller instituted also some early experiments on Duboisin, which is far less virulent than Nicotin. Dr. Bancroft in his highly valuable special essays has given extensive notes also on the investigations concerning these alkaloids, as carried on in Britain.—ED.]

## NOTES, MEMORANDA, &c.

The Dialectic Society of Trinity College, Melbourne, has done good work during the past year, the subjects discussed being varied in character, being generally on social ethics of the present day. The Fourth Annual Meeting was held on 17th August, in the large hall of the Athenæum, the proceedings being marked by an able address by the Prelector, Mr. R. Stephen, B.A., on "The Endowment of Research," a subject peculiarly interesting to all scientific workers. There is a danger lest the most important branch of Science—that of discovery—would be neglected if left without external aid. In any case, no effort to extend the limits of knowledge is lost labor, and the fruit borne is out of all relation to the means employed to foster it. Accordingly, it has been suggested that a fund be maintained by the State, not for the reward of veterans, but to provide for men who are likely to prove valuable original workers. It is to support this suggestion that this address is intended. The author then goes on to prove why this duty should be undertaken by the State: because, in the first place, the maintainance of the highest branches of Science is a benefit to the whole community, and, secondly, this cannot safely be left to the efforts of individuals. Leaving out of consideration the benefit directly derived from the cultivation of the higher forms of knowledge, no nation can afford to despise the advantage of having in its midst a body of scientific workers—men who have given up active competition in the struggle for wealth and honors. These are a living reminder to their fellows that wealth and position are not the highest aim of man—a lesson needed in all ages, and not least in the present.

"The difficulty of support is felt especially by one class—those who devote themselves to observing details concerning some small section of Nature. We have all admired or laughed at the Scarabeeist portrayed by Oliver Wendell Holmes. His labour seems trivial—in the eyes of many his life is wasted; yet the great temple of Science could never have been reared but for the massive and secure foundations laid by such observers. But to gain a livelihood from such work is quite hopeless. To take an example from real life: Science owes much to the Scotch naturalist Thomas Edward. The classification of the northern shell-fish, in particular, derives its completeness from his energy. In his case persevering industry did wonders, but with a little timely support how much more might have been accomplished. The necessity of maintaining himself and his family by working as a shoemaker made his scientific researches impose too great a strain upon his constitution. The same reason forbade him to buy books embodying the latest results of other workers, by which much time and trouble might have been spared. Science needs men of this stamp, but they cannot maintain themselves without injury to themselves and to their work. If there be no means of support for them, scientific discovery will necessarily be left to men of independent fortune. This most important branch of national progress will be restricted to one class, a class suited for it neither by habits nor inclination."

The author then goes on to show why research cannot be properly supported except by the State, and is careful to point out that great difficulty must be experienced in distributing endowments properly, and hints that one great defect lies in the mode of appointment by competition examinations. The successful candidate may be entirely wanting in those special abilities needed by the original enquirer. In the one case, memory, power of selection, and quickness in thought are most prominent; in the other patience, attention to details, and perception of analogies.

"What, then, is the duty of this colony in helping the growth of Science? In all cases where there are institutions of long standing it is better to modify these to suit the times than to introduce a novel system. But although we have in our midst a National Gallery, Museum, and Library, for the furtherance of Art and Literature, there is no organisation for the support of scientific men. The defect should be remedied at once. Details of any scheme for the purpose would be premature; but, if the principle be recognised, the elaboration of a suitable system ought not to be beyond the powers of our statesmen. The history of other nations points out the main features. A number of scientific chairs should be established, with the express object of maintaining a class of men who shall pay for their support by the consecration of their life to study. For the reasons mentioned before, the requisite funds should be supplied by the State; but their disposition should be left in the hands of some select body fully competent for the task. Special aptitude for enquiry, not success in examinations, should be the condition of appointment; and the appointment should be, for all practical purposes, for life. No hindrances by restrictions or special duties should be imposed, unless, following Professor Conington's recommendation, a periodical publication of researches be insisted upon. The idea of requiring public lectures should be dismissed at once.

"The scheme suggested is of course defective, and requires correction by experience. Some of the holders of these endowments might become careless, some might belie the promise of their youth; but such cases would be rare, and the balance of good results would in all probability be a large one. Whatever be the issue of the experiment, the principle upon which it is based is sound, the ideal aimed at is a lofty one; and, whether failure or success result, it would still be seen

> "How far high failure overleaps the bounds
> Of low successes."

We trust that the subject, so ably discussed by Mr. Stephen, will not be allowed to drop out of sight, and that others will aid heartily in procuring what is sought. We would suggest that the Government be asked to provide, say, for ten endowments of £500 per annum, such sum, in each case, to cover all expenses for material, instruments, &c., except printing, illustrating, and publishing, which would be best done by the Government. Applications for endowment to be submitted to a board comprised of two representatives from the University, and each of the scientific societies, each application to be accompanied by an original paper showing the special ability of the author, and that too much stress should not be laid on the necessity for each applicant to have attained academical or University training.

## NOTES AND QUERIES.

Reply to "Alpha."—The insect referred to by "Alpha" in the May issue of the "Southern Science Record" belongs to the order Hemiptera, family Cicadariæ, and follows closely the genus Fulgora, and Cicada proper. It will be observed that this insect invariably (as far as I know) feeds on the foliage of Eucalyptus Viminalis, or Manna Gum, but I feel certain that our Native Manna is made by quite a different insect, viz., the Cicada, of which we hear the stridulations during our hot-wind days. The insect, whilst in the pupa state, is soft and succulent, and it is during the transitory stages that I have observed the curious circumstance mentioned by "Alpha."—C. French.

## EXCHANGES.

Victorian Coleoptera.—Duplicates for Exchange (including Scolecobrotus Westwoodii, Uracanthus, species (You Yangs), U. triangularis, Earinus mimula, &c.)—J. E. Dixon, St. Leonard's, Anderson Street, South Yarra.

Dr. T. P. Lucas, of Bank Street, Emerald Hill, is prepared to make exchanges of Lepidoptera and Bird's Eggs.

Longicorns and Buprestidæ, rare species (Australian and Exotic), for exchange. Rare specimens purchased.—C. French, Botanic Gardens, Melbourne.

# THE LYCOPODIACEÆ OF VICTORIA.

BY C. FRENCH.

[Read before the Field Naturalists' Club of Victoria, 10th August, 1882.]

PART I.

The present short paper on the Lycopods of Victoria is written with the intention of pointing out the few indigenous genera and species which, by reason of their somewhat obscure habitats, are apt to be passed unnoticed by any save the careful observer of natural objects; also to present a paper which will in some measure be a fitting adjunct to that just completed on the Ferns of Victoria and their Habitats. It will be remembered that my next paper was to have been on the Orchidæ of this Colony, but, as that will be a very lengthy one, I have thought it advisable, for the reason above stated, to make this slight deviation.

The order Lycopodiaceæ, as many are aware, contains many rare and beautiful plants, and although in Victoria the number of species is limited, yet in tropical Australia, in the dense jungles of the Daintree and Mossman Rivers, and in other parts of Northern Queensland, we find some magnificent kinds, which hang suspended from the trees, assisting by their graceful habit the general effect of tropical luxuriance and beauty. In looking at a living specimen of our tiny *Selaginella Preissiana* (commonly about an inch in length), we cannot help wondering what the primeval forests of the past were like, when the extraordinary animals of which we occasionally find the fossil remains lived, and the gigantic Lycopodiums, the Lepidodendra, &c. (which Professor McCoy, in his splendid work on the "Palæontology of Victoria," informs us occur in profusion everywhere in the Palæzoic coal measures of every part of Europe, and in other formations also in Victoria), had their places in these forests, and reared their giant heads amongst the ferns and other plants of that remote and remarkable age.

In vol. VII of the "Flora Australiensis" of Bentham-Müeller, page 673, we are told that the genus Lycopodium is widely spread over every part of the globe. Of the eleven Australian species, three are generally distributed throughout the New and the Old World, one in the Old World, and seven others in New Zealand, five of them extending to the Pacific Islands, and two to South America. The allied genus Selaginella, we are informed (in the same invaluable work above referred to), has the same wide range as Lycopodium, and of the five Australian species three extend into tropical Asia, or at least into the Malayan Archipelago. I have before remarked the paucity of species in Victoria, and will now proceed to offer a few notes on same—many of which have been made from personal observation. I must here remark that I have confined myself chiefly to the two principal genera, the remaining ones being minute and not generally cared for, excepting for scientific collections or research.

*Lycopodium* (LINNÆUS).

Stems leafy, hard, branching, creeping, prostrate or erect. Leaves small, entire or minutely serrate, inserted all round the stem, usually in 4 rows. Spore-cases all of one kind. Spores all minute and powdering.

*Lycopodium selago* (LINNÆUS). A very common plant, though, from its alpine and sub-alpine habitats, little known to most of us as a Victorian species. The stems are partially creeping, and the branches are "thrown up" vertically in habit. The color is dark green, and it grows to the height of about six to eight inches, although I have seen European specimens much longer. For cultivation it is of little value, excepting for Wardian cases or fern-shades, when, with a little attention, plenty of moisture, and a little shade, it will thrive well. I have never found this species myself, and can only judge of its appearance from dried specimens which I have seen, and from the excellent description which precedes every species throughout the "Flora." Found in Victoria, at Mount Baw-Baw at an elevation of 4,000 feet, and Munyong Mountains, by F. Müeller, at an elevation of 7,000 feet; also in Tasmania and in most cool mountainous, alpine, or Arctic regions, both of the Northern and Southern Hemisphere.

*Lycopodium varium* (R. BROWN). A truly variable species, and in Victoria (excepting in alpine districts) a rare plant. In appearance it is not unlike some of the forms of *L. selago*, but usually more pendant, and more epiphytical in its character. The New Zealand form is a very beautiful one, and deserves more notice than is usually accorded to it, as, when grown properly, it makes a most elegant plant for a basket, or for covering old logs in artificial ferneries. The color is a light green, and in some forms the leaves are of a somewhat succulent texture. I have only found this plant on one occasion, viz., in the Dandenong gullies many years ago, where a solitary and miserable specimen was all which, after a patient search, I could find. I have, however, since seen it from the Cape Otway forest, and doubtless it will be found in some of the remote and almost impenetrable gullies of our Gippsland forests. Found, according to Bentham and Müeller, in New South Wales, Tasmania, also in New Zealand, the Pacific Islands, and South Africa. *L. Selago*, var. varium (of F. v. Müeller) is identical with this species. Height (or length) of leaves from 6 inches to 1 foot, or even more.

*Lycopodium clavatum* (LINNÆUS). Var. fastigiatum.—This well-known plant, which apparently is a variety of the common Club-Moss of Britain, is little known here, being (as with the two preceding species) a native of the alpine or sub-alpine parts of the Colony. The color of the leaves is of a light green, and the stems spring up from a long creeping leafless rhizome, and are from a few inches (and, according to Bentham, seldom in the Australian specimens) above six inches in height. For cultivation it is of little use, and we are informed that in England the country people use *L. clavatum* for various domestic purposes, viz., for mats, brooms, &c. I have not seen it growing in its natural state, although I believe to have seen something very like it growing near Marysville, not far from the Falls of the Stevenson River. Found also in Tasmania, in boggy places on Mount Wellington. *L. fastigiatum* (of R. Brown) is identical with this species. Baron von Müeller appends a note in "Bentham," stating that it has been found on the Dargo by Mr. Stirling at an elevation of 4,600 feet.

*Lycopodium laterale*—(R. Brown).—We now come to a species nearer home, and one which unfortunately is becoming very rare anywhere near Melbourne. *L. laterale* is a pretty plant of not more than from a few inches to a foot or so in length. The habit is stiff and erect—(I observe by the description in Bentham that the habit is prostrate, decumbent, or ascending; but in the specimens which I have found they have always been quite erect,—but of course this latter character may or may not be constant). The color is of a light green, and the spikes containing the sori are about an inch or so in length, and are of a yellowish brown color, giving to the plant a most pleasing appearance. Many years ago this pretty plant could be found growing in its native state in a boggy flat near to where now stands the Caulfield Racecourse; but this favoured collecting ground, with its rich flora, is now built upon, and "civilized" (?) out of all recognition, but little of its former beauty remaining. For cultivation it is of little value, excepting for minature fern-cases, &c. To grow it well, boggy sandy soil should be used, with a never-failing supply of water. Found in Queensland, New South Wales, in many parts of Victoria, also in New Caledonia and New Zealand.

*Lycopodium diffusum*—(R. Brown).—A somewhat smaller species than the former, though in general appearance very much like it, but, according to Bentham (and from a specimen which I have seen), a more rigid plant. The color is about the same as that of *L. laterale.* This species is of very rare occurrence, having being found on the Grampians by Mr. D. Alton, although Mr. D. Sullivan, who has most creditably worked this district, informs me that he had never succeeded in finding a single specimen during the many years of his residence in the neighbourhood. I should imagine that this species would be of little use for cultivation. In Tasmania it is said to grow in alpine bogs, so this information may be of some assistance to any person going in search of it.

*Lycopodium scariosum*—(Forster).—A species common, I believe, in our alpine and sub-alpine districts, where it is found growing in boggy situations on the mountains. The stems are prostrate, creeping to a length of several feet, and are of a somewhat silky texture. The specimens which I have seen from Tasmania seem to be more compact in the habit than the Victorian ones, and, if anything, rather more woody in its texture. This species is useful only for a scientific collection, or for Wardian case culture. The spikes are sessile, and the color of the plant is of a yellowish green. Found also in Tasmamia, in New Zealand, and in Antarctic America. *L. decurrens* (R. Brown) is synonymous with this species.

*Lycopodium densum*—(Labillardiere).—A most beautiful species, and one which is well-known to most lovers of our native plants. It is found growing in many of our mountain districts, where its handsome erect form, and beautiful light green color, render it a plant not likely to be overlooked by any but the careless or the uninitiated. In the mountain districts of Dandenong, Fernshawe, and Marysville, I have seen this fine Lycopod growing in perfection, but somehow it does not seem to thrive as well as many other species when cultivated, although the conditions of its native state have been carefully observed. It grows in sandy loam, and often on burnt heath-ground in mountain districts. I have seen some specimens of a variable nature which have been sent to me by my friend Mr. D. Sullivan, of Moyston. These seem to be more dwarf, and of a somewhat closer habit, than the ordinary forms. Mr. Sullivan informs me that they have been found growing amongst the rocks on Mount William. To those who wish to grow this species it may be remarked that it should be placed in a shallow pot or deep pan. The drainage should be perfect —(this is of course a standing rule),— and the composts used should be pure heath-soil, clean sand, and a little yellow loam and burnt wood-ashes. When lifted, care should be taken so that the roots are not damaged, or else there will be much difficulty in its cultivation. The fruiting specimens often grow to a height of two or three feet, but when the scrub is cleared away the plants of this species seem to become dwarfed, and to lose much of their former beauty. Found in New South Wales, Tasmania, also in New Zealand and Norfolk Island.

### *Selaginella* —(SPRING).

Stems leafy, usually much branched, more slender or smaller than in Lycopodium. Leaves small, entire, inserted all round the stem, but in four rows. Spore-cases of two kinds.

*Selaginella Preissiana*— (SPRING).—A pretty little annual species growing in boggy soil about the foot of mountain districts. In habit it is erect, and grows to the height of from one to three inches. This species reproduces itself very freely, the little masses of minute powdery spores being easily distinguished without the aid of a microscope. The color is of a bright green, but when in fruit, the yellowish color of the spore-cases seem to impart a much lighter tint to the whole plant. For cultivation (excepting in scientific collections) it is of little value, many of the mosses—as *Dawsonia superba*, and others—being much superior to it as miniature cryptogamic plants for artificial culture. Found also in Tasmania, and in Western Australia. *Lycopodium gracillimum* (Kunze) is identical with this species.

*Selaginella uliginosa*—(SPRING).—This pretty plant, which, as far as I am aware, completes the indigenous species, is common about all boggy places in heath land throughout the greater part of the Colonies. In color it is of a light green. The habit (when growing in the "open"— that is, unprotected by scrub) is erect, but when "drawn up" by the scrub it would appear to a casual observer to be of a somewhat climbing habit. To grow it well, it should be planted in black sandy peat, with a never-failing supply of water. The best plants for lifting from the bush are those which have, by reason of their exposure, become short sturdy plants, and the sod should not be shallower than six inches. For cultivation it is worthy of notice, being useful for button-hole bouquets, and if carefully arranged it also looks very well in vases and in table decoration. In the old days of our Horticultural exhibitions a deal of this plant was used as a "back" for stands of cut roses, but of late years the more refined (?), if not so natural, black velvet has taken the place of our humble Lycopod; and I cannot but admit that the change has proved a success. Height, from 6 inches to 1 foot. Found in Queensland, New South Wales, and in Tasmania. *Lycopodium uliginosum* (Labillardiere), is synonymous with this plant.

(To be continued.)



## A Gesneriaceous Plant,—discovered in New Guinea; defined by Baron Ferd. von Mueller, K.C.M.G., M.D., F.R.S.

Among a number of plants, recently brought from the vicinity of Owen Stanley's Range by the Rev. W. G. Lawes, and like some former collections kindly placed at my disposal, is a gesneriaceous plant, beautiful like all co-ordinal species. As this moreover shows some points of structural interest, I single it out from some other novelties and rarities for early description, this contribution to floral records from Papua being all the more desirable, as no notice has hitherto publicly appeared of any gesneriaceous plant from thence, one *Cyrtandra* and two *Æschynanthes* excepted, though in the many moist sylvan recesses of that large island probably species of that order will yet be found. Dr. Beccari's collections being from the N.W. side of New Guinea, it is not likely that this distinguished botanical traveller met with the same plant, ours coming from the S.E. inland regions.

*Didymocarpus Lawesii.*—Caulescent, silky-tomentose; leaves opposite, lanceolar, crenate-serrulate; petioles of the upper leaves very short; peduncles elongated, bearing compound cymes; bracts lanceolar; sepals five, broadly imbricate, free, ovate-lanceolate, nearly glabrous; corolla dark blue, comparatively small; its tube very short; its upper lobe (lip) obovate-cuneate, exterior in bud, cut into three very short lobules; lower lobe almost obcordate, cleft nearly to the middle; stamens two; anthers coherent towards the middle; staminodia none; style short, as well as the slender ovary glabrous.

Pertaining to the section Orthobæa.—The characteristics of the fruit, to be investigated from future material, may possibly raise this plant to a distinct generic position. The junction of *Bæa* and *Streptocarpus*, to which genera our plant perhaps is referable, was proposed already in the Fragm. Phytogr. Austr. IV, 147 (1864).

## Definitions of some new Australian Plants,
## by Baron Ferd. von Mueller, K.C.M.G., M.D., Ph. D., F.R.S.

[Continued.]

*Polyalthia Holtzeana.*—Branchlets quickly glabrous; leaves on very short stalks, almost ovate, but rounded or slightly cordate at the base and gradually narrowed into an obtuse apex, chartaceous in texture, glabrous on both sides, pellucidly subtle-dotted, prominently ribbed beneath; flower-stalklets lateral, two together or solitary, nearly as long as the petals, thinly downy; sepals cordate-deltoid, very much shorter than the corolla; petals lanceolate-linear, acute, less downy than the calyx; fruitlets rather numerous, almost egg-shaped, glabrous, not quite so long as their stipites.

Near Port Darwin; Maurice Holtze.

Flowers in shape similar to those of *P. elliptica*, but somewhat smaller and perhaps of other color; fruitlets in form and size resembling those of *P. litoralis*, but longish stipitate like those of *P. pallida*; peduncles extending to the length of those of *P. biglandulosa*; leaves more like those of *Uvaria dulcis.*

*Adenanthos Forrestii.*—Grey silky-downy; leaves linear-spatulate and undivided or more frequently above the middle divided into three oblong-cuneate lobes, concave, provided with a dorsal gland close to the summit; flowers solitary, terminal, on very short stalks; involucre consisting of 8-14 very unequal and blunt bracts; corolla outside except near the base grey-downy, under and around the anthers silky, otherwise inside nearly glabrous, its tubes much longer than the lobes; anthers all fertile; style smooth; stigma not much thicker than the summit of the style; hypogynous glands subulate-linear, glabrous; ovary thinly silky.

Near Point Dover and Point Culver; J. Forrest.

In floral characters similar to *A. Dobsonii*, in vestiture and especially in foliage greatly different; fruits not yet obtained.

*Dendrobium Foelschei.*—Pseudo-bulbous stems oblong-cylindrical, consisting of but few joints; leaves terminal, few in number, awl-shaped-cylindrical, narrowly channelled; peduncles slender, axillary to the leaves and of about their length or longer, provided with a few distant cylindrical pointed membranous empty bracts; racemes many-flowered; pedicels thinly filiform, whitish, several times longer than the semi-lanceolar acuminate bracts; ovary very much shorter than the pedicels; lobes of the calyx broadly linear, acute, white towards the base, dark rosy-red towards the summit, the inner two somewhat longer than the three outer lobes; basal protraction very short, narrow-conical; labellum hardly half as long as the other calyx-lobes, saturated rose-colored; its lateral lobules almost semiovate, its terminal lobule nearly rhomboid, pointed into a short acumen, crested by three vertical torn membranes; column about three times shorter than the labellum; anther glabrous; capsule ovate-pearshaped, whitish.

Near Port Darwin; Paul Foelsche, Esq.

This exceedingly pretty species is closely allied to *D. canaliculatum*; the leaves however are narrower, the peduncle is more slender, the flowers are smaller and more numerous, the pedicels longer and thinner, the five calyx-lobes are narrower also pointed not blunt nor greenish-yellow towards the summit, the upper lobule of the labellum is rather longer than broad and all three lobules are red not violet-colored, though that tinge also in *D. canaliculatum* assumes gradually a rosy hue.

## NATIVE PLANTS OF THE GRAMPIANS AND VICINITY.

Arranged generally under the direction of

BARON FERDINAND VON MUELLER, K.C.M.G., Government Botanist.

BY D. SULLIVAN.

[Read before the Field Naturalists' Club of Victoria 23rd January, 1882.]

[Continued.]

### (2). SAXIFRAGEÆ.

*Bauera rubioides*—(ANDREWS).—About streams and springs, rare. Height 2-3 feet. Flowers bright pink.

*sessiliflora* -(F. v. M.).—From the summit to the base of Mount William, along the courses of the various rivulets, and on the streams and cataracts of the Grampians. Height 4-8 feet. Flowers pink. I found one small plant some years since with white flowers. I have not seen this beautiful plant on either the Serra or Victoria Ranges, so that it appears to be absolutely confined to Mount William and the Grampians. This and *Pultenæa rosea* are great ornaments to the flora of our exceptionally favoured mountains.

### (3). ROSACEÆ.

*Rubus parvifolius*—(LINNE).—On granite ranges near Mount William.

*Acæna ovina*—(A. CUNNINGH.).—On pasture land, where it is becoming an intolerable nuisance.

*sanguisorbæ* — (VAHL.). — Banks of streams about Mount William and the other ranges.

### (4). CRASSULACEÆ.

*Tillæa intricata*—(NEES).—About water-holes and lagoons, not rare.

*verticillata*—(D. C.).—Very generally diffused through the district, both on the low lands and mountains. It ascends to the summit of Mount William.

*purpurascens* —(J. HOOKER).—Wet places throughout the district.

*macrantha*—(J. HOOKER).—Poor soil, not rare.

### (5) Onagreæ.

*Epilobium tetragonum*—(Linne).—About water-holes, lagoons, and streams, not rare.

### (6) Lythraceæ.

*Lythrum salicaria*—(Linne).—Streams near Mount William, not common.

### (7) Halorageæ.

*Haloragis micrantha*—(R. Br.).—About springs from the base of the mountains to an altitude of 1,000 feet.

*tetragyna*—(R. Br.).—About mountain streams, very common.

*teucrioides*—(A. Gray).—From the lowlands to the highest peaks of the mountains.

*ceratophylla*—(Brogn.).—Low-lying grass-lands, very abundant.

*Myriophyllum variifolium*—(J. Hooker).—Water-holes and lagoons.

*integrifolium*—(J. Hooker). „ „

*Callitriche verna*—(Linne). „ „

### (8) Myrtaceæ.

*Calycothrix tetragona*—(Labill.).—Sand-hills near Moyston, Stawell, the Black Range, and Horsham, and on the summit of Mount William. Height 2½-4 feet.

*Sullivani*—(F. v. M.).—On ridges of the Grampians, about Hall's Gap. Height 3-5 feet. Flowers white.

*Lhotzkya genethylloides*—(F. v. M.).—From the bases of the mountains to their summits. On the summit of Mount William it is consociated with *Pultenæa rosea, Bauera sessiliflora, Grevillea confertifolia, Eucalyptus alpina,* &c. Height 1½-5 feet, the latter being its height in shady places.

*Callistemon coccineus*—(F. v. M.).—Low-lying land near Mount William, rare. Height 6-9 feet.

*Bæckea diffusa*—(Sieber).—Rare on the Grampians.

*Kunzea parvifolia*—(Schauer).—On Mount William at an altitude of 1,200 feet, and on the Grampians. It is very abundant on the Pyrenees (Mount Cole), &c. I notice that it has a preference for the dry northern aspects of the mountains, and for rocky places. Height 2-3½ feet. Flowers purplish.

*Thryptomene Mitchelliana*—(F. v. M.).—Very plentiful on the Grampians, especialy about Hall's Gap. It does not extend to Mount William nor the Serra Range. It occupies the lower rocky ridges of the mountains and the margins of rivulets between them. Height 4-6 feet.

*Thryptomene plicata*—(F. v. M.).—On the lower ridges of the Grampians, not common. Habit always prostrate (so far as the mountain variety is concerned). Flowers pink or whitish.

*ericæa*—(F. v. M.).—On granite ridges near Mount William, rare. This species is pretty abundant on Mount Cole. Habit trailing, or occasionally adscendent. Flowers pink or whitish.

*Melaleuca gibbosa*—(LABILL).—Wet, somewhat saline, flats near the mountains, not rare. A small bush $1\frac{1}{2}$-$2\frac{1}{2}$ feet. Flowers purplish pink.

*decussata*—(R. BR.).—On the ridges of the mountains and on wet heath-ground, not rare. Height (on the flats) 7-10 feet, on the mountains 2-3 feet. Flowers purplish pink.

*squarrosa* — (SMITH). — About streams and heath-swamps, common. Here it never exceeds the dimensions of a shrub. Height 9-12 feet. Flowers pale yellow.

*Melaleuca squamea*—(LABILL).—On the summit of Mount William. Height 2-3 feet. Flowers purplish pink.

*(To be continued.)*

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## OOLOGY OF AUSTRALIAN BIRDS.

BY A. J. CAMPBELL.

### PART VI.—ORDER—INSESSORS.—*(Continued.)*

FAMILY—*Luscinidæ*.—(Continued).

220. ACANTHIZA PUSILLA—(Little Brown Acanthiza). *Locality*—Queensland, New South Wales, and Victoria. *Egg*—Beautiful pearly white, sprinkled and spotted with very fine specks of reddish brown, forming in some instances a zone near the larger end. Length $8\frac{1}{2}$ lines; breadth 6 lines.

221. ACANTHIZA DIEMENENSIS—(Tasmanian Acanthiza). *Locality*—Tasmania. *Egg*—Beautiful pearly bluish white, sprinkled and spotted with reddish brown: in some instances the spots form a zone round the larger end. Length $8\frac{1}{2}$ lines; breadth 6 lines.

223. ACANTHIZA APICALIS — (Western Acanthiza). *Locality* — West Australia. *Egg*—Flesh-white, thickly freckled with reddish chestnut, the freckles becoming so numerous at the larger end as to form a complete zone. Length 8 lines; breadth 6 lines.

225. ACANTHIZA INORNATA —(Plain-colored Acanthiza). *Locality*—South and West Australia. *Egg*—White color tinged with greenish grey. Length $7\frac{1}{2}$ lines; breadth $5\frac{1}{2}$ lines.

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Eggs marked thus * not previously described.

226. Acanthiza nana—(Little Acanthiza). *Locality*—Australia except North and West. * *Egg*—Smooth surface, pearly white, and long in form, freckled all over with reddish chestnut, which is more thickly dispersed about the larger end. Length $8\frac{1}{2}$ lines; breadth $5\frac{1}{2}$ lines.

227. Acanthiza lineata—(Striated Acanthiza). *Locality*—Australia except North and West. * *Egg*—Smooth surface, fleshy-white, very finely speckled with reddish chestnut, sometimes in form of a narrow belt round the larger end, but more frequently in the form of a thick patch or blotch exactly on the top of the egg. Length 8 lines; breadth 6 lines.

228. Acanthiza magna—(Great Acanthiza). *Locality*—Tasmania. *Egg*—Similar to those of the other species of this genus; pearly-white, blotched with dull red, apex rounded. Length 9 lines; breadth $6\frac{1}{2}$ lines.

This information is supplied me by Mr. H. T. Hull, an observing young naturalist in Tasmania.

229. Geobasileus chrysorrhous—(Yellow-rumped Geobasileus). *Locality*—Australia and Tasmania. *Egg*—Beautiful uniform pearly-white color, but occasionally they are found sprinkled over with very minute specks of reddish yellow, which in some instances form a zone at the larger end. Length 9 lines; breadth 6 lines.

230. Geobasileus reguloides—(Buff-rumped Geobasileus). *Locality*—Australia, except North and West. * *Egg*—Of a uniform pearly-white. Length 8 lines; breadth 6 lines.

231. Ephthianura albifrons—(White-fronted Ephthianura). *Locality*—Australia and Tasmania. Both Mr. Gould and Mr. Ramsay state that Tasmania is not a habitat of this species, although the former admits they are very common, and breed on some of the islands in Bass's Straits. *Egg*—Beautiful white, sometimes of a pinkish tint, spotted, others irregularly marked with bright deep reddish brown at the larger end, where occasionally they form an indistinct zone. In some specimens the spots are crowded at the top, and very sparingly sprinkled on the other parts of the egg. Mr. Ramsay furnished the length, $6\frac{1}{2}$ to 7 lines; breadth 5 lines; but the medium measurement of those I have taken in Victoria, and of those forwarded to me from Tasmania, is, length 8 lines; breadth $6\frac{1}{2}$ lines.

232. Ephthianura aurifrons—(Orange-fronted Ephthianura). *Locality*—New South Wales, Victoria, and South Australia. *Egg*—From a nest and eggs in the Sydney Museum the latter appear in size and markings similar to those of the *E. albifrons.*

233. Ephthianura tricolor—(Tricolored Ephthianura). *Locality*—Australia, except North and West. * *Egg*—Smaller and dumpier than those of the two preceding species, pinky white, sparingly spotted with small round distinct spots of dark pinky red, which are more numerous towards the larger end. Length 7 lines; breadth 6 lines.

236. ORIGMA RUBRICATA—(Rock-Warbler). *Locality*—Queensland and New South Wales. *Egg*—Pure and glossy white. Length $8\frac{1}{2}$ lines; breadth $6\frac{1}{2}$ lines.

237. CALAMANTHUS FULIGINOSUS—(Striated Calamanthus). *Locality*—Victoria and Tasmania. *Egg*—Rather large and somewhat round in form, of a reddish wood-brown, obscurely clouded with markings of reddish brown, the larger end being darkest. Length $10\frac{1}{2}$ lines; breadth 8 lines.

238. CALAMANTHUS CAMPESTRIS—(Field Calamanthus). *Locality*—Victoria, South and West Australia. *Egg*—Ground color, reddish buff blended all over with markings of deep chestnut-brown, gradually deepening towards the larger end, where they form quite a dark top to the egg. Length 10 lines; breadth 7 lines.

239. CHTHONICOLA SAGITTATA—(Little Chthonicola). *Locality*—Australia, except North and West. *Egg*—Light cochineal-red, with a zone of blackish-brown spots at the larger end. Length 9 lines; breadth 7 lines.

FAMILY—*Motacillidæ.*

240 ANTHUS AUSTRALIS—(Australian Pipit). *Locality*—Australia. *Egg*—Lengthened form, greyish white, blotched and freckled with light chestnut-brown and purplish grey, the latter color appearing as if beneath the surface of the shell. Length 11 lines; breadth $7\frac{1}{2}$ lines.

241. CINCLORAMPHUS CRURALIS—(Brown Cincloramphus). *Locality*—Australia, except North and West. * *Egg*—Ground color, of a pinkish tinge, with pinkish red and purplish spots freckled over the whole surface, the purplish markings appearing under the surface of the shell. Length $11\frac{1}{4}$ lines; breadth $8\frac{1}{2}$ lines.

242. CINCLORAMPHUS CANTILLANS—(Black-breasted Cincloramphus). *Locality*—Victoria, and South Australia. * *Egg*—Similar to that of *C. cruralis*, but, if anything, more lengthened; in form and markings rather more pronounced. Length 12 lines; breadth 8 lines.

243. PTENOEDUS RUFESCENS—(Rufous-breasted Cincloramphus). *Locality*—Australia. *Egg*—Purplish-white, very broadly marked with freckles and small blotches of deep chestnut-brown, so much so as frequently to render the blotches more conspicuous than the ground color. Length 10 lines; breadth $7\frac{1}{2}$ lines.

(To be continued.)

# PROCEEDINGS OF SOCIETIES.

## THE ROYAL SOCIETY OF VICTORIA.

The ordinary monthly meeting of the Royal Society was held in the Society's hall on Thursday evening, 14th Sept. The President, Mr. R. L. J. Ellery occupied the chair.

Messrs. J. R. Corr, M.A., and Behrendt were elected members, and Mr. D. Anderson as an associate.

Mr. WHITE read a very long but interesting paper "On the performance of certain time-keepers." He referred to the watches exhibited at the late International Exhibition held in Melbourne, comparing the merits of these watches with watches of different nationalities which have become common in Melbourne since the Exhibition. He explained the excellence of certain watches in time-keeping qualifications, under variation of temperature and in different positions. He considered that standing first on the list were the first-class watches of English and Swiss manufacture, and referred especially to the American Waltham watches, which he thought were marvels of excellence in performance when their low price was considered.

Mr. ELLERY delivered a short address "On the coming Transit of Venus." He stated that the transit, which would take place on the 6th December, was the last that would happen for 121 years. Every effort, he said, had been made by astronomers in all parts of the world to make observations with all care and precision. The phenomenon would commence about 2 o'clock, Greenwich time, on the 6th December, and the ingress of the planet would be first visible at a point in the South Indian Ocean, at sunset. The first phases would be visible to all places lying within a curve enclosing the South Pole, Madagascar, the Red Sea, and a part of Arabia, Africa, Western part of Europe, Iceland, South part of Greenland, South-west part of North, all South America, and the South Pacific and Indian Oceans. The ingress, he said, would take place at sunrise in the parts of this curve which pass through North America and the South Pacific. The latter phases and the egress of the planet would be visible nearly over the whole of North and South America, the North and South Pacific, as well as the Eastern parts of Australia, where the last phases happen near sunrise. The whole phenomenon would be visible through a large part of North America, all South America, and over a large part of the South Pacific Ocean. He next proceeded to describe the various points to be taken up by observers, and the different positions to which it is intended to send the British observing parties. Only the last part of the phenomenon, he said, would be visible in Australia, and that so shortly after sunrise that the Sun would be still low in the horizon when the planet left the Sun's disc, forming the last phases. Whilst the British observing parties have positions in New Zealand and in Queensland, the Sydney astronomers would occupy the principal position on the East coast, and also a station on

Lord Howe Island. The Victorian Astronomers proposed to form two stations besides the Observatory, one at Hobart and one in the Eastern portion of Gippsland. He pointed out the necessity that existed of selecting points whose longitude was already known or could be easily determined, as the utilisation of the observations depended very intimately on that knowledge.

Mr. W. C. Kernot exhibited two models of iron girders, and explained experiments made with them. One of the models represented a girder of a railway footbridge in use in the goods shed at the Spencer-street Railway Station, and the other showed a structure of similar size and appearance, but constructed in strict accordance with mathematical investigation. The latter contained rather less metal, and was stated to have taken less than half the time to construct than the former. On being tested with a load that was gradually increased till fracture took place, it bore 771lb., while its competitor endured only 208lb. This result, he said, corresponded very nearly to what was anticipated by calculation.

A short conversational discussion ensued on the above subjects, and the thanks of the meeting having been accorded to the gentlemen for their contributions, the proceedings terminated.

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## THE FIELD NATURALISTS' CLUB OF VICTORIA.

The usual monthly meeting of the Club was held on Monday evening, 11th Sept., at the Royal Society's Hall, the Rev. J. J. Halley, one of the Vice-Presidents, presiding, and there being a good attendance of members.

Messrs. E. T. Randall, W. J. Bowen, and Jas. L. Prince having been duly elected members, and several nominations received, the meeting resolved itself into a special one for the purpose of considering a notice of motion to admit life members. After some discussion the motion was carried, the fee being fixed at £5, and Mr. B. R. Patey was the first to avail himself of the privilege of becoming a life member of the Club.

The papers promised included one by Baron F. von Müeller on "Some Terrestrial Orchids new for Victoria," and a series on the "Victorian Leguminosæ of the tribe Papilionaceæ," by Mr. D. Sullivan, of Moyston.

Mr. C. French read the concluding part of his paper "On the Lycopodiaceæ of Victoria," and was followed by Mr. J. N. McKibbin, who described the various Orchids he had found inhabiting the Maryborough district. Dr. T. P. Lucas contributed another of his interesting series of papers "On Geology," on this occasion describing the rocks included under the Cambrian system of Professor Sedgwick, of Cambridge.

Some very fine exhibits were shown, amongst them being several rare shells, viz., *Scalaria pretiosa*, *Cypræa physis*, &c., and mineral specimens, including a pair of gypsum trays made by the Russian prisoners at Ergensenk, Siberia, by Mr. J. F. Bailey. Mr. C. French had 49 species of the larger kinds of Victorian Buprestidæ (genus

Stigmodera), including the rare *S. Macfarlanei* from Cape York, also a group of exotic Scarabæus beetles, including the sacred Scarabæus of the Egyptians, and 11 species of Orchids in flower, recently collected by the exhibitor at Cheltenham. Amongst these were *Pterostylis pedunculata* and *P. nana*, var. *pyramidalis*, both new for Victoria, the last-named being first found by Mr. French, and the former by Mr. J. E. Dixon, who, as also Mr. J. N. McKibbin, showed a fine collection of this attractive class of plants. Mr. A. J. North exhibited a nice specimen of a rare bird (*Cincloramphus cantillans*). Deserving of especial mention was a fine series of microscopic slides representing the Phylloxera in its various stages of growth, from the ova up to the perfect insect; also specimens of leaves and rootlets in different stages of disease, these being kindly sent in by the Hon. L. L. Smith, who attended and explained the most recently adopted methods for eradicating the disease. The slides were arranged and shown under the powerful microscope of Mr. H. Watts, and attracted a great deal of attention from the members present.

After the usual conversazione the meeting separated.

## THE MICROSCOPICAL SOCIETY OF VICTORIA.

The ordinary meeting of this Society was held on Thursday, 28th September, the Rev. J. J. Halley, Vice-President, in the chair.

The acting Secretary acknowledged the receipt of the following publications, viz., "The Quarterly Journal of Microscopical Science" for July: "The American Monthly Microscopical Journal" from Jan. 1880 to June, 1882; "The Northern Microscopist" from Jan. to July, 1882; "The Reports of Mining Surveyors and Registrars" for the quarter ending 30th June, 1882; and the "Bulletin de la Société Belge de Microscopie" for June 1882.

Nominations were received for officers and committee.

Mr. Barnard sent a short description of a deposit from the bore of the Williamstown Coal-prospecting Company, which had been handed to him as infusorial earth. He found it to be a marine deposit very rich in Foraminifera and sponge-spicules, with fine sand and a small quantity of broken shells. The genus *Lagena* was largely represented, specimens of *L. lævis*, *L. striata*, *L. semistriata*, *L. scalariformis*, and of various other species being present. Specimens were also found belonging to the genera *Entosolenia*, *Nodosaria*, *Rotalia*, *Polymorphina*, *Textilaria*, *Globigerina*, *Discorbina*, and *Nonionina*. The paper was accompanied by several slides of the material mounted in different ways, and a quantity unmounted for distribution.

Mr. A. W. Howitt forwarded a number of mineralogical specimens from Dunlop, in Riverina, taken from depths of 400 feet, and less, in sinking a well. Mr. Cresswell undertook to examine the specimens and report upon their nature.

Mr. Moffat showed an interesting form of confervoid with whorled branches, and Mr. Allan exhibited one of Crouch's Premier Binoculars.

## THE ROYAL SOCIETY OF NEW SOUTH WALES.

The general monthly meeting of the members of this Society was held on Wednesday, at the Society's house, Elizabeth-street. There was a good attendance of members, and Mr. Rolleston, C.M.G., presided.

The minutes of the previous meeting having been read and confirmed, the following new members were elected unanimously:— Alexander L. Cameron, squatter, Booligal; George Nugent Conlan, Commander s.s. Liguria, Grafton Club, London, W.; George James Renwick, B.A., M.B., M.Ch., 257, Elizabeth-street; Rev. James Thos. Robertson, M.A., Presbyterian minister, Tumut; George Edward Twynam, surgeon, Clione, West-street, Petersham.

The President said that at a meeting of the Council recently held it was suggested that a vote of condolence should be passed to the widow of the late Dr. Darwin, and he had pleasure in moving the adoption of the following resolution:—"The members of the Royal Society of New South Wales having heard, with deep regret, of the death of Charles Robert Darwin, one of their most distinguished honorary members, desire to express their sense of the loss which the whole scientific world has sustained, and they desire that their heartfelt expression of condolence should be expressed through their President to the widow of the late distinguished naturalist."

His Honor Judge Windeyer said he had pleasure in seconding the resolution now proposed, which he thought would come with some grace from a society such as this, existing in a country which was visited in earlier days by Mr. Darwin in his scientific researches. Nothing need be said to recommend the resolution to every member of the Society. Mr. Darwin's discoveries marked an era in the history of Science, and probably no man who had lived within the last century, at all events, had done so much to raise the character of scientific research for England as Charles Darwin had done throughout the whole of the civilised world. (Hear, hear.)

Dr. Liebius remarked that Mr. Darwin was elected in 1879 as an honorary member, and he expressed himself as highly gratified at the attention paid him by his election.

The resolution was unanimously adopted, and after an announcement as to the steps which would at once be taken for extinguishing the debt on the Society's premises, representing £1500, of which sum £500 would be forthcoming by special grant from Government, the President proceeded to read his "Notes on the Progress of New South Wales during the year 1872 to 1881." After giving a most exhaustive review, under the heads of Population, Production, Trade and Commerce, and Accumulation of the progress of the colony during the preceding decennial period, Mr. Rolleston concluded his address in these words,—"We appear now to be on the threshold of another epoch of excitement and prosperity, and whoever may live to see the decade out may have a marvellous story to tell of the country's progress, far outstripping that which I have been able to show you to-night." By the merciful providence of God, I see around me several of those members of the Royal Society who listened to that paper, and they will be able to judge in how far the picture brought forward to-night transcends that presented in 1872. In 1871 the population of New South Wales was 519,182 souls, her revenue was £2,727,404, and her trade amounted to £20,854,540. In 1881 we have seen that her population had increased to 751,468 souls, her revenue to £7,377,786, and her trade to £33,458,829. The trade inwards and outwards, per head of the population, was—in 1871, at the rate of £40 3s. 4d.: and in 1881, at the rate of £44 10. 6d.; whilst the revenue increased from £5 5s. per head in 1871 to £9 16s. 4d., or nearly double, in 1881. Figures like these betoken a development which few countries can equal, but whether or no we can boast of a corresponding advancement in all those qualities which go to form a high national character it is beyond the province of this paper to discuss. The question admits of very serious doubt, and will be viewed differently, as it may happen to be regarded in its social, moral, or religious aspect. I would only express a hope, that with the increase of our wealth we may not be unmindful of those measures which are necessary to promote the true happiness of the people, and to develop in the rising generation a love for all that is good, and pure, and loveable in our humble nature, as well as conducive to their happiness hereafter."

Mr. Llyod said he hoped this paper would appear in print in *extenso*, so that it would give the members some opportunity of weighing it well over, and discussing it at a future meeting. It disclosed some very remarkable statistics, which were well worth consideration; and one very extraordinary feature, as it appeared to him, and of which he was not aware until it was stated to-night, was the comparative condition of our population.

Mr. Wilkinson, Government Geologist, quoted facts which dissipated all notions as to any falling off in the mining industries of the colony, although the production of gold may have decreased; Mr. Chas. Moore, Director of the Botanic Gardens, briefly replied to the question of water conservation; whilst Mr. Alex. Dean commented upon the want of population, attributing the deficiency to a want of proper advertising at home.

Mr. W. G. Murray, in an eloquent speech, proposed a vote of thanks to the President, which was carried by acclamation, it being understood that a discussion on the paper would be undertaken at the next meeting of the Society.

This concluded the sitting.

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## THE PRESIDENT'S ANNUAL ADDRESS.

[Continued.]

December 26th, 1875, 5.58, p.m., Mort and Nicolle, meat preserving works: there was a heavy shower on 25th, and rain was hanging about; on 26th it was cloudy, and clouds cleared in the evening, thunderstorm next day. September 16th, 1876, 2.35, a.m., M'Lauchlan, carpenter's shop; large fire, strong gale sprang up and extended fire; no rain for days. April 23rd, 1877, 4.27, a.m., Hanks' grocery store and other premises; no rain for days. September 8, 1877, 10.30 p.m., boatbuilder's, place, Balmain; began to rain two days after, with change of wind to S.E. February 26, 1878, 3·38 a.m., Olsson, general dealer, 10 small shops and some timber; light rain 30 hours after fire. May 12, 1878, 2.40 a.m., Dixon-street fuel merchant, large fire; no rain for days. August 6, 1878, 1.55 a.m., Flagstaff Hotel, large house; no rain for days. November 27, 1878, 12.18 a.m., hay and corn dealer's and other buildings, 681, George-street, large fire; change of wind, day before fire, to E.S.E., 0·006 inches of rain fell on the 27th. January 3, 1879, 12.34 a.m., Burwood Congregational Church; no rain for days. July 16, 1879, 10.33 p.m., store, 687 George-street, and other premises; no rain for days. October 28, 1879, 1.20 p.m., two 3-storey produce stores, very large fire; no rain for days. January 11, 1880, 7.13 p.m., music store and other premises, 610 George-street; no rain for days. May 6, 1880, 1.37 a.m., Fresh Food and Ice Company, large fire; no rain for days. May 26, 1880, 10.35 p.m., hay shed, cottage, stable, &c., Foss-street, Glebe; raining all 26th till evening, and again during the night; rain only 0.11 inch. May 28, 1880, 6.7 a.m., Shale and Oil Company, 150 barrels of oil burnt; raining on 27th, cleared up on 28th. July 22, 1880, 11.10 p.m., Victoria Theatre, large fire; no rain for 10 days. July 25, 1880, 12.25 a.m., Read's Carpet Warehouse and other premises; no rain for days. We have here 42 fires extending over a period of 21 years, and there is not one instance in which rain has followed within the 48 hours as an evident consequence of the fire. Now, several of these fires began when it was raining, and seemed to produce no increase in the fall—indeed in many cases it looks as if the fire had stopped the rain; and if these instances had been taken out to prove that large fires drove away the rain, the evidence would seem almost conclusive. It may perhaps be said that none of these fires were large enough to make it rain; but if fires ever have such an effect, some of our fires, occurring as they did under most favorable conditions, should have done it; for instance, when the Prince of Wales Theatre and houses in King-street were burnt. The afternoon of the day on which the fire took place had been showery, very light rain fell, showing the air was at the point of saturation, and when the fires came on, and for some hours after, the rain ceased, and at 3.30 a.m. another very light shower fell, and that was all for days. Now, the shower at 3.30 a.m., and all those in the afternoon, only made up a total 0·04 inches; the rain was therefore little more than mist; sometimes one night's dew will measure more than that. Again, when J. and E. Rowe's fire (wholesale chemists) took place, it had been raining for two days before, and the next morning after the fire the weather cleared up. You would notice that amongst the list of fires I have put two important explosions—the first that of $2\frac{1}{2}$ tons of gunpowder which was on a dray at Penrith, and was accidentally exploded, without any rain following; the other the great explosion of nitro-glycerine on March 4, 1866, when two stone stores were destroyed, and no rain fell. And one fire at Liverpool, where, in the midst of a great bush fire, 1,000 tons of wood and a shed were burnt without any rain following. This gives us a measurable quantity of heat, and must have been very far in excess of any ordinary city fire.

(To be continued.)

## THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

The usual monthly meeting of the Royal Society of South Australia was held in the Institute on Tuesday evening, 5th September. There was a fair attendance. His Honor the Chief Justice occupied the chair. Several donations to the library were received. Messrs. R. A. White, Superintendent of Signals, and Leonard William Haacke, Ph.D., &c., were elected Fellows.

Professor Tate said every one was aware how much Science was indebted to the memory of the late Charles Darwin. It was proposed to raise a fund of money for the erection of a statue of Darwin in London, and the balance to be devoted to a fund associated with his name in connection with the furtherance of biology. Circulars had been forwarded, but he thought that, instead of individual subscriptions, if he could get co-operation something substantial might be done by the advocates of Science. He remarked that the Society had not identified itself as much as it might have done with matters of the kind, and he instanced the memorial to the Rev. W. B. Clarke, the pioneer of Geological researches in Australia, whose labours had extended over fifty years in New South Wales. He was the original discoverer of gold in Australia, and antedated Hargrave by four years. The indifference shown to the Biological Station at Sydney Harbour was another instance. He thought South Australia should be connected with the recognition of the memory of Darwin. He therefore moved—"That a committee of the Society be appointed to act in the matter." The motion was carried, and Professor Tate, Messrs. Smeaton, Chappell, and Rutt were appointed as the committee to carry out its objects.

Mr. Charles Todd exhibited Campbell's Sunshine Recorder, which has been used at the Observatory for some time. The duration of the sunshine was, he need hardly point out, an important factor in climatology. The instrument was simple in construction, but its records were very valuable. It was one of the many means by which philosophers made Nature record her own operations. It consisted of a sphere of glass four inches in diameter, and a card being introduced in the focus of the parallel rays, the image of the Sun burnt its track upon the card, which was graduated. He explained by means of the blackboard, the principle of the Sunshine Recorder. In answer to a remark of Professor Tate, Mr Todd said it would be a great advantage if a system could be devised whereby not only the particular portion of the sky overcast, but the density of the clouds themselves, could be recorded. The effect of a dense cloud, of course, would be greater than that of a thin cirrhus cloud.

Professor Tate drew attention to some mineral specimens from Eudunda sent by Mr. E. Boyer, especially noticing brown oxide of iron in pentagonal dodecohedra, pseudomorphic after iron pyrites.

"On an Acanthaceous plant (*Strobelanthes Tatei*) new to Science, from the Northern Territory of South Australia," by Baron Sir F. von Mueller was duly received.

Mr. James Mann, Medical Officer of the Destitute Poor Department, read a paper entitled "Notes upon the Life History of a Human Blood-worm." He gave a technical description of the worm, which is known to Science as the *Filaria sanguinis hominis*, and he related the result of his observations in China, where the natives were infested by the worm. The mature filaria was very thin, but measured two or three inches long, had a distinct alimentary canal, and the female had a perfect reproductive apparatus. After being discharged from the body of the mosquito, the worm found its way into the stomach of the human subject through the water drunk. The parent selected as its habitat one of the lymph channels of man. Thence it discharged myriads of embryos, which found their way into the vessels which carried on the circulation of the blood. The embryos were incapable of further development, or of performing the functions of reproduction. They could only attain sexual maturity by the intervention of an intermediary host. That host was furnished by the mosquito, which dined on the blood of man. The embryos exhibited an extraordinary periodicity, being present from 7 p.m. till 7 a.m., and disappearing from the blood entirely during the day. No one knew where they went. That periodicity was influenced and modified by sleep. The filaria was very frequently associated with certain pathological conditions. Another peculiar characteristic was that, if the patient slept in the day-time and kept awake at night, the filaria appeared in the blood in the day and not at night. Taken into the stomach the filaria might be acted upon by the gastric juice, but it sometimes succeeded in penetrating into the tissues, and had a peculiar aptitude for selecting the lymph tracts as its resting-place. There was a conversational discussion upon the subject of the paper, and the opinion was expressed that, having mosquitoes here, the filaria might also be found, but so far it had not been detected.

Dr. Whittell asked whether the parasite affected the Europeans as well as the natives.

Dr. Mann said the Chinese drank water from the paddy-fields, and to that water mosquitoes had access, whereas Europeans were very careful to drink only filtered water.

Professor Tate remarked that another point was that Europeans in those countries were not in the habit of drinking water. (Laughter.) In answer to further questions, Dr. Mann said females predominated; the male worm had only recently been found. A portion of it was found in the neighbourhood of the groin-gland of a patient in Amoy, China, but the discovery was so recent that no further information had been obtained.

Dr. Mann intimated that he would elaborate his paper at some future time. A vote of thanks was accorded the Doctor.

## THE ROYAL SOCIETY OF TASMANIA.

The monthly meeting of this Society was held on Monday, the 11th September; Mr. T. Stephens, T.P., in the chair.

The following gentlemen, who had previously been nominated by the Council, were balloted for and declared duly elected as honorary Members of the Society, viz.:—Baron Ferd. von Mueller, K.C.M.G., M.D., F.R.S., Government Botanist of Victoria; and the Rev. J. E. Tenison-Woods, F.L.S., F.G.S., F.R.G.S., etc.

The hon. Secretary, Mr. Barnard, laid before the meeting the usual returns for the month of August.

The following presentations to the Museum were made. From Mr. A. Winter, specimens of an albino variety of the Brush Kangaroo (*Halmaturus Bennettii*), mounted; from Mr. W. Ritchie, specimens of asbestos, from Anderson's Creek. From Mr. J. Simmons, specimen of lode tin from the claim of the Lottah T. M. Co., Gould's Country. From Mr. Lester, specimen of ruby tin from the vicinity of the Heemskirk River.

In reference to the specimens of asbestos from the West Tamar, which were exhibited at the meeting, the Chairman remarked that it was to be regretted that this mineral had hitherto received little attention, though it had long been known to exist in the colony; indeed the Asbestos Ranges derived their name from it in very early days, though, as Mr. Gould had pointed out, they were quite unconnected with the serpentine of the neighbourhood of Anderson's Creek, in which rock it occurs. There was one point in connection with this substance which was involved in some obscurity. The mineral known to manufacturers in the United States and elsewhere, and now largely used for sheathing boilers and steam-pipes, for packing piston-rods, and for general felting purposes, is the true asbestos classed by Von Cotta, Dana, and other mineralogists, among the anhydrous silicates of lime and magnesia, and is a fibrous variety of tremolite, or actinolite. The proper title of the West Tamar mineral is probably chrysotile, better known as picrolite, or Schiller asbestos, a fibrous variety of serpentine, which belongs to the hydrous silicates of magnesia. As far as one could judge from superficial examination, the fibre seemed to be of excellent quality, and it would be interesting to ascertain whether it is inferior in any essential point to the other asbestos, so far as regards the special purpose for which it is manufactured.

Mr. C. H. Grant observed that there were many reasons why the article had not yet been exported in large quantities for manufacturing purposes. Asbestos was found in considerable abundance in many parts of the world, especially in Cornwall, Corsica, and the Austrian Alps; but the largest deposits he knew were situated near the banks of the St. Lawrence, and in the United States: there the fibres were of great length.

Mr. R. M. Johnston said that he had found a variety of fibre and colour in abestos, according to its exposure to atmospheric influences. It was only possible to get the fibre, in its true state, in the solid rock.

Mr. R. M. Johnston read the second part of his paper "On the Fishes of Tasmania," which will be concluded at the next evening meeting of the Society.

The Chairman said that at the last meeting of the Society mention was inadvertently omitted of a new addition to the *fauna* of Tasmania in the shape of two native rats—one constituting a new genus,—which are described by Mr. Oldfield Thomas, F.Z.S., of the British Museum, in the "Annals of Natural History" for June, 1882. One was described from a specimen sent to the British Museum by the late Mr. Ronald Gunn, the other from specimens contributed by Mr. Augustus Simson. A paper on this branch of the Tasmanian *fauna* had been communicated by Mr. Petterd, and would probably have been read that evening had time allowed.

Mr. John Swan remarked that about two years ago he obtained a specimen of a black rat, generally considered as a Tasmanian species, but, on reference to Gould's work, he found it to agree with the description of one previously known to exist in West Australia, and not mentioned as occurring in Tasmania. He did not agree with the idea that rats of different colours could not belong to the same species, for he had observed two of these animals, which had their nest near his residence, one of them being similar to the one above referred to, and the other of a much lighter colour. When at Deloraine a short time since, he saw a black rat killed, the colour of which induced no remark, being evidently regarded as nothing unusual.

A short discussion ensued, after which the usual vote of thanks was passed to the several donors to the Museum, and also to Mr. Johnston for his interesting paper.

# NOTES, MEMORANDA, &c.

## EARTH WORMS.*

By Thomas Harrison.

The story goes that a Frenchman, an Englishman, and a German professor once, simultaneously, took it upon themselves to write concerning the natural history of the camel. The Frenchman went straight to the *Jardin des Plantes* and studied the animal in question from the specimens in the menagerie. The Englishman started for the Syrian desert, and picked up data from observations of the camel in a state of nature; whilst the German *savant*, shutting himself up in his study, developed an account of the camel out of his own consciousness. The three descriptions are especially characteristic of the three nations, and it is fortunate for Science that the example of the Englishman is still followed by his compatriot scientists at the

* "Earth-worms," by Chas. Darwin. 1881.

present day. The work before us is a notable illustration of this mode of procedure. This, one of the last emanations from the brain of the illustrious naturalist who has just passed away, stands before the world as an evidence of the painstaking zeal in collecting and following facts displayed by English investigators of natural science. The first idea of the work may have been a suggestion, may have been an inspiration, but its publication was only decided upon after long and patient research and observation of real phenomena. For thirty years has Mr. Darwin been the unflagging student of the habits of such an apparently insignificant animal as the worm, that a less thoughtful naturalist would have deemed utterly beneath his notice. Out in the wide-spread commons of England, in meadows and in corn fields, on the lawn of the garden, in soils rich and poor, sandy, clayey, chalky, wet, and dry, in Summer and in Winter, by night and by day, were the enquiries carried on, the result being a book lucidly written, bristling with examples, and interesting as a novel, even to the reader of but the barest scientific attainments; and after a perusal of the volume the chances are, that the vermicarium will be as common in the verandahs, at least, of enthusiastic students of animal life, as is now the aquarium illustrative of the behaviour of marine organisms, or the formicarium used by Sir John Lubbock, whereby to familiarize himself with the habits of ants.

An advantage to students is, that the so-called vermicarium is especially easy of construction. A common deal box of any dimensions, but about eight inches in depth, must be filled almost to the top with soil moderately pressed down and kept tolerably moist. A spade full of earth taken from almost any field, or garden, is pretty certain to contain one or more worms. Place these on the surface of the mould, and the experimenter is pretty certain to be rather astonished at the rapidity with which the new occupants bury themselves by boring beneath the earth. In a few days they will commence to throw up castings, which should, *a la* Darwin, be carefully collected and when dry weighed with accuracy. It was found by the author that the amount of these castings varied with the nature of the soil, the time of the year, and as the seasons were wet or dry. The experiments verifying these facts may be easily carried on in these artificial habitats, since soil of any degree of richness may be made to fill the boxes, while if the same are kept under cover, the moisture and temperature may be regulated at pleasure, and thus the study may be pursued even by the invalid by the fire-side or in the laboratory.

Even independent of its habitats, the earth-worm is an interesting specimen of the animal creation. What may be termed its skeleton is a series of rings or somites of a chitinous nature. Each of these rings is furnished with minute reflexed bristles, by which the worms often hold so tightly to their burrows that it is impossible to drag them out without tearing them to pieces;—the same bristles serving as a means for facilitating locomotion, since, when the worm elongates itself, the head is pressed forward, and when it again contracts its length the bristles pointing backwards prevent any retrograde movement. They possess a mouth immediately behind what may be termed a kind of proboscis, a prolongation of the head. Between the crop and the intestines is a gizzard, in which are collected small grains of sand that serve as millstones to triturate their food. They sometimes even swallow without injury small and pointed pieces of glass, either by accident or design. Behind the gizzard is a straight intestine terminating in an orifice at the extreme end of the tail, and from which the undigested food, earth, &c., is ejected in the well-known form of "casts." They have apparently no organs of hearing, since they are evidently unaffected by sounds of the loudest wind instruments, but are extremely sensitive to vibrations: without the slightest trace of eyes they are to a certainty able to distinguish between light and darkness. They remain seemingly uninfluenced by the odor of tobacco-juice, paraffin and millefleurs, but are able speedily to discern, probably by smell, the presence of bits of onion and cabbage: with respect to the latter they are somewhat dainty, preferring the green to the red, and displaying a singular liking for "brain-feeding celery." It would seem also as if they appreciated the value, as a digestive agent, of prussic acid, since the leaves of the wild cherry are preferred to those of the hazel. As acidity is the natural result of living upon large quantities of decayed leaves, the earth-worm is duly provided with calciferous glands, which produce an alkaline reaction.

Perhaps the most singular facts stated by Mr. Darwin are those which go to prove that without brains the worm possesses an instinct of no mean order. Their burrows, for example, are lined with fine earth, and even small stones, whilst their apertures are plugged with leaves. In dragging the leaves into the mouth of the burrow a sagacity is displayed that seems almost indicative of reason. "A leaf may be either dragged in by its point, or footstalk, or middle. * * * If a man had to fill a small cylindrical hole he would drag or push in the leaves by their pointed ends, unless they were very thin relatively to the size of the hole, in which case he would probably insert some by their thicker or broader ends." It was found upon experiment that of the leaves placed at the disposal of the worms some eighty per cent. were pulled in by the tip, nine by the base, and eleven by the middle, (in this case the leaf was laburnum especially narrowed at the base). When rhododendron leaves, they being smallest towards the base, were used, sixty-six were drawn in by the base, and only twenty-four by the tip. To test the matter still further, Mr. Darwin cut triangles out of stiff writing-paper with sides three inches long and base one inch long in 120 cases, and half an inch in 163 cases, rubbing the papers with fat to prevent them becoming damp by dew, whilst similarly-shaped triangles of damped limp paper were drawn in all sorts of ways into the burrow. The result of the experiments convinces Mr. Darwin that the manner in which the triangles were drawn in is by no means a matter of chance. The conclusion is, that these humble architects are able to acquire some notion of the general shape of an object, probably by touch, as do those who are born blind and deaf. In these wonderful selections the worm seems in advance even of the intelligent ant, who will often drag an object transversely which could be more easily drawn longitudinally.

The earth swallowed by the worms is not merely for the making of burrows, but for food, they extracting the nutriment therefrom whilst it is passing through their stomachs. This swallowing and subsequent casting forth of the earth upon the surface is of great importance to the agriculturist. Not only are lower layers of rich soil brought up from beneath by these little workers, but in passing through their bodies the earth becomes saturated with the secretions of the stomach, and is thus changed into an exceedingly rich mould or humus, something of a compensation to the farmer for the loss of a few stalks of wheat, the roots of which have been appropriated and eaten by these same subterranean workers. The sizes and amounts of these castings is something startling. Near Nice, Dr. King found worm castings three inches in height, while in Bengal and the Neilgherries they are found still higher. A worm of gigantic proportions is met with in Gippsland: it would be interesting to note the amount of castings thrown up by such a vermicarian Goliath.

The amount of earth brought to the surface by worms depends, of course, upon the quantity found within a given area. Upon this head Von Henson calculates that 54,000 worms are to be found in an acre of garden land. A peculiarity is that the castings are most numerous upon poor land. This is explained by supposing that the worm must consume a larger than ordinary amount of earth to obtain the requisite quantity of nutriment. At any rate the fact is not by any means unimportant. If the worm-casts act as manure, it is just where the land is poorest that most manure is required, and that seems to be the desideratum which Nature has supplied.

The depth to which the castings accumulate within a few years is shown by several very striking instances. "In 1842 an old pasture field was covered with a layer of chalk; in 1871, on a trench being dug, the chalk was seen in a distinct layer seven inches beneath the surface. A layer of coal-ashes laid down at the same time was found at the end of twenty-nine years in two parallel layers, one seven and the other five and a-half inches below the surface. A still more striking case was that of a field ploughed in 1841, and then harrowed and left to become pasture. It was so thickly covered with large and small flints (some half as large as a child's hand) as to be always called the stony field." Mr. Darwin used to doubt whether he would live to see the larger flints covered with vegetable mould and turf. But after thirty years all the stones had so completely disappeared that a horse could gallop from end to end of the field without striking a single stone with his shoes." Examples are given in which the burial of various objects has been still more rapidly brought about.

Now when it is considered that it is not simple earth, but a rich fertilizing agent, that is thus brought up from beneath and deposited upon the soil, it does not need much discernment to enable one to come to the conclusion that earth-worms are, in this respect, the friend rather than the enemy of the cultivator.

# VICTORIAN LEGUMINOSÆ.

## TRIBE—*Papilionaceæ.*

BY D. SULLIVAN.

[Read before the Field Naturalists' Club of Victoria 9th October, 1882.]

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As a supplement to Mr. Luehman's papers on the Acacias of Victoria, a brief review of the Papilionaceæ, which forms the principal tribe of the vast and important natural order Leguminosæ, may possibly prove interesting to those who have not an opportunity of visiting the various parts of the Colony in which these plants abound.

We are all more or less acquainted with the strikingly beautiful flowers of the Sweat Pea, Laburnum, Furze, Darling Pea, Glory Pea, Cape Broom, and, above all, of the incomparable Desert Pea. These, as well as a host of others too well known to need mention, belong to the tribe under consideration, which was so named from the resemblance of the flowers of some species to a butterfly. The petals are very unequal, the upper being the largest, and overlapping the others while in the bud state. Technically, this petal is termed the *standard*, or *vexillum.* On each side is a smaller one, which generally ends in a narrow stalk or claw towards the base. Together these are called the wings (alæ). The two lower petals are united more or less by their edges into the form of a boat, hence the term keel, or carina, applied to them. The standard represents the outer wings, the alæ the under wings, and the lower petals combined, the body of the butterfly. The stamens, ten in number, are hidden from view by the lower petals, so that in order to see them you must cut the latter gently with the point of your knife. The cohesion or otherwise of the stamens will afford us a simple basis for grouping our native species, of which we have a goodly number, some of them ranking among the prettiest flowering plants to be met with in any part of the world. In the genera Pultenæa, Dillwynia, Daviesia, Viminaria, Sphærolobium, Gompholobium, Eutaxia, and Aotus, the stamens are all free from each other; in Kennedya, Swainsona, Bossiæa, Indigofera, and Glycine they are in two bundles, one being free and the other nine united into one parcel; and in Platylobium, Hovea, Goodia, and Templetonia, they are united into one bundle. Stamens when free from each other may be briefly described as polyandrous; when in two parcels, diadelphous; and when united into one parcel, monadelphous.

Let us now collect all the plants we meet with having papilionaceous flowers, taking care to examine the stamens while in a fresh state. Having satisfied ourselves as to the cohesion or otherwise of the stamens, we label our specimens accordingly, placing them in separate portfolios until we have leisure to examine them further. Assuming now that we have collected a large number of plants, we shall proceed to separate them into the genera and species of which each group is composed. Commencing first of all with those genera least prolific in species, we may possibly have representatives of Viminaria, Sphærolobium, Gompholobium, Eutaxia, and Aotus in our first lot. I have only noticed one species in each of these genera as far as I have yet travelled through the Colony.

1. *Viminaria denudata* is a small tree of willow-like habit, with long, twiggy branchlets drooping with the weight of the long racemes of small yellow flowers borne at their summits. The leaves are filiform, and of considerable length, while the seeds are reddish-brown, smooth, and without any appendage. This plant abounds on wet heaths as well as on the margins of lagoons and mountain streams.

2. *Sphærolobium vimineum* is, in regard to the branchlets and *apparent* arrangement of the flowers, a miniature of the preceding, but on closer inspection it will be seen that what at first appeared to be a long raceme is, in reality, a number of few-flowered clusters each forming an independent raceme arising from the axil of a rudimentary leaf-bract. The small fruit is nearly spherical. The seeds are oval, kidney-shaped, shining, slightly streaked, and without any conspicuous appendage. It is found generally leaning against other shrubs for support in similar situations to those mentioned as preferred by *V. denudata*.

3. *Gompholobium Huegelii*, of which there are two varieties differing very materially from each other, is a charming little shrub seldom exceeding one foot in height. The leaves in both are ternate. The leaflets in the yellow-flowered variety are very narrow and glabrous, while in the red-flowered plant they are broader and downy. The five-parted calyx has equal, valvate segments with woolly margins. In both the fruit is inflated, egg-shaped, and about the size of a well-developed pea, and contains several small, smooth seeds with a membranous, ringed appendage. This plant, which is pretty common on the heath grounds in several parts of the Colony, would be a most desirable introduction into our public gardens. The seeds, however, are rather difficult to obtain, especially in very dry seasons.

4. *Eutaxia empetrifolia* is a prostrate shrub easily confounded with some species of Pultenæa and Dillwynia. Its concave, glabrous, blunt, *decussately opposite* leaves will, however, in the first instance distinguish it from either of these. It is frequently to be met with on barren hills consociated with *Pultenæa pedunculata*, and occasionally also on clayey banks of brackish creeks and water-holes.

5. *Aotus villosa* is an erect or somewhat procumbent shrub with robust, villous-hairy branchlets. The flowers are yellow, and densely crowded towards the summits of the branches. The leaves are blunt, reflexed at the margins, and rather thick, and of coarse texture. The fruit is small, oval, compressed, and, like the rest of the plant, very hairy. On sandy heaths in the vicinity of mountains.

A curious incident occurred to me on the heath-ground near Mount Abrupt, while gathering specimens of this plant:—Four strapping fellows rode up within about twenty yards of where I stood. A warm debate ensued as to my object in wandering about in so lonely a place. One, who appeared to be the leader, was of opinion that I was a surveyor; another, that none but an artist could take so much notice of surrounding objects; the third maintained that I was connected with the Kelly gang, and that before many days there would be some bank robberies in the neighbourhood. The expression of this notion was, I confess, a great relief to me for I was just beginning to think that the veritable Kelly party stood before me. The fourth suggested that I was an escaped lunatic from the Ararat Asylum, and considered it their duty to take me to Dunkeld to be forwarded thence to my old quarters. The opinion of the leader at last prevailed, and so I was permitted to enjoy my rambles in peace.

The three remaining genera of the Polyandrous group, viz., Pultenæa, Dillwynia, and Daviesia, will form the subject of my next paper.

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## Definitions of some new Australian Plants, by Baron Ferd. von Mueller, K.C.M.G., M.D., Ph. D., F.R.S.

[Continued.]

*Eremophila Pantoni*—(Sect. Pholidia).—Grey from a very appressed and somewhat shining indument; leaves scattered, rather long, trigonous or channelled-linear, at the pointed summit recurved; calyx small, but longer than the flower-stalk, its segments ovate-lanceolar, conspicuously overlapping at the margin; corolla outside thinly beset with star-hair, inside of blueish color, above the narrow-tubular base suddenly widened; lobes of the upper lip deltoid-semi-elliptical, all short and somewhat pointed; stamens enclosed; lower portion of the style downy; ovary except the glabrous base velvet-downy, with two ovules in each cell.

On the Gascoyne-River; Polak.

This species differs from *E. Dalyana* chiefly in broader leaves and in the narrower base of the corolla; from *E. scoparia* in longer leaves, larger flowers and velvet-downy ovary; from both in the not distinctly scaly vestiture, not opposite leaves, broader and therefore more overlapping segments of the calyx; it seems also to have a different geographic range.

The genus Eremophila, eminently characteristic of the Australian Desert-Flora, was founded by R. Brown in 1810, when five species became known. In the course of the next forty years eight species were added by Ker, Endlicher, Bartling, De Candolle, Bentham and R. Brown. Since then the number has been raised through Melbourne researches to 60. Thus occasions arose to identify the names of several Australian geographic explorers with this beautiful genus. While now adding one more to the species, I connect the name also of Joseph Panton, Esq., with this group of plants, as a mark of public recognition of that gentleman's exertions through many years for promoting the pastoral interests and indeed also the general geography of Australia.

*Isotropis Forrestii*—Tall, much branched, somewhat woody towards the base; leaflet on a rather long and slender stalk, broad or narrow-linear, flat or channelled, as well as the branchlets scantily silky; stipules bracts and bracteoles minute; pedicels about as long as the calyx or variously shorter; calyces grey-silky; upper petal not much longer than the others, all upwards black-purplish; anthers three times longer than broad; ovules 13-15; pod turgid, ellipsoid, blunt at the summit, attenuated at the base into a short stipe, thinly velvet-silky.

Near the Gascoyne-River; J. Forrest.

Closely allied to the East Australian *I. filicaulis*, but taller and more robust, the leaflets often narrower and their stalks longer, the upper portion of all petals dark-colored, the anthers more elongated and the pod comparatively broad, not linear, as noted in Mr. Bentham's description of *I. filicaulis*. The ripe seeds of this and other congeners, when obtained, should be compared with those of *I. atropurpurea*, which species has them kidney-shaped, reddish-or yellowish-brown and very prominently reticulated.

*Prostanthera Campbelli*—Branchlets grey-silky; leaves glabrous, very short and slender, almost cylindrical, slightly channelled; flowers axillary, on very short stalks; bracteoles very minute; flowers small; calyces glabrous, their upper lip roundish-deltoid, their lower lip semi-orbicular and somewhat shorter; corolla white with velvet streaks, its tube short and glabrous, its upper lip bluntly two-lobed, its lower lip slightly longer, with a roundish middle lobe and orbicular-semiovate lateral lobes, both lips outside scantily short-downy, inside and at the margin copiously hairy; appendage shorter than the anthers, adnate or often obliterated.

In the vicinity of the Gascoyne-River; J. Forrest.

Nearest allied to *P. canaliculata*, but by the more bearded and shorter corolla, and by the want of long anther-appendages already distinguishable.

This pretty flowering and aromatic fragrant bushy plant is dedicated to the hon. Sir Th. Cockburn Campbell, Bart, M.L.C., of West Australia, an enlightened promoter of scientific research in that part of her Majesty's dominions. It is the only known subtropic western species.

*Eria Fitzalani.*—Pseudobulbous stems elongate-or ovate-conical, consisting of few joints, terminated by a solitary narrow-lanceolar chartaceous leaf; primary nerves of the leaves nine, three or more secondary nerves in the interstices; peduncles arising singly from the base of the stems and scarcely exceeding them in length or even shorter; racemes many-flowered, closely short-hairy, not much elongated; flowers small; bracts oval-lanceolar; united pedicel and ovary somewhat longer than the segments of the calyx and the bracts; upper segment of the calyx lanceolar; lowest segments semilanceolar-deltoid, bluntish, extended with the column into a short and blunt conical prolongation; inner segments almost linear, glabrous, all of nearly the same length and cream-colored inside; labellum about as long as the other calyx-segments, membranous, glabrous narrowed towards the base and marked with three thin but prominent lines, quadrate-ovate towards the summit, slightly excised in front, lateral lobes almost obliterated; pollen-masses lenticular, attached in two fascicles.

Mulgrave-River; E. Fitzalan.

Described from imperfect specimens, so that a revised account of this plant will be given, whenever better material will become available. In some respects allied to *E. obesa*, but the leaves are longer, the flowers much smaller and more hairy, the inner calyx-segments remarkably narrow; from *E. Kingii* it differs in shorter stems, larger bracts, calyces not yellow inside, narrower inner calyx-segments and almost lobeless labellum. The genus is new for Australia, as Calochilus through Mr. Buchanan is shown to exist in New Zealand.

(To be continued.)



## The Parrots of Victoria.

By T. A. F. Leith.

[Read before the Field Naturalists' Club of Victoria 9th October, 1882.]

PART I.

Before beginning to describe the parrots of Victoria, I consider it necessary, in order to do them justice, to preface my paper with a few remarks on the Parrot family in general:

Parrots, then, as many may be aware, belong to the numerous, interesting, and beautiful family Psittacidæ, order Scansores, or climbers, which order includes also the Ramphastidæ, or Toucans, the Picidœ, or Woodpeckers, and the Cuculidœ or Cuckoos. This order of birds, to enable them to climb, have the power of turning one of the front toes backwards, so as to have two hind toes and two in front at work together. In Zoological arrangement this family take the place among birds that the Quadrumana do among Mammalia. The family have beaks large, hard, solid, and rounded. The upper mandible is hooked at the tip, and the lower notched; the tongue fleshy and rounded; and they are the type of the order Scansores. When eating they often use one foot as a hand in which to hold their food; and from the formation of their tongue and throat they have the power of imitating the human voice. Parrots are found in four divisions of the Globe, viz., Africa, Asia, America and Australia, but never were natives of Europe. The largest member of the family is the Scarlet Macaw of South America—(*Ara Macao*), which is about three feet long, and is a most magnificent bird—colours scarlet, blue, yellow, and green. The smallest member of the family is the little New Guinea Love Bird Parrakeet (*Psittacula pymæa*), not three inches in length. I have the egg of the Passerine Parrakeet, *Psittacula passerina*, of South America, and as the New Guinea bird is considerably smaller, it may be judged what a small egg it lays. The Psittacidœ family live mostly on fruits, seeds, &c.; but in domestication they will eat anything man does; when in their wild state many have the power to live long without water. They make their nests in holes of hollow trees, as a rule, with one or two exceptions; and all the family lay white eggs, from two to about eight in number. When hatched the young are naked, with very large heads, and they take a considerable time to get into full plumage—in fact some of the males take three or four years. Parrots have been known in domestication to live over 100 years; as one I know of, brought home from the South Seas by Captain Cook, when on his voyage to observe the Transit of Venus in 1770-1, died in the *Jardin des Plantes* in Paris in 1874, or thereabouts—and it was a bird of mature years when brought home. Parrots are divided into several sub-families,—as Ariane, Pezoporinæ, Lorinæ, Psittacinæ, Cacatuniæ, Strigopinæ, and the genus Agaporius, or Macaws, Ground Parrots, Lorikeets, True Parrots, Cockatoos, Kakapos, and Love-birds. The Pezoporinæ—(or ground parrots) differ in the formation of their feet from the other members of the family, and, the claws being straight, they can walk well; the genus Pezoporus being peculiar to Australia, which continent is richer in parrots than any other, with the exception, perhaps, of South America; while India, so well stocked with beautiful birds, is very poor in parrots, most of them belonging to the genus Palæoaruis (or ring-necked). This family is well represented in the large island of New Guinea, as I have already heard of 25 varieties having been seen there. New Zealand has three Parrakeets, two varieties of Kakapos—(*Stigops Habroptilus* and *Strigops Greyii*); also two Mountain Parrots, viz., the Kea and the Ka-Ka. The Fiji Isles have some beautiful birds of this family—(the *Platycercas splendens*, the *Lorius solitarius*, the Masked Parrot, &c.); and so have many of the larger isles of the Pacific. Timor has a beautiful small variety of the Sulphur-crested Cockatoo; and in the Straits Settlements (Sumatra, Java, Borneo, the smaller islands of the Indian Archipelago, Philippine Isles), some beautiful members of that family are seen. A few well known Parrots are natives of Africa,—viz., the *Psittacus erythacus*, or grey parrot, and the Count de Vaillant's Parrot, &c., the former learning to talk well. The United States has one (the Carolina Parrot), and some of the West Indian Isles have pretty Parrakeets, as Trinidad, &c. Some pretty Lories are found in the Aru Isles, Moluccas, &c., and a few parrakeets in Ceylon; while Madagascar furnishes a lovely little buff-colored Love-bird. In the Moluccas is found the charming *Lorius Domicella*, or collared Lory, a bird that learns to talk with the volubility of a "cheap-jack." The genus Nestor contains two or three species, something like the genus Strigops, the best-known of which is the *Nestor productus*, or Norfolk and Philip Island Parrot; and in New Caledonia is the strange Horned Parrot. Tasmania has one peculiar to the island, viz., the Yellow-bellied Parrakeet *Platycercus flaviventris*. It seems to have been a provision of Nature that parrots should build in the hollows of trees, as, when feeding the young, the beak of the parent bird gets fixed in that of the young ones often; and were they in an ordinary birds'-nest, the consequence would be, that they would fall on the ground instead of back in the nest, when the mandibles get disconnected. With these few remarks upon this, one of the largest, and, in my opinion, by far the most beautiful, family of birds in the world when seen in their native haunts, amidst the indigenous flora which harmonizes so beautifully with the fauna of every description peculiar to it—the metallic and other tints of every conceivable hue, reflected and glistening in the glorious rays of a summer sun—I will proceed to describe from my own collection the Parrots of Victoria.

Victoria has some thirty Parrots, belonging to the genera Calytorhynchus, Callocephalon, Licmetis, Cacatua, Calopsittacus, Polytelis, Aprosmictus, Platycercus, Psephotus, Euphema, Melopsittacus, Pezoporus, Lathamus, and Trichoglossus.

The FUNERAL COCKATOO — *Calyptorhynchus funerus.*—This fine black cockatoo is the one most common in Victoria, and is met with in various parts of the colony North, South, East, and West. General plumage dark, with a patch of sulphur yellow below the ears; eyes reddish brown, bill horn-colour in some, differing according to age and season. Centre feathers of the tail yellow, spotted black, with centre of each feather black on stem. They are wild and shy, and will not live any length of time in confinement, especially in a cage. They build their nests in giant old Eucalypti in a state of decay, and their nests are therefore unsafe to get at; but I believe they lay two eggs, and those I have seen are about the size of a pigeon's, but more oblong. Their cry is a wild shriek, or rather squeak, and they are fond of frequenting the high timbered land near the sea coast, perched on the tree-tops, till the arriving of stormy weather, when they retreat inland. The only difference I perceive between male and female is in the size, the former being the largest. These birds take their name of "funeral cockatoo" from the slow way they fly in Indian file, and clad as they are in funeral plumes; those covering the crown of the head they can raise into the form of a crest, and lower at will.

The BANKSIAN COCKATOO—(*Calyptorhynchus Banksii*).—This beautiful black cockatoo was named, I believe, after Sir Joseph Banks, he taking a great interest in Ornithology. At one time it was common enough in the interior of Victoria, but it is now more often met with in the northern parts. Its plumage is glossy black, perhaps with a slight greenish tint in some, with a broad band of vermillion in the tail feathers; the female differs from the male, and has a white spot on the top of the head, and on the neck, with yellowish streaks on the breast, and a mixture of yellow and red on the under tail coverts, crossed by black bands. These birds are found in small families living on the seeds of the various forest trees, and, like others of the family, will not thrive in captivity; they have a fine prominent brown eye, rather wild and restless-looking.

The Gang-Gang, or Rose-crested Cockatoo—(*Calocephalon galeatum*).—This curious and interesting cockatoo, the only one of this genus, and the only species, is a shy bird, keeping away from the abode of the white man. They are found in small numbers feeding on the seeds of the eucalypti, and are very local in their distribution, frequenting the same spots, and rarely visiting new localities until driven out by man—whom at first they do not seem to understand; and therefore, when found, are easily shot. The male is of a dark slate colour, with dull whitish marks round the top of each feather, and has a beautiful rose-red crest; with the same coloured feathers extending over the head and cheeks. The female is much the same on the upper surface, with the whitish mark occurring more frequently on the wings and breast, which has a slight tint of crimson-red near the bottom; the crest and cheeks are dark in the female. When captured these cockatoos are easily tamed, and make good cage birds. Eyes black.

The Sulphur-crested Cockatoo—(*Cacatua galerita*).—This bird is so well known to all, that any detailed description of him is not necessary, and it will suffice to say that the general plumage, when in freedom, is white as the driven snow, and falling back from the crown is a beautiful crest of pale sulphur or lemon-yellow. The only perceptible difference between the sexes is, the male being the larger of the two, and generally the most noisy and best talker in confinement. The Sulphur-crested Cockatoo is met with in large flocks in all parts of the Colony, and is more or less destructive to the crops, at which times they post sentries to give the alarm at the approach of an armed ruffian; for, like the rooks in the old country, I know they can smell powder, and distinguish between a fowling piece and a pitchfork, or an American axe. Eyes black, set in the middle of a patch of bare white skin, which in some has the appearance of being covered with flour. I have been informed that if the feathers of the crest are counted, thirteen will be found in the male, and eleven in the female.

Leadbeater's Cockatoo—(*Cacatua Leadbeateri*).—This lovely cockatoo is known throughout Victoria generally as the Leadbeater Cockatoo, and, on the North-west Murray and in New South Wales, as the Major, or Major Mitchell, it having been first noticed, I believe, during the expedition of Major Mitchell to the Darling about 1833, Mr. Leadbeater being taxidermist. Back and upper tail coverts pure white; cheeks, throat, breast, abdomen, and under-wing coverts pink, deepest on the latter; on the head there is a beautiful large crest, the lower half of which is reddish pink, with a yellow mark in the centre of each feather, the upper part being fleshy white, forehead ditto. In the female the pink colouring is much fainter. They make handsome cage birds, and have other local names, as the Pink Cockatoo, the Coloured-crested Cockatoo, &c. In Victoria they are most common in the neighbourhood of the Murray River.

The Rose-breasted Cockatoo, Gallah, or Whillich—(*Cacatua roseicapilla*).—These birds are more or less migratory, and may be met with at certain seasons anywhere between the Murray and the Yarra. I once shot one within 15 miles of Melbourne; and in dry seasons flocks of them have been seen on the Deep Creek. They move about in small flocks uttering a peculiar whistling shriek. Part wings and upper surface leaden grey colour. Neck, breast, and belly rose colour. Cranium covered with a crest of salmon-coloured feathers, raised and lowered at will. The female is less bright in her rose colour, and perhaps a little shorter than the male. The Rose Cockatoo is a hardy bird, and I have taken them home to England where they do not seem to suffer from the cold of Winter. When captured young they tame quickly, and soon learn to talk. One I had a year or two ago was beginning to talk very well: unfortunately it began to call my dogs by their names, a liberty which their ancient British blood could not stand, and they took the opportunity of my absence from home to pay him out; the last I heard of him was his being seen on the Hobson's Bay Railway line followed by a mob of young gentlemen—there being no "larrikins" near the Albert Park. Another method of distinguishing between the male and female in this bird, I am informed, is the darkness of the under tail coverts in the male.

The Long-billed Cockatoo, or Corilla Parrot—(*Licmetis nascica*).—This cockatoo received its name from the upper mandible being very long; and there are one or two other varieties of the genus Licmetis. The general plumage of our Victorian one is white, shot with red spots about the head, neck, &c., differing much in different specimens, as the plumage of all birds is more or less affected by their food and water: when the latter is impregnated with much iron, it soon becomes apparent where the birds drink it, if their general plumage is white, and various spots and marks appear, especially red ones. The Long-billed Cockatoo, owing to the great length of its wings, is a bird of rapid flight, the wings extending to the extremity of the tail. This bird, when obtained young, becomes easily domesticated, and is, perhaps, when trained, the best talker of all our Australian Parrots. Many will remember, in the Coffee-room of the Albion Hotel, a most loquacious bird of this species, who, when irritated, made use of language quite fit for the Legislative Assembly. I have shot these cockatoos, but did not observe much difference in the plumage of the sexes, but the female is shorter and broader across the back. One local nick-name for this bird is "Paddy," but he is not the first of the feathered tribe that received this name, for long ago the Java Finch or Sparrow was called the Paddy Bird.

## On the Habits and Instincts of Some Species of Victorian Ants.

By Thomas Harrison.

[Read before the Field Naturalists' Club of Victoria 9th October, 1882.]

I commenced my studies of the habits of Ants, in an approximately systematic manner, on the 20th August last. For the first time this season I noticed a few of the species vulgarly styled "sugar ants" scattered in (I suppose) preying excursions over the pavement of the verandah of my house. The verandah is about 20 feet long, and has a northern aspect. The entrance to the nest of the ants appeared to lie at the eastern end. Only a very few ants were visible, and these were very much scattered about. I first placed a tea-spoonful of sugar near the western end of the verandah, at a distance of about 20 feet from the nest. The sugar remained for over an hour untouched by any ant coming from the nest, but was visited by a few returning foragers, who straightway appropriated each a crystal, which they carried home. At the expiration of the above time, I watched a laden ant proceeding towards the nest. The path taken followed, for the most part, the joints between the tiles of the pavement, and was therefore very roundabout. Just before coming at the nest end, the little creature was met by another ant, evidently bent upon a foraging expedition. There was a stoppage and a crossing of the antennæ, after which the unladen ant proceeded towards the sugar, following in every respect (as if guided by scent), the path that had been taken by his comrade. On the return of this ant, he also met with another ant, when precisely the same events followed. For about an hour the sugar seemed to be regularly visited by outgoing foragers, the number of those outward bound now exceeding those returning by about five to one. Soon afterwards, by moving a box, I discovered a thickly crowded path of ants close to the edge of the pavement. I dropped another tea-spoonful of sugar at about 10 or 12 inches from the track and on the gravel of the garden walk. In this case the sugar was discovered and visited within five minutes,—there was, in fact, a perfect rush towards it. So great was the rush that the whole heap of sugar was carried away in about twenty minutes. I then placed some more sugar at the same spot, and directly afterwards drew, with a camel's hair pencil, a streak of honey upon the pavement, at about three feet from the sugar, and at a spot altogether out of the common pathway. The honey seemed a far more powerful attraction than had been the sugar. It was soon surrounded by a double fringe of ants standing shoulder to shoulder, so that the assemblage had the appearance of a black bordering round an amber-colored spot of honey. So powerful seemed the attraction of this new food that three or four of the sugar-ants—engaged in mortal combat with one or two ants of a different species, which I had caught and placed among the throng of sugar-ants,—left their adversaries and adjourned towards the honey. One combat, however, was continued, and both of the belligerents fell into and became clogged with honey. The stranger ant managed to crawl out and escaped. He was followed by several of the sugar-ants, but the object of the pursuers seemed rather to lick the honey borne away by their late foe than further to attack him. In about 15 minutes I noticed three or four queens, or winged ants, among the feeders. One of these dropped into the honey, but was dragged out and cleaned by the workers. Several of the workers also fell in, but no notice was taken of their misfortune, and they were quietly left to free themselves or perish.

The next day was very cloudy and cold. I did not expect to see a solitary ant visible that day, but about five minutes before sunrise I noticed that the honey had, even at that early hour, as many visitants as on the previous evening. My first impression was that they had simply gorged themselves, and could not get home; but on touching one of the group with a camel's hair brush the whole of the assemblage broke up, running about in an excited manner until all was quiet, when they returned with the utmost avidity to their former place of feasting.

I now began attempting to establish small colonies within glass nests, in accordance with the suggestions of Sir John Lubbock. These nests are constructed by cementing two sheets of glass to a quadrangle of thin strips of wood, an aperture being left by means of which the ants can enter. The space between the sheets of glass is filled up with moist earth. Sir John Lubbock recommends that an ant-hill should be thrown upon a board, surrounded with fur or a trench of water, and the artificial nest so placed upon the board that the ants will enter the same branch of shelter as the original earth on the ant-hill gradually dries up. I first tried bordering the board with fur—that of oppossums and kangaroos,—but found it offered no barrier whatever to the escape of the ants. I then placed a board within a shallow tin pan, the edges of the board being all round about one inch from the edge of the pan. For a time all seemed to go on well enough. The board becoming accidently moved, so that its edge was only about half-an-inch away from the sides of the path, some fifty or so of the ants managed to escape. I captured many of these, and, having re-adjusted the board, placed them upon it. It is noteworthy that after having once escaped by swimming, not one of the recaptured ants could be retained. No sooner were they placed upon the board than they made a rush for the water at once, and, after one or two attempts, generally managed to find themselves safe and at liberty. The only plan I have so far found effectual is to place the ant-nest within a shallow box, covered with a plate of glass, the upper edges of the box being surrounded with slips of green baize, which prevents the escape of the prisoners, yet allows a plentiful supply of air to enter.

I now commenced to collect ants in earnest. The first nest I attacked was that of a very common species, of a dark brown color, the bodies being of a reddish tint in certain parts. These ants are very lively, but I do not find they are so fierce as are many other kinds I have met with. The little sugar-ants, although of Lilliputian dimensions, attack and master the larger species—especially if they happen to be two to one—with great vigour. It is generally a fatal encounter, however, since I, in most cases, found both combatants lying dead on the morning after the fight. In digging up this nest I found nothing but workers. Wishing to procure some queens, and also some pupæ, if possible, I dug up the nest in several places. In one of these I found a sort of chamber, in which, lying matted together, were some hundreds of ants, all dead and in various stages of decomposition. I brought home a goodly number of ants from the nest, and duly placed them within one of the shallow glass covered boxes. The glass nest was very speedily invaded, and a small gallery excavated. It happened, however (probably through having left the box too much in the Sun, or from some other cause), that nearly every individual of the colony died: and it is a singular fact that all the dead bodies were carried away by the survivors and piled in a confused heap one upon another. I have tried experiments with ants of half-a-dozen species placed within similar boxes, but none of them appear to bury their dead in the systematic manner specified.

In one of the nests dug up I found a very large number of queens (winged ants). These entered the glass nests more readily than did the workers. They did not, however, excavate a gallery, but simply availed themselves of several spaces existing in the earth beneath the glass. Relative to these ants, which were of the kind common in pastures and paddocks, and which sometimes form collections of colonies twenty or thirty feet square, I, on two mornings, noticed a rather singular event. The boxes had stood covered up all night, so that no light could enter. Soon after sunrise I removed the cover, and then saw a number of workers rush into the glass nests and pull out one after another of their winged brothers or sisters. I noticed this on two mornings, but as all the workers died about this time the observation, so far, has not been repeated. I scarcely ever saw a winged ant outside the nest after the workers had all died.

Ants seem to have a natural sense of gallantry, independent of mere nationality or species. I have constantly placed queens among ants of quite another species, but they, so far as I could see, were never attacked, although workers were beset at once and slaughtered. I one day placed a number of what I will call the "undertaker ants" upon one end of the board surrounded with water. At the other end of the board I emptied a bottle containing some hundreds or so of the ordinary tree-ant. There were also a great many pupæ belonging to the latter species. I noticed that the larger ants generally allowed the smaller ones to pass unmolested, save where the latter were carrying pupæ. If so laden they were attacked, nipped, and maimed. The pupæ, however, were never seized by the victor, neither did I ever notice any of the pupæ interfered with by the ants to whom they did not belong. I found that the ordinary tree-ants, like the so-called sugar-ants, are inordinately fond of honey, but no other species I have yet met with seem to care about it as food.

Most persons interested in ant-life have heard of beetles found in "formicaries:" If I mistake not these are generally of minute size.

At a late exhibition at Melbourne, there were several cases of these beetles, few of them being of more than a quarter of an inch in length. These beetles are now commonly regarded as the pets or domestic animals of the community. In the nests of one species of ant (those of a yellowish pale olive green color and by no means of a lively character), I have dug up, several times, beetles fully half-an-inch in length, as also a number of grubs. These do not appear to have any right to be considered as domestic animals, but at the same time they do not seem to be molested in any way by the ants. Thinking that these ants might not be carnivorous, and that they had no inclination to prey upon the grubs, &c., I resolved to try them with honey as food; but they are of so delicate a nature that they almost invariably died a few hours after capture. I think it is this species of ant that I have often found under stones in company with a small black ant. The nests of the two species generally appear to be separate, but once or twice I have noticed that both kinds of ants mingle freely together—at least as soon as the stone is removed. It scarcely appears that this is a case of slavery. At any rate, if it should prove so, the human order of things seems to be reversed, since the *black* ants are the masters—at least in fight—of their paler fellow colonists.

# PROCEEDINGS OF SOCIETIES.



## THE FIELD NATURALISTS' CLUB OF VICTORIA.

The usual monthly meeting of the Field Naturalists' Club of Victoria was held at the Royal Society's Hall on Monday evening, 9th ult. Mr. J. R. Y. Goldstein, one of the Vice-Presidents, occupied the chair, and there was a very good attendance of members.

Messrs. T. Leadbeater and Thomas Walker were duly elected members of the Club.

Mr. T. Harrison read his preliminary paper on ants, and, although most of his experiments with these insects had resulted in failures, he was enabled to record many interesting observations.

A pleasant paper on the Cockatoos of Victoria was contributed by Mr. Leith, who exhibited specimens of those described.

Mr. D. Sullivan, of Moyston, sent in another of his instructive papers on the botany of Victoria; on this occasion describing several species of the Leguminosæ, and, as in former instances, presented the specimens for preservation in the Club's herbarium. Some fine Victorian Coleoptera and Micro-lepidoptera were exhibited by Messrs. J. E. Dixon, T. Hyland, and F. Spry, amongst the former being specimens of the rare *Boinia bicolor* and *Scolecrobrotus Westwoodii.*

Mr, C. French showed 11 species of beautiful exotic Buprestidæ of the genus *Chrysochroa*; Mr. A. J. North a rare bird (*Glareolia grallaria*) from Central Australia; Mr. T. Worcester four rare land shells of the genus Helix; Mr. H. Watts, a piece of stone covered with fresh-water polyzoa, also specimens of fresh-water algæ from Cheltenham; and Dr. Lucas, live orchids collected by him at Nunawading.

During the conversazione attention was called to the special excursions arranged for Cup Day (31st October) to the You Yangs, and for Prince of Wales Birthday (9th November) to Beaconsfield, and from the number of promises received there is every probability of a good attendance at both. The meeting terminated, as usual, about half-past ten.

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## THE ROYAL SOCIETY OF VICTORIA.

The ordinary meeting of the Royal Society of Victoria was held on Thursday evening, 12th ulto., Mr. R. L. J. Ellery, the President, occupying the chair.

Mr. T. Wakelin was elected a country member, and Mr. R. Stephen a town member.

A brief paper, entitled "New and Little-known Polyzoa," was read by Dr. Macgillivray.

Mr. Behrendt gave an interesting description of Messrs. Siemens and Halski's system of elevated electric railways.

Professor Nanson read a paper on "Methods of Election," and explained the characteristics of the French method. He advocated a system which would enable an elector to make out a list of candidates in the order of preference. Electors not sufficiently well informed to do this might simply strike out from the voting paper the names of all candidates they object to.

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## THE MICROSCOPICAL SOCIETY OF VICTORIA.

The Annual General Meeting of this Society was held at the rooms in Collins Street on Thursday, the 24th Oct. There was a good attendance of members, and Mr. Barnard occupied the chair.

The Acting Secretary acknowledged the receipt of the *Journal of the Royal Microscopical Society* for August, the American *Monthly Microscopical Journal* for July, *The Southern Science Record* for July, August, and September, "The Flora of Australia," a lecture by Baron von Mueller (from the Author), and the Seventh Decade of the Zoology of Victoria (from the Government).

The Acting Secretary read the Committee's Report, which showed that the Society is in a fairly prosperous condition, and now consists of 60 members, of whom five are honorary and eighteen country members. The funds in hand amounted to £42 9s., and the arrears of subscription due were £23 12s. 6d., against which there were were outstanding accounts amounting to about £55.

Several members urged the desirability of endeavouring to increase the membership of the Society, in order to obtain an income sufficient to admit of the Transactions being regularly published.

The Report and Balance-sheet were unanimously adopted, and a cordial vote of thanks accorded to the Officers and Committee for their services during the past year.

The Chairman declared the following gentlemen duly elected as officers for the ensuing year, there being no opposition, viz., Dr. Ralph, President; Rev. J. J. Halley, Vice-President; Mr. R. G. Haig, Treasurer; and Mr. W. M. Bale, Secretary; and the ballot for three members of the Committee resulted in the election of Mr. J. R. Y. Goldstein, Mr. J. Lindsay, and the Rev. T. Porter.

The Rev. A. Creswell forwarded a brief report on the mineralogical specimens received from Mr. A. W. Howitt, which he considered to be clays from decomposed Tertiary Basalt, and which contained no organisms.

Mr. Bale read a paper on "Micrometers," and gave detailed instructions for making a simple eye-piece micrometer to measure thousandths of an inch and larger fractions under the quarter-inch objective, by stretching silk fibres across the diaphragm of a C eye-piece. In the unavoidable absence of the Vice-President, the Annual Address was postponed till the next meeting.

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## THE ROYAL SOCIETY OF NEW SOUTH WALES.

A general monthly meeting of the Royal Society of New South Wales was held, 4th ult., in the Society's rooms, Elizabeth-street, Mr. C. Rolleston, the President, in the chair. The minutes of the meeting of September were read and confirmed.

The Chairman announced a list of donations received.

A ballot was taken which resulted in the admission of Sir Edward Strickland, K.C.B., F.R.G.S., as a member of the Society.

Mr. C. Moore read a letter addressed to him from Melbourne, intimating that a subscription had been set on foot there for the erection of a memorial over the grave of the late Mr. Daniel Bunce, who was a companion with Leichhardt in one of his expeditions, and subsequently the Superintendent of the Botanical Gardens at Geelong, and an ardent botanist, suggesting that probably the members of the Royal Society might be disposed to promote the object.

The President briefly alluded to the national disaster which had occurred since the last meeting of the Royal Society, in the destruction by fire of the Garden Palace, and read a circular from Dr. Cox, President of the Linnean Society, in reference thereto, and expressing a hope that if any irregularity in correspondence should take place that it was not to be attributed, under their unsettled circumstances, to any want of courtesy on their part. He then proposed for adoption a resolution conveying an expression of sympathy with the Linnean Society, and offering them the rooms of the Royal Society in which to hold their meetings until they shall have succeeded in obtaining suitable premises for themselves.

Mr. C. Moore seconded the motion, and it was unanimously adopted.

The Rev. J. E. Tenison-Woods read a paper on "Some Marine Carboniferous Fossils," and another on "Some Mesozoic Fossils from the Palmer River, Queensland."

Mr. E. Marin La Meslee read the following paper on "French Geographical Societies and the Colonies:"—"During my recent visit to France I had occasion to attend several reunions of the Société de Géographie de Paris. The Secretary-General expressed regret that within the last 15 or 20 years Australian explorers had not thought it advisable to forward to that body notes of their travels or copies of the documents they published. Mr. Maunoir wishes me to remind intending explorers and travellers to any part of Australia, and hitherto unexplored countries on this side of the world, that the 'Société de Géographie de Paris' presents annually bronze, silver, and gold medals to those among travellers and explorers whose labours are considered most meritorious in the light of the advancement of geographical science. No particular part of the world is mentioned as a field for geographical labour, and the rewards offered are open to all those who work in the cause of geography, without distinction of nationality. I may mention that on the list of the recipients of the 'Great Gold Medal' I find the names of most of the greatest English travellers of the age, the list being headed by that of Sir John Franklin, who, in 1829, received the first gold medal that was ever presented by the Society. The names of Livingstone, Burton, Speke, Grant, Baker, and Cameron at different intervals appear among those of many illustrious travellers. I also find that two Australian explorers were rewarded for their geographical discoveries—one, the regretted and unfortunate Dr. Leichhardt, with the 'Great Gold Medal' in 1847; and the other, J. M'Douall Stuart, in 1865, with an honourable mention. Eighteen years have elapsed since the last-mentioned name appears on the Society's list, and many explorations have since been made, some of which may rank amongst the greatest geographical achievements of the present century, and would have met with their reward at the hands of the great French Society had the explorers thought of forwarding copies of the relations they have published of their travels and explorations to that scientific body. Much yet remains to be done in and around Australia for future explorers, and it is well that they should be reminded that not only in England will their labours be appreciated, but also across the Channel, where there is at present growing a feeling of sympathy with regard to Australia and Australian matters in general. I may here mention that I met with a most agreeable reception at the 'Société de Géographie,' and the lecture I had afterwards the honour to deliver in the Great Hall of the Boulevard St. Germain was attended by a numerous and sympathetic audience, and, judging from the tone of the French press, fully appreciated. There exists also in the French capital another society called 'Société de Géographie Commerciale,' which was founded in view of furthering the advancement of commercial relations between France and the outside world, and help to bring to the notice of merchants and men of business the advantages offered to French commerce and industry in the different countries of the world with which they had not hitherto held direct commercial relations. That body, which counts among its members men belonging to the most influential section of the French commercial world, is now presided over by Mr. Meurand, ex-Plenipotentiary, Minister, and Director of the Staff at the Foreign Office. The Society is equally anxious to gain as much information as possible with regard to the Colonies. It was my intention to have delivered another lecture on the same subject before the members, but I had to leave Paris sooner than I expected, and was therefore prevented. However, the Secretary, Mr. Gauthiot, commissioned me to forward all the information that I could collect on the subject. Some time afterwards the directors of the National Library of Paris requested me, on my return to Australia, to forward to that institution all the latest geographical documents, maps, reports, statistics, &c., that could be procured about the Australian Colonies, the library officials having of late received numerous applications which they regretted having to return unanswered for the lack of information. I was the bearer of letters to that effect, addressed to the Ministers of Lands of the various Australasian Colonies by Mr. Delisle, the Administrator-General. Sir John Robertson and the Secretary for Lands in Melbourne have already responded in the most liberal manner to the request embodied in those letters, and I have no doubt that in the other Colonies they will act with the same liberality. In fact, while in Paris, I heard everywhere expressed a wish that the existing commercial and other relations already existing between France and Australia might tend to increase, and both the Geographical Societies and the National Library seemed anxious to obtain the most ample information, and fulfil their part in furthering the knowledge of the many advantages the Colonies offer to commerce and industry. With regard to Geographical Science, it was generally remarked, with astonishment, that neither Sydney nor Melbourne possessed a constituted Geographical Society, seeing that both cities are so particularly well situated to derive great benefit from the information that might be diffused through such a society. Placed as they are in the midst of what may be considered the remaining most unexplored parts of the world, surrounded by islands such as New Guinea and the groups to the eastward, it is a matter of wonderment at home that no steps should have been taken until now to effect explorations of a complete character, whose results would be beneficial not only to the scientific world, but in a much greater measure to the commercial world. I need not say what immense benefit would be conferred on the savage races inhabiting those almost unknown climes were they to become open to the influence of civilisation and commerce. Before closing these few remarks, I may mention, as an incident matter, that the Société de Géographie de Paris is now forming a collection of the portraits of the great travellers of this century, and Mr. Maunoir requested me, among other things, to collect those of the Australian explorers. I find the matter more difficult than I expected at first, and I shall be thankful to any one who will kindly inform me where such may be obtained by purchase or otherwise."

Mr. G. Butterfield made a *viva voce* statement of observations on the comet, its position, and motions.

Votes of thanks were adopted to the authors of the papers, and to Mr. Butterfield for his observations, and the meeting terminated.

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## THE PRESIDENT'S ANNUAL ADDRESS.

[Continued.]

Now with regard to bush fires, it is a common belief that they produce rain, and I have had some cases reported to me where rain has followed the fire, apparently caused by it; but in my own long experience of bush fires I cannot recollect one instance in which it was obvious that rain followed the fire, and I think I need only mention the great fires which have raged in the neighbouring colony of Victoria, as well as here during the last three months, as proof that such fires frequently take place without a drop of rain following. And if these fires had not sufficient intensity, we can refer to the memorable Black Thursday, February 6, 1851, in Victoria, when, as if to make a culmination of all the fires that had been burning in Australia for weeks, there came a fearful hot wind, which fanned the flames in Victoria until in their mad career they leaped from tree to tree, and became so hot and furious that it seemed as if all Nature was on fire. Yet, violent as was this disturbance, no rain followed it for many days. A correspondent in the country, who believes that rain may be produced artificially, sends me the following instances of the effects of bush fires:—On January 1, 1881, a heavy bush fire came across from the Darling to Cobar, and burnt up the heavy grass on some unstocked country; it continued burning for 10 days, and on January 10 we had 1·48 inch rain. Another case was observed in the Wimmera district, Victoria, where, during a heavy bush fire in the Mallee scrub, a thunderstorm gathered and put out the fire with rain. Another observer worked at three large bush fires, and each time the fires were put out by rain. These instances are given as evidence in favour of the idea that the fire caused the rain; but none of the meteorological circumstances are stated, and it is impossible, therefore, to say that there would have been no rain if there had been no fire. But, as the date of one instance is given, I am able, by reference to the weather maps which are published daily, to say, with some degree of certainty, that if there had been no fire there would still have been rain. The date of the rain is January 10, 1881; on January 7, 8, and 9, southerly and S.E. winds had been blowing on the coast, causing a fall of temperature, which did not reach the interior generally until the 10th, and the temperatures of the 10th show a great fall from 20 to 25 in the interior, and especially in the district Bourke to Dubbo; the result was that rain fell at 19 other stations in addition to the one referred to near Cobar. At Euston 2·59 inch fell, at Wentworth 1·85 inch, Moree 0·32 inch, and others which need not be mentioned. Now, it would not be safe to assume, without further evidence, that the fire about Cobar caused a general southerly wind and a fall of 20° in the temperature, and rain at such distances from the fire as Wentworth and Euston; but it is highly probable that the fire had nothing to do with the rain. It would be interesting if we could examine every case of this sort and see if the rain was due to the fire or to ordinary meteorological changes. From what has been said already it is evident that some of the most competent authorities in England and America think that under certain circumstances rain may be produced artificially. Unfortunately for us, they all carefully avoided saying what the circumstances were. But I think we may form some idea of what they are from a consideration of the natural conditions under which rain is deposited. I am not going to ask you to follow me through the elaborate investigation of this question by Sir W. Thompson, M. Peslm, Dr. Hann, and others. It will be sufficient to say that they have proved that the principal cause in the formation of rain is the ascent of saturated or nearly saturated air, and that the rain caused by the mixing of two currents of air bears a very small proportion to the whole. Their investigations have further taught us that air as it rises, whether from the effect of heat or up-draught, loses 1° of temperature for every 180 feet which it ascends; but if, as it ascends, the dew-point is reached, a cloud is formed, and the latent heat given out by the condensed vapour warms the air so much that it has to rise 286 feet to lose 1° of temperature. Its upward velocity is therefore accelerated, and its moisture rapidly precipitated; and this must go on until it loses the excess of moisture and reaches the temperature of surrounding air. These are facts which have an important bearing upon our inquiry, and these laws may be seen in operation any calm fine day in the formation of cumulus clouds.

(To be continued.)

## THE LINNEAN SOCIETY OF NEW SOUTH WALES.

The monthly meeting of this Society was held on Wednesday evening, 25th ulto., the President, Dr. James C. Cox, F.L.S., &c., in the Chair.

The following gentlemen were elected members of the Society: 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.

A variety of donations were announced.

The following papers were read:—

1. "Description of a new species of *Solea* from Port Stephens," by E. P. Ramsay, F.L.S. This new species of Sole, of which a drawing was exhibited, was proposed to be named *S. lineata*.

2. "Contributions to Australian Oology" (continuation), by E. P. Ramsay, F.L.S. In this paper the author gave descriptions of the nests and eggs of nineteen additional species of Australian birds, whose nidification and oology had previously been imperfectly known.

3. "Descriptions of Australian Micro-Lepidoptera," by E. Meyrick, B.A. This, the eighth paper by Mr. Meyrick on the Micro-Lepidoptera of this country, treats exclusively of the *Oecophoridæ*, a family represented in Australia by about 2,000 species. Fifteen genera and 107 species are described at great length in the present paper.

4. "Notes on the Geology of the Western Coal-fields," by Professor Stephens, M.A., No. 1. This was a brief account of the Wallerawang and Capertee Conglomerates and overlying Coal measures, together with some description of the Devonian beds of the Capertee Valley and Coco Creek. Specimens of *Brachiopoda* and *Favosites*, together with a large *Pleurotomaria*, as well as of Porphyry and other rocks obtained from the same locality, were shown in illustration of the paper.

5. "Notes on the Oyster Beds at Cape Hawke," by James C. Cox, M.D., &c. This was a paper in support of the author's views, as expressed in a previous paper, of the undoubted specific difference between the Drift Oyster and Rock Oyster of our Coasts.

Professor 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.

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## THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

The annual meeting of the Royal Society of South Australia was held in the South Australian Institute on Tuesday evening, 3rd October. There was a pretty fair attendance. His Honor the Chief Justice (President) occupied the Chair.

Several donations to the Society were laid on the table.

The ASSISTANT SECRETARY (Mr. A. Molineux) read the annual Report, which gave the list of the papers submitted to the Society during the year, and expressed the opinion that the forthcoming volume of the Society's transactions would be equal in interest to its predecessors. The Society had continued to receive, through the Natural Science director, a good deal of information about the natural history of the province. The corresponding members and local correspondents were encouraged in their researches by the aid given to them in the identification of their specimens, and the assurance that all that was of value in their observations would be placed on record in the Society's transactions. More than two years ago the Society began the systematic registration of the strata traversed by wells and borings; but the number thus recorded had hitherto borne a very small ratio to what might have been tabulated. Particulars of several borings had been received from the Hydraulic Engineer and the Engineer-in-Chief, but none of the numerous wells sunk by the Surveyor-General's Department in the outlying districts, which was to be regretted, as the information would have been valuable. Fellows and local correspondents were asked to inform the Society of any wells about to be sunk, in order that blank forms might be forwarded and records taken. The attention of the Society having been drawn to the difficulty and expense of obtaining correct analyses of mineralogical specimens, they had affirmed the desirableness of appointing a public analyst, and the Governors of the South Australian Institute had been communicated with, but the want remained unsupplied. The membership of the Society had increased during the year from 102 to 123 of all classes of Fellows. Two Fellows (Messrs. W. R. Ingleby, Q.C., and C. H. Strother) had died. Mr. Ingleby's interest in the Society's proceedings had continued unabated from the time of his joining, in 1861, to the date that failing health prevented his attendance. The balance-sheet showed—Receipts, £343 8s.; expenditure, £141 17s. 7d.; balance in the Bank, £201 10s. 5d., out of which £90 were due to the printer for the transactions.

The Chief Justice, in moving the adoption of the Report, &c., intimated that he was retiring from the position of President, which he had occupied for two years with gratification and profit to himself. He spoke in eulogistic terms of the abilities and high scientific reputation of his successor, Mr. C. Todd, C.M.G., Government Astronomer.

Professor Tate, in seconding the adoption of the Report, said there was a great want in the direction of illustrating natural history specimens. He had been rendered valuable aid by the late Mr. C. H. Strother in that department. Mr. Strother, an able artist, had just got his hand into the peculiar work when he died. And he was sorry to say that in Mr. Strother the Society had lost an aid most difficult to replace. He had illustrated the fossil lamp shells of South Australia, and his work had been spoken of highly. The volume to come should certainly be illustrated, and attention should be directed to the matter. The Chairman said that the Government Printing Office now enjoyed facilities in the way of reproducing drawings in coloured lithography. If the Society applied to the Government they might allow the illustrations to be reproduced.

The Report and Balance-sheet were adopted.

The election of officers took place as follows:—President, Mr. C. Todd, C.M.G.; Vice-Presidents, Dr. Whittell and Mr. D. B. Adamson; Hon. Treasurer, Mr. Smeaton; Hon. Secretary, Dr. Cleland; Council, Dr. Haake, Dr. Stirling, Mr. Rutt, and Professor Tate. In reference to the retirement of Mr. Rutt from the post of Hon. Secretary, the Chief Justice expressed regret at the loss of his services. On the motion of Mr. Todd a vote of thanks to the Fellows retiring from the Council—the Hon. S. J. Way, C.J., Mr. Chapple, and Dr. Mayo—was carried. Mr. Todd attributed to the interest taken in the Society's operations its success during the past year. Dr. Mayo and Mr. Chapple, also retiring from the Council, had rendered valuable service. In reference to Professor Tate, who was the first President to the Royal Society of South Australia, he spoke in high terms of that gentleman's ability, zeal, and energy. Mr. Todd then thanked the Society for electing him President.

The Chief Justice returned thanks, and said it had had been his intention to read a paper, but his time had been unusually occupied during the year, especially with regard to two offices he held.

Mr. C. Todd made some reference to the comet appearing in the eastern heavens. He had watched it very carefully. It occupied a very sparse star-part of the heavens, and was a grand object, occupying a part of the sky with no rival. He saw it on Saturday morning, and it was then rapidly approaching the Sun, and the following Sunday it had passed its perihelion. It was so bright that it could be seen at noonday. Mr. Russell and Mr. Ellery had secured its meridian position. Since it had passed its perihelion it had retraced its path amongst the stars and was now receding from the Sun, and as it receded its tail increased very rapidly. It had increased from fourteen degrees to twenty. As the tail grew the nucleus became smaller, and it seemed as if passing from the head into the tail. He produced a drawing of the appearance of the comet as seen on Tuesday morning. The nucleus was reduced to a very bright streak, and looked like a ring fore-shortened. It was not unlike the comet of 1842 in some respects.

Mr. Todd also mentioned that steps were being taken to determine the longitude of South Australia, and the English astronomers had selected Lieutenant Darwin to visit Australia in connection with the work, and Mr. Stone had written that Lieutenant Darwin would observe the transit of Venus next December in Queensland, after which he would proceed to Banjoewangie and Singapore, there to exchange signals with an Australian observer at Port Darwin. It had been desired that he (Mr. Todd) should go to Port Darwin to make observations, but he could not leave.

Mr. Smeaton reported that the amount subscribed towards the Darwin Memorial Fund was £18 18s.

An alteration in the rules, making the hour of meeting 8, p.m., instead of 7.30, was confirmed.

Professor Tate exhibited *Pterostylis pedunculata*, found near Macclesfield by himself, and near Clarendon by Mr. J. G. O. Tepper, F.L.S. The plant, he said, was an acquisition to the flora of South Australia.

The following papers were taken as read:—1. Additions to the "Flora of South Australia," by Baron Sir F. von Mueller, and Professor Tate. 2. "List of Recent Echini of South Australia," by Professor Tate. 3. Further notes on "*Hypoxis glabella*," by Professor Tate.

Dr. J. D. Thomas read a paper upon the "Hydatid Disease in Australia." He bore testimony to the important claims of the biological station about to be founded by Baron Maclay, at Sydney, and then, entering into the subject of his paper, described the nature of the hydatids with the assistance of diagrams, showing the different types of parasites and other similar forms of animals infesting other animals. He showed that the hydatid did not affect any other portion of the liver than that in which it was located. On the blackboard, and with the aid of diagrams, he explained the nature of the hydatid's operations. He pointed out the nature of the ravages the parasite could commit in the human system, and referred to the researches and experiments made by scientists resulting in remarkable discoveries calculated to prove beneficial to man. He expressed a hope that, seeing the spread of hydatid disease in Australia, some competent persons should make most careful experiments, with a view to doing away with any errors that might exist. Next to Iceland, Australia showed more hydatid disease than any other place in the world. He had experimented upon thirteen dogs, and six out of the thirteen had the *Tænia echinococcus.* Considering that many contained immense numbers of eggs, it was something alarming. The tapeworm was twice as common among dogs in Australia as in Iceland. The minute eggs of the pest were, no doubt, taken into the human system through water drunk. Sheep and oxen took in the minute ova with herbage or water, and the seeds of the disease were sown. The gastric juice softened the eggshell, and the movements of the stomach broke the shell, releasing the embryo, which immediately bored its way into the walls of the stomach. Very soon it met with a blood-vessel and often bored into it. Through this source it found its way to the liver, where it obtained a congenial location and developed into a hydatid. What ought to be done in Australia would be to experiment largely to investigate a subject of such vital importance to the community. In concluding his paper, which was of a very technical character, the doctor intimated that on another occasion he would enlarge upon the subject, and would give the statistics. The examination of specimens provided by the doctor was postponed till the next occasion.

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## THE ROYAL SOCIETY OF TASMANIA.

The usual monthly evening meeting of the Society was held on Monday, 9th October; Mr. Justin McC. Browne in the chair.

Mr. H. W. D. Archer, M.H.A., of Brickendon, who had previously been nominated by the Council, was balloted for and declared duly elected as a Fellow of the Society.

The Hon. Secretary, Mr. Barnard, brought forward the usual returns for the month of September.

Presentations to the Museum were made as follows:—From Mr. S. H. Wintle—A collection of Fossils from the Rock House Estate, St. Paul's River. From Mr. A. J. Taylor—Specimens of Garnet from Mount Heemskirk. From Mr. Schofield—An Egg, probably of a species of Petrel, embedded in Guano, from Bird Island. From Mr. Moore—Specimen of Aragonite from a cutting through greenstone at Elboden-place, Hobart. From Mr. J. R. McClymont—18 silver and 32 copper coins. From Mr. James E. Salier—Jaws of a large Shark. From Mr. D. Carson—A "Bleeding Heart" Dove *(Phlogœnas cruenta)*.

The following papers were read:—"Description of some New Marine Shells of Tasmania," by Lieut. C. E. Beddome, I.N. "Notes on two species of rather rare Fish recently captured in the Derwent, viz., *Clinus despicillatus*, a species of the Blenny family, and *Bovichthys variegatus*," by R. M. Johnston, F.L.S. "Descriptions of hitherto undescribed Antechini and Muridæ inhabiting Tasmania," by E. T. Higgins, M.R.C.S., Eng.; and W. F, Petterd C.M.Z.S.

The proceedings closed with a vote of thanks to the authors of the papers read, and to the donors of presentations.

## NOTES, MEMORANDA, &c.

"An Aquarium for Melbourne."—A paper with the above title, by Mr. Thomas Harrison, appeared in the *Victorian Review*. The writer pleads for the establishment of such an institution in our midst. We cordially agree with him, and hope that lovers of natural history, and especially those who take an interest in marine life, will take the matter up, and not rest until the thing is brought to a successful issue.

We have received the last issue of Professor McCoy's admirable decades of the Zoology of Victoria, No. vii. The illustrative lithographs are, as usual, all that can be desired, and, if anything, are even better than those contained in previous numbers. We will notice the publication more at length next month.

## EXCHANGES.

"Hepialus Staceyi."—Specimens of this magnificent Australian Moth (male and female) are offered in exchange for rare Australian Coleoptera. C. French, Botanic Gardens, Melbourne.

H. Watts would be glad to correspond with any person who may have collected Freshwater Algæ in any of the Australian Colonies. No. 20 Wellington St., Collingwood.

# Definitions of some new Australian Plants,
## by Baron Ferd. von Mueller, K.C.M.G., M.D., Ph. D., F.R.S.

[Continued.]

*Ficus Pinkiana.*—Glabrous; leaves scattered, chartaceous, smooth, almost equilateral, on very short stalks, of considerable length, nearly lanceolar, short-acuminated, entire at the margin, with 10-15 pairs of very spreading primary nerves, thinly net-veined; stipules very narrow, long-pointed; receptacles quite small, nearly ovate, on stalks of about their own length; outer bracts distant from the receptacle; calyces with narrow acute segments, finely downy.

Trinity-Bay.

Well developed leaves 5-9 inches long, $1\frac{3}{4}$-3 inches broad; leaf-stalks about $\frac{1}{3}$ inch long. Receptacles measuring 3-4 lines in length, only seen separately. Peduncles 2-3 lines long. Upper inner bracts all reflexed and glabrous. Ovary very gibbous. Style extremely thin. Stigma dilated and depressed.

This species differs from *F. subglabra* (which is allied to *F. humilis*) already in perfect smoothness, in larger and particularly longer also more pointed leaves of generally darker green with more divergent nerves, in shorter and broader leaf-stalks, in longer and narrower stipules, in smaller receptacles with no outer bracts near, so far as can be noted from the aged material before me. Only female flowers were noticed by me in the few receptacles examined; hence the latter may be unisexual, as in *F. subglabra.* From *Ficus Philippinensis* this new one is distinguished by the somewhat larger leaves of less firm consistence and of not so gradual attenuation into the base with not quite so spreading lateral nerves, by narrower stipules, by longer not globular receptacles on conspicuous stalks, by not almost glabrous calyces and by longer styles. The specimens were communicated by Mr. James Pink from the Botanic Gardens of Brisbane, where this tree is under cultivation.

The genus Ficus presents confessedly the greatest of difficulty as regards specific discrimination, more so than almost any other genus in the whole realm of plants, not only on account of the multitudinous species embraced by it (estimated in 1880 at 600 by Bentham and J. Hooker), but also in consequence of the minuteness of the floral organs. So far as local material allows here of research, I have not been able to identify the new kind with any extra Australian species. It approaches however in many respects to the Indian *F. excelsa* of Vahl, as recognised by Roxburgh and Wight, differing already in longer and more acuminated leaves and smaller fruit.

*Helipterum Forrestii.*—Annual, not tall; leaves membranous, linear- or narrow-lanceolar, pointed, flat or on the margin reflexed, on both sides glabrous or beneath as well as the stem and branches woolly tomentose; flower-heads minute, on glabrous capillary peduncles, often somewhat paniculated, not radiating, cylindric-ovate;

involucrating bracts in few rows, pale yellowish or towards the summit pink, glabrous, the outer obtuse, the inner rather acute, none on a distinct stipe; flowers 12-24, not emersed, all bisexual, the innermost barren; achenes nearly glabrous; bristles of the pappus 9-16, only slightly plumous, at the base free.

In the neighborhood of the Gascoyne-River; J. Forrest.

It differs already from *Helichrysum Tepperi* in being very leafy, in forming no unisexual flowers, and in having no simple pappus bristles; from *Helipterum polycephalum* in producing longer and glabrous peduncles much like those of *Podolepis Siemsseni*, and also in having the pappus-bristles so much less plumous, as indicating some claim for the reception of this plant in the genus Helichrysum.

*Helipterum sterilescens.*—Herbaceous, woolly-tomentose; leaves flat, almost lanceolar, those near the root attenuated into a petiole, the upper stem-leaves sessile and narrower; flowerheads small, crowded into dense corymbs; involucre in its rayless portion nearly hemispherical, consisting of pale slightly fulvous pellucid glabrous bluntish bracts; radiating lamina of the inner bracts short, white, almost ovate, slightly woolly at the stipes; fertile flowers two or three or even one only; sterile flowers 15-25; fertile achenes densely white-silky; sterile achenes glabrous, but surrounded at the base by silky hair; pappus-bristles white, 12 or less, simple and very thin towards the base, otherwise plumous, crisply thickened at the summit.

Near the Gascoyne-River; Polak.

Habit and resemblance of *H. corymbiflorum*, and probably annual also; flowerheads however more closely crowded, also shorter and proportionately broader; ray-laminæ less elongated; flowers largely sterile; achenes not all silky; pappus bristles fewer and not equably plumous. Unless this new species should prove from larger material to be a casually aberrant state of a higher developed form, it will be remarkable in the whole genus by its scanty fertility, though semi-sterile flowerheads occur also in the section Acroclinium, in *H. strictum* and in a few other species.

*Atriplex Bunburyanum.*—Diœcious, shrubby, diffuse; leaves small, lanceolar- or rhomboid-ovate, quite entire at the margin or slightly denticulated, on both sides lepidotely grey; glomerules forming interrupted spikes; fruit-bearing sepals rather large, on thin stalklets, membranous, reniform-cordate, irregularly denticulated at the margin, crested from minute lobules at the back, free nearly to the base.

Near the Gascoyne-River; Bunbury.

Allied to *A. Moquinianum*, *A. stipitatum*, and *A. paludosum*.

*Ptilotus Polakii*—Branched; leaves small, numerous, of thick consistence, ovate-lanceolar, flat, not pointed, soon glabrous; flowerheads terminal, longer than the peduncle, at first turbinate, at last hemispheric; bracts and bracteoles of equal length roundish and somewhat apiculated, glabrous, colourless; calyces before expansion much pointed, nearly three times as long as the bracts, towards the summit bright red, and there as well as along the whole margin glabrous, towards the greenish base villose-downy, the three inner sepals at the base inside woolly-bearded; stamens two or rarely one only fertile; anthers didymo-roundish; ovary unilaterally turgid, as well as the style glabrous.

In the vicinity of the Gascoyne-River; Polak.

Allied to *Pt. laxus* and *Pt. parvifolius.*



## Victorian Leguminosæ.

### Tribe—*Papilionaceæ.*

By D. Sullivan.

[Read before the Field Naturalists' Club of Victoria 13th November, 1882.]

The three remaining genera of the Papilionaceous Leguminosæ with free or polyandrous stamens are Dillwynia, Pultenæa, and Daviesia. The Daviesias are separable in the first instance by their more or less three-cornered fruit and beautifully speckled or striated seeds.

1. *Daviesia ulicina*—(the "Native furze" of bushmen)—is a compact rigid bush three-five feet in height, with elliptical, downy, pointed leaves. The fruit is compressed, glabrous, three-cornered, and containing one or two comparatively large, speckled, kidney-shaped seeds with a conspicuous appendage (aril). The flowers in one variety are of a bright yellow; in the other reddish-brown with variegated streaks. In the yellow-flowered variety the leaves are reduced to mere spines, not unlike those of the common furze, hence the specific name.

2. *Daviesia brevifolia* can at once be distinguished by its large, inflated, three-cornered fruit. At a casual glance it would appear to be destitute of leaves. They are reduced to very minute spines, from the axils of which issue the naked-looking young branchlets. The seeds are large, reniform, and beautifully speckled, with a conspicuous aril round the hilum in the shape of an elongated ring. I have not seen this elegant and rare species anywhere except at the Grampians.

3. *Daviesia corymbosa* is pretty common on scrub-hills in barren hilly localities. The leaves are broad linear, entire, glabrous, and apiculate. The flowers small, yellow, with streaks of various shades, and arranged in axillary corymbs. The fruit is compressed, smooth, and reddish-brown in color. When viewed between you and the sun a branchlet laden with fruit presents a very beautiful appearance. Height three-five feet. A variety, *D. mimosoides*, attains the dimensions of a small tree in some of the deep shaded gullies of the Grampians.

The two last-named species are worthy a place in our public gardens.

The Pultenæas can be identified readily by the position of the two bractlets, which are placed higher up on the calyx than those of other genera of Leguminous plants.

4. *Pultenæa Benthami* is an elegant shrub found on the margins of streams and in shaded gullies of some of our higher mountain regions. Its leaves are narrow, rigid, and needle-pointed, with a prominent midrib and *reflexed* margins. The flowers are yellow, with dark streaks. The racemes are terminal upon the branchlets. The bractlets in this species are *on* the segments of the calyx, from which they can be readily distinguished by their reddish-brown color. Height, six-ten feet.

5. *Pultenæa mollis* is another of the tall-growing species, reminding one, when not in flower, of some species of the cyprus family. The very narrow silky-hairy leaves give the plant a velvety softness to the touch very unusual among Australian plants, which are generally remarkable for rigidity in the foliage. The yellow flowers are densely crowded towards the summits of the branchlets. There is a variety on the Grampians with pale yellow flowers. Common on the lower stony ridges of the higher mountain regions. Height five-nine feet.

6. *Pultenæa pedunculata* has been already alluded to as a prostrate plant rooting from the joints, thus extending in a short time over extensive areas of the barren, gravelly, or sandy scrub-hills on which it flourishes. The two first-named species are desirable for cultivation.

The Dillwynias have the leaves very narrow and *inflexed* at the margins, the fruit is less compressed, and the seeds do not shine so much as those of the Pultenæas.

7. *Dillwynia hispida* is one of the most common. It is a charming little shrub, but weak in habit. The flowers are terminal in loose racemes, and are of a reddish-brown color, which has suggested the name "Native Wallflower," by which it is known among country people. The flowers are extremely tender, and do not preserve their color when pressed.

8. *Dillwynia ericifolia* is a much taller shrub with very fine foliage, resembling some species of Erica, hence the specific name. There are two varieties. That abounding on sand-hills is of an erect habit and attaining often a height of five feet, while that confined to the mountains is of a scrambling or procumbent habit. The former is slightly downy on the summits of the branchlets; the latter totally glabrous, and distinguished as *Dillwynia glaberrina.*

As these brief essays of mine are hurriedly pushed forward, owing to the fact of my time being fully occupied in the discharge of School and Post-office business, as well as in the private tuition of members of my own family, they may possibly fail to fulfil the object for which they were originally intended, viz., to be an aid to amateurs in their first efforts at collecting and classing the various species of our native flora.

At a tea-meeting in a certain township not long since, a drawling, tedious, speaker took possession of the platform to address the audience. He premised his speech by requesting some gentleman near him, in the event of his remarks not being agreeable, to give his coat-tail a "pŭll" (pronounce the u as in gull). Unfortunately for the hearers, no one thought proper to carry the suggestion into practice, and so we were necessitated to bear with him for a long weary hour. Now the gentlemen of the F.N.C. will, I trust, act differently. If my efforts in the direction indicated above fail to be of practical utility, do, please, give my coat-tail a "pŭll" (figuratively, of course), and I certainly shall feel greatly obliged.



## The Parrots of Victoria.

By T. A. F. Leith.

[Read before the Field Naturalists' Club of Victoria 13th November, 1882.]

PART II.

The Cockatoo Parrakeet—Cockateel, &c—(*Calopsittacus Novæ Hollandiæ*).—This parrakeet is in appearance a diminutive cockatoo, and in habits he is perhaps the most migratory of all the parrot family in this country, going from the extreme East to the West of the Continent. Their flight is rapid, and they travel in large flocks, visiting parts of this Colony, South Australia, and Western Australia, at certain seasons. The male has the forehead pale yellow, and a pretty delicate crest of grey feathers, yellowish where they leave the crown; sloping backwards, throat yellow, cheeks with a patch of light red; a band of white on the upper wing coverts, extending from the shoulders downwards; back leaden grey, breast darker; rest of under surface ash-grey, tail-feathers darker. The female has little yellow about the head, but has the red patch on the cheeks—less brilliant, however, than the male; rump and tail grey speckled; under tail coverts yellow-speckled.

These parrakeets thrive well in confinement, and learn to talk very distinctly. I remember one in an hotel in Sydney that could say "Have a nobbler, Mary," quite as distinctly as any customer. I have known several instances of this parrakeet breeding in aviaries in this Colony and rearing its young. I have a pair at present alive, and their existence seems to be one of perfect peace and happiness, although in confinement. The male, at times, when the female leaves his side for a time, utters a plaintive whistle as if he were sad without her: this is not always the case with the *genus homo*. Eyes black.

Barraband's Parrakeet—Green Leek—(*Polytelis Barrabandi*).—The adult male is a beautiful bright light green, darker on the back and wings; forehead orange yellow, back red; throat and part of the cheeks orange yellow, with a pretty band of red at the bottom of the throat; primaries, secondaries, &c., bluish; rest of the wings green; upper tail coverts green, with bluish tinge; lower dark. The female is a much less bright green than the male, has no yellow or red about the head, a little plum colour on the throat and upper part of the breast, with a little orange and red about the thighs, The male is a strikingly beautiful bird when in plumage, and makes a very handsome cage bird, but, like the Rose Hill Parrakeet, does not, as a rule, live long in confinement.

I have seen these parrakeets within 20 miles of Melbourne; they are migratory, and visit various parts of the Colony at times: this winter they were numerous in the Avoca district, and are common enough at times on the Goulburn.

The Black-tailed Parrakeet — Rock Pebble, &c.,—(*Polytelis melanura*).—This very fine parrakeet visits the Mallee country, North-west Victoria, crossing from South Australia, at various seasons, in small numbers. In the male the beak is red; crown and back of neck greenish yellow; throat, breast, and upper wing coverts yellow, with a little crimson on centre wing-feathers; primaries, secondaries, &c., blackish blue, upper tail coverts dark bluish green, darkest towards the tip; under dark, and some of the under tail feathers marked with pale pink. The female is much less brilliant in plumage than the male.

These birds, when captured young, make good talkers, and, like the rest of the family, show much affection for their owners, and a dislike to strangers suddenly introduced to them; this, of course, does not apply to those living in the bars of public-houses, as, under these conditions, the extreme sensitiveness is soon rubbed off, and they are ready to eat biscuits or cheese with any customer, no matter what his colour, country, dialect, or politics. I confess I am at a loss to know why this bird was named the Black-tailed Parrakeet; as, with most that I have handled, the tails are more of a dark bluish and green.

The King Lory, or King Parrot—*Aprosmictus scapulatus.*—This noble bird, not surpassed in beauty or color by any of the numerous lories known, has its head, neck, breast, and belly covered with feathers of the most brilliant military scarlet, with the beak also red. In some adult birds there is a slight tinge of blue, showing at the bottom of the scarlet, on the back of the neck; upper wing coverts dark green, back a shade darker. In the middle of the wing is a splash of pale pea-green showing through, called by some "the butterfly in the wing;" rump dark blue; upper and under tail coverts blackish-blue. The female has no scarlet except on the abdomen, and a slight plum tinge about the throat, with no sign of the butterfly on the wings.

These parrots have been so destructive to the potatoes of the Gippsland selectors that they have applied to them the slang name of "Spud Parrots;" and although the said parrots may approve of the *Solanun tuberosum*, I dare say they trouble very little about the selectors, who unceasingly wage war against them, most often with a rusty single-barrelled fowling-piece dangerous at both ends. These birds are found in abundance in Gippsland, the Cape Otway Ranges, and many other parts of the Colony.

Barnard's Parrakeet—The Scrub Parrot, &c.—*Platycercus Barnardi.*—These beautiful parrakeets are found in the Mallee country in Victoria, which country is covered with a species of rather scrubby Eucalyptus known by the settlers as "Mallee," but the Mallee signifies, I believe, in native language, the country of the Black Swan, the same as the Lowan country signifies the country of the Ocellated Leipoa, and Warrigal the country of the Dingo, &c. The male has a red band above the beak, crown light green, browner in some, slightly shot with yellow in young birds, followed by a band of bluish brown, a collar of yellow, greenish in young birds on the back of the neck; cheeks pale green, getting bluish towards the throat; back dark dull blue; rump pale green; primaries, secondaries, &c., blue; upper wing coverts light blue and yellowish green, getting cærulæan near the shoulders; centre tail feathers green, getting bluish at tips; outer light blue; breast pale green, a round patch of crimson on yellowish ground on the lower part; in young birds yellowish. Female.—Top of the head darker, and not nearly so brilliant in the various colours, and the crimson patch at the bottom of the breast almost entirely absent.

I have this beautiful parrakeet well impressed on my memory, as, on following one, I got bushed for some time, with the thermometer at about 140°, and no water in the district. I brought the parrot home, although at one time, owing to the great heat and my thirst, I began to calculate the probabilities of my bones bleaching in the district. There are three Australian Parrakeets about the same size, with yellow collar, viz., Barnard's, Bauer's, and the Yellow-Collared, which latter name I have often heard applied to all three by those unacquainted with the distinctions.

Bauer's Parrakeet, Banded Parrakeet, or Port Lincoln Lory—(*Platycercus Bauerii*).—This bird visits the North-West and other parts of the Colony, and not long ago was common, and is now found about Coghill's Creek and Mount Bolton. Forehead and crown dark brown; back of the neck has a primrose-yellow collar; back dull green; rump emerald green; primaries, secondaries, &c., blue and black; shoulders pale green; throat plum colour; upper part of breast dull green; lower and abdomen yellow; centre tail feathers deep-coloured green. The female is not so fine or brilliant a bird.

These birds live well in confinement, and are known by dealers in this country under the name of "Port Lincoln Lories." Different specimens, at different seasons and ages of these birds in particular, differ a good deal; so that any description must be more or less imperfect, and mine is only intended, in this and other varieties, as a short general description, taken from the specimens in my own collection; and it must be borne in mind always, that there are many birds belonging to the Parrot and other families that have been very differently described by ornithologists of note, and perhaps neither were colour-blind; but just as the painter is baffled to place on canvas the heavenly tints of the setting sun, so is it with the ornithologist who attempts to paint in words the beautifully-blended colours and tints of the birds of the air.

# FAMILIES OF COLEOPTERA, OR BEETLES.

BY W. H. WOOSTER,
Member of the Microscopical Society of Victoria.

PART VII.

TRICHTENOTOMIDÆ. — *Shape,* oblong; firm. *Head,* transversely square. *Maxillæ,* two-lobed, outer very long and lancelike; inner very small. *Jaws,* prominent, stout, horizontal. *Antennæ,* inserted before the eyes, near base of jaws, stout, 11-jointed, last three serrate within. *Eyes,* moderate, transverse, sinuate in front. *Thorax,* with sharp toothed edge between top and sides. *Hind-feet,* four-jointed, rest five, subcylindric. *Abdomen,* of five-segments. Westwood established this family not many years ago on some large beetles found in India and Java.

CERAMBYCIDÆ—(or Longicornes).—*Shape,* long and narrow, in one section stout and oblong; firm. *Head,* of various form, often ends in a snout. *Maxillæ,* one or two-jointed. *Jaws,* very various. *Upper-lip,* soldered to *epistome* in *Prionides,* free in rest. *Antennæ,* mostly very long, often much longer than body, generally inserted in a notch of the eyes, 11-jointed, 12 in some. *Eyes,* rather large, seldom entire. *Elytra,* mostly wider than thorax. *Shanks,* mostly with two terminal spurs. *Feet,* subpentamerous, *i.e.,* apparently four-jointed with a rudimentary joint at base of claw-joint; joints generally spongy, below third joint usually bilobed. *Abdomen,* with five.segments, seldom six in males. *Colors,* dull to beautiful, and even metallic. *Found* on trees, shrubs, and flowers, under bark, &c. The majority fly at dusk. The larvæ are timber-borers. This is an immense family, and a favorite with many collectors. Masters' catalogue contains about 500 Australian species; but my friend, Mr. C. French, assures me that his collection of Australian Longicorns included about 760 species. It seems a pity that such a complete and grand collection should have been allowed to leave the Colony. Masters gives only about 65 as definitely Victorian; though I am certain hundreds are to be found in the Colony. The *size* varies from $\frac{1}{4}$in. to 3in. or more.

PHYTOPHAGI.—*Shape,* hemispherical, oval, or oblong; firm. *Head,* moderate, rounded, seldom oblique and snouted, free, or more or less sunk in thorax. *Upper-lip,* always apparent, transverse. *Jaws,* mostly short, stout, and dentate at tip. *Maxillæ,* small, two-lobed, inner simple, outer slender, often two-jointed and palpiform. *Eyes,* small, finely granular, often emarginate within. *Antennæ,* at front and inner edge of eyes, generally on face, at vertex in some groups, distant or near at base, filiform or gradually thicker to tip, seldom as long as the body, 11-jointed, with an appendage like a twelfth in most, in some ten, nine, eight, and four-jointed. *Thorax,* very variable. *Elytra,* mostly well developed and quite covering abdomen. *Abdomen,* of five segments. *Legs,* moderate or small, hid under body, seldom large and visible. *Hind-legs,* swollen in some. *Shanks,* simple, not dentate externally.

*Feet*, subpentamerous, first to third joints wide with brushes below. *Colors*, dull to splendid, some being very sumptuous. *Size*, $\frac{1}{16}$ in. to 1in. Found on trees, shrubs, and herbs, and under bark. This and the remaining families were worked out by M. Chapius as a continuation of Lacordaire's great work after his death. As now constituted it embraces what used to be considered several distinct families, and which many think would still be better so regarded; such as the *Crioceridæ, Cassididæ, Chrysomelidæ, Halticidæ, Hispidæ*, &c., which now rank as tribes. I am not aware whether Masters' catalogue has been continued beyond the *Cerambycidæ*; but, as above defined, it is a very numerous family, and very well represented in Victoria.

EROTYLIDÆ.—*Shape*, from long and narrow to oblong or oval; firm. *Head*, small or moderate, sunk in thorax to hind edge of eyes, contracted into a snout which is often narrowed at base. *Jaws* generally stout and short, split at tip. *Maxillæ* two-lobed, inner slender, unarmed, or with one or two horny spinules; outer subtriangular, at least as long as inner, and lying on it. *Maxillary palpi*, four-jointed: 1st slender, long; 2nd and 3rd short, obconic; 4th various in size and shape. *Labial palpi*, three-jointed; 1st slender, longish; 2nd short, obconic; 3rd very various. *Eyes*, oval or round. *Antennæ*, at front inner edge of eyes, their cavities limited behind by a fold of the face, mostly short and stout, 11-jointed, last three or four a distinct club. *Thorax*, large, sub-quadrate, or narrowed before, side edges angular, cut square in front, very various behind. *Pygidium*, generally moderate. *Elytra*, oval or oblong, more or less convex or hemispheric. *Metasternum*, mostly very long. *Abdomen*, five-jointed, joints subequal, *Legs*, robust, in some long and slender, in a few diverse. *Feet*, stout, five-jointed or subpentamerous. *Claws*, simple. *Colors*, often prettily variegated. *Size*, $\frac{1}{8}$ to $\frac{3}{4}$in. Found mostly in fungi, sometimes on plants. The family does not seem to be a large one, but Victoria has yielded me a few pretty species.

ENDOMYCHIDÆ.—*Shape*, oblong to oval. *Head*, much as in *Erotylidæ*. *Jaws*, oblong, dentate, or simple at tip. *Maxillary lobes*, distinct and ciliated, outer rather large, inner slenderer, shorter, and less solid, densely ciliated within, and often with longer and stiffer hairs besides. *Maxillary palpi*, four-jointed, 1st to 3rd mostly shortish, 4th never securiform, generally slender or oval. *Labial palpi*, three-jointed, thick, short, near at base, 1st joint, very short, 2nd obconic, transverse; 3rd larger. *Eyes*, transversely oblong, rather large, subsinuate at edge, seldom small and round. *Antennæ*, on face, near sides, rather distant, average $\frac{1}{2}$ length of body, of 11 joints, seldom less, 1st oblong, last three a club. *Thorax*, moderate or small, a transverse square, lateral edges straight or nearly, mostly emarginate in front, with angular prominence each side of head, generally with three grooves, one transverse at base, the others longitudinal at each end of first. *Pygidium*, triangular, semicircular, or squarish. *Elytra*, cover abdomen, not soldered, margined or dilated at outer edges. *Legs*, long and slender, mostly reach beyond sides of body. *Hind coxæ*, very remote from middle ones. *Thighs*, generally robust, subcompressed in middle, not or very incompletely grooved below. *Shanks*, slender, straight, or nearly, often with sexual differences in 1st and 2nd pairs. *Feet*, four-jointed, or three-jointed with rudiment of 4th at base of claw-joint. This, like the last, is not a numerous family, and seems rather rare in Victoria. The few I have taken are of small size and obscure colors, and were found on bushes and eucalypt suckers.

COCCINELLIDÆ.—*Shape*, hemispheric; firm. *Head*, inflected, short, sunk in thorax, seldom free. *Jaws*, moderate, not prominent, end in 1-4 stout teeth. *Maxillæ*, horny at base, of two ciliated lobes, sub-biarticulate. *Maxillary palpi*, four-jointed, first very short, second and third variable, fourth very large, securiform, seldom oblong and truncate. *Eyes*, moderate, oval or round, notched or entire. *Antennæ* near front inner edge of eyes, base hid or visible, 11-jointed, in some of eight, nine, or ten joints; end in a variable club, mostly short or retracted. *Thorax*, transverse, generally narrower than elytra, very convex transversely, narrowed and nearly always emarginate in front. *Scutellum* triangular, moderate or very small. *Abdomen*, of five segments, in some six or seven. *Legs*, short, mostly invisible from above, and generally all alike. *Thighs*, unarmed and subcompressed. *Feet*, of 3 joints, with a rudimentary fourth joint at base of claw joint. *Claws*, with an appendage, often bifid, seldom simple. *Colors*, mostly red and black, in dots or lines; generally polished. *Size*, $\frac{1}{8}$ to $\frac{3}{8}$in. Found on plants and under bark; some are phytophagous, and others prey on aphides and thus become the farmers' friends. This family is composed of the well-known Ladybirds of our childhood, and is moderately numerous, several, though not many, species being found in Victoria. This completes the list of "Families of Coleoptera."

# PROCEEDINGS OF SOCIETIES.

## THE ROYAL SOCIETY OF VICTORIA.

The ordinary monthly meeting of the Royal Society of Victoria was held in the Society's Hall, Victoria Street, on Thursday, 16th ult., Mr. R. L. J. Ellery, the President, being in the Chair.

Messrs. J. Summers and John A. Stuart were elected members of the Society; while Mr. James H. Horner was elected an associate.

Mr. D. ANDERSON read a paper entitled "Improvements in contrivances for varying the Gauge of Wheels of Rolling Stock for Rail and other Permanent Ways," and also exhibited a working model of the invention. Mr. Anderson proposes to render his invention practicable in the following manner:—The axle of the carriage or truck is made with a slot-collar. In the centre and at the side of this collar is a sleeve, on the outer edge of which the wheel is fastened. These sleeves are drawn out from or into the slot-collar by right or left-handed screws fastened to a double platform. On the inner end of the sleeve is a flange, held in position by hinged clamps on either side of the slot-collar, and in these clamps recesses for the reception of the flanges are provided. The hinged clamps fall from the position occupied while the truck is running by the partial unscrewing of two bolts, when the flanges can be moved either way from or in towards the slot-collar. The method of working this contrivance is briefly as follows:—The trucks having been run into an adjusting platform, the ends of which are capable of being drawn in or forced back so as to attain either gauge by the aid of such machinery, for instance, as an engine working an endless cogged chain, with left or right-handed screws. Should it be desired to alter from the broad to the narrow gauge, the broad flange will already be in position: this is unscrewed and allowed to fall back, and, the rails being then drawn in towards each other by the contrivance already mentioned, the slot is reduced in size, and the outer extremities of it jambed against each side of the flange, when the clamp is forced back into position and screwed up. When accommodating a truck to the wider gauge, the rails are forced back in the same manner until the slot is extended sufficiently to receive the larger flange. It is contended that the invention would be especially useful for coal trucks, or refrigerating cars in which frozen meat was being conveyed from the interior of New South Wales to Melbourne, as the alteration can be made in less than an hour, even if only a single truck is operated on at a time, while if several were run on to the platform at once the work could be completed in a few minutes. It is admitted that the first cost of making axles of the new pattern would be much greater than at present, but, as they are indestructible, the matter of the difference in cost is a comparatively trifling consideration. Locomotives cannot be heated in this way, owing to the fire-boxes interfering with the alterations. Mr. Anderson stated that he intends to ask permission from the Victorian and New South Wales Railway Departments, in March next, to run a truck, fitted with an axle of his invention, from Melbourne to Sydney and back again.

Several members expressed their entire approval of the principle applied by the inventor to his contrivance.

A paper was also read by Professor Kernot, on "The Lateral Stability of the Victoria Street Bridge." In this short paper it was contended that the engineers who had officially condemned the structure had based their recommendations and calculations on a misunderstanding of the principles of statics. The bridge was condemned as weak under wind pressure, but in its present state its resistance under ordinary pressure was double that of many chimneys and many other structures that experience has proved to be perfectly safe. It was also twice as strong against floods as the Toolamba Bridge on the Goulburn Valley Railway. The Victoria Street Bridge was exactly a point of contact and conflict between the old and empirical school of engineers who reject Science as "theory," and the new school who contend that all correct estimates must be based on strict mathematical investigation.

After Professor Kernot's paper had been discussed, the Society adjourned.

## THE FIELD NATURALISTS' CLUB OF VICTORIA.

The usual monthly meeting of this Club was held on Monday evening, the 13th Nov., at the Royal Society's Hall, there being the customary good attendance of members. Mr. J. R. Y. Goldstein, one of the Vice-Presidents, presided.

After the formal business had been disposed of, Mr. E. Pitcher read a continuation of Mr. D. Sullivan's (of Moyston) paper on the Leguminosæ of Victoria, contributing, as in previous instances, the specimens described to the Club's herbarium.

Mr. J. R. Y. Goldstein gave a most interesting description of two very common Fungi, viz., *Penicillium* and *Mucor*; the former being the blue mould so generally to be found on old boots, bread, jam, &c., and the latter always to be seen on horse-dung.

Mr. H. Watts, read a short but instructive paper, explaining the fructification and conjugation of two species of fresh-water algæ, viz., *Zygnema* and *Spirogyra*, a beautiful illustration of which he showed under his microscope.

Mr. T. A. F. Leith read a further contribution of his very pleasant paper on the Parrots of Victoria, interspersing his descriptions, which composed six species, with several amusing anecdotes of their habits and peculiarities.

Dr. T. P. Lucas contributed a description of an evening trip to Warragul, where he had been for the purpose of collecting nocturnal Lepidoptera, and the result was eminently satisfactory, several new species being secured.

The specimens brought for general exhibition were very numerous, comprising some fine Birds, Nests, and Eggs collected by Mr. A. J. Campbell during a recent trip to the Wimmera district, amongst them being *Pachycephalla Gilberti*, or Gilbert's Thickhead, hitherto supposed not to extend beyond West and South Australia, but now found, for the first time, in West Victoria; *Cacomantus insperatus*, or Brush Cuckoo; *Ptilotis leucotes*, or White-eared Honey-eater; *X. leucopsis*, or White-faced *Xerophila*, the egg of which is described by Gould as being white, whereas those exhibited were mottled all over with chocolate brown markings; *Ptilotis sonora*, or Singing Honey-eater; *Acanthogenys rufogularis*, or Spiny-cheeked Honey-eater; *Psephotus multicolor*, or Varied Parrakeet; *Glossopsitta porphyrocephalus*, or Porphyry-crowned Lorikeet; *Merops ornatus*, or Australian Bee-eater; *Malurus Lambertii*, or Lambert's Superb Warbler; *Pardalotus xanthopygius*, or Leadbeater's Pardalote; and *Petroica Goodenovie*, or Red-capped Robin. Mr. J. F. Bailey showed rare fossils from the older pliocene strata of the Railway-cutting at Royal Park, including *Nautilus Australis* (McCoy), *Waldhemia macropora* (McCoy), *Haliotis rarasoides* (McCoy), *Cerethium Flemingtonensis* (McCoy), *Cypræa* sp., *Leda* sp., *Trivia* sp., *Conus* sp., *Voluta* sp., *Triton* sp., *Cassis* sp., *Emarginula* sp., *Capsulus* sp., *Arca* sp., *Cidaris* sp., also Polyzoa and large tooth of species of Otodus; these, in Mr. Bailey's opinion, fully confirming his belief that the above strata are of the same age as the Red Crag of England. Mr. T. Hyland showed a species of moth very destructive to the American pop-corn. Mr. A. O. Sayce, trap-door Spider's nest (Mygale sp.) from South Australia; Mr. J. E. Dixon, 43 species of Coleoptera, collected at the Club's recent excursions to the You Yangs and Beaconsfield; Mr. F. Spry, Lepidoptera of the month; Dr. T. P. Lucas, insects, especially Lepidoptera, from Warragul, several species being new and unnamed; and Mr. C. French, 50 species of New Zealand Longicorn Beetles, including many new genera and species; also a beautiful Orchid, *Chiloglottis Gunnii*, and a yellow variety of it, from Bolwarra, in the Bullarook forest. The customary conversazione brought the meeting to a termination.

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## THE MICROSCOPICAL SOCIETY OF VICTORIA.

The ordinary monthly meeting of the above Society was held on the 30th November, the Vice-President (Rev. J. J. Halley) in the chair.

The Secretary acknowledged receipt of the "American Monthly Microscopical Journal" for August; the "Northern Microscopist" for September; the "Southern Science Record" for October; the "Journal of the Royal Microscopical Society" for October; the "Proceedings of the Linnean Society of New South Wales," vol. vii, parts 2 and 3; and Leidy's "Freshwater Rhizopods of North America." The last-named work was a donation from Baron von Mueller, to whom the cordial thanks of the Society were voted for this valuable donation.

The Vice-President brought under the notice of the members the Prospectus of Cole's "Studies in Microscopical Science," and it was resolved that the Society should subscribe to them.

Mr. Wm. Fox was elected a member of the Society.

The Vice-President read the following address, which had been postponed from the previous meeting:

### THE VICE-PRESIDENT'S ADDRESS.

"The unusual honor of delivering the Annual Address to the Microscopical Society of Victoria has this year fallen to my lot.

"I venture to perform the duty with a diffidence which, I confess, is not generally mine in speaking in public; for I am very conscious that while I owe to your kindness the honor of occupying the Vice-chair of this Society, I address several whose investigations have been far more systematic and diligent than anything I have attempted, and that, indeed, during the last year of my office, while I have proposed great things, I feel that I have achieved nothing. My valid excuse is, simply, that matters of higher importance have absorbed every moment of my time.

"In considering the wide and important field open to the microscopist it is a matter of regret that our Society is so small, and that, small as it is, the number of members who contribute papers is smaller still. This paucity of membership interferes largely with our usefulness; papers conveying information curious and novel,—descriptions of species and genera new to the world of Science,—hints as to improved modes of working—are lost, simply because, with a revenue so limited as ours, we are unable to bring out our Journal with despatch and regularity: indeed, unless our members very much increase, I fear that your Editorial Committee will become a name and nothing more.

"In such circumstances, perhaps, this Annual Address may properly take the form of what would in theology be called apologetics. We must defend our position, and show the *raison d'ètre* of our existence. Looking, then, at our Society as we are accustomed to look at the various divisions of sentient life as they come under our investigation, we will proceed to examine the various species of what we may call the genus *Microscopista*, the generic characteristics of which are, that they examine minute objects with artificial aid more or less elaborate, and that they do this with a more or less useful end in view.

"Of this great genus, whose habitat is the civilized world, the first species is the *M. delectata*, or the playing microscopist. This is the lowest species in the scale of development, and some observers consider that the other species are all derived from this one, while a few who have no love for the genus affirm that this is the one and only species, the others so-called being only transient varieties. But *M. delectata*, though often despised, is by no means to be set aside. We will grant that in his hands the instrument is a plaything and nothing more,—that he looks at the wondrous beauties revealed merely to please the eye,—that he peers into quaint and curious forms merely to satisfy curiosity,—that the valve of a diatom is interesting to him merely as it is strange, and that the organs of an insect or the home of a Bryozoon only allure as they are novel. In this there is nothing to be despised. The great order of the Bimana must be amused, and the more rational the amusement the better; and surely it is not less rational to find amusement in examining the wonders of Nature,—her painting of marvellous beauty,—her sculpturing of unrivalled forms,—than in turning over the prints of man, or spending time examining and collecting his effigies;—surely as reasonable as counting the pips on a card, as cannoning ivory balls, or bouncing india-rubber ones over a net. We will not, then, push out of existence the playing microscopist; for my own part I have for him a very tender regard, being perhaps myself but little removed, if at all, from this species. In your name I will welcome all such to our gatherings, assuring them that they will find here much to amuse them if they do not care to learn; but we will hope that in consorting with higher forms they will imperceptibly, perhaps, yet surely, by the force of association, put on new features, lose obsolete and useless organs, and develope into higher and higher forms, and this not in descendants yet to be, but in a conscious life-history. Again I say we are delighted to find, and would gladly have more in our midst of, *M. delectata*.

"We advance next to *M. evocationes*, or the collecting microscopist. This is also one of the somewhat despised forms:—'Only a collector,' with an elevated head and a righteous shrug, is a phrase often heard. But in great economical systems 'mere collectors' play a most important part. This solid world, with its fertile plains, is just a vast collection gathered together by collectors, organic and inorganic.

And collectors provide the material for others to work on and to work up. The higher workers not infrequently have neither the time nor the opportunity to collect, and, so far as the preparation of microscopic mounts is concerned, have often not the manual skill and the delicacy of touch to be successful. Such must depend for their mental pabulum in its raw state on others. And there is work of immense importance to be done by the 'mere collector.' If such cannot add to our knowledge by their own investigations, if from their brains can come no world-shaking theories that shall make their names and our Society's name familiar as household words, they can add to the treasures of our cabinet, their quick-seeing eye can pick out new forms, their diligent feet can take them to unexplored parts, and their delicate hands can mount their finds in such a way that the true investigator will be able to read with his glass, as in a glass, natural riddles adding to the world's store of knowledge. Our Society cannot afford to despise the collector. Far from it; we will thankfully receive from any quarter, and ardently welcome, genuine specimens of *M. evocationes.*

"*M. tabernarius*, or the tradesman microscopist. A large and growing species, every day producing novel varieties, and one that in these days must be treated with no little respect. Utilitarianism has invaded the old halls of Science, and in these modern days not one but many a philosopher's stone has been found in the crucible of the chemist and the jar of the electrician: and mean homes have turned palaces, and common delf silver-plated, at least, through fortunate discovery. Yes, gold in abundance has followed in the track of the scientists. All this is but *vero verius*, nothing more true. In saying the scientific plaything of yesterday is the mighty machine of to-day—the toy of an enthusiast one day, the necessity of life to thousands the next,—it would be but a work of supererogation to remind you of the giant strides made in the development of electric science and practice. In our own line we can perhaps look for no startling discoveries that shall revolutionize the world of daily life, but there is yet room for the *Microscopista tabernarius.* I do not mean the man who makes the instruments,—for him there undoubtedly is ample room, and almost every month we have to hail improvements that make our work more easy. But the microscope is a tool of trade for some. We have heard that the intricate and charming markings of Diatoms and Foraminifera have been used by pattern designers, and in some trades the microscope is daily used. About a year ago I was at the Italian National Exhibition at Milan. Among the most interesting of the exhibits was the process of silk producing and manufacture. At that exhibition the results were not merely shown, but all the details from the beginning to the end, and a row of microscopists with persistent care examined the silkworm eggs, picking out and rejecting every egg that showed any symptom of disease. But why go to Milan—has not the *greatest* of your legislators declared that by the aid of a powerful microscope he was enabled to determine on the spot the magnificent character and splendid suitability of the Stawell stone for our new halls of legislature? In this Society it would be of thrilling interest to hear what was the powerful instrument he used—how he used it in the trying circumstances of the Parliamentary pic-nic—what he learned—and how he learned it by looking at a lump of sandstone! But this is perhaps too much to expect; let us be content that the value of your instrument has been acknowledged in those halls of wit and wisdom. I think I must place this new-caught specimen in a unique sub-species of his own, and label him *M. ludificatio.* I hardly dare to translate this title, but its English synonym is not far off 'humbug.'

"Under *M. tabernarius*, as a sub-species, we will place *M. detergitata*, or the detective microscopist. Here we come to a class directly useful to mankind. By the aid of the microscope we discover largely what it is that we eat and drink, how—sometimes very widely—the real differs from the apparent, and how true it is that 'things are not what they seem,'—a wide field, that has hitherto not been taken up to any extent by our Society. Under this species I had intended to have ranged myself during the past year, and to have done something worthy of your attention for this meeting: but, alas, it has been but a good resolution, and gone, I fear, where many other good resolutions have gone before it. This I have done,—prepared a series of test starches for comparison, some 18 or 20 slides of which I had the pleasure of placing in the Society's cabinet. I have also made a preliminary examination of some of our ordinary articles of food, not sufficiently exact to go into detail, but enough to give to you a hint as to what may be done, and to indicate a useful line of work. For example, arrowroot I have found adulterated with sago, and arrowroot, tapioca, and sago all showing more or less of the well-known form of potato starch. Cocoa has exhibited potato starch, sago starch, in one case the beautiful grain of tous-les-mois, besides sugar crystals and inorganic matter, that may be coloring matter or may be dirt; in one case, I suspect, plaster of Paris. Mustard showed pea-flour, potato starch, and wheat flour, as well as inorganic matter, probably plaster of Paris. Oatmeal showed wheat flour, and maizena potato starch.

"I give these just as examples of what is and of what may be done. It is not our province to do with legislative action, yet we have, I think, a right to know what it is that we eat and drink. Many of the adulterations are in themselves harmless to the public health, though not to the public morals. This species of microscopist is much needed, and I regret that, so far as our Society goes, we have no member that has given himself up to this work in a systematic and careful manner, but certain it is that such work needs doing, and doing well. I can only bid you hope that our energetic Secretary will secure for us numerous specimens of *M. detergitata.*

"*M. medicus* is the medical microscopist,—our learned and much honored President comes, of course, under this title. One would say that specimens of this species would be found in abundance about our rooms, making themselves heard above the more subdued voices of other species; for surely the microscope must be a necessity for medical men, and one would certainly have predicated that our Society's literature would have been enriched by their contributions many and learned; but, with the one exception of our President, I do not think that for years a solitary specimen of the *M. medicus* has been heard in our gatherings. I cannot altogether account for this: I do not know if the class is an exceptionally shy one,—shrinking from publicity—in no case courting profane gaze,—and with a modest dislike to uttering opinions in gas-light, and never on any occasion advancing thoughts that are not well matured and tested. It may be the *M. medicus* has a difficulty in consorting with other species of the same genus, and prefers buzzing only where his more immediate kin are found. I do not know what bait must be prepared to catch this remarkably shy form: possibly our President may give our Secretary a few hints on the subject.

My last species is the *M. germanus*, a true genuine microscopist. Of this species we have some admirable examples, men who patiently and perseveringly take up some section of the wide world of Science, and work on and on till they have worked out some beautiful system, or worked up the whole life history of a race. It is these men who add to the sum of the world's knowledge, and so add to the sum of its happiness. The discovery of truth in any line cannot but be beneficial, for every discovery of truth helps in the discovery of other truth, and sometimes in lines remote enough from the first. The story of the world of science is full of instances of this. And every man who lays a stone may know that he is doing something for the completion of that grand temple of truth that shall fill the world with its radiance.

"Gentlemen, we exist that we may bring together these various classes, all interested, though in different ways, with microscopy. Men of kindred pursuits naturally desire to meet each other, or should do so, that there may be mutual help and the interchange of ideas, and that by such help knowledge may 'grow from more to more.'

"I think I have shown that we have a right to exist, that by our existence we may not only amuse and profit each other, but do good in the community in which we are placed, and perchance do something to help in the advance of knowledge in the mighty world of Science.

"May I trust that next year will be far more prosperous than any preceding ones have been."

On the motion of the Rev. T. Porter, a vote of thanks was accorded to the Chairman for his very interesting address.

Among the exhibits were a specimen of *Tingis hystricellus*, shown by the Vice-President, and some fossil Bryozoa, from the older Pliocene strata in the Royal Park, by Mr. J. F. Bailey.

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## THE ROYAL SOCIETY OF NEW SOUTH WALES.

The monthly general meeting of the Royal Society of New South Wales was held on Wednesday evening, 1st ulto. There was a good attendance of members, the President (Mr. C. Rolleston) occupying the Chair.

It was announced that 36 books had been received as donations to the library.

In answer to an appeal from the Council, a sum of about £225 had been promised in subscriptions from members towards clearing off the debt still due on the building. The President made a further appeal to members.

The Hon. Geo. Thornton, M.L.C., and Mr. Hans Frandsen Madsen, surveyor, were unanimously elected members of the Society.

A letter from Herr R. Gessler, of Basle, Switzerland, stated that he would esteem it a favour if a pound or so of the seeds of the salt-bushes of New South Wales could be forwarded to him.

Mr. James Manning read a most interesting paper, "Notes on the Aborigines of New Holland." These notes had been collected in 1844 and 1845, and the information contained in them had been subsequently corroborated by the experiences and research of others than the collector. The subject almost exclusively dealt with in the notes was the religious belief of the aborigines of the Southern part of New Holland. The god of their belief was Boyma, who, they said, dwelt at an immense distance to the north-east, in a heaven of beautiful and supernatural appearance. Their belief also included the existence of a son of Boyma, equal to his father in omniscience, and but slightly inferior to him in any attribute. There was a third person in their creed, who was of semi-divine origin, and who was the great law-giver to the human race. There was a place of everlasting fire for evil men, and a Heaven for the good, who inherited eternal happiness. The dread of eternal punishment acted forcibly as a restriction on their conduct in life. From all the joys of Heaven, however, the women of the tribes were restricted. The men had an imperfect consciousness that there was a future world for the women, but it was not that of the heaven good men went to. The women were entirely ignorant of the secrets of the religion, and were regarded as inferior beings. After death the souls of men rose, and were taken before the throne of Boyma, where they discarded all that was mortal. Judgment was pronounced by the god; and, as the sentence was declared, they were removed to heaven or hell. The only prayer used was one on the occasion of the interment of the dead. Many other interesting particulars of the religion were given, the conclusion drawn being that the aborigines had not been without a high sense of the Supreme Godhead, and of a moral conception of what was right and wrong. A discussion followed on the paper, some of the speakers being of opinion that the natives had been communicated with by missionaries, and that this was the outcome of the ideas they had gleaned. Others thought, from personal experience, that Mr. Manning's notes contained a strong foundation of fact.

A vote of thanks to Mr. Manning concluded the business of the meeting.

## THE PRESIDENT'S ANNUAL ADDRESS.

[Continued.]

Where the Sun acts upon moist earth or water it causes, first heat, then evaporation, and an upward motion of the moist air, which, when it reaches the altitude and the temperature of the dew-point, condenses into a cumulus cloud; the central parts, heated by the heat given out by condensation, rush upwards, rolling masses of clouds out of the top as the condensation increases—the extent of the cloud forming a measure of the activity of the forces which gave rise to it. A curious and instructive instance of this phenomenon in Nature is found in the equatorial region of calms. Here the sun almost invariably rises in a cloudless sky, which remains clear until about noon, when heavy masses of cloud begin to collect, and, rapidly increasing, form a dense black covering from which rain pours down in torrents; towards evening the rain gradually ceases, the clouds disperse, and the night is serene and fine, and the weather remains so until the heat accumulates on the following day to replace the same effects. These phenomena are strictly in accordance with the known laws of atmospheric condensation. At the Equator the calm belt is supplied with air from the Trades, which are almost saturated with moisture, and this air resting on the ocean under a vertical sun, the saturation necessarily becomes complete. Now the series of effects we have just considered comes about in this way: the sun, as it gains power in the forenoon, heats the stratum of air which rests on the water, and gives rise to evaporation from the sea; the moist heated air begins to rise rapidly; but so soon as its cooling, from elevation and expansion, reduces its temperature to the dew-point, then moisture is deposited as cloud, and the ascending rate, accelerated by this deposition, leads to increasing clouds above, and to rapid cooling down of the air below; for the heavy clouds stop the sun's rays and throw all below them into shade and a much lower temperature; hence the heavy rain, which speedily brings down the moisture that had been carried up; the cloud particles left after the heavy rain fall slowly down, and melt as they fall; the sun having, meantime, by his westerly course, lost the morning's power, the evaporation is not renewed, and the sun sets in a clear sky. This process carried on in the calm belts is just that which may be seen on a calm day, and I may mention here, as an illustration, a recent observation in Sydney: April 20, 1882, the morning was fine and bright and the air very moist; at 9 a.m. the difference between the wet and dry bulbs was only 1·7. It was perfectly calm all the morning, and there were only a few cirrus and small cumulus clouds about at 9 a.m. As the morning wore on, the sun got very powerful, and the little cumuli grew into great ones, rolling out great masses from the top, and so forming a shade for the clouds and earth below. The base of these clouds seemed to spread out into dense stratus, and about noon I could see that those in the W.S.W. were depositing rain, and now and then a down stroke of lightning, followed by low rumbling thunder. The clouds now grew rapidly, and, forming over the Observatory, obscured the sun and caused a sudden fall in the temperature, shown by the metograph to be $6\frac{1}{2}°$; only a few drops of rain fell, and the temperature rose again about 2°. As I watched the cumulus and the rain in the W.S.W., the clouds slowly descended and became lost in the haze. If we may assume that the air at the Observatory was in a similar condition to that all round, we find that a fall on that occasion of $6\frac{1}{2}$° in the temperature produced a few drops of rain; at noon and before the sun was covered, the difference between the dry and the wet bulbs was 5·9; and in order to cool this air to the dew-point by elevation, its temperature would have required reduction by 10·4, or to be raised up 1870 feet. It is probable, therefore, that the clouds forming over Sydney on that day were about 1800 feet high. These instances are illustrations from Nature of the conditions under which the leading scientific meteorologists of the day tell us that rain is formed. If, however, it so happened, as in temperate latitudes it might, that there was a cold wind blowing over the warm saturated one, when this up-current was started, then the heated air would rush up into it, and when once the stream was started there would be a great downfall of rain—in fact, we should have a case in which, the "unstable equilibrium" of the atmosphere, having been upset, the downfall of rain would be disproportionate to the cause which set it in motion; but this condition, viz., a cold current blowing over a warm moist atmosphere, is a very uncommon one, for the cold air, being the heavier, seeks the lower position, and can only take the upper one when moving with considerable velocity. It would, therefore, rarely happen that an up-current, even when once started, would continue for any length of time unless the cause of it were maintained—in fact, the cause which uplifts the atmosphere must have a definite relation to the amount of rain deposited. Of course this relation would vary with the humidity of the air, with the relative temperatures of the layers of the atmosphere, and with many other conditions; and it would be quite impossible to say definitely how much uplifting force would be necessary at any particular place until all these conditions were well known, and then it would be an easy matter to calculate exactly how much powder or fuel would be required to effect the desired result. Some of these conditions, however, especially the relative temperatures of the several layers of the atmosphere, cannot be ascertained, and others are exceedingly difficult to measure. We may, however, get some idea of the amount of force necessary by studying certain phenomena of rainfall which are presented to us in various parts of the earth. Many illustrations of the fall of rain from ascending currents might be selected; but the following will suffice for our present purpose: the island of Port Rico, in the West Indies, extends 90 miles east and west, and only 30 miles north and south; a chain of mountains, from 1500 to 3700 feet high, extends along the island from east to west. Throughout the year the N.E. trade wind blows on to the island every day from 9 a.m. to sunset, and at night there is a strong land breeze toward the ocean on all sides. During the rainy season, this is from the end of May to the end of October, the rain falls every day on the northern portions of the island from 2 p.m. to sunset. This is due to the mountains, which turn up the trade winds, saturated as they are with vapour in the afternoon, into the colder regions, and thus cause precipitation of rain. But this is all on the northern slope; for on the south side not a drop falls from this wind, and sometimes this part of the island suffers from drought for more than a year without interruption. So well known and so constant is this condition that it is proposed to tunnel through the mountains, and thus bring some of the superabundant waters of the north to the south side for the purpose of irrigation. It is instructive to notice here what a very moderate rise will cause constant rain from a wind that is nearly saturated with moisture. I am sorry I have not got observations of the actual state of the air, and the effect of the mountains in quantity of rain. Again, the celebrated rainy spot in India, where the annual rainfall is counted by hundreds of inches, is a place of exactly similar character. It stands 4200 feet high, on a range of hills on the north of the Bay of Bengal, and at a distance of 200 miles from the sea. The range rises abruptly to between 4000 and 5000 feet high, and has between it and the sea a belt of low and swampy land. The S.W. monsoon, coming over the Indian Ocean, arrives at this part of the coast laden with moisture, which is not abstracted, but rather added to, by the warm swampy belt at the foot of the hills. Directly the wind begins to mount the hills, the precipitation commences in earnest, and the rain comes down as it does nowhere else. At Cherra Pungee, a town on these hills, 4200 feet high, the annual rainfall is 600 inches, and of this enormous quantity about 500 inches fall from April to September. On one occasion the rain fell at the rate of 30 inches per day for five days, and in 1861 the total rainfall for the year reached the enormous quantity of 805 inches. No better example of the effect of hills on rainfall than this could be chosen. On the coast of New South Wales we have the same law in operation, and as a result 58 inches of rain falls at Cordeaux River, 1200 feet high (about), for 39 inches at Wollongong, the foot of the same hill; and Kurrajong, at an elevation of 1800 feet, gets 53 inches of rain for every 33 inches which fall at Windsor. At Kurrajong and Windsor the same proportion is maintained in heavy storm rains with easterly wind; but under such circumstances the rain at Cordeaux is double, and sometimes 230 per cent. of the rain at Wollongong. If we can get a measure of the force required to produce these effects, it will serve as a guide in estimating what would be required to make rain. At Sydney the average relative humidity is 73, and at Windsor it is rather less; and we have just learned that such atmosphere lifted from Windsor to Kurrajong, 1800 feet, deposits 60 per cent. more rain. If we could make it rise up over Sydney 1800 feet, we might fairly expect to get 60 per cent. more rain. Now, a wall built 1800 feet high, and of considerable length, so that the wind would not divide and go round it, but go over, would have the desired effect—*i.e.*, to lift the air and cause rain; but anything that would do this would serve the purpose, and it may be done by fire, but of course the fire must have the effect of lifting the atmosphere up. It will not do for the products of the fire to rise up slowly, mixing with the air, and making it drier as they rise. If it is to have the effect of a wall—that is, making the whole of the air passing over rise up 1800 feet—it must act, as an explosion would do, suddenly, or by a constant up-rush of such violence that it would rise up 1800 feet. The force necessary to do this is easily computed, and we can in this way get a money value for the work to be done. At Sydney the average velocity of the wind is 11 miles per hour, and all the air passing over is to be lifted, and the weight of it on the surface is, say, 14½lb. on the square inch, and 13½lb. at 1800 feet high. At least, for our present purpose, these figures are sufficiently exact. The average weight to be lifted, therefore, is 14lb. on the square inch. The fire must have the same length as the proposed wall for the same reason. We have, therefore, to lift a weight of 14lb. on the square inch over a surface of 1000 feet by 16 miles, 52,800 feet, and raise it up 1800 feet every minute. To do this we will assume that coal is employed, and that, as it is burnt in the air, the whole of its heat will be effective. The mechanical equivalent of good coal is 14 millions of foot pounds for each pound of coal used. We have therefore—

$$\frac{14 \times 12 \times 12 \times 1000 \times 1800 \times 52800}{14{,}000{,}000 \times 112 \times 20} = 6110 \text{ tons per minute} = 8{,}800{,}000 \text{ tons in a day,}$$

or nearly nine millions of tons of coal per day to increase the rainfall 60 per cent, at a cost, at 10s. per ton, of £4,500,000. Of course, this is only a theoretical experiment, and ignores all the heat lost by radiation and imperfect combustion; but it serves to give some idea of what is necessary to disturb the course of Nature, and I think shows how utterly futile any such attempt would be, even near the sea, where the air is moist. Inland it is a common thing in summer to find 20° between the dry and wet bulb thermometers, and when that is the case, the air would have to be lifted 6000 feet to form a cloud, and in such weather no cloud could form until either moisture were taken up from the Earth or the temperature of the air lowered about 34°. I may, perhaps, just mention, as an illustration of the tremendous forces in operation about us, but all unheeded, the mechanical power of the sunshine. It appears from the experiments of Sir John Herschel, confirmed by Pouillet, that ordinary sunshine exerts a force on every 14 feet of surface of one horse power, and on an acre of 3200 horses; or, to put it in another way, if we could utilise the sun's heat falling on a single acre of ground, we should have a steam engine of 3200 horse power, working steadily in sunshine, or a power equal to lifting 47 tons water 1000 feet high every minute. If we try to conceive of this power accumulating on a square mile or 100 square miles, or the whole country, we shall get some notion of the forces at work in the production of rain, and what it means if we try to interfere with them. And it is to be hoped that we shall some day make the attempt to use some of this cheap fuel in pumping up water from our wells for the purpose of irrigation. It is often said that if we could tap the clouds and let off the electricity we should at once get plenty of rain; but this is a pure assumption. Science has not yet been able to ascertain what part, if any, electricity plays in the suspension of clouds. Franklin's memorable experiment is often quoted as a proof that rain would follow if a conductor were sent up to the clouds; but the facts must be overlooked, for the rain fell before there was any appearance of electricity, and hundreds of similar experiments were made subsequently without bringing down the rain, and if there were any truth in the supposition the facts would be patent enough in large manufacturing districts with tall chimneys, lightning conductors, and smoke extending upwards as a continuation of the conductors, for there would be such frequent downpours as would convince the most superficial observer. And Crosse's experiments proved that lightning could be withdrawn from a cloud by miles of wire without producing rain. But has electricity so much to do with rain? Experience teaches us that the great bulk of rain falls without any electrical manifestation—even heavy tropical rains, and it is no uncommon thing for clouds to give rise to tremendous electrical discharges and not a drop of rain. It is evident, therefore, that the two have no necessary connection. I have not yet referred to the vibrations of sound as a cause of rain. The laws under which water is held in the atmosphere are well understood, and to anyone who knows these conditions, the idea that vibration will cause its precipitation is absurd. Sound-waves do not alter the temperature or tension of the air except in a very slight and temporary way, and, without change in one or both, water cannot be deposited. If it is said that the firing of cannon had caused rain, the reply is that the statement rests upon the incomplete testimony of a few persons who did not inquire into the facts as carefully as they ought to have done; and, on the other hand, there is the testimony of two generations in France, who, by constant experiment, were convinced that the sound of guns had the opposite effect, and, severe as M. Arago was upon them for their belief in fine weather made by cannon, they had quite as much evidence in favour of their view as have those who hold the modern one. It is estimated that in the battle of Sedan about 300 tons of gunpowder were used during the three days that the fight lasted; and the enormous amount of heated gases thus set free, and the heat of, say, 300,000 men, together with the actual moisture set free (probably equal to 0·010 inch on a square mile), might, if circumstances were favourable, disturb the equilibrium and cause rain; but none fell during the three days. On the fourth day, that is, the first after the battle, it did rain; but, even if it was a result of the battle, which is doubtful, the price is a heavy one to pay. It seems therefore unreasonable to hope for the economical production of rain under ordinary circumstances; and our only chance would be to take advantage of a time when the atmosphere is in the condition called unstable equilibrium, or when a cold current overlies a warm one. If under these conditions we could set the warm current moving upwards, and once flowing into the cold one, a considerable quantity of rain might fall; but this favourable condition so seldom exists in Nature that I think we must abandon the idea of making rain artificially. I hope I have not been tedious; but when so many proposals are put forward, some even going so far as to propose that our Government should take to cannonading the sky, it was time some one took the matter up; and I have tried as briefly as possible to place the important facts before you.

The Chairman then vacated the chair, and called upon the President-elect to fill it, and Mr. Rolleston did so.

The Rev. J. E. Tenison-Woods then said he took that opportunity of proposing a vote of thanks to Mr. Russell on his retirement from the office of President of the Society. There were two particular qualifications specially desirable in a president. One was, that he should be possessed of high attainments in some particular field of Science; and the other was, that he should have the welfare of the Society so thoroughly at heart that he should take an active interest in everything that concerned its prosperity. He thought these two qualifications had been most happily united in the retiring President. (Hear, hear). The address they had just heard was a most interesting one, and every one who had listened to it must have felt that the Society had gone ahead very much during his presidency. (Hear, hear). Wonderful strides had been made in scientific research recently; and it was no exaggeration to say that in the colonies New South Wales had taken the lead, distancing all the other colonies in scientific matters. This was creditable to us as a young community, and was calculated to raise us high, not only in the estimation of the other colonies, but in that of the world. (Hear, hear).

The motion was carried by acclamation, and Mr. Russell briefly acknowledged the compliment.

A vote of thanks was also accorded to the retiring council, the honorary secretaries, and the honorary treasurer.

Professor Liversidge, after acknowledging the vote, said that the Rev. J. E. Tenison-Woods had sent in to the Council a very valuable paper upon the "Geology of the Hawkesbury Sandstone," and as it was desirable that they should hear that gentleman read it himself, he moved that the meeting be adjourned till the following Wednesday evening for that purpose. Mr. Woods was to leave Sydney shortly, and that was the reason he submitted the motion.

The motion was adopted, and the meeting accordingly adjourned.

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## THE LINNEAN SOCIETY OF NEW SOUTH WALES.

The monthly meeting of this Society was held on Wednesday evening, 29th November. The President, Dr. James C. Cox, F.L.S., &c., was in the Chair.

The following donations were announced:—*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 publisher. "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."

The following papers were read:—

1. "Description of two new birds of Queensland,"—By Charles W. De Vis, B.A. One of these birds—*Prionodura Newtoniana*—

constitutes a new genus and species of the family Paradiseidæ. It is described from a unique specimen taken in Tully River scrubs, Rockingham Bay. The other bird described—*Cracticus rufescens*—came from the same locality.

2. By the Rev. CARL KALCHBRENNER—*Fungi aliquot Australiæ Orientalis.* The following new species were described—*Agaricus megalotheles*, *Agaricus Kirtoni*, *A. peltastes*, and *Scleroderma pileolatum.*

3. The Rev. J. E. TENISON-WOODS, Vice-President, read the fifth part of his "Botanical Notes on Queensland." This paper consisted of a description of the "Brigalow" scrubs, which consist mainly of *Acacia harpophylla* (F. v. M.) instead of *A. excelsa*, as usually stated. The brigalow forms thickets of from 30 to 80 feet in height, amongst which a peculiar flora occurs. A list of those collected by the author was given at the end of the paper.

4. "Contribution to a knowledge of the Fishes of New Guinea," No. 3,—By William Macleay, F.L.S., &c. In this paper Mr. Macleay completes the list of the Fishes sent by Mr. Goldie from Port Moresby, bringing the number of species up to 274. The new species described in the present paper are:—*Platyglossus guttulatus*, *Coris cyanea*, *Pseudoscarus Goldiei*, *Pseudoscarus frontalis*, *Pseudoscarus papuensis*, *Pseudoscarus zonatus*, *Pseudoscarus labiosus*, *Pseudoscarus Moresbyensis*, *Monacanthus nigricans*, *Monacanthus fuliginosus*, *Trygon granulata*, and *Tæniura atra.*

5. "Notes on the Geology of the Western Coal Fields," No. 2,—By Professor Stephens, M.A. In this paper Professor Stephens proceeds to an examination of the Wallerawang, Marangeroo, and Capertee conglomerates, which leads him directly to the conclusion that the continent off whose shores the upper marine carboniferous beds were deposited was a system of high mountain ranges, snow-capped, and under erosion by glaciers which descended to near the level of the sea. It was shown, further, that all the subsequent formations were of shore or river formation, in plains skirting the mountains, or in valleys penetrating their recesses, and that these were all fresh-water deposits, excepting the coal seams themselves, which were subaërial; and that the most recent sedimentary formation in that district was the Hawkesbury Sandstone, also lacustrine in origin, and due, like the underlying strata, to a continued rise of the lake waters upon the land.

6. "Note on an Australian species of Phoronis,"—By William A. Haswell, M.A., B.Sc. The species described, which was named *Phoronis australis*, was obtained with the dredge off Ball's Head in Port Jackson, and inhabits the walls of a semi-gelatinous sac of large size.

7. "Note on a curious instance of Symbiosis,"—By William A. Haswell, M.A., B.Sc. A *Cellepora*, having minute actinids scattered over its branches, and occupying the terminal portions of narrow canals in the substance of the bryozoarium, was dredged in Torres Straits. It was suggested that this may throw some light on certain

problematical pores occurring in various fossil and recent species of Bryozoa.

8. "Note on the segmental organs of *Aphrodita*,"—By William A. Haswell, M.A., B.Sc.

Mr. W. A. Haswell 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 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 Suva, 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 Suva by Capt. Brodie, of the "Ariel."

## THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

The usual monthly meeting of the Royal Society of South Australia was held in the Institute on Tuesday evening, November 7th. There was a moderate attendance, and Mr. C. Todd, C.M.G. (President), occupied the Chair.

Several donations of books, &c., were received.

Messrs. J. B. Whiting and A. B. Black were elected as Fellows.

In reference to the announcement of exhibits of Microlepidoptera, Professor Tate stated that Mr. Meyrick, a specialist in the department, was prosecuting his researches in this Colony; he had already visited Mount Lofty, Flinders Ranges, and was now at Port Lincoln, and thus the Society was debarred the honour of his presence that night. His researches had resulted in many discoveries, and he had promised to add to the University collection. He had been allowed to take from the University a number of specimens to describe from, and under those circumstances the exhibits could not be shown that night, but would be brought forward at some more suitable time.

The Professor exhibited a specimen of a plant new to Science, recently discovered by him in the Gorge of Onkaparinga, and named the *Trymalium Wayæ*, F. v. Mueller, and Tate, after the ex-President, because of his active aid in botanical research having brought about its discovery, and that of some others new to the colony. It belonged to a genus represented in Western Australia by several species. After the discovery of *T. Daltoni* in Victoria, we cannot regard the occurrence of another species in South Australia as very remarkable. The Professor exhibited *Hymenanthera Banksii*, an intricate thorny bush not previously known in the Colony. It was found by him in the Gorge of the Onkaparinga. He also exhibited *Dendrobium Canaliculatum* var. *Foelschii*, F. v. Mueller, a new variety of an epiphytal orchid from the vicinity of Port Darwin, discovered by Inspector Foelsche.

In answer to a question, Professor Tate said he believed the *Hymenanthera* would make an admirable hedge. It was a form of vegetation ascending to the snowy table-lands of Victoria.

The Professor also exhibited specimens of a hydrated siliceous rock, an altered marl, containing Miocene fossils, found by him at Tintaro, near Noarlunga, in a wilderness of scrub, at an elevation of 525 feet above sea-level. Hitherto fossiliferous beds of that formation in the district about St. Vincent's Gulf had not been known above 100 feet elevation. At the close of his remarks the Professor gave an interesting description of the physical features of the Onkaparinga River, pointing out that the stream flowed through a narrow gorge 500 feet in depth for a distance of several miles. The walls of this gorge were composed of clay slates, and were absolutely narrow. The land surface fell away rapidly on either side of the tertiary plains, which were about 150 feet above sea-level. The flanks and top of the walls of the primary rock were also covered by tertiary strata.

A collection of sea-weeds from Rottnest, Fremantle, by Mr. M. Malange de Courderot, was shown. There were a few interesting forms amongst them. A duplicate set had been sent to Norway.

Professor Tate also directed attention to a number of Alpine plants from the source of the Mitta-Mitta River. The collection was made by Mr. James Stirling, of Omeo, Victoria, and was obtained at an elevation of 4,000 or 5,000 feet. The Mitta-Mitta was a tributary of the Murray, near the boundary between New South Wales and Victoria.

Mr. Fraser S. Crawford moved—"That the Council be requested to arrange that the room be open one evening in each month for the purpose of allowing any Fellow who may attend an opportunity for discussing scientific subjects without notice." He urged that it would be most convenient to members, and further scientific investigation if such a plan were adopted. Informal meetings of this kind would enable unscientific members who were interested in the acquirement of information to gain largely from conversation, and the exchange of ideas with each other and with Fellows of special attainments.

Mr. Wilson seconded.

The Chief Justice moved, as an amendment—"That the proposition be referred to the Council for them to report." That would be more desirable than to occupy the evening with a discussion when there was an important paper to consider.

Professor Tate thought that would not be a correct course, as Mr. Crawford had conformed to the rules of the Society in regard to his motion. He would not oppose the measure suggested by Mr. Crawford if the regular meetings of the Society were to be allowed to benefit by the proceedings at the informal meetings.

The CHIEF JUSTICE urged that his amendment was not out of order. The President said it was quite in order. He sympathized with Mr. Crawford, because he could quite see that young members would benefit largely by it; but it would be advisable for that gentleman to remit his scheme to the Council, as it could afterwards be thoroughly ventilated.

Mr. CRAWFORD said it had been remitted to the Council, who did not fall in with the idea. He thought he was doing his duty, and was willing to postpone the matter to another meeting, but he did not care to have it remitted to the Council.

Dr. CLELAND suggested that a special committee might discuss the matter.

After some further conversation, the amendment was carried.

Dr. DAVIES THOMAS read an able and lengthy paper upon the subject of "Statistics of Hydatid Disease in Australia." He gave an account of the nature of the disease, as in his former paper on the subject, and in his statistics mentioned that the number of deaths from hydatid disease in South Australia during sixteen years was 34, viz.—In 1871, 1 death; 1873, 3; 1874, 1; 1875, 2; 1876-7, 11; 1878-9, 3; and 1880-1, 13. During the last ten years hydatids are credited with 1 death out of 1,043. The doctor spoke very strongly on the subject of hydatid disease in animals in the South-East, attributing its prevalence to the fact of the swampy nature of parts of the district being favourable to the production of the hydatid in its primitive form. Dr. Thomas also referred to experiments he had made with dogs killed by the police, and mentioned that out of 20 dogs 8 had *Tænia*. He thought the system of having private abattoirs favoured the spread of the disease, as dogs had access to such premises, and frequently fed upon diseased portions of slaughtered animals. In a case where he had attended a child under two years of age suffering from hydatids, he ascertained that the infant had been in the habit of playing with a pet dog, and had sometimes put to its own mouth bones gnawed by the dog. He strongly recommended the filtering or boiling of water used for drinking purposes, especially in the case of people living in the South-East.

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## THE ROYAL SOCIETY OF TASMANIA.

The usual monthly evening meeting of this Society was held on Tuesday, 14th ulto.; Mr. T. Stephens, V.P., in the Chair.

Mr. Wyatt Hickling, who had previously been nominated by the Council, was balloted for and declared duly elected as a Fellow of the Society.

The Hon. Secretary, Mr. BARNARD, brought under notice the returns for the past month; also meteorological observations for the month.

The following presentations to the Museum were made:—1. From Mr. William Knight, M.A.—12 coins, viz.: 1 franc piece (silver), French Republic, 1851; three half and three quarter annas (copper), India, 1835; one ditto, 1858; three ditto, 1862; one 5-cents, Ceylon,

1870. (2). From Mr. G. Dinham—Portion of cloth unrolled from the mummy of an Egyptian priest. (3). From Mr. A. S. Raiker, Campbell Town—A copy of the *Mercurius Caledonicus*, the first newspaper printed in Scotland, dated 1661. A silver egg-cup and spoon, a silver teaspoon, and pair of sugar tongs, formerly the property of an officer on board Captain Cook's ship when on the voyage round the world. (4). From Mr. E. D. Swan—140 specimens of shells, 5 ditto of birds, mounted, and a collection of insects, from Fiji; 25 specimens of shells and a lizard (*Pygopus lepidopus*), from New South Wales; and 8 Tasmanian birds, mounted.

The Secretary drew special attention to this valuable collection of objects of natural history from Fiji and New South Wales, presented by Mr. E. D. Swan, and observed that that gentleman set an admirable example to Fellows of the Royal Society, when visiting foreign countries, not to forget the Royal Society by adding to the contents of the Museum as opportunity was afforded, and thus helping to make it more and more attractive to the youth of the colony, specially, in an educational point of view.

The attention of the meeting was directed to a magnificent specimen of topaz, discovered by Mr. S. H. Wintle on the claim of the North Mount Cameron Tin Mining Company, and kindly forwarded by him to the Museum for exhibition. This specimen weighs 4lb., is of a pale blue colour, very transparent, apparently without flaw, and shows the form of crystallisation very perfectly. It will remain on view at the Museum for a few days.

The Chairman read a letter which he had received from Mr. Ward, Government Analyst, who, he said, had kindly undertaken to examine the West Tamar Asbestos, and to compare it with the manufactured product which had been exhibited in the shape of a specimen of packing for steam joints. The results of analysis are as follow:—

(A)

| | West Tamar Asbestos. | "Packing." |
|---|---|---|
| Silica ... ... | 41·80 ... ... | 38·88 |
| Magnesia ... ... | 36·22 ... ... | 31·68 |
| Iron Protoxide ... | 8·28 ... ... | 6·84 |
| Water lost at 212 F. ... | 1·00 ... ... | — |
| Do. lost at red heat ... | 12·70 ... ... | 22·60 |
| Lime ... ... | none ... ... | traces |
| | 100·00 | 100·00 |

(B)

Results calculated *minus* loss on ignition:—

| | West Tamar Asbestos. | "Packing." |
|---|---|---|
| Silica ... ... | 48·43 ... ... | 50·23 |
| Magnesia ... ... | 41·97 ... ... | 40·93 |
| Iron Protoxide ... | 9·60 ... ... | 8·84 |

In reference to (B), Mr. Ward says:—"I have also calculated them out minus the total loss on ignition, thus getting a much fairer comparison, as the 'packing' contained oil as well as water. The results show that, so far as chemical composition goes, there is nothing against the use of the Tsamanian mineral for similar purposes. The composition in each case closely resembles that of some varieties of serpentine, and not that of hornblende.

Mr. R. M. JOHNSTON, F.L.S., read a description of a new species of Fish (*Lophotes Guntheri*), caught near Emu Bay, Tasmania.

Mr. JOHNSTON then read the concluding portion of his paper on the Fishes of Tasmania, which had been held over from a former meeting.

The SECRETARY referred to the elaborate and exhaustive paper on the Fishes of Tasmania which had just been concluded by Mr. Johnston, and regretted the absence of several members who had been present at the previous evening meetings, when the two former parts had been read, and who, it was anticipated, would have joined in the discussion upon the whole subject when completed. It had been hoped also that the paper might have been printed in the interim, to facilitate the discussion. Mr. Barnard added, that the Society, as well as the colony, are highly indebted to Mr. Johnston for his valuable contribution to this important division of natural history, as, to his own personal knowledge, the publication in the Tasmanian *Journal of Science*, some forty years back, of an article by Dr. Richardson, on the Fishes of Port Arthur, was followed up by an earnest application from the writer to the then Lieut.-Governor, Sir John Franklin, to procure and send home specimens of all new varieties of fish that could be obtained from our waters; and ever since, a more comprehensive account of our Fishes has been deemed a *desideratum*. This has now been accomplished by Mr. Johnston, who enumerates 190 species of Fish as known to Tasmania. Mr. Barnard then referred to the economic uses of the fish which abound on our coasts, and said this catalogue, in pointing out the best species for the purpose of being cured and exported, will prove a most useful guide in promoting trade and foreign commerce; and he concluded by moving the thanks of the Society to Mr. R. M. Johnston for his valuable papers, to Mr. W. F. Ward for his analysis of the specimens of Asbestos, and also to the various donors of contributions to the Museum during the past month.

Mr. NAPIER remarked that many years ago a large trade was done by some Chinese in the treatment of fish for exportation.

The vote of thanks, moved by Mr. Barnard and seconded by Dr. E. J. Crouch, was then put to the meeting and carried unanimously.

Mr. JOHNSTON, in acknowledging the vote of thanks, spoke of the labours of those who had preceded him in the same path, and especially mentioned the late lamented Mr. Morton Allport as having contributed largely to the Ichthyology of Tasmania; and he then drew the attention of the meeting to some exquisite drawings of certain Fishes, by Mr. H. J. Graham, which he had brought down for exhibition.

The meeting, which is the last for the session of 1882, then closed.

# NOTES, MEMORANDA, &c.

This month's issue of the SOUTHERN SCIENCE RECORD brings to a close the second volume of the Journal. When the publication was first inaugurated, we found sixteen pages sufficient to meet the demand on its space. On the completion of the first volume, however, it became necessary to increase the number of pages to meet the fast growing requirements of the time. The increase we then made *appeared* to us ample for all probable needs. But we now find it absolutely necessary to *still further increase* our pages, so pressing and important is the matter which claims insertion. As it will be obvious to our readers and subscribers that we cannot continue to add to the cost of production of the SOUTHERN SCIENCE RECORD without some proportionate return for our outlay, we are constrained to make the price of the Journal henceforth ONE SHILLING per copy. The Journal will consist of Thirty-two pages of closely-printed matter per month, which, however, may require to be supplemented, as hitherto, under unusual pressure.

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We are obliged to withhold for the present our intended notice of Professor McCoy's "Decades of the Zoology of Victoria," No. VII. We will endeavour to review the work early in our new volume. Other important matters are also postponed for the third volume.

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As will be perceived by friends and subscribers, our issue of this month has already swollen to the full number of pages which it is proposed shall comprise the monthly publication for the year 1883, thus supporting the urgency of our contemplated enlargement. We must take this occasion to thank our friends and supporters of the Journal for past favors, and will look for a continuance of their support in the future.

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"THE GARDEN AND FIELD, ADELAIDE, S.A.—This is an unpretending little periodical published monthly, and deserves to be well patronized, both in South Australia and in all the other colonies, since the matter therein is of a nature likely to be of interest over the entire Continent. The Agricultural and Horticultural interests are principally dealt with, but we notice that scientific matters are included in the contents, such things being as attractive, perhaps, among country as among town readers. Then there are articles by, we suppose, a Melbourne writer upon "Analysing the Sun," "Producing Rain or Droughts at will," &c. A glance at the contents of any number will show that many other subjects are ably treated. We cordially wish the publication every success, both at home and abroad. We are not aware whether the proprietary have established agencies in Melbourne and Sydney, but their monthly issue can easily be obtained through Messrs. Gordon and Gotch, or directly from the publishers, Messrs. Webb, Vardon, and Pritchard, Graham-street, Adelaide. The subscription is six shillings per annum.