THE

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OF THE

## Field Naturalists' Club of Victoria.

**VOL. IX.**

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The Author of each Article is responsible for the facts and opinions he records.

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## VOL. IX.

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## FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting was held in the Royal Society's Hall on Monday evening, 14th March. Professor W. Baldwin Spencer, president of the Club, was in the chair, and there was an attendance of some 80 members and friends.

### LIBRARIAN'S REPORT.

The hon. librarian reported the receipt of the following donations to the library:—"The Geelong Naturalist," quarterly, Nos. 1, 2, and 3, from Gordon College Field Naturalists' Association; "Technics," journal of Stawell Technical College, 1st February, 1892, from Stawell School of Mines; "Records Australian Museum," vol. i., No. 11 (Index), from Museum; "Catalogue Marine Shells of Australia and Tasmania," part i., from Museum; "Journal New York Microscopical Society," vol. viii., part 1, from Society.

### ELECTION OF MEMBER.

On a ballot being taken, Mr. H. Quiney was elected a member of the Club.

### PAPER.

The only paper of the evening was communicated by Professor W. Baldwin Spencer, on "A Trip to Queensland in Search of Ceratodus." Special interest attaches to this form, since it is the Australian representative of a small group of animals (the Dipnoi) which is intermediate between the fishes and the amphibia. Ceratodus has its home in the Mary and Burnett Rivers in Queensland, whilst its ally, Lepidosiren, is found in the Amazon, and another relative, Protopterus, flourishes in the waters of tropical Africa. Although unsuccessful in obtaining the eggs of Ceratodus, owing to the early season, Professor Spencer was able, from a careful study of the surroundings under which the animal lives, to demonstrate very forcibly that its lung is, doubtless, of as great a service to it during the wet as during the dry season—a theory in direct opposition to the generally accepted one that it functions principally during the dry season, when the animal is inhabiting a mud-cocoon within the dry bed of the river. Many interesting specimens, including Ceratodus, earthworms, land planarians, Peripatus, &c., were secured, and

shown in illustration of the paper; and the limelight views, prepared from photograghs taken on the trip by Professor Spencer, and exhibited by Mr. J. Searle with his usual skill, were a fitting accompaniment to a highly interesting paper.

NATURAL HISTORY NOTE.

Mr D. Le Souëf read a note communicated by Mr. H. Barnard on "A Visit to the South Barnard Island, Northern Queensland." Interesting details were given as to the bêche-de-mer fishery conducted there, and full description of a Tern rookery.

EXHIBITION OF SPECIMENS.

The meeting terminated with the usual exhibition of specimens, of which the following is a list:—By Mr. E. Anderson.—Specimen of *Thailina selene*, bred from a larva taken at Gisborne by Mr. G. Lyell, jun.; 2 specimens of *Monoctenia vinaria*, bred from larvæ distributed by the Rev. Mr. Hennell at the January meeting; water-colour drawings of *Monoctenia vinaria* and *Ialmenus evagorus*. By A. Coles.—Lace Lizard from Dimboola; Australian Goshawk; Death Adder, captured at Monduval, N.S.W., after having bitten Mr. J. M. Simson, of Toorak, who was successfully treated with strychnine and ammonia. By Miss Cochrane.—Paintings of orchids and other Victorian wild flowers. By Mr. C. French.—Eleven new species of Australian Longicorn Beetles, including one new genus and three new species found in the Berwick and Lilydale districts, Victoria. Names as under:—*Maulia* (new genus) *pictipennis*, Blackburn, new species, Berwick, Victoria—C. French; *Bebius* (genus new for Victoria) *variegatus*, Blackburn, new species, Lilydale, Victoria—C. French; *Ectosticta ornata*, Blackburn, new species, Lilydale, Victoria—C. French; *Penthea conferta*, Blackburn, new species, interior of Queensland; *Lygesis ornata*, Blackburn, new species, Queensland; *Monohammus frenchii*, Blackburn, new species, Queensland; *Sisyrium lævigatum*, Blackburn, new species, Western Australia; *Opsidota guttata*, Blackburn, new species, Western Australia; *Microtragus frenchii*, Blackburn, new species, Western Australia; *Neostenus nigra*, Blackburn, new species, Western Australia; *Coptocercus tatei*, Blackburn, new species, Western Australia; also Lepidoptera from New Guinea. Exhibited by C. French, jun.—Eggs of Glossy Ibis; eggs of Western Brown Hawk. By Mr. G. Hill.—Victorian Coleoptera. By Master Gerald Hill.—Victorian Hymenoptera. Exhibited by Baron von Mueller.—The following plants, collected by Stephen Johnson:—*Wrightia baccelliana*, from Russell River, Queensland—new to science; *Phyllanthus hypospodius*, from Mount Bartle Frere, Queensland—new to science; *Eugenia johnsonii*, Mount Bartle Frere, Queensland—new to science; *Wendlandia basist*

*aminea*, from Russell River, Queensland ; *Cassinia lævis*, new for Victoria, collected by A. J. Campbell, near Bacchus Marsh ; *Cassytha paniculata*, new for Victoria, collected by S. Jephcott, Hume River; *Eugenia hedraiophylla*, F. v. M., Mossman's River, Queensland—new to science. By Mr. D. Le Souëf.—Eggs of the Comb-crested Parra or Lotus Bird. By Mr. F. Spry.—Larva of *Agarista casuarinæ* (18 days old).'

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The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 11th April. Professor W. Baldwin Spencer (president) was in the chair, and there was a full attendance of members and friends.

### REPORTS OF EXCURSIONS.

The first report was read by Professor Spencer, who, together with Mr. C. French, F.L.S., headed an excursion to Fern Tree Gully on 26th March. The party was unable to get through much real work, owing to the heavy showers of rain which fell at intervals during the day, but those who remained in the district for the following day were more fortunate. Professor Spencer recorded seven species of earthworms, two of which were new, together with the same number of land planarians and a few specimens of *Geonemertes ;* Mr. French reported a fair collection of beetles, flies, cicadas, and ichneumons ; Mr. H. T. Tisdall furnished a long list of botanical specimens, including a large number of fungi. Amongst the former was a rare orchid *(C. leptochila)*, recorded for the first time for Victoria. Mr. C. Frost named several birds and five lizards, one of the latter *(Liolepisma æneum)* being noted for the first time in Australia, though found previously in New Zealand ; whilst Mr. T. Steel noted the curious land shell, *Helix atramentaria.*

A report of the Club's excursion to Merri Creek, under the leadership of Mr. G. Sweet, followed. The geologists met with a fine section showing the basalt resting directly on the silurian rock ; but by far the most interesting objects were the fine sections of columnar basalt. Only a few of these columns have been left standing their full height, the superiority of the stone for building purposes making it an object of special interest to the quarryman. In a special note Mr. Sweet advocated the employment by the Government of some of the unemployed to clear away the *débris* which at present somewhat obscures this remarkable and uncommon formation.

### ELECTION OF MEMBERS.

A ballot for new members resulted in the election of Mr. Eyre Williams, B.A., Mr. J. B. Backhouse, M.B., and Mr. H. Grayson.

PAPERS.

The first paper was contributed by Mr. James Lidgett, and treated of "Some Transformations of Australian Lepidoptera." The paper was divided into two parts, the first of which served as an introduction to a systematic treatment of the subject, which embraced the life-history of nearly a dozen separate forms.

Mr. A. J. Campbell, F.L.S., then gave an oxy-hydrogen lantern exhibition illustrative of a recent trip through a dense tropical jungle in the Richmond River district of New South Wales—a paradise for a naturalist, but scarcely for a photographer. Nevertheless, Mr. Campbell proved the camera to be a valuable adjunct to his field work, and managed to bring back about four dozen negatives, from which, with the assistance of two members of the Working Men's College Photographic Club, he was enabled to make a series of very effective slides, remarkable not only for their clear and crisp outlines, but also as illustrations of valuable natural history subjects and typical scrub scenes. Mr. R. S. Sugars very successfully worked the apparatus, kindly lent for the occasion by the authorities of the Technical College.

The following may be mentioned as amongst the most successful views of the series:—"In the Pine Ranges," "Still Life," "Marshall Falls," "Palm Scene," "Botanical Studies," "Bower of the Regent Bird," and coaching scenes, especially the one "Under the Shadow of a Great Rock."

DEPUTATION TO THE GOVERNMENT.

The chairman announced that a deputation from the Royal Society and the Field Naturalists' Club waited on the Chief Secretary on Thursday, 7th April, and asked that the allowance for the department of the Government Botanist, which has been reduced by the Cabinet from £2,750 a year to £1,200, should be increased to £1,500, as this would enable Baron von Mueller to more effectually carry out the work pertaining to his office. Mr. M'Lean, in replying, said the Cabinet had only decided on the reduction after having made careful inquiry into the department and its utility, and they came to the conclusion that £1,200 would be ample to devote to the purpose. However, as the deputation had asked him to again bring the matter under the notice of the Cabinet, he would do so on the first opportunity. The Club was represented by Professor Spencer, Rev. W. Fielder, and Mr. F. Wisewould.

EXHIBITION OF SPECIMENS.

The meeting terminated with the usual exhibition of specimens, of which the following is a list:—By Mrs. Flatow.—*Spondylus*, from California; fossil fish, from Lebanon; Nautilus (fossil) and Ammonite, from England. By Mr. C. French, sen.—A

complete collection of the British Sphingidæ ; also a rare orchid (*Cryptostylis leptochila*, F. v. M.), from the Dandenong Ranges. By Mr. C. French, jun.—Case of Australian sea-birds' eggs, including ten species of Terns. By Mr. G. E. Hill.—A case of Victorian Longicorns and two Victorian snakes. By Baron von Mueller.—*Embelia flueckigeri* (new to science), collected at Russell River, Queensland, by Stephen Johnson ; *Eugenia sayeri* (new to science), collected at Russell River, Queensland, by W. A. Sayer ; *Eugenia myrsinocarpa* (new to science), collected at Trinity Bay, Queensland, by Fitzalan ; *Argophyllum nitidum*, collected at Johnstone River, Queensland, by Berthau—new for Australia ; *Myrtus epipastica*, collected at Endeavour River, Queensland, by W. Persieh—new to science. By Mr. Dudley Le Souëf.—Nest and eggs of the White-eyebrowed Robin ; also, *Peripatus insignis*. By Mr. T. Steel.—Egg cells of the Mason Wasp, from Fiji ; also Land Shell (*Helix atramentaria*) from Sassafras Gully.

## EXCURSION TO MERRI CREEK.

THE excursion to Merri Creek for geology, on Saturday, the 5th March, was moderately well attended. Several members met at Spencer-street station, and on reaching Coburg station their number was increased. The course selected by the leader—Mr. George Sweet—was nearly due north, over the southern portion of the basaltic rocks which form the surface of most of the land from Brunswick to the Dividing Range. Several old worked-out quarries, with massive blocks of basalt still standing solitary and alone amid the *débris*, bore testimony to the excellent character and extensive use of this class of rock. Ever since substantial buildings have been erected in Melbourne it has been used for the basements and for paving the water channels of rights-of-way, for which it is well adapted. Turning at right angles towards the east when opposite the North Coburg station, we encountered the quarries where a large part of the present supply of bluestone for building and paving purposes is obtained. Reaching the top of the west bank of the creek, it was found that the course of the creek lay through the basalt itself, through which it had eroded its course to a depth varying from 40 ft. to 60 ft., with banks generally sloping back from the creek for a hundred yards or more, but rising where we first struck the creek, and also in some other places, into precipitous cliffs of basalt overlying upper silurian rock, which occasionally appeared in the bed of the creek, and in which the waters had found a rock more easily eroded than the massive basalt. Owing to this occasional large and deep pools have been formed, very tempting to bathers, and which are only secured against such use by the strict enforcement of the

bye-laws. Near Newlands Bridge a fine section was met with, showing the basalt resting directly on the denuded, upturned edges of the silurian rock, which was observed to be slightly altered by the heat of the basaltic flow for a foot or two below the line of contact. The dip of the beds here was W. 15°. No fossils could be observed in any of the stratified rocks, though diligent search was made, and we had to be content with suggestive markings in the bedding plains. Crossing over the market gardens cultivated by the industrious Celestials, and well irrigated by the Yan Yean waters, proof was seen of what this basaltic soil is capable of growing under favourable conditions. Continuing our course behind (east of) the Stockade, evidences of the double flow of basalt are observable. One flow appears to have found its way into the then existing depressions in the surface, containing in some places a soft calcareous material, and in others highly ferruginous sand and quartz gravel deposit. Both were seen to have been forced among the flowing mass, and now appear chiefly at the bottom of the lower flow, and penetrating upwards into the main mass—the former as an impure limestone in veins and larger masses, and the latter (seen in the bed of the creek) ferruginous conglomerate, compactly cementing together other portions of the lower part of the first flow. In the basalt near this zeolites are in places abundant; crystals of arragonite and calcite were also obtained. But by far the most interesting object of this excursion was the fine section of columnar basalt (similar in character to that at the Giant's Causeway, in the north of Ireland) in the old prison quarry, now unused, at about midway along the back (east) of the Stockade. Here, for a width of 120 feet, and to a height of 20 feet near the centre, the columns have been quarried, in common with the slightly laminated and nodular basalt flanking and surmounting them—these monoliths having been sought, on account of the superiority of the stone, for important parts of the prison. But few of them have been left standing their full height, nearly all of them having been broken off; still a fine section was before us, appearing to occupy what was a deep and long depression in the land surface at the time of eruption. A striking peculiarity of this section is that, though the columns, all across the central main body of the mass, are vertical, yet, on either side, where the height is much less, the columns incline towards the centre of the mass till, on the extreme flanks, they approach the horizontal, appearing something as a section of the high stacks of loose fire-wood seen in some parts of the bush, where all are erected on their ends; the central logs are vertical, or nearly so, while, as they recede from the centre, their tops incline towards it more and more, till, if the stack is still added to, the outer logs, acting

as so many abutments, will approach the horizontal. From the quarry across the creek the same prismatic structure continues in a north-eastern direction, the creek having cut its course across the line of this formation, so that, in its bed and up the eastern bank, the present tops of the columns form a pavement of geometric design, observable for a distance of 120 feet by 30 feet, showing 4, 5, 6, and 7-sided figures, the most common being the pentagonal and hexagonal. Some of the horizontal joints show an approach to the cup-and-ball socket structure of jointing, the concavities being distinct. Wherever this prismatic structure occurs the basalt is very dense, the joints small, and the columns fitting closely together. Here we lingered among the ruins of this temple of nature with delight equal to what one might feel when among those of art. To say that we worshipped is unnecessary, since we each, after the fashion of all visitors to ancient structures, brought away with us relics to illustrate our visit and perpetuate its memory.

## VISIT TO SOUTH BARNARD ISLAND.

By H. Barnard.

Communicated by D. Le Souef.

I was landed on the South Barnard Island from the s.s. *Palmer* at 12 o'clock at night, and carrying my luggage well above high water mark, found a sailing boat docked on some logs for repairs, so I laid down under it and slept till morning. A little after daylight I saw a man come out of one of the huts, of which there were several, and then introduced myself to him. He turned out to be the head of the fishing station, and he invited me to stay as long as I pleased, but told me that all his boats were at the Barrier Reef, 30 miles away, and that one of them came in every day with the slugs or bêche-de-mer, and went out again at once; he also pointed out that there were two sandbanks about 25 miles out on the way to the reef, on one of which Terns were breeding in hundreds, and if I liked I could go out in one of the boats and the men would land me on the banks for an hour or two. As one of the boats came in the same evening and left at 12 o'clock the same night, I went in her; this was Saturday night, but, owing to there being very little wind, we did not get to the reef till Monday morning. Going out we passed within sight of the sandbank, but not near enough to see the birds. Out here it was beautiful. The coral, which was within a few feet of the surface, was of every shape and colour imaginable, and we passed over miles of it. There were four fishing boats anchored where we went, and the method pursued is to have a piece of wire tied on to a long pole. The slugs are taken at low water out of rowing boats. When fishing is ended for the day the slugs are thrown into the hold of one of the larger boats, and then taken to the island, where a lot of gins split them down the

back, and throw them into a large pot. They are boiled for about an hour, and are afterwards hung in a smoke-house till dry, when they are bagged and sent to Geraldton, and sold for about £10 per bag. Now for the birds: I stopped at the reef till the afternoon, when, as one of the boats was returning, I went with it, and in about half an hour we again sighted the sandbank. As we neared it I could see the birds flying about in thousands. We ran the boat right on to the sand and jumped out into the water, which was about two feet deep. The birds rose and circled overhead as we landed; I had three shots, bringing down a bird each time, when the rest took their departure, and I was not able to obtain a fourth. The eggs were lying on the sand in hundreds—I may say thousands, for in one place I noticed a heap about eight inches deep, and in another they were laid as close together as the birds could sit for more than six feet square. The bank was not more than twenty yards across, and about three feet above high water mark. The Terns were the same species we saw breeding on one of the North Barnard Islands. I only stayed on the bank about half an hour, as the men were anxious to get away. We reached the island about one o'clock the same night, and I employed the next morning in skinning the birds and blowing the eggs. Owing to the want of a boat, I was as much handicapped on this island as we were on the North Barnard, so I employed the time in searching for insects, of which there were very few. I did not leave till the following Sunday, as the steamer was delayed, and then returned to Rockhampton.

## LIST OF INVERTEBRATA OBTAINED DURING THE EXCURSION TO THE GRAMPIANS.

### ARACHNIDA.

Araneida.

Species of the following Genera:—Anepsia, Argiope, Epeira, Arcys, Tetragnatha, Celænia, Cryptothele, Centropelma, Ariamnes, Theridium, Latrodectus, Habronestes, Amaurobius, Mithurga, Lampona, Drassus, Clubiona, Mygale, Stephanopis, Cymbachna, Diæa, Tharpyna, Voconia, Lycosa, Hasarius, Salticus.

### LEPIDOPTERA.

Gastrophora henricaria
Epinephile abeona
Delias harpalace
„ aganippe
Heteronympha merope
Xenica klugii
„ kershawi
Pyrameis kershawi
Pyrameis itea
Synemon sophia
Hesperilla donnysa
„ (sp.)
Agarista casuarinæ
„ lewini
Chærocampa
Teara tristis

And several of the micro-lepidoptera.

COLEOPTERA.

Longicornes—
Epithora dorsalis
Coptocercus rubripes
Phoracantha fallax
,, recurva
Trichomesia newmani
Hebecerus crocogaster
Distichocera par
Pseudocephalus (sp.)
Unknown, 3 species
Buprestidæ—
Stigmodera macularia
,, octospilota
,, xanthofulosa
,, octosignata
,, amphichroa
,, australis
,, unknown, 4 sp.
Lucanidæ—
Lamprima cultridens
Autacocyclus (sp.)
Lucanidæ—
Mastochilus (sp.)
Rutelini—
Anoplognathus (sp.)
Carabidæ—
Calosoma schayeri
Unknown, 3 species
Elaters—
Chrosis illita
Unknown, 6 species
Cleridæ—
6 species
Curculionidæ—
16 species
Mordellidæ—
4 species
Cistelidæ—
3 species
Chrysomelidæ—
20 species

## DESCRIPTIONS OF NEW AUSTRALIAN PLANTS, WITH OCCASIONAL OTHER ANNOTATIONS;

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

*(Continued.)*

Myrtus monosperma.

Glabrous; leaves rather large, on very short petioles, mostly ovate-lanceolar, bluntly protracted at the upper end, cuneate at the base, somewhat undulate, dark-green and shining on the surface, less so beneath, their primary venules rather distant, moderately prominent, their oil-dots very copious and pellucid; pedicels few or several, axillary, capillary, rather long, some on compressed thin peduncles; flowers very small; lobes of the calyx four, semiovate or semiorbicular, conspicuously ciliolated; petals almost glabrous, half over-reaching the calyx-lobes; anthers orbicular- or cordate-ovate, brownish; disc glabrous; ovulary two-celled; fruit small, nearly globular, usually one-seeded, its pericarp very thin; seed comparatively large, almost globular, its testule cartilaginous, pale, quite smooth, shining; embryo forming only one coil, but at one end somewhat protruding beyond the curvature.

Endeavour-River; W. Persieh.

Sap of the wood, according to the finder's note, of epipastic effect.

Leaves to 3 inches long and to 1½ broad, somewhat resembling those of *Scolopia Brownii*. Pedicels attaining a length of one inch. Flowers hardly above ⅛-inch long. Fruit measuring about ⅓-inch. Seed of nearly ¼-inch measurement, its endopleura brown and smooth. Already the carpic characters are sufficient to distinguish this species from all others. The extreme acridity of the sap, if adscribed rightly to the wood of this particular tree, seems unique in the genus if not the whole myrtaceous order.

*Myrtus lasioclada* in a remarkable variety (or perhaps closely allied but distinct species) to which the name *decaspermoides* has been given, shows leaves shaped like those of *Decaspermum paniculatum* and *Myrtus Beckleri*, with inconspicuous venulation, recurved pedicels, five-lobed calyces and very abbreviated stamens with anthers, perhaps through monstrosity, pointed by the excurrent connective. The doubts about this plant can best be unravelled in its native locality, successive altitudes of occurrence more particularly affecting the characteristics of highland-plants.

*Decaspermum paniculatum* occurs on the Logan-River (Scortechini), and on the Bellinger-River (W. Macdonald).

*Rhodamnia Blairiana* has with *Argophyllum nitidum* been brought from Mt. Bartle-Frere by Mr. Stephen Johnson. Well formed seeds very angular; testule bony-hard.

*Rhodomyrtus trineura* extends to the sources of the Burdekin-River and also to Mt. Bartle-Frere. Leaves to 5 inches long, 2 inches broad. Petals pink.

*Eugenia minutiflora* bears some affinity to *E. confertiflora*.

*Eugenia grandis* we have also from Endeavour-River, where it was found by Mr. Persieh.

*Eugenia suborbicularis* is now also known from the Mitchell-River (E. Palmer). Bark smoothish, brown. Fruit copiously produced, attaining sometimes the size of a middling apple; its pericarp pleasantly acid, but often not without some acridity, outside red. (Daemel.)

Eugenia Luehmanni.

Glabrous throughout; leaves short-stalked, small, almost lanceolar but gradually much protracted into a bluntish acumen, the venules much concealed; panicles short, brachiate, their main divisions somewhat thyrsoid; pedicels almost undeveloped; flowers very small, rather crowded, three or two or only one on the short ultimate peduncles; calyx-tube hemi-ellipsoid, without any conspicuous angulation, densely glandular-dotted; lobes semiorbicular, much shorter than the tube; petals of about double the length of the calyx-lobes, disconnected, very much surpassed by the stamens and style; anthers almost ovate; stigma minute; ovulary deeply sunk, two-celled.

On Mount Bartle-Frere, together with a Styphelia of the section Acrotriche; Stephen Johnson.

Height of tree to about 20 feet. Leaves 1½ to 2½ inches long, ½ to ¾ inches broad, much shaped like those of *Decaspermum paniculatum*. Flowers appearing racemously arranged when some are solitary on the ultimate peduncles. Calyx during anthesis hardly ¼ inch long, dull-brownish outside. Petals and anthers whitish. Ovules rather few. Ripe fruit unknown.

This hitherto unrecorded plant exhibits many of the characteristics of *E. spicata*, but its corolla is never syzygoid, although this affords neither an absolute mark of distinction for that species; the leaves are generally smaller, the pedicels seem never to become conspicuously developed, the ultimate peduncles are shorter, the flowers less numerous in the panicle and thus less umbellular-fasciculed but partly somewhat spicate, and the fruit, when known, may show further differences.

HYPSOPHILA OPPOSITIFOLIA.

Leaves on rather long petioles, mostly opposite and ovate-lanceolar, bluntly acuminated; panicles many-flowered, cymous, terminal and axillary; sepals connate towards the base; petals ovate, outside beset with short appressed hairlets; filaments much incurved, considerably longer than the anthers, stoutish, dark-purplish, hispidulous; style very short; stigma much broader, depressed; disc as well as ovulary glabrous.

On Mount Bartle-Frere; Stephen Johnson.

Leaves 1½ to 3 inches long, therefore smaller than those of *H. Halleyana*, from which the diagnostics above given readily distinguish this congener. Should nevertheless it pass by middle forms into the plant first described within this genus, then the additional notes, now offered, will further build out the specific definition. Fruit of the new form has not been found yet.

BEILSCHMIEDIA LACHNOSTEMONEA.

Leaves mostly ovate- or elliptic-lanceolar, protracted into a short blunt acumen, glabrous, closely reticular-venulated, on both sides shining; panicle beset with minute appressed hairlets; sepals and petals almost of equal length, nearly oval, connate towards their bases; the six stamens of first rank somewhat shorter than the sepals and petals, the three of second rank still shorter, the filaments all brownish-lanuginous; staminoides three, very short; pistil in staminate flowers narrow-conic, glabrous, with a minute stigma.

Russell's-River; W. Sayer.

The plant in its characteristics fits closely *B. Roxburghiana*, of which however even for India the specific limits remain yet unsettled, it being so difficult to obtain from jungle-trees the flowers and ripe fruits simultaneously at the same localities. The plant, now described as new at all events for Australia, seems to differ from the typic *B. Roxburghiana*, which is neither yet recorded from the Sunda-Islands, in somewhat smaller leaves, shorter petioles, more elongated panicles, more lanuginous filaments and

narrower staminoides; the fruit, as yet unknown, may also be different. The flowers are conspicuously larger than those of *B. obtusifolia*, the only other Australian congener as yet discovered, and some other differences occur between the two.

ENDIANDRA DICHROPHYLLA.

Branchlets bearing a very thin silk-like vestiture; leaves rather large, ovate-lanceolar or almost ovate, short-acuminate, dark-green on the surface, much paler on the lower page and there bearing a very subtle-appressed indument, rather strongly keeled, their primary venules thin and devoid at their axils of conspicuous foveoles, the secondary venules reticular; panicles usually much shorter than the leaves, axillary and terminal, bearing a very thin somewhat silk-like vestiture, bracts rather conspicuous, ovate-lanceolar; flowers very small, on extremely short pedicels; sepals somewhat larger than the petals, with these connate below the middle and persistent; filaments extremely short; fruit narrow-ellipsoid; pericarp very thin, outside black, glabrous; endopleura of the seed brown.

Russell's-River; Stephen Johnson. Height of tree, as far as ascertained, to 40 feet. Leaves 2–5 inches long, 1⅓–2 broad, their petioles rather short. Fruit when well developed about 1 inch long. The leaves resemble rather those of *Cryptocarya patentinervis*, than those of any Australian Endiandra, although four of the congeners have the leaves also greyish underneath, but the costulation is less prominent and copious than in most of the others, while besides various recorded characteristics separate them. Several other new laurinaceous plants, of which we have specimens in our collections from North-Queensland, can for want of adequate material not yet be described.

April, 1892.

## LYRE BIRDS.

*To the Editor of the Victorian Naturalist.*

SIR,—It may be of interest to your readers and members of the F.N.C. to learn that Lyre Birds are already beginning to build in the Dandenong Forest. On 23rd March Mr. Robert C. Chandler and I found a newly started nest there, the walls of which were raised by the birds at least two inches between the time of our passing in the forenoon and return some three hours later. This early building has been suggested as an explanation of the fact of two eggs being occasionally found in one nest. The bird laying now is supposed to get tired of sitting, to desert the nest, and to return at the usual breeding season (from June forward), when she lays another egg, and sits again. What say our ornithologists?—Yours, &c.,

H. KENDALL.

Rathmines Grove, Auburn.

THE

# Victorian Naturalist.

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## FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting was held in the Royal Society's Hall on Monday evening, 9th May. Professor W. Baldwin Spencer was in the chair, and there was an attendance of about 100 members and friends.

### LIBRARIAN'S REPORT.

"Records of Australian Museum," ii., 1; "Nests and Eggs of Australian Birds, Supplement 2," by A. J. North, from author; "Journal of Bombay Natural History Society," vi., 4; "Proceedings of Royal Society of Victoria," iv., new series.

### ELECTION OF MEMBERS AND AUDITORS.

On a ballot being taken, Miss Tulford, Miss Turner, Master E. R. Turner, and Messrs. W. Anderson, E. A. Mann, T. M. M'Knight, F.L.S., and H. G. Turner were elected members of the Club. Nominations were received for office-bearers for the coming year, and Messrs. H. Ashworth and J. Shephard were elected as auditors.

### PAPERS.

Two papers were read by the secretary, the first of which was contributed by Mr. T. S. Hall, M.A., and had reference to "Musical Sands." On a late visit to Phillip Island, Mr. Hall noticed that the sand when walked over gave out a musical note resembling that caused by drawing the finger rapidly over a piece of corded silk. Various theories propounded by naturalists were brought forward in explanation, and the hope was expressed that those of our own country would give the subject consideration.

The second paper, contributed by Mr. C. C. Brittlebank, dealt with the "Life History of two Insects," and gave some very interesting details concerning the transformations of one of the Curculionidæ, together with the life cycle of one of the "Tree-hoppers," from observations made some years ago in the Dandenong district. The paper was illustrated by some well-executed coloured drawings.

### NATURAL HISTORY NOTES.

Amongst the natural history notes presented to the meeting the following were of great interest:—"Note on a New Rotifer,"

found and described by Mr. J. Shephard; "The Great Earthworm of Gippsland," by Mr. J. Hulme, communicated by Professor Spencer; and "The Whistling Moth," quoted from the *Queenslander* of April last.

Mr. C. Frost called the attention of members to some parasitic larvæ which were plainly visible under the skin on the back of a frog; and the Chairman made reference to a new Victorian orchid (*Pterostylis pedaloglossus*) found near Oakleigh, and exhibited in flower by Mr. C. French, jun.

PRIZE COMPETITION FOR NATURAL HISTORY SPECIMENS.

The exhibits in connection with the prize competition for natural history specimens recently instituted by the Club for the purpose of encouraging the study of natural history amongst the younger members of the community were on view, and although the committee was somewhat disappointed at the rather small number of exhibits, the quality of some of them was highly satisfactory.

Messrs. F. G. A. Barnard, D. Best, C. French and G. D. Pritchard acted as judges, and the competitors were placed in the order of merit as shown in the subjoined list.

GROUP ZOOLOGY.

Class 2.—Mollusca (*land, fresh water, and marine shells*).—Edward S. Hart, Charles Gabriel, Eleanor C. Keartland, Alice M. Keartland.

Class 3.—Lepidoptera (*butterflies and moths*).—Laurence K. Cronin, Bernard C. Cronin.

Class. 4.—Coleoptera (*beetles*).—George E. F. Hill, Alice Waterhouse.

Class 5.—Other Orders (*wasps, bees, ants, &c.*)—Gerald F. Hill, Bernard F. Hill, Wilfred F. Hill.

Class 6.—Different Orders of Insects.—Archibald D. Michie.

Class 7.—Life History of Insects.—Bernard F. Hill, Gerald F. Hill.

GROUP BOTANY.

Class 10.—Algæ.—Eleanor C. Keartland, Alice M. Keartland.

GROUP GEOLOGY AND PALÆONTOLOGY.

Class 10.—Rocks and Minerals.—Stanley Mitchell, James Finlay.

EXHIBITION OF SPECIMENS.

By Mr. E. Anderson.—Drawings to illustrate the life history of *Amelora leucaniata*, *Thalassoides inspirata*, and *Teara melanosticta*. By Mr. F. G. A. Barnard.—Victorian Fern, *Botrychium ternatum*, grown by exhibitor. By Mr. C. C. Brittlebank.—Coloured drawings illustrating life history of a Curculionid and a "Tree-hopper." By Mr. F. J. Ellemor.—Pair of stuffed Banded

Stilts. By Mr. C. French.—Illustrations of life history of Victorian Locust, with parasites. By Mr. C. French, jun.—Orchid in flower (*Pterostylis pedaloglossus*), from near Oakleigh. By Mr. C. Frost.—Frog showing parasitic larvæ under the skin of back. By Mr. H. Grayson.—Marine Hydrozoa (*Obelia geniculata*), with medusiform gonozooids. By Mr. H. Hill.—Seventeen Victorian moths, with parasites—Muscidæ, Ichneumonidæ, Chalcididæ. By Mr. R. Hall.—A colony of sixteen *Lamprima rutilans* embedded in the stem of a eucalypt; also specimens of bloom of *Thea chinensis* (Tea Plant), showing also the seed. By Mr. G. A. Keartland.—White-lined Earless Lizard (*Tympanocryptis lineatus*) and Bearded Lizard (*Grammatophora barbata*). By Mr. D. Le Souëf.—Egg of Royal Albatross and Wandering Albatross. By Baron Von Mueller.—The following plants (new to science), viz.:—*Beilschmiedia lachnostemonea*, Russell River, Queensland, W. Sayer; *Endiandra exostemonea*, Daintree River, Queensland, Th. Pentzcke; *E. dichrophylla*, Russell River, Queensland, Stephen Johnson; *Eugenia luehmanni*, Daintree River, Queensland, Stephen Johnson; *Randia spinuligera*, Mount Bartle Frere, Queensland, Stephen Johnson; *Prasophyllum dixonii*, near Oakleigh, C. French, jun.; also *Sesbania aculeata* (new for Victoria), near Junction of Darling River, Mrs. Holding; and *Prasophyllum archeri*, near Oakleigh, J. E. Dixon. By Mr. J. E. Prince.—Two stings from Stingaree weighing 9¼ cwt., caught off Sandridge. By Mr. G. Sweet.—Tasmanian carboniferous plants—*Tæniopteris*, *Gangamopteris spatulata* (M'Coy), *Gangamopteris angustifolia*, *Glossopteris ampla* (Dana), *Glossopteris browniana*, *Nœggerathiopsis media*—from the "tobacco leaf" bed, lying above the Mersey River coal bed, near Latrobe.

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Note on a New Rotifer.—In a paper on Rotiferæ by Mr. H. H. Anderson, B.A., and myself, communicated to the Royal Society in December last, I described a form of the genus Cathypna, which at the time was dubiously regarded as new. I now feel justified in claiming it as a distinct species and, with the kind permission of Professor Spencer, name it *Cathypna spenceri*. The description is as follows:—The points of difference from *C. luna* are—in the lorica being broader anteriorly and the dorsal occipital edge more deeply excavated; the posterior possessing more of a lobed character, having a decided inward curve on either side and a rounded termination overhanging the toes; the most marked departure being in the setting of the claws, which, instead of tapering from the shoulder to the end, are recessed so as to form a reversed barb; the surface of the lorica was also stippled. Length, about $\frac{1}{150}$ inch.—John Shephard.

## A TRIP TO QUEENSLAND IN SEARCH OF CERATODUS.

By Professor W. Baldwin Spencer.

*(Read before the Field Naturalists' Club of Victoria, 14th March, 1892.)*

My main object in going to Queensland was to procure if possible the eggs of Ceratodus and the creature itself; secondly, I wanted to collect earthworms; and, thirdly, to see the country. In my main object I was quite unsuccessful, for the simple reason that this year Ceratodus did not lay its eggs till late on in November—two full months later than the time recorded by the only observer who had up till then procured them. University work forced me to return, not by any means empty-handed, but without the one thing which had tempted me to go north.

To save time, and avoid unpleasantness also, I went by train. It is a long weary ride across New South Wales, especially in warm weather. Unfortunately I left Sydney by the northern mail on Friday evening. There were very few carriages and some of what there were were "engaged" for legislators who travelled home free and in ease whilst we who paid for our journey were huddled and crowded together. This discreditable state of affairs seems to be common at the close of each week during the sitting of Parliament in Sydney.

The journey north leads by the side of the Hawkesbury River, and after passing across the well-known bridge the train skirts the shores of what appears to be a succession of lakes. In reality the winding river, shut in by wooded hills, expands every now and then into sheets of water each of which in the gathering darkness, seemed to be a little lake. About 11 o'clock you find yourself apparently running along through the streets of Newcastle and stretching out eastwards see the long quays and open water leading out to the sea. The whole is brilliant with numberless electric lights, though you have an idea that in daylight coal dust would be a little too prominent. As it is, however, Newcastle is associated in one's mind with a series of flashing and twinkling lights prettily reflected in the water and with a very second-rate refreshment room. After Newcastle you settle yourself down as comfortably as possible for a run northwards of 400 miles, through the night and greater part of the next day, to the Queensland border. You seem to get gradually more and more out of the world until at 5 o'clock next afternoon the train pulls up at the border station. By that time our number of passengers has been reduced to four. After looking about a minute train, which at first sight you take for a toy, is descried at the end of the platform. Further searching shows a very narrow gauge line streaking away through the limestone hills north-

wards into Queensland. The original name of this border station was Wallangarra but unfortunately this is now being changed to Jennings. It is a pity to lose the old native names and to substitute for them such ugly ones. One would have thought that a more effective plan of perpetuating the memory of legislators might have been devised.

Small though the railway is, it is very comfortable and well managed and all officials uniformly courteous. The carriages are like the insides of omnibuses, with a broad seat all round the windows. On express trains the last car is always for smokers and has a little balcony on which you can sit out in the open air right at the end of the train and hence shielded from wind and dust. This is a most excellent arrangement. From Wallangarra the train runs to Warwick and then across the uplands forming the Darling Downs with their wonderfully rich dark-red soil, on to Toowoomba. Here the line turns nearly due east and begins to climb gradually to the top of the Dividing Range close to the eastern escarpment of which Toowoomba lies. Suddenly you turn a corner, the upland country ends abruptly, and the train zig-zags rapidly down the face of the lofty escarpment which rises directly from the flat coastal district. The sun was setting just as we reached the crest and in the brief twilight we had magnificent glimpses of the distant plains with the abrupt hill sides and deep gorges in the foreground. Close upon midnight Brisbane is reached.

A slight difficulty arose in Brisbane with regard to my small amount of collecting material but on learning that it was simply intended for scientific purposes, the Customs officials at once courteously saved me all trouble by allowing it to enter free of duty. In fact my experience in Queensland was that I met with the greatest courtesy from all officials and the greatest kindness from such friends and strangers as it was my good fortune to be brought into contact with—an experience common, I believe, to all visitors to the Northern colony.

From Brisbane the line is now continued through Maryborough on to Bundaberg at the mouth of the Burnett River.

About 75 miles north of Brisbane the vegetation changes almost suddenly, and the line runs across a belt of country, perhaps twenty miles wide, of a semi-tropical description. To this we will return presently ; suffice it to say at present that the traveller finds himself suddenly surrounded by palms and pines and fig trees, and sees all the tree trunks covered with epiphytic ferns—with great masses especially of staghorn and bird-nest ferns, and with orchids from which hang down long clusters of yellow blossom.

This belt of vegetation stops as suddenly as it began some few miles south of Gympie—a well-known gold mining town, which

lies by the side of the Mary River, and where I had been told that Ceratodus was to be had in abundance. Here I determined to stay and began at once to make inquiries. To my disappointment I found that no one at the hotel knew anything about the animal but I wandered forth in quest of information. The river itself was dirty with the washings from the mines, and looked anything but promising; however, I made for some miserable huts on the outskirts occupied by Chinese and after a little trouble found a fisherman amongst them. This individual was decidedly apathetic but after some time said that he might or might not be able to catch me a few. Wandering along by the river I began to feel rather as if I were searching for a needle in a haystack. However, I learnt that the fish certainly were to be caught, though some few miles away, but that there was no chance whatever of getting assistance from any blacks, simply because there were not any in the neighbourhood, and at that time I thought their assistance indispensable. It was late in the afternoon and I wandered on by the river searching for planarians and earthworms. Amongst the former I secured two specimens of a beautiful new species, to which Dr. Dendy has given the name of *Geoplana regina* and also specimens of the almost cosmopolitan form, *Bipalium kewense*, and of *Geoplana cærulea*, a form common in New South Wales, rare in Victoria, and very abundant indeed in Queensland. This was, I believe, the first time on which land planarians had been collected in Queensland—not that there was any difficulty in finding them, but that no one had taken the trouble to look before. Amongst earthworms, I collected for the first time for myself a true perichæte—that is, one in which the little setæ, or bristles, form a complete circle round each segment of the body. In all our Victorian forms, without exception, there is a break in the middorsal and ventral lines where the setæ are absent. True perichætes do not appear to come further south than the north of New South Wales. Under the logs also were specimens of a common Queensland worm, *Cryptodrilus purpureus*; of a new species of perichæte worm, *P. gympiana*; together with three species of frogs—*Pseudophryne bibronii*, *P. australis*, and *Limnodynastes tasmaniensis*.

During the evening I had the opportunity of talking to one or two who were well acquainted with the country, and was strongly advised to go on without delay to the Burnett River. I determined that this would be the wisest course to adopt and accordingly packed up next morning and after an hour or two's stroll round Gympie, during which I did a large amount of log-rolling with but scanty success, owing to the extreme dryness of the country, once more took train northwards towards Maryborough. I spent the night at a little wayside inn where con-

siderable surprise was evinced at my putting in an appearance; however a wandering lascar turned up so that I was more or less kept in countenance and together we had tea in what was presumably a combination kitchen and scullery. During two or three hours' collecting I met with nothing but gum trees, endless ants and scorpions, a few stray specimens of *Geoplana cærulea*, and one or two lizards and frogs. I somehow had the idea that north of Brisbane everything would be at least semi-tropical and could not at first help feeling disappointed to find myself, except in the small district mentioned before, surrounded by little else but gum trees without a trace of a palm or of anything which looked at all tropical. Eastern Gippsland was really richer in vegetation and more varied in form of animal life than the part of Queensland in which I spent most of my time. In fact, so far as my experience yet goes, Gippsland, as a general collecting ground, would be very hard to beat.

Early in the morning I started in a mixed train along a branch line leading inland for some fifty miles till it stopped apparently nowhere in special and not far from a fine mountainous bluff. The station is called Biggenden and here we found coaches waiting for us. A Queensland coachdriver is a most marvellous man, both in the way in which he accepts with almost pleasure any amount of luggage and in the way in which he stows it all on board. From Biggenden came a hot ride of about forty miles across uninteresting country. The only township we passed was a small place known as "The Shamrock," not far from the gold-field of Paradise. After changing horses we started off again seeing nothing but gum trees and a few emus and kangaroos. Among the gums were what are locally known as Blood Gums, whose light-coloured trunks are covered with reddish blotches, due to the exhalation of kino; Woollybutts, which for perhaps ten feet above the ground have the trunk somewhat like that of a stringybark, and above this are quite smooth and whitish; and a form of gum called Brigalow. This grows in clumps, and differs from all the others in having its foliage comparatively dense, so that it affords a good deal of shade. The cattle congregate in the shade, and these dark patches give a curious and characteristic appearance to the landscape. Every now and then we came across a few birds, known as Squat Pigeons. These have the habit of squatting on the ground when approached and being of a brownish colour are hard to see. Sometimes they can be knocked over by the whip of an experienced driver.

Late in the afternoon we mounted a slight ridge and came down through a gap into the wide Burnett Valley. On either side of this rise low hills and through the middle flows the river with a broad channel, occupied chiefly—except during the flood season—by long, broad stretches of sand. A short ride brought us to

Gayndah, a long, straggling township on the river banks, and here I took up my quarters in the comfortable Club Hotel. At one time Gayndah was the centre of a wool-producing district and bears evident signs of having seen a better day.

Intent on meeting with Ceratodus, I made my way to Mr. Thomas Illidge, the postmaster of Gayndah, to whom I had been recommended, and I gladly take this opportunity of expressing my thanks to him, not only for the valuable help and information which he gave me, but for many acts of kindness which added greatly to the pleasure of my stay in Gayndah. I may here also express my thanks to my friends, Dr. Cole and Messrs. Frank and Virgil Connelly, from whom—though a complete stranger—I received most valuable help. If a naturalist wishes to meet with genuine kindness and every possible assistance, I can warmly recommend Gayndah to him.

One of the first things I learnt was that Dr. Siemen, of the University of Jena, had recently come to the Burnett district for the purpose of securing the eggs of Ceratodus, and the various development stages of Platypus and Echidna; and not only this, but that he had secured the services of the available blacks. I must confess to a feeling of something like chagrin at having come so far to meet with, apparently, no chance of success in what was my main object.

After sleeping over my preliminary disappointment, I determined on carrying out the only plan possible, which was to obtain one or two boys accustomed to the river and, with their help, to at any rate get Ceratodus and, if possible, the eggs. It was now well on in September—the time at which Mr. Caldwell had found that the animal had laid eggs—so there was still hope that I might secure them. Perhaps it may be well here to state briefly the special interest which attaches to this particular form Ceratodus. As you all know, there are two groups of animals—the fishes and the amphibia—of which the first live in water, and breathe by means of gills, whilst the second either spend, as the newts do, their whole life in water, breathing by means of gills, or else, like the frogs, spend the early part of their life in water, breathing by gills and then come out of the water and breath by lungs just as reptiles and mammals do.

Now there is a very small group of animals known as the Dipnoi, which are, we may say, intermediate between the fishes and the amphibia. They are neither so lowly developed as the fishes, nor so highly developed as the amphibia—in fact, they may almost be described as "missing links" which still exist, and show us the way in which air-breathing were evolved from water-breathing animals. If we simply went by their external appearance we should class them amongst fishes, which they closely resemble in many respects. Now, fishes have what is

known as a swim-bladder, which is merely a long hollow process developed from the œsophagus. This serves, probably, mainly as a float, and not at all for respiratory purposes; but in the small group, Dipnoi, of which Ceratodus is one, this same swim-bladder becomes modified to act as a lung. Not only this, but, whereas in fishes the impure blood which is carried from the body to the heart passes to the gills, is purified there and then goes straight to the body, in the Dipnoi part of the blood goes from the heart to the lung and then is carried back again to a chamber in the heart specially developed for its reception. In fact, in the Dipnoi we can see some of the earliest stages in the evolution of important organs of the body as we now find them in all animals above fishes.

At the present time only three examples of the Dipnoi are known to exist in the world—one form, Lepidosiren, lives only in the Amazon; another, Protopterus, is only found in tropical Africa; and the third, Ceratodus, occurs only in the Burnett and Mary Rivers, in Queensland. In past times, however, Ceratodus lived in other parts, such as Europe, as its fossil remains testify; and in Australia Professor Tate has recorded the presence of its teeth in the strata of the Lake Eyre basin. In fact, Ceratodus is one of those rare forms of which fossil remains were found and named before the living form was discovered.

The habits of Protopterus have been studied, and it is stated that during seasons of drought it makes a cocoon of mud for itself, and breathes by means of its lung. On account of this habit, these forms have often been called mud and lung fishes.

My main aim, then, was to find the eggs of the Ceratodus. From Mr. Caldwell's published notes, which are only too brief, I knew that it deposited them much like some amphibians such as the Axolotl do, on weeds, and that he had found them in September.

To return now to Gayndah. I purchased a tent and provisions, and having hired two boys accustomed to the river, started away to camp out some few miles up the Burnett. The country was very dry and sandy, with all the creeks empty of water. The outcropping rocks are granitic, with basalt capping the hills around, and the disintegration of the granite appears to give rise to a vast amount of sand. Along the river itself there is an alternation of large sandbanks, where the stream is shallow, and of long deep pools with great granite masses. The banks are bordered by Bottle-brush Trees (Callistemon), which at that time were crimson with flowers, and alive with Thickheads. Leaving my stores to find their way to an appointed spot, I kept by the river bank on the look-out for weeds, for without these it was hopeless to set to work. After a short halt at a station close to Mt. Debatable, where the Sociable Wasp *(Polistes ferrugineus)* was

busy making its nest in the verandah, I walked on until we were some six or seven miles out of Gayndah but there was not a trace of weed in the river. Close in to Gayndah there was a small quantity but where we expected to find a good supply there was none at all, owing apparently to heavy floods which in the last wet season had swept down the river. Accordingly we turned back and pitched our camp not far from Gayndah. It was evening by the time we were settled down, and too dark to see the eggs, so we lit a fire and fished. It was a lovely moonlight night and the coolness was delightful after the heat of the day. The river is full of fish, and we caught sand eels and mud eels, jew-fish, perch, and bream, but not a single Ceratodus—or, as they call it locally, salmon. Turtles kept rising to the surface and showing their black heads above the water, and every now and then when we sat still we could recognize a Platypus. In the morning I set to work to search over the weed. One of my boys stripped and went into the river for it, whilst I sat half in and half out of the water looking carefully over each piece. In the hot blazing sun this was not enjoyable and after some hours' work and not the slightest sign of an egg and when the small patch of weed was pretty well exhausted, I sat down to think and questioned my boys closely as to where there was more weed. A little way on the other side of Gayndah they told me there was a backwater usually full of weed. Why they had not told me of this before I could not imagine, and the remarks made probably conveyed this idea to them. However, we were close to the end of this weed and as we had to get to some more, I sent one boy into Gayndah to procure help in removing our camp, for which, fortunately, I had made previous arrangements. In the afternoon I finally exhausted the weed and myself with no result and for a change set to work to turn over a few logs. Amongst planarians, *Geoplana cærulea* and *variegata*; amongst earthworms, *Cryptodrilus purpureus*; amongst frogs, *Limnodynastes tasmaniensis* and *Hyperolia marmorata*; and amongst lizards, species of Pygopus, Hinulia, and Egernia, and a small mammal, a species of Antechinus, rewarded my efforts, but everything was too dry, though the season was early, for anything very much in the nature of worms. Along the river banks endless numbers of the beautiful butterfly *Danais erippus* attracted my attention. It was feeding on the plant (Lanthana) along with which it has been introduced. In the river itself was to be seen the curious water lizard *Physignathus lesueurii*, of which we caught a small specimen, and also the frog *Hyla lesueurii*, whilst the Callistemon trees contained plenty of a little green species of Hyla which the boys used as bait for fishing and which appears to be new to science. I also caught this same frog on window panes at night in Gayndah, where, like a moth, it goes to the light. As the evening came

on the mullet began to jump. They feed especially on a filamentous alga which grows in the water, and contains numerous crustaceans, especially a prawn-like form, for the sake of which they eat the alga. The latter is used as bait for them. At night we caught a large mud eel, five feet long, which we eagerly drew into land, thinking it to be a salmon. I tried sugaring the trees, but it was of no use, not even a single ant put in its appearance and thus ended another day of hard work and disappointment.

In the morning I had my boys up by 4 a.m., and before 6 we were out of camp, and by 9 o'clock had our tent pitched by the side of a backwater on the other side of Gayndah. This contained plenty of weed and here I spent some days. We procured a long pole, with three prongs at the end, to pull the weed up with. We used to get a large bucketful at a time, and then go over it piece by piece. This process had to be conducted under a hot sun and the result was that my arms became swollen to about double their natural size—so much, indeed, that I could not sleep with anything like comfort, since the slightest pressure woke me up. The final result was that I did not see the slightest trace of any Ceratodus eggs, though, had they been there, there is no doubt but that we should have found them. I then sent one of my boys down the river for some miles to see if there were any more weeds, but there were none to be seen. Just at this juncture I heard of some blacks but on trying to secure them found that they were anticipating a "muster" on one of the neighbouring stations, and were not to be procured. Seeing no prospect of getting what I wanted, and being none the better for my exposure to the sun, I went into Gayndah.

Here I may, perhaps, say something as to some conclusions I had come to with regard to the habits of Ceratodus. With the exception of the brief account given by Mr. Caldwell as to the laying of its eggs on weed, and the curious amphibian-like embryos, we know little about the natural history of the animal. As before said, it is confined to two Queensland rivers—the Mary and the Burnett, and my experience is limited to the latter. Firstly, with regard to the animal's name. The Dipnoi have two popular names—"lung fishes" and "mud fishes"—the latter given to them because, in the case of Protopterus, the animal may live for a part of the year in mud. The Ceratodus is not known locally by either of these names; it is, however, sometimes called the "Barramundi" and sometimes the "Salmon." The first of these is, however, really that of a true osseous fish (*Osteoglossum leichardtii*), which lives chiefly in the Dawson and Fitzroy Rivers, further north than the Burnett. The second is a fanciful name, given on account of the very pink-coloured flesh of the animal. Beyond this there is no resemblance whatever between the real and the so-called Burnett "Salmon." Mr. Saville Kent, in his

report on Fishes to the Queensland Government, states that Ceratodus is a valuable food fish. This is a curious mistake. Its flesh is very oily, coarse, and disagreeable and it is but rarely eaten and then only by Chinese and those who can afford nothing better. There is thus, I am thankful to feel, not much fear that so interesting an animal will become rapidly exterminated.

Now, as to its method of life. Ceratodus is a big fish, and may reach the length of 6 ft., and even more. I believe the largest ever caught weighed 87 lbs. It is always to be met with in the deep pools, and not in the shallow waters and it is important to notice that these pools are many of them of considerable extent—some more than a mile long. In the hottest summer they contain a good supply of water and thus, though occasionally a Ceratodus may, of course, find its way into a shallow pool which gets dried up, normally no such thing happens and the animal passes its whole life in water. The usual idea is that the lung is of service to the animal, as in the case of Protopterus, when the waters practically dry up. I very much doubt if Ceratodus ever makes for itself a mud cocoon, as Protopterus does. It may possibly, but very rarely, bury itself in mud, but the fishermen with whom I spoke and who were perfectly well acquainted with the animal, knew nothing of its ever doing this. On the contrary, I fancy that the lung is of at least as great service to the beast during the wet weather as during the the dry season—and probably even of greater.

Normally, then, we may say that Ceratodus never leaves the water. If by any chance it gets out of the water it is perfectly helpless. You may put one close to the edge and there it lies passively. Its weak limbs are quite incapable of sustaining the weight of the body. Nor can it live out of the water, unless kept constantly damp, for more than a very few hours—not, indeed, so long as the Jew-fish from the same river. In the water, however, it constantly uses its lung. Sitting by the stream when all is quiet in the evening you can hear a diminutive kind of spouting going on, the animal at intervals rising to the surface and expiring and inspiring air much as a minute whale might do. Out of the water, too, it does not open and shut its gill flaps like an ordinary fish but they remain tightly shut and the animal opens and closes its mouth, to all appearances breathing like one of the higher forms.

If we consider the environment of the Ceratodus we shall see that there are two special and constantly recurring conditions under which a lung would be useful to it.

In the wet season the tributary creeks, dry in summer, become transformed into roaring torrents and when once you have seen the great sandbanks along the river bed and the dry sandy country through which the creeks pass you can easily recognize

what a vast quantity of sand must be brought down during the course often of a very few days and how thick the water must become with fine particles. On the other hand, during the hot season there suddenly grow with enormous rapidity great quantities of water weeds. The river is then at its lowest and the decaying vegetable matter will often render the water foul. Under either of these conditions you can see that the possession of an organ enabling the animal to remain in its natural element and yet breathe air directly will be of great advantage to it. It is the shallower pools especially which become choked with weeds, and since normally the Ceratodus lives in the deeper pools, in which is the purer water, it is, I think, very probable that the flood season, when the water is disagreeably full of sand and mud, is the time when the lung is of greatest service.

In Gayndah I learned that Dr. Siemen was camped out some forty miles up country, where the Auburn and Bowen Rivers join the Burnett, close to one another. Accordingly I made up my mind to go up the river, both to see him and to search for weed. The difficulty was how to get there. However, I met with a friend in the person of Mr. Bailey, proprietor of the Queensland Hotel, who, at considerable inconvenience to himself, promised to see me through the difficulty; and, taking one of my boys with me, we left Gayndah early one morning, before 4 a.m.

The country was extremely dry and sandy, with poor gum trees and every now and then a patch of Brigalow. By 10.30 we reached a wayside accommodation house, and then in the heat of the day we started off along a most miserable track across country as utterly uninteresting and monotonous as can well be imagined. We had two good dogs with us, and the only break in the monotony was when they put up a big "iguana." Most were much too quick for them, but one they got hold of, and it was wonderful to see how they stuck to him without getting within reach of his mouth. When all was over I slung him over a dead trunk, to get his head on the way back. However, when we came back he was not perfectly fresh and was left behind. By four o'clock we had crossed the Bowen River and pitched our camp about a mile beyond. Then I walked on to Dr. Siemen's camp. My advent was announced by the yelping of sundry mongrels, the property of a small camp of blacks. On these animals I kept a sharp look-out. Dr. Siemen I found living in comparative luxury and from him I received a most cordial welcome. We spent the evening most pleasantly talking over matters of common scientific interest. Three of his blacks came in with a few Echidnas. I learnt from him that he had been no more successful than myself in procuring Ceradotus eggs—that, in fact, they had not begun to spawn yet. Unlike myself, however, he was able to stay there until they did spawn, and most

generously offered to procure certain material for me. There was a small amount of weed in the river but not a trace of an egg. On cutting open the body of a "salmon" I found the spawn inside, looking very similar, indeed, to that of a frog, each separate egg being black in colour at one pole. It was evidently not yet quite ripe for laying. The season when Mr. Caldwell got his eggs in September seems to have been an exceptional one as regards the temperature and amount of weed in the river. There had been no big flood for some time previously to his visit, so that the river was full of weed and everything was favourable for the depositing of spawn. This season, as luck would have it, the warm weather started rather late and the weeds had been largely washed away by heavy floods, the river at the end of September being comparatively high. I think it safe to say that, granted the presence of eggs, they could be got by "whites" just as well as by "blacks." Any collector going at the right time and not frightened of tiring and tedious work could get them for himself now that the manner of spawning has once been ascertained. Each egg, surrounded by a little gelatinous capsule, is laid on weed, but I think, from what I heard with regard to Mr. Caldwell's methods, that he found it necessary to spend a very considerable time in the neighbourhood of the river whilst the embryos were slowly developing, as they were not easily and safely carried about. The next day Dr. Siemen and I spent together with, I trust, mutual enjoyment—at all events, to myself it was one of the pleasantest days I spent in Queensland. I did a small amount of collecting but it was far too dry and sandy to get anything in the way of worms. Down by the river I came across a black woman and piccaninny fishing, but they were frightened when I spoke to them and fled. There were large numbers of *Danais erippus* and of a beautiful species of Acræa with transparent wings. Late in the afternoon I attempted, but with not very great success, to photograph some blacks. One especially, named Frank, had his back scored with cicatrices in regular pattern. I spent the evening till eleven o'clock with Dr. Siemen and said good-bye to him wishing sincerely that he might be successful in his endeavours to secure what we were both in search of and what it was perfectly evident that I myself could not obtain.

I may say here that Dr. Siemen had with him the best of the blacks who were with Mr. Caldwell and who secured for the latter the eggs of Ceratodus. These blacks were fine and powerfully built fellows, but here, as everywhere else, rum and disease are rapidly lessening their numbers.

On the way back our dogs started many big lizards and it was amusing to see one of them hanging on to the tail of a large *Cyclodus gigas*, whose head and body were hidden in the hollow of a log. Jew Lizards we met, as well as species of Hinulia

and Liolepisma. We camped by the Burnett, some 20 miles out of Gayndah, and spent the evening fishing in a little backwater. There are two kinds of turtle in the river, the long-necked *(Chelodina longicollis)* and the short-necked *(Chelymis macquariensis)*, and sometimes one is surprised at pulling out a turtle instead of a fish. Next day we made our way back into Gayndah, passing by large patches of Grass Trees in full flower, with swarms of the little black native bees hovering around them. Just as we were passing through a mob of travelling cattle our dogs started two Kangaroo Rats (*Bettongia*, sp.) There was a general scattering as the little animals, with the dogs in full chase, ran through the mob. After a short run one was caught, which had in its pouch a single small young one not more than 1½ inch long.

I stayed a few days in Gayndah, hoping to make a collection of earthworms, which up till then there had been very little chance of collecting. The name of the township will be well known to Australian entomologists, since it was here that Mr. Masters made a very fine collection: he was fortunate enough to have almost a year in the district, and thus secured forms at all seasons. About a mile behind the township is a large stretch of scrub, where I spent a considerable time, often accompanied by one or other of my friends—Messrs. Illidge, Cole, and Connelly —to whom I am indebted for help in the laborious task of digging out worms from dry ground. My favourite place was a large patch centering in a big Bottle Tree, *Sterculia quadrifida (?)*. Here was an open space, lightly timbered with small trees of *Melia azedarach*, the light green foliage of which formed a strong contrast to the sombre foliage of the dense scrub all around. Besides Eucalypts and Bottle Trees, the scrub was made up of such trees and shrubs as *Geijera muelleri* and *salicifolia*, which were covered with small yellowish flowers, *Leptospermum lanigerum*, *Bursaria spinosa*, *Nephelium* (sp.), *Hovea longipes*, *Solanum stelligerum*, &c. I am indebted to the Baron von Mueller for his kindness in giving me the names of plants, to Mr. C. French for names of Coleoptera, to Mr. A. H. S. Lucas for names of Amphibia and Lizards. From the open space alleys lead away into the recesses of the scrub, and along these numbers of the beautiful *Danais erippus*, *Papilio erectheus*, and *Acrasea* (sp.) kept flying to and fro. Of birds, probably because I was not specially on the look-out for them, I saw very few.

The two most numerous forms of life were ants and millipedes. The moment you put anything which could serve as food for them on the ground, the former appeared as if by magic. Several times they spoilt butterflies just while I put them down on the ground and made a paper bag for them. They always bit off first the little knob at the end of the antenna. White ants

of course abounded and in the tree trunks were swarms of native bees. There were not as many logs to turn over as could have been wished for and the ground also was rather too dry and sandy.

We began by digging around the base of the big Bottle Tree, and, after digging some time, came across some large worms, about two feet in length. These differ in habit from any others I have collected. The burrow runs down for perhaps two feet, and then opens into a small chamber. The head end of the worm lies usually a short distance up the burrow, whilst the greater part of its length is twisted into a knotted coil, and lies in the chamber which may also contain one or two smaller, immature forms, evidently the young of the larger ones. Under and in rotten logs you often meet with a shortish, stout worm, perhaps six or eight inches in length, which, at first sight, differs very much from the long one. Its body is stiff, and the surface comparatively dry, whilst the other is four or five times its length, the body soft and the surface always very slimy. The short one I met with all along the Burnett River, at Gympie and in the palm district between this and Brisbane, whilst Mr. D. Le Souëf collected it at Toowoomba. It is the *Cryptodrilus purpureus* of Michaelsen and, much though the two differ in habits and appearance, the long one is at most a variety of the short, typical form. I only got it in this one spot. In the scrub were some four new species of the same genus, and three new species of a genus (Didymogaster) of which previously only one species had been described from New South Wales, by Mr. Fletcher. Of the typical Victorian genus, Megascolides, to which our large Gippsland earthworm belongs, I did not find any example in Gayndah, but the Perichætes were fairly well represented.

Most of the earthworms were secured under fallen logs and in rotten trunks of the Bottle Tree. In times of drought, the latter are cut down, and, containing a great amount of moisture, are eaten readily by cattle.

The season was too early for beetles, but, amongst others, I secured specimens in the family Carabidæ of *Carenum deauratum* and *bonelli*, *Eutoma* (sp.), *Philoscaphus mastersii*, and *Homalosoma hercules;* and, in the Paussidæ, of *Arthropterus* (sp.) One species of the genus *Leptops*, in the Curculionidæ, simply swarmed on the bark of the Bottle Trees and some of the upturned logs in the more open parts were alive with the little red form, *Lemodes coccinea.*

A short time before leaving for Queensland I had been struck with the presence of curious laterally-placed segmental openings in a very large millipede from Fiji, which Mr. French had kindly forwarded to me. In the Gayndah scrub—where smaller, but still large, millipedes abounded—I was interested to find the

meaning of these openings. Each one is connected with a gland, and, when irritated, the animal passes out a few drops of a most obnoxious fluid, of a red-brown colour, the function of which must be protective. Whilst on this subject, I may mention that one morning, when Mr. Frank Connelly and myself were digging for worms, we accidentally cut in two a Cockroach. From between the segments in its back it poured forth a milky white fluid, possessing an odour so execrable and pungent that it drove us from the spot.

Under logs we found, also, of land planarians, *Geoplana cœrulea* and *variegata*, and amongst Vertebrata, the frogs *Limnodynastes tasmaniensis*, which was common everywhere, and *Hyperolia marmorata*. Of lizards, we secured species of Phyllodactylus, Pygopus, Grammatophora, Hinulia, Liolepisma, and Egernia. Snakes were rare, only the genera Morelia, Furina, and Hoplocephalus being represented. Whilst in the scrub I did not see a single marsupial.

On the road from Biggenden to Gayndah I had been struck with the appearance of two small hillocks capped with basalt. The country all round was thinly wooded with nothing but gum trees but just the tops of these two hillocks were rich with vegetation, though each was at most fifty yards in width. Dr. Cole, Mr. Illidge and myself drove out to see if there were anything worth collecting. Unfortunately, since I had passed along the country had been fired and everything was as dry and parched as it well could be. However, just the very cap of the hills still formed a strong contrast to the surrounding country and here we found growing—though nowhere else, apparently, except in these two very limited areas—*Damara robusta*, the Queensland Kauri, *Cupania xylocarpa*, *Micromelum pubescens*, *Carissa brownii*, *Citriobatus* (sp.), and amongst ferns a rich growth of *Polypodium* (sp.), and *Adiantum* (sp.) Animal life was almost absent. We disturbed three Wallabies but except these and a few millipedes and scorpions and endless ants there was nothing to be seen.

My time was passing by rapidly, and though I would much have liked a few more days in the Gayndah scrub it was a choice between this and two or three days in the palm district between Gympie and Brisbane. Regretfully I left Gayndah and taking the coach back to Biggenden found myself in the evening in Maryborough. In the morning I had about two hours to wander about. Close to the town were camped some blacks. It was curious to note how they had adapted themselves to their environment. They had made their "humpies" out of old sheets of corrugated iron. A semi-clothed native lying down in the shelter of a mia-mia made of English corrugated iron formed as incongruous a mixture as could well be imagined. Early in

the afternoon I left the train at Cooran and took up my quarters in a delightful little wayside inn surrounded by ferns. On going up to the house I detected at once the genuine Lancashire dialect and knew that the owner hailed from within ten miles of Manchester. I was accordingly made welcome, and wandered out to do a little collecting before evening came on. I found myself just on the northern border of the palm scrub which ran in a broad belt of about twenty miles width across the country from east to west, inland from the sea coast. The country was fairly hilly with a few isolated peaks standing out clearly. I was just at the base of one of these—Cooran—and to the south lay two more—Cooroora and Pimparan. South from these again the ridges increased in height and then the country fell away into the slightly undulating plains which stretched eastwards towards Bribie Island and southwards to Brisbane. Some remarkable peaks, called the Glass Mountains, mark the southern end of the hilly district.

So far as animals are concerned, I was much disappointed with this palm scrub, but equally delighted with the richness of the vegetation.

Commencing first near to Cooran, I followed back the line and "log-rolled," finding a few worms and four land planarians (*Rhynchodemus obscurus*), a small dark-coloured form, and *Geoplana cærulea* and *variegata*, together with specimens of a very small new white species, to which Dr. Dendy has given the name of *G. minor*. After long searching I came across *Peripatus leuckartii*, very dark purple in colour and evidently similar to the typical form and without the curious diamond-shaped markings characteristic of the Victorian form. Though searching hard, I only found nine specimens altogether and all these close to Cooran. Most of my time was spent in this scrub at different parts and usually in company with George Martin, the son of my Lancashire friends, who helped me very considerably in collecting. The scrub was very thick with vines and prickly lawyers and barristers and supplejack, making progress tedious, and there were comparatively few logs on the ground. What delighted me most were the ferns. The trunks of the pines and gums were often covered over with them and with orchids. High up were enormous clumps of the Bird-nest Fern (*Asplenium nidus*), and larger ones of the Stag-horn (*Acrostichum alcicorne*). Some of the latter measured fully 12 feet through, and from them hung down lovely pendant fronds of smaller ferns, especially of *Polypodium tenellum*, which is locally known as the Feather Fern. On the ground grew various species of Davallia, Adiantum, Pteris, Doodia, Aspidium, Polypodium, &c. Perhaps the most beautiful of all were the large and delicate fronds of *Adiantum formosum*. There were apparently three forms of palms—species of Ptychosperma, Livistona,

and Kentia. The latter is very common, and usually known as the walking-stick palm. In the scrub were great pine trees, and under the bark stripped off from these, and lying about in large slabs, I expected to find any number of worms and insects but was much disappointed. Millipedes and scorpions were there, and two large forms of land shells; but scarcely an insect to be seen, and not a planarian or peripatus. I got a few new species of earthworms, of which, again, the commonest form was *Cryptodrilus purpureus;* and in rotten logs, which, unfortunately, were few in number, were large forms of cockroaches. The earthworms formed the best part of my collection here, and comprised representatives of five genera—Perichæta, Megascolides (one species, the only one found), Cryptodrilus, Perissogaster, and Acanthodrilus. The latter is only recorded, as yet, from Northern Australia, where there are two species, and is characteristic of New Zealand. Perissogaster is peculiarly Australian and has only three species yet known. My specimens were obtained by digging on the banks of a creek at Cooran and were whitish in colour and about 1 to 1½ feet in length. The boys use them for fishing, quite unaware of their scientific value.

In Queensland, as in Victoria, I could very rarely, indeed, find traces of casts made by worms or of leaves dragged down into the burrows, and it would appear that here, as in Africa, the ants are of more use than the worms as agents in turning over the soil. Under the bark and logs were a few frogs—*Pseudophyrne bibronii* and *coriacea*, *Crinia signifera*, and a female specimen of *Cryptotis brevis*. In certain spots there were great numbers of trap-door spiders. Some of the tubes, which led for about 2-4 inches down into the ground, were an inch in diameter. The top of the tube, with its semi-circular trap-door, projects slightly above the surface.

One of the most striking features of the scrub were the epiphytic orchids, of which, owing to its size and large pendent masses of yellow-brown flowers, *Cymbidium canaliculatum* was the most noticeable. In parts the ground was crimson with the fallen berries of a species of Eugenia: we cut one down about 60 feet high, laden with fruit, which has a tart taste, and from its colour and size has caused the tree to be known as the Native Cherry. Another Eugenia has a large purple fruit, and is hence known as the Native Plum. High up, some 50 feet above ground, we saw hanging down clusters of light brown fruit. Luckily there was a hanging vine close at hand and up this George Martin went like a monkey. The fruit belonged to the tree *Dysoxylon rufum*, and each was covered over with innumerable minute stiff hairs, which pierced the skin in hundreds. Other plants we noticed were the Wistaria, which here grows wild, *Dracæna angustifolia*,

and one which Baron von Mueller has marked as rare—*Rhipogonum elseyanum*. Two dangerous ones are common, one with large bright green leaves and succulent sheathing stalks, which is locally known as the "Congey Boy"—this is eaten greedily by the Native Turkeys, but has the effect of making a man's tongue swell to an enormous extent; the other is the Stinging Tree, *Urtica gigas*—the sting of this is extremely painful and seems to prove fatal to horses driving them rapidly frantic.

Close by the base of Mount Cooroora, a beautiful specimen of *Macrozamia denisoni* in fruit was growing and on Mount Cooran, the rock on the western side was completely overgrown with Staghorn and Bird-nest Ferns and with an orchid, *Dendrobium* (sp.), with beautiful clusters of delicate white flowers, amongst which trailed *Kennedya rubicunda*, its bright red blossoms contrasting strongly with the pure white of the orchids.

My last day I spent at the Glass Mountains—curious cone-like basaltic structures rising abruptly from almost flat country. The day was oppressively hot, making it no small exertion to even turn over a log and as the sun went down a heavy storm came up and from the train I caught my last glimpses of this delightful district lit up by almost incessant flashes of brilliant lightning.

## THE DISCOVERY OF SUPPOSED HUMAN FOOT-PRINTS ON ÆOLIAN ROCK AT WARRNAMBOOL.

By C. G. W. Officer, B.Sc.

*(Read before the Field Naturalists' Club of Victoria, 14th September, 1891.)*

In last December (1890) some men engaged in quarrying at Warrnambool, on lifting a slab of stone, discovered on the rock beneath certain curious impressions, which at once arrested attention because of their similarity to human footprints. Mr. Archibald, the energetic Curator of the Museum at Warrnambool, on hearing of the discovery, at once proceeded to secure the slab bearing the impressions for the Museum, where it now lies.

While on a recent visit to Warrnambool Mr. Archibald very kindly gave me every facility for examining the marks, and I was able to photograph them with a fair amount of success.

Before proceeding with the description of the impressions it will be well to say a few words about the formation in which they were found. Among the prominent geological features of the southern coast of Australia the sand dunes are not the least interesting; but it is not my present purpose to enter into a detailed account of them. The late Rev. Julian Wood divided the dunes into three classes—(1) ridges; (2) conical hills; (3)

shifting dunes. The first two classes are generally well grassed, while the latter are devoid of vegetation. Mr. C. S. Wilkinson described one of the ridge-like dunes occurring near Cape Otway. It runs parallel with the coast for about a quarter of a mile, at an average height of 50 feet; but a height of 300 feet has been recorded for others. The landward slope of the dunes is much steeper than the seaward. Mr. Wilkinson found the average angle of steepest slope to be about 32°. A few observations by myself gave an angle varying between 30° and 32°. In Victoria the dunes do not extend inland for more than three or four miles, but in Western Australia they extend in places for ten miles. The sand of which the dunes are composed consists mainly of broken fragments of shells with silicious particles. Under the microscope the skeletal parts of corals, polyzoa, foraminifera, and, according to Mr. Wood, echini spires and sponge spicules can be distinguished.

Warrnambool is situated on the southern coast of Victoria, and various quarries and cuttings expose good sections of the underlying rocks. In most of these the rock is seen to be well bedded, the beds being inclined, and at first sight the formation would appear to be a sedimentary deposit. The stone is used for building purposes. When first quarried it is somewhat friable, but it hardens on exposure. Under the microscope the material appears to be identical with that of the dunes now being formed. Mr. D. Avery, of Queen's College, Melbourne, has kindly made an analysis of a sample of the stone for me, and has given the following composition :—

| | |
|---|---|
| Organic matter and water ... ... ... | 5·88 |
| Alumina and iron oxide ... ... ... | ·26 |
| Silica ... ... ... ... ... ... | 1·43 |
| Carbonate of lime ... ... ... ... | 92·43 |
| | 100·00 |

From this it will be seen that the rock consists almost entirely of carbonate of lime. In the quarries the angle of dip is about 31°, and the direction of dip is, generally speaking, at right angles to the coast line; but there are exceptions to this. In several places I found the direction of dip easterly, or parallel with the present coast line. Along the coast the cliffs afford good sections. Here thinning out, false bedding and unconformities are noticeable; but the greatest angle of dip is the same as in the quarries—viz., 31°. The rock of the sea cliffs is much harder than that in the quarries, a fact probably explained, in great part, by the exposure of the former. No whole sea shells are met with in this formation; but Professor Tate, of Adelaide, has, I believe, found several species of land shells. The formation is confined to the coastal regions, never extending more than a mile or two inland.

There is no doubt, then, that these rocks are of Æolian origin —*i.e.*, they were formed in exactly the same way as the dunes of to-day are being formed, wholly by the agency of wind-blown sand.

Overlying these old dunes in many places are sheets of limestone, locally but erroneously called flint. This limestone varies considerably in texture. In many places it is sandy and friable, and can hardly be called compact; but, generally speaking it is, on the surface, hard and somewhat cherty in appearance, getting less compact and more friable as it is traced downwards, and gradually merging into the sandstone beneath. It varies from a few inches to several feet in thickness, and is no doubt derived from the carbonate of lime like that contained in the underlying rock.

The supposed human footprints were found in a quarry about a mile from the sea, and at a depth of about 50 feet from the surface—in fact, near the bottom of the formation. As I have said, the slab bearing the impressions now lies in the Warrnambool Museum.

There are two impressions, much like what would be made by a shoe or boot. They are each about 9 inches long; the right is about 3 inches across the broadest part, and the other is somewhat less. In both can be distinguished a narrow part corresponding to the instep. At the upper ends the two impressions are about 2 inches apart, and point outwards, and are both much deeper at the lower than at the upper ends. Just below, and at the same time a little to the left of each, there is a distinct bulging out of the stone.

About 7 inches behind these two imprints is a large oval-like depression. This has unfortunately been somewhat injured in the operations of getting the slab out and conveying it to the Museum. Alongside of this depression is another of the same character, but considerably larger. There is a very distinct bulging out just below the lower margin of each, and between the two the rock has the appearance of having been squeezed up.

The quarrymen state that, when they first laid bare the slab bearing the impressions, there were two other prints very like the two I have described first, but larger, and lying to the right of these—in fact, bearing the same relation of position to the right large impression as the other two do to the left. These were unfortunately destroyed, owing to the carelessness of the men in getting the slab out. The stone when first quarried is soft, and any marks are soon obliterated unless care is taken.

We have seen that the rock in which the supposed footprints were found is of Æolian origin; and as they occurred in a bed sloping at an angle of 32°, and on the side remote from the sea, it is evident that they were formed on the landward face of an

old dune. Their shape and appearance at once suggest that they are the impressions made by a person sitting down, after the manner of a blackfellow, on the old hummock.

It may be objected that it would be impossible for any such tracks to be preserved, made as they were on such a yielding and shifty material as the sand of a dune, especially at an angle of 32°. On examining a large dune now being formed near Warrnambool, I found the surface much firmer than might have been expected, owing to the fact that it had been raining the previous day, and the sand was still damp. Tracks of birds, bandicoots, rabbits, and dogs were numerous and remarkably distinct. These tracks might easily be preserved by fresh sand being blown over them within a short time after they were formed. So it is by no means impossible, or even improbable, that human footprints should be preserved under favourable conditions. It may be now asked if any other tracks besides the ones already considered have been discovered.

There is in the Warrnambool Museum a slab of Æolian rock bearing the footprints of a bird. This was obtained in a quarry at Warrnambool, in 1876, at a depth of 25 feet from the surface, and at an angle of 32°. The footprints are two in number, the digits being about 2½ inches long, and the stone at the borders of the impressions bulges out just as would occur by the pressure of the foot.

In July last Mr. Archibald wrote me as follows, from Warrnambool :—"On Saturday last J. Rodgers found in his quarry, situate about 1½ miles east of the quarry you saw, a slab with the impressions of two human feet on it. One was broken, the other I have seen. It is that of a person going down the old hummock, the weight having thrown up the sand in front. On the same slab were the imprints of the pads of a dingo apparently. . . . These were found at about 15 feet."

Mr. Dobson, M.I.C.E., F.G.S., says that this footprint appears as if made by a booted foot ; and a blackfellow, on being shown it, scouted the idea of its being caused by a naked foot. No measurements of this appear to have been taken. I do not think that much importance need be attached to the blackfellow's testimony.

Again, in July, Mr. Archibald wrote from Warrnambool :—"A stonemason called me from the Museum, the other day, to look at the tracks on the slab he had just got in from the quarry. The tracks were those of an emu, and the slab came from a depth of 40 feet."

When at Warrnambool I made inquiry of a good many men employed at various quarries as to any other tracks they might have discovered. They were unanimous in saying that they frequently had come across tracks of birds, dingoes or wombats,

kangaroos, and what they were certain were human footprints. One man said that he had on one occasion traced footsteps for nearly 50 yards along the bed he was working and going up the face of the old dune. It is a pity that no precise record of these discoveries has been kept; but the quarrymen, not knowing them to be of any interest, said nothing about them, until Mr. Archibald, by mere chance, heard of and secured the slab he has in the Museum. However, in the face of the evidence we have, it is almost impossible to believe that all these impressions can be mere *lusi naturæ*. One of the principal points to be observed is that all these marks appear to have been impressed on the surface of the sand, for, as I have already remarked, the stone at the edges of the tracks is distinctly bulged out. In the case of the ones we have been specially considering, it will be noted that the bulging out is at the lower edge of each of the impressions. Now, if these were really caused by a person sitting on the slope of a dune, this is just what might be expected, as all the weight would be thrown forward. It cannot be said that marks of toes have been satisfactorily made out in these impressions, but in the left one, if seen in a favourable light, five slight depressions, side by side, can be distinguished, and these might easily have been made by toes. However, I think, considering the yielding character of the sand, that it would only be under very favourable conditions that such details would be preserved. In the case of a person sitting down on the slope of a dune, the act of rising would probably cause all toe marks to be obliterated—partially, at any rate.

The late Mr. Peter Beveridge, a well-known early settler, states in his book, "The Aborigines of Victoria," that the blacks' clothing—where any was worn—consisted of a 'possum-skin cloak, worn like a toga, which fell to about the knees. I think that in the impressions on the slab in the Warrnambool Museum we have the record of two persons clothed in a cloak, sitting close together and somewhat obliquely to each other, the left one being probably a child, indicated by the smaller size of the impressions. Considered in this connection, the age of the formation in which the footprints occur becomes a most interesting question. I have not been able to come to any definite conclusion as to their age in terms of years, but there are a few points which are worth considering. It has been already noted that our impressions were found at a depth of 50 feet; but as they were formed on the landward face of a dune, we have to consider not so much the vertical depth as the horizontal—*i.e.*, the distance in a horizontal line from the point where they were formed to the outermost extension of the dune. In this case this distance is several hundred yards. However, no great lapse of time is necessary for this, for the rate at which a dune may

advance may be very considerable, as may be seen in many places along our coast.

The dunes which are being formed at the present day overlie the older ones unconformably, and do not extend anywhere near where the tracks were found. They are quite bare, and are rapidly overwhelming pasture-land and trees and scrub in their advance. When the first settlers arrived in the Warrnambool district the old consolidated dunes were covered with timber and scrub. Mr. Archibald states that when he first went there, in 1858, sheoaks, blackwoods, and gumtrees of great age were growing all over the present site of the town and quarries. So it seems evident that the accumulation of these older dunes had for some time ceased. The presence of the sheets of limestone overlying them points to the same conclusion, for, taking into consideration the shifting character of the dunes of to-day, the limestone would require a period of rest for its formation.

If one walks along the coast at Warrnambool, it will be observed that the Æolian rocks form jagged and rugged cliffs, dipping landwards at the usual angle. Stacks and isolated rocks appear at some distance from the shore. Unless, as Mr. Dennant has remarked, this is due to merely local circumstances, it must be taken as an evidence of subsidence which has taken place since the formation of these rocks. But at present the whole southern coast of Australia is being upheaved, as shown by raised beaches and other evidences. A considerable amount of volcanic energy appears to have been manifested along our coasts within a comparatively recent period. Darwin and others have remarked that outbursts of volcanic activity are often accompanied by subsidence, and it is not improbable that minor oscillations of the relative level of land and sea have taken place within recent, or, at any rate, late Pliocene times, along our coasts. That one subsidence and subsequent elevation has taken place since human habitation began is shown by the present condition of Tasmania.

The Rev. John Matthew, M.A., has shown that the Australian blacks are not the true aboriginals, but are a mixture of the real aboriginals with Papuans and Malays, these peoples having invaded the country several times from the north. In Tasmania were found the true aboriginals, the Malay and Papuan influence not having extended there, having been arrested by Bass' Straits. So Tasmania must have been peopled long before these invasions took place. Considering the very primitive condition of the Tasmanians (Mr. Matthew says they were Palæolithic), I think it is unlikely that they crossed from the mainland by sea, but that the passage took place when Tasmania was part of the mainland, or, at any rate, at the time when the extent of sea to be crossed was very much less than now. Since then consider-

able subsidence must have taken place; but at the present time Tasmania is undergoing upheaval in common with the southern coast of Australia. Raised beaches are well developed along the shores of the estuary of the Derwent, on the southern side of the island. On the north coast I have noted raised beaches at Emu Bay, Penguin, Devonport and at Point Sorell.

Such oscillations of level along the coast must have a disturbing effect on the regular accumulation of the sand dunes, and I think it is possible that this might account for the cessation in the formation of the older dunes, and that, in considering the age of our impressions, time must be allowed for—(1) the accumulation of the sand between the place where the tracks were found and the outermost extension of the dune; (2) the consolidation of the sand to form rock, the formation of the limestone, and the growth of large timber and scrub, which could only take place when the sand had ceased to accumulate; (3) a subsidence, during which a good deal of the formation has been denuded away by the sea; (4) the present movement of elevation, which would seem to be going on pretty rapidly.

Professor Tate, on the evidence of some land shells, has assigned this Æolian formation to Pleistocene, or, more correctly, late Pliocene times—a period corresponding to the Pleistocene, or glacial, epoch in the northern hemisphere, not having been demonstrated for Australia. Mr. Dennant, F.G.S., has given cogent reasons for calling the formation recent. Professor Spencer is of opinion, from a consideration and comparison of the present faunas of Tasmania and Australia, that separation could not have taken place later than late Pliocene times; but separation, so far as animals were concerned, might not necessarily have meant separation as far as human beings were concerned, primitive as the latter might have been.

The shortest distance between Tasmania and the mainland is about 190 miles, while the greatest depth in Bass Straits does not exceed 50 fathoms; so that a comparatively small amount of subsidence or elevation would make a considerable difference in the coast line. Now, if separation took place in late Pliocene times, there must have been considerable differences in the coast line since then. In fact, a coast line, geologically speaking, may be said to be almost always in a state of unstable equilibrium, and an Æolian formation such as that of which we have been speaking, being essentially a coastal one, will probably share to the fullest extent the vicissitudes of the coast line, and will be, at best, a formation of a very transitory nature. So then, I think, there is no doubt that the Æolian formation at Warrnambool which we have been considering is of recent age. I am also of opinion that there have been one or more minor oscillations of level since the rocks in question were formed.

Since, then, we can safely assign the formation to the human period, there is nothing inherently improbable in such impressions as we have been considering being due to human beings; and, also, seeing that the tracks of birds and other animals have undoubtedly been preserved, there is no reason why human foot-prints should not also have been preserved in the same way.

## NOTE ON MUSICAL SANDS.

By T. S. Hall, M.A.

(*Read before the Field Naturalists' Club of Victoria, 9th May,* 1892.)

While on a trip to Phillip Island at Christmas time I was struck by the musical note given out by the sea sand when walked over. I had never noticed this phenomenon before, though it occurs not uncommonly in other parts of the world. My first idea was that the sound was caused by the india-rubber soles of my shoes, but I found I could get the musical note by striking the sand with my hand, or by drawing a stick rapidly over the surface. The sound was produced only where the sand was dry, and resembled almost exactly that caused by drawing the finger rapidly over a piece of corded silk. On making the sound by skating over the surface, I found that the note could be detected at a distance of forty paces. The sands were musical wherever I tried them about Cowes, and the only gentleman to whom I spoke who had noticed the phenomenon said he had also noticed it at San Remo. I have since tried the sand at Geelong, Barwon Heads and Warrnambool without any result. Probably other members of the club have noticed the phenomenon elsewhere.

Mr. Cecil Carus Wilson gives some interesting notes on musical sands in *Nature* of last year (vol. xliv., p. 322), and his experiments go to show that the sound is caused by the rubbing together of millions of grains of perfectly clean quartz, free from angularities and all about the same size. This theory, which was put forward some years previously, has been opposed by Dr. A. A. Julien, and Prof. H. C. Bolton, of the United States, who have given some attention to the subject (*Nature*, vol. xliii., p. 30). They hold that the grains are prevented from actual contact by an elastic air cushion, consequently the note is given out only when the sand is dry. In two localities in the United States "squeaking sands" occur which give off a different sound when disturbed, and then only in the moist state. They believe that Mr. Carus Wilson's theory would explain the latter phenomenon, but not the former.

The three observers mentioned agree that localities for musical sands are not rare, but observers are lacking, and they have published lists of such localities as far as known. Inland sands as well as sea sands may be examined, as one of the most remarkable displays was noticed by Prof. Bolton in the Sinai Desert.

## PROTECTION OF INSECTIVOROUS AND NATIVE BIRDS.

*To the Editor of the Victorian Naturalist.*

Sir,—Last November Baron von Mueller brought forward at our meeting the subject of the protection of insectivorous and native birds, and made several valuable suggestions. Since then I have been making careful inquiries, and obtained the views of men in the trade and others qualified to speak on the subject. I find that, prior to the opening of the present season for Wild Duck, Teal, and other wild fowl, they were offered to the dealers fully six weeks prior, the cause of this being the higher price obtained for them. The refrigerating rooms being brought to a practical stage is no doubt answerable for this, as they can be kept there and sold without being exposed for sale before the legal time. Other notable instances of their ready disposal are the large ocean steamers, who buy them for the table, and sell the balance at home; also, some of the proprietors of our city restaurants advertise themselves as purchasers. Bird-sellers are induced to obtain large numbers of our native birds alive, finding ready sale to captains and officers of ships, who buy as a speculation and sell at home. A step on board many of the ships preparing for sea cannot but convince one of the wholesale destruction going on from day to day—sometimes over a hundred birds in one ship.

To combat this evil there seems to be a necessity for a further alteration in the game laws, such as the following:—First, to issue licenses, similar to the English, to kill game or wild fowl. The cost differs according to the length of time for which it is taken out. Thus, if taken out for the whole year (1st August to 31st July), the cost is £3, and the certificate printed on *red* paper; if taken out for three months (1st August to 31st October), the cost is £2, and the certificate *green*; if taken out from 1st November to 31st July, the cost is £2, and the certificate *yellow*. A game license for fourteen days costs £1, and the certificate *white*. Thus anyone found without a license is liable to punishment, and the issue of the licenses being granted only a day or two prior to the opening of the season, and dated for the opening, prevents the destruction. Secondly, all vendors of wild fowl and game should be licensed and their premises open to the inspector for inspection, such officer to have full power to prosecute. Thirdly, the Government of this colony being the owners of the railways and having control of the ports should give the railway commissioners power to make bye-laws preventing them being used for the transit of birds during the close season, such power being given to the stationmasters of every station, with power to take names and addresses for prosecution by the authorities. Customs officers and the police

may be made inspectors for their respective districts. Fourthly, Bird-sellers, exporters of bird skins, and officers of ships who make a trade of live birds should have to pay an export duty equal to the fine imposed on shooting birds out of season. The licenses and fines, if strictly enforced, would amply cover all cost of inspection ; as, for instance, take the case of the 857 pair of wild fowl shipped at Geelong the morning the season opened. Now, no one could say these birds were shot that morning, and must, consequently, have been days before. The fine would have amounted to £3,428. This, I think you will readily admit, would effectually check the wholesale and illegal destruction of our native birds.

NATURALIST.

Windsor, 25th January, 1892.

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At the last meeting of the Royal Society of Victoria, Dr. Dendy read some "Further Notes on the Oviparity of the larger Victorian Peripatus, generally known as *P. leuckartii*." He dealt at length with various criticisms upon his former observations on the same subject, and pointed out that, as he originally suggested, the larger Victorian species is probably not *P. leuckartii* at all, which fact would explain the apparently contradictory statements as to the mode of reproduction. *P. leuckartii* has now been shown to be viviparous, as is usual in the genus, and Dr. Dendy now brings forward additional evidence pointing very strongly to the conclusion that the larger Victorian species is normally oviparous, and at the same time recapitulates the arguments previously adduced by him (but ignored by his critics) in favour of this view. The evidence in favour of his view may be briefly summed up as follows :—(1.) Fifteen eggs, shown by their subsequent development to be indubitably those of Peripatus, were laid in his vivarium last winter by a number of animals kept in captivity. (2.) These eggs, after but not before being laid, exhibited a beautifully and regularly sculptured shell, as in many insects. (3.) Female specimens, dissected at various times of the year, were never found with embryos in the uterus, but generally with large undeveloped eggs. (4.) When the eggs were first found, no embryo was recognizable inside them, but only a quantity of yolk ; but in due course some of the eggs developed until, after a period of 8½ months from the time of laying, a perfect young Peripatus was found in one of the eggs, exhibiting all the appendages and even the commencement of the characteristic pigmentation of the adult. We consider that Dr. Dendy has completely defended the position taken up by him in his earlier papers on the subject against the somewhat heated and personal attack recently made upon him by Mr. Fletcher in the "Proceedings of the Linnean Society of New South Wales."

## DESCRIPTIONS OF NEW AUSTRALIAN PLANTS, WITH OCCASIONAL OTHER ANNOTATIONS;

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

*(Continued.)*

Endiandra exostemonea.

Branchlets and petioles thinly brown-tomentose; leaves of chartaceous substance, mostly ovate-lanceolar, somewhat acuminate, shining on both sides, slightly paler green beneath and there the costulation prominent and tomentellous, the venulation conspicuous and closely reticular, the leaves except their keel and costules almost glabrous; panicles axillary and terminal, usually much shorter than the leaves, pedicels very thin and as particularly also the peduncles beset with brown appressed hairlets; flowers very small, their calyx nearly glabrous, its lobes semi-ovate, somewhat longer than the petals; stamens glabrous, with two lanceolar appendages at the base, their upper portion exserted; style rather conspicuous, as well as the ovulary glabrous; fruit large, globular.

At the Daintree-River; Theod. Pentzke.

Leaves on rather short petioles, to 5 inches long, to 1¾ inches broad. Flowers in the panicle often multitudinous. Calyx and petals brownish, paler towards the margin. Stigma minute. Fruit not yet obtained. The aspect of this species is different to that of any other congener, the extension of the stamens beyond the calyx being also unusual. The plant will have its place in the phytographic system near *E. virens*, from which it recedes in its far more copious vestiture of the branchlets, in broader leaves with a somewhat different venulation, in thinner pedicels, in calyces of less turgidity and in emerging stamens; most probably the fruit will turn out to be also not identical.

Polyosma reducta.

Branchlets and petioles bearing minute appressed hairlets; leaves rather small, chartaceous, mostly lanceolar, gradually acuminated, devoid of denticulation and lustre, above almost glabrous, beneath paler and subtle appressed-puberulous, their venulation much concealed; racemes terminal and oftener axillary; pedicels very thin; bract and bracteoles minute, at the upper end of the pedicel; denticles of the calyx very short; fruit comparatively small, ovate-globular, slightly oblique, destitute of longitudinal lineations, its summit emerging from the calyx and somewhat pyramidal; seeds one or two.

Sources of the Russell-River ; W. Sayer.

A tree, attaining a height of 25 feet. Leaves 1 ⅓–2 ½ inches long, rather brittle, almost suddenly passing into the slender but very conspicuous petiole. Flowers unknown. Fruits about ⅛ inch long, on pedicels of nearly the same length ; endocarp thinly cartilagineous, the spurious dissepiment longitudinally divisable into halves. Seeds, if two, only on one side turgid. Albument oily, somewhat granular. Embryo minute, roundish.

So far as our material reaches, the generic position is indisputable. The smallness of the leaves and particularly of the fruits as well as the externally obliterated venulation of the leaves separate already this species from its several congeners.

RANDIA SPINULIGERA.

Nearly glabrous ; leaves chartaceous, almost sessile, from a roundish base lanceolar, at the upper end narrowly protracted, but the apex bluntish, paler beneath, thinly venulated ; stipules broad-linear, acute, dilated at the base, soon wearing away ; cymes much shorter than the leaves, usually developing one flower only ; peduncles occasionally converted into short acicular spinules ; flowers rather small ; calyx minutely but acutely five-denticulated, somewhat beset with appressed hairlets ; corolla glabrous, its lobes five, nearly as long as the cylindric tube, narrow-lanceolar, conspicuously reticular-venulated ; filaments very short ; anthers fixed about their middle, linear, slightly exserted, by about one-third shorter than the corolla-tube ; style glabrous, almost capillary ; stigmas disconnected, oval ; fruit comparatively small, ovate-ellipsoid, wrinkled ; seeds two or even one only ripening in each half of the fruit, ovate, convex on one side.

On Mount Bartle Frere : Stephen Johnson.

Leaves to 4 inches long to 1 ½ broad, without any lustre in their dried state ; peduncles seldom above half an inch in length, spinules often less long ; pedicels always short ; calyx ⅛ to ¼ inch long, its limb persistent ; corolla-tube narrower downward, about ½ inch in length, and so the style ; stigmas hardly $^1/_{12}$ inch long ; fruit ½ to ⅔ inch long, but not seen in its perfect maturity ; seeds $^1/_5$ to ¼ inch long.

Distinguished from *R. tetrasperma* in larger leaves, not gradually narrowed into the base, in extension of the calyx beyond the ovulary, in longer corolla, in enclosed anthers and larger not globular fruit. Differs from *R. Moorei* already in longer upwards more narrowed leaves, more slender and more elongated calyx-tube ; narrower, thinner, more pointed and conspicuously venulated corolla-lobes, in longer anthers ; the fruit of *R. Moorei* may also be different, but the stigmas are likewise severed. Also allied to *R. patulæ*.

The dissepiment of the ovulary or fruit could not be traced from the specimens available; should it not pass through the whole width of the cavity, then it will become necessary to transfer this plant to Gardenia. In some respects it reminds of *Coffea benghalensis*, the stigmas of which are elliptic also.

Prasophyllum Dixoni.

Comparatively dwarf, leafless at the time of flowering, except a rudimentary leaf close to the spike; tuber roundish, somewhat compressed; flowers in the spike few, very small, closely together, pale yellowish-green, recurved; bracts almost semi-lanceolar, acuminate, somewhat shorter than the calyx-tube; unpaired calyx-lobe ovate-lanceolar, concave, as long as the paired petals and hardly by about one-third shorter than the labellum and paired calyx-lobes, the latter lanceolar, connate near their broadish rather bulging bases; paired petals ovate-lanceolar, finely short-pointed; labellum suddenly short- and broad-stipitate, ovate-cuneate, hardly apiculate, fringeless though imperfectly and faintly ciliolar-denticulated toward the summit and there somewhat red-edged, towards the base slightly two-ridged; lobes of the gynostemium very short, glabrous bifid; fruit obliquely cylindric-ellipsoid.

Near Kardinia-Creek; Ch. French jun. and J. E. Dixon.

As yet only two specimens found, and so far as this material allows to judge not really indentifiable with any described species. According however to figures in Mr. Robt. Fitzgerald's splendid work on "Australian Orchids," the plant just now discovered here as one of our earliest flowering in the season, differs from *P. viride* in the stem being more slender, the paired calyx-lobes less bulging, in the labellum rather truncate than distinctly bilobed at the base, the stipes shorter, also in throughout greenish colour of all floral parts; in this latter respect the new Victorian plant is still more unlike *P. ansatum*, although as regards floral structure it is evidently a near ally; but the apex of the paired calyx-lobes and petals is devoid of a glandule, whilst the labellum is not callously thickened towards the summit, but towards the base, nor is it glandular enlarged at the edge near the middle. Our plant flowers in April and May, so that at such time it may easily elude detection.

May, 1892.

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## FIELD NATURALISTS' CLUB OF VICTORIA.

### Annual Meeting.

The annual meeting of the Field Naturalists' Club was held in the Royal Society's Hall on the 13th June, 1892. Professor W. Baldwin Spencer occupied the chair, and there was an attendance of more than 100 members and friends.

#### ANNUAL REPORT AND BALANCE SHEET.

The annual report was the first important matter to come before the members, and its details were of the most encouraging character as regards the progress of the Club. About fifty new members have been added to the ranks of the Club during the past year, bringing the total membership up to 235, and the attendance at the monthly meetings has been far in excess of that of previous years. The balance-sheet showed receipts for the year to have been £178 12s. 4d., with an expenditure of £166 1s. 1d. Regretful reference was made to the deaths of several members, notably those of Sir William Macleay, an hon. member; Dr. T. S. Ralph, one of the original members; and Mr. Edward Bage, jun., a life member; and then followed allusion to the initiation of the prize competition scheme for encouraging the study of natural history amongst the younger members of the community—a scheme which had already borne fruit, as evidenced by an array of prizes distributed later in the evening to fifteen successful competitors. On the conclusion of the report it was pointed out that one important item had been unintentionally omitted—viz., the steps taken by the Club in initiating and awakening interest in a proposal to establish a gun tax. It was agreed that this matter should be included in the report, and on the motion of Dr. A. Dendy, seconded by Mr. Luehmann, the report as thus amended was unanimously adopted.

In speaking upon the report, Mr. J. Shephard alluded to the great importance of microscopic work in connection with the Club, his most forcible argument being that if the work of the Club was to be permanently successful it must be progressive—extending its countenance substantially to a study which not only touched field naturalists' work in nearly all its branches, but which was also attracting new workers day by day, who would bring as much advantage to the Club as the Club would to them.

LIBRARIAN'S REPORT.

"Technics," No. 4, from Stawell Technical College; "Label List of Australasian and Pacific Islands Pulmonata, founded on Tryon's Manual," vol. i., 1885, by Dr. J. C. Cox, from author; "Proceedings of Royal Society of New South Wales," xxv., 1891, from Society; "Proceedings of Linnean Society of New South Wales," second series, iv., 3, from Society; "Journal of New York Microscopical Society," viii., 2, April, 1892, from Society; "Journal of Pharmacy," May, 1892, from Society; "Proceedings of Australasian Association," vol. iii., Christchurch, from Association.

REPORT OF EXCURSION TO MORNINGTON.

The Rev. A. W. Cresswell, M.A., brought up a report of the excursion to Mornington on 24th May, which, although it nearly fell through from lack of attendance of those interested in geology, yielded fair returns in the way of specimens and a large amount of pleasure to the two gentlemen who essayed the trip.

ALTERATION OF RULE 10.

Mr. F. G. A. Barnard moved that the words "and two secretaries" in Rule 10 be altered so as to read "and secretary" —his arguments for the alteration being based on the experience of previous secretaries. The alteration was agreed to by the majority of members present.

ELECTION OF OFFICE-BEARERS FOR 1892-93.

An election of office-bearers then took place, and resulted in the return of all the members of the old executive, the result being as follows:—President, Professor W. Baldwin Spencer, M.A.; vice-presidents, Mr. D. Best, Mr. C. Frost, F.L.S.; hon. treasurer, Mr. F. Wisewould; hon. librarian, Mr. F. G. A. Barnard; hon. secretary, Rev. W. Fielder; hon. editor of the *Victorian Naturalist*, Mr. A. H. S. Lucas, M.A., B.Sc.; committee—Dr. A. Dendy, F.L.S., Mr. J. Gabriel, Mr. C. French, F.L.S., Mr. T. Steel, F.C.S., Mr. H. T. Tisdall, F.L.S.

Mr. C. Frost called attention to the retirement through press of private work of Mr. Dudley Le Souëf as one of the hon. secretaries, and referred in fitting terms to the fact that he had taken up the work at a time when it was difficult to get anyone else, and that he had thrown into it an enthusiasm which was now bearing fruit in the enhanced prosperity and usefulness of the Club.

Mr. Le Souëf suitably acknowledged the vote of thanks accorded him.

ELECTION OF NEW MEMBER.

On a ballot being taken, Miss Holzer was elected a member of the Club.

PRIZE COMPETITION FOR NATURAL HISTORY SPECIMENS.

Baron von Mueller, K.C.M.G., had kindly consented to distribute the prizes in connection with the prize competition for natural history specimens, and before doing so he introduced Mr. W. Finzelbach, assistant to the Botanical Laboratory at Geneva, who acknowledged his reception in a very entertaining speech. The work of distributing the prizes then commenced, and in his introductory remarks Baron von Mueller passed in review the educative value of the study of natural science, and referred to the healthy enthusiasm which a love of Nature incited—an enthusiasm which would influence for good not only the individual but the state, as well as foster reverence in all its phases. These remarks were emphasized by a personal reference to his first original work, begun at the age of 14 years, and not completed till five years afterwards. The prizes were then distributed to those competitors who had gained first and second places in the various classes (see list of competitors in June number of the *Naturalist*), each prize being accompanied by a few kindly remarks to the recipients. A vote of thanks was proposed by Mr. W. H. Archer, F.L.S., who bore testimony to the magnificent work Baron von Mueller had done in botanical science, a fact which made the advice he tendered to the competitors so forcible, since it was that of a worker to future workers. The vote was carried by acclamation.

EXHIBITION OF SPECIMENS.

The meeting terminated, as usual, by a good display of exhibits, of which the following is a list:—By Mr. F. G. A. Barnard.—Case of Victorian insects. By Miss Cochrane.—Paintings of orchids. By Mr. A. Coles.—Black-tailed Tribonyx, Spotted Water Crake, Balgowlah Lizards, and Rock Scorpion from New South Wales. By Mr. F. J. Ellemor.—Specimens of 18 species of birds taken at Lake Charm, of which the following deserve mention:—*Petræca goodenovii* (Red-Capped Robin), *Platycercus barnardi* (Barnard's Parrakeet), pair; *Erythrogonys cinctus* (Banded Red-Knee), pair; *Tribonyx ventralis* (Black-tailed Tribonyx), pair; *Malacorhynchus membranaceus* (Membranaceous Duck), pair; *Erismatura australis* (Blue-billed Duck), pair. By Rev. W. Fielder.—*Nautilus pompilius* (Pearly Nautilus), with shell; *Argonauta orizata* (Paper Nautilus), with egg case. By Victorian Department of Agriculture (Entomological Branch).—Two cabinet drawers of named predatory Coleoptera of Australia; chart

drawings of Peach Aphis and parasites, for lecturing purposes. By Mr. C. French, sen.—*Nyctalemon* (sp.), from New Guinea. By Mr. C. French, jun.—Eggs of Gilbert's Thickhead and Olivaceous Thickhead (Victoria); eggs of Grey-tailed Thickhead (Tasmania). By Mr. J. Gabriel.—Collection of Australian birds' eggs. By Mr. G. F. Hill.—Case of Coleoptera. By Mr. G. A. Keartland.—Two specimens of *Hoplocephalus coronoides* (green specimen from King Island, and red one from Bayswater). By Mr. J. A. Kershaw.—The following Lepidoptera, taken, though rarely occurring, in Victoria:—*Papilio erectheus* (Don), *Papilio sthenelus* (Macl.), *Papilio anactus* (Macl.), *Tachyris ega* (Boisd.), *Tachyris melania* (Fab.), *Elodina angulipennis* (Luc.), *Callidryas pyranthe* (Lin.), *Holochila absimilis* (Feld.), *Holochila xanthospilos* (Hub.), *Ogyris idmo* (Hew.); also *Chrysophanus æneus* (Miskin), Dandenong (first time recorded for Victoria, and mentioned by Mr. Miskin in "Proceedings of Linnean Society of New South Wales for 1890" as "*appearing to be entirely confined to Queensland.*" By Baron von Mueller.—*Trachymene eatoniana* from Youndegin, Western Australia (new for Australia). By Mr. W. Scott.—Fossil shells from Mornington. By Mr. J. Searle.—Coleoptera and Lepidoptera from New South Wales. By Mr. G. Sweet.—*Charaxes sempronius* (Fab.), from Bald Hills, Broken River, near Mansfield.

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The monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 11th July. Professor W. Baldwin Spencer was in the chair, and there was an attendance of about 80 members and friends.

### LIBRARIAN'S REPORT.

The hon. librarian reported the following donations to the library:—"Annual Report, Mining Department of Victoria, 1891," from the Department; "Proceedings of Linnean Society of New South Wales," second series, iv., part 4, from the Society; "Transactions of the Geographical Society, Victorian Branch," ix., part 2, from the Society; "Victorian Earthworms," part 1, by Professor W. B. Spencer, from the author; "Technics," March, April, and June, 1892, from the School of Mines, Stawell; "Journal of Pharmacy," June, 1892; "Catalogue Marine Shells of Australia and Tasmania, part 2—Pteropoda," from the Australian Museum; Pamphlets (German), A. J. Campbell; "Botany," by Dr. A. Dendy, F.L.S., and A. H. S. Lucas, M.A., B.Sc. (from Messrs. Melville, Mullen and Slade).

### REPORT OF VISIT TO THE ZOOLOGICAL GARDENS.

Mr. Dudley Le Souëf handed in a report of a visit of the members of the Club to the Zoological Gardens on 18th

June. About 25 members took part in it, and evinced a great deal of interest in the improvements which have been lately instituted there for the better housing of small birds, as well as an exercising enclosure for the lions and tigers, and new quarters for the elephant. The young pumas and black leopard, and the black-headed snake from Queensland, also interested the visitors very much.

### PROPOSED GUN TAX.

A deputation, organized by the Field Naturalists' Club and representing the Royal Society, Royal Agricultural Society, Royal Horticultural Society, and Zoological and Acclimatization Society, waited upon the Minister of Customs on 1st July. In introducing the deputation, Messrs. G. D. Carter and J. Bosisto, M's.L.A., dwelt upon the necessity of protecting our insectivorous birds from the reckless and indiscriminate shooting which is now so prevalent, as well as human lives, which are frequently sacrificed to the inexperience of sportsmen. The imposition of such a tax as a legitimate source of revenue was also suggested. Professor Kernot (Royal Society), Mr. C. M. Officer (Zoological Society), and Mr. C. Draper (Royal Agricultural Society), also emphasized these views, the former specially dwelling upon the fact that if a tax was imposed it should be of sufficient amount to fulfil the objects of its institution. Mr. F. Wisewould referred to the draft which had been drawn up by the sub-committee of the Field Naturalists' Club—a draft based upon similar acts in England and some of the Australian colonies. A few new features had, however, been added, notably that which made it illegal for persons under the influence of liquor to carry firearms. It was also provided that under no circumstances should a license be given for the use of swivel guns. The Club was also represented by Mr. D. Le Souëf and Rev. W. Fielder (hon. secretary). In answer to the deputation the Minister said that he would take the draft bill which had been prepared into favourable consideration. He would have an amended draft drawn up and submitted to those interested before its introduction into Parliment. He was of opinion, however, that a 5s. tax, as proposed, was not heavy enough, since it would be worth the while of those who let out guns to pay the tax themselves.

### ELECTION OF MEMBERS.

A ballot for new members resulted in the election of Messrs. C. Burton, D. M'Eacharn, and C. Peers as members of the Club.

### PAPER.

Mr. R. S. Sugars gave an illustrated paper on "A Trip to South Gippsland," which took place in January last. Making Toora his

headquarters, the author made successful expeditions, judging from the photographic slides shown, to the Franklin Falls, four or five miles from Toora; to the Agnes Falls, on the Agnes River; and to some new falls on the Franklin, which Mr. Sugars has named Yeoman's Falls. A waterfall of less extent on the Falls Creek was also visited, and called the Weeping Falls. The views presented allowed the audience to judge very clearly the character of the natural features of the country passed through, and as the committee has decided that the next long excursion of the Club should be to South Gippsland, members who attend may reasonably expect not only a pleasant, but also a profitable trip. In concluding an interesting paper Mr. Sugars thanked the Secretary and Directors of the Working Men's College for the use of their splendid lantern, as also Mr. A. J. Campbell, F.L.S., for working it.

EXHIBITS.

The meeting terminated with the usual exhibition of specimens, of which the following is a list:—By Mr. A. J. Campbell.—The first authenticated egg from the nest of the Regent Bird (*Sericulus melinus*), found last December in the Richmond River district. By Mr. C. F. Duncan.—Six rare Ferns. By Mr. C. French, jun.—Eggs of Masked Gannet and Indian Tern, from North-West Australia. By Mr. H. F. Hill.—Case of Hymenoptera parasitic on Victorian Lepidoptera. By G. A. Keartland.—Two lizards (*Delma fraseri* and *Lialis burtoni*); four snakes; eggs of *Tallegalla lathami* (Brush Turkey), *Eupodotis australis* (Native Turkey), *Œdicnemus grallarius* (Southern Stone Plover), *Geophaps scripta* (Partridge Bronzewing Pigeon), *Centropus phasianus* (Pheasant Coucal), &c.; skins of Redwing Lory (Moreton Bay), Rosella, three Finches (Burdekin River, Queensland). By Mrs. W. Martin.—*Heliophyllum yassense* (Eth. N. Sp.) By Baron von Mueller.—Native Bees' honey; also, comb and Bees from near Port Jackson, New South Wales, collected by Miss King; *Trachymene effusa*, showing large edible roots, collected by Miss Alice Eaton, Youndegin, West Australia; two Giant Lemons of Fiji, weighing over 3 lbs., collected by W. Graburn, Esq.—these lemons often weigh 5 lbs. By Mrs. R. Simson.—Crustacea, from Geelong. By Mr. F. Spry.—Complete life-histories of *Ogyris olane* and *O. abrota*.

## EXCURSION TO FERNTREE GULLY.

We left Melbourne by the 10.20 a.m. train on the morning of 19th March for Upper Ferntree Gully. The party, which was under the leadership of Professor Spencer and Mr. C. French, numbered in all eleven, of whom two were ladies. The previous

night having been wet, the road to the gully was soft and muddy, and the gathering clouds looked as if there were more rain still to come.

We took the direct road to the gully, finding as we turned over logs that the heavy rain had scarcely penetrated beneath them, and that there were but few signs of life; now and then we found an odd earthworm or two, with stray Land Planarians and Nemertines, whilst beetles were very rare indeed. Walking up the gully was not a very easy matter, and when we had got half way up the rain came down in torrents. The two lady members very wisely determined to turn back; and the climb up the last and steepest half of the gully was not pleasant. The rain, however, did us one service—it brought out a few specimens of Geonemertes which we caught crawling along the fallen fern stems. At the top of the range we found a kind of accommodation house where mild refreshments were supplied, and were very glad to avail ourselves both of these and of its shelter. Here, in front of a good log fire, we gradually got dry. Late in the afternoon the rain had partly ceased, and we retraced our steps to the railway station, but this time by way of a new road, bearing south-east from the gully, and from which a splendid view may be obtained, turning over logs, and shaking bushes for insects, which, however, were by no means plentiful.

It had been arranged before leaving Melbourne that a bush friend of one of the leaders would meet us at the railway station, and, after seeing our friends off by the 5.40 train to town, would drive some of us to a hut situate some four or five miles south-east of the railway station, and well back in the mountains. The Fates, however, were against us, as after waiting for some time after the departure of the train, our driver did not put in an appearance, so that we had the choice of two things—either to return to Melbourne by the 7.50 train, or put up at the hotel until Monday morning. The matter was soon decided, and six of the party—viz., Messrs. Best, French, Frost, Luehmann, Spencer, and Tisdall—elected to stay.

We spent a very pleasant evening, and made an early start on the following morning, preparing our breakfast by the creek side, and after having finished, started off to walk some miles along the Black Hill road in the direction of Gembrook. The country, although heavy rain had fallen, was very dry, and after rolling over any number of logs, we caught here comparatively few either of earthworms or insects—a few lizards being about all we came across in this dry place. About two and a half miles from the railway station a specimen of an orchid was found by one of our party, and being very like a common species, no notice was taken of it, beyond the remark that it was remarkably late in flowering. The specimen was, however, secured and

brought to town, when Baron von Mueller at once detected the difference, and found to his delight that the orchid, which we exhibit here this evening, was one of his own naming, and quite new for Victoria. (A special note *re* this orchid has been kindly prepared by the Baron, and is attached to this account of the trip.)

Turning over logs on the way, we found it again far too dry for worms to be plentiful, but secured a few planarians, such as *Geoplana howitti* (var. *obsoleta*), *adæ*, *mediolineata*, and *alba*, together with one which is probably a large variety of *G. ventropunctata*.

Walking onwards towards Gembrook, we came to a bullock-dray track bearing eastward, and following this along the ridge and then down the hillside, we found it led to a very nice gully, in which grow splendid plants of *Dicksonia antarctia* and *Alsophila*, as also some good Blackwood, Musk, Sassafras, &c. Higher up this gully there are, or used to be, some very fine plants of the Slender Tree Fern (*Cyathea cunninghami*, var. *baylei*), but we, of course, had no time to go and see them. About a mile from where the track crosses the gully is the fine nursery of the late J. C. Cole, and here maples, hollies, oaks, rhododendrons, &c., may be seen to perfection, the clover being nearly up to one's knees, the whole reminding one forcibly of home.

The part of the gully in which we halted was a very good one, there being quite a number of fallen logs on which the loose bark hung, so that many minute things, good insects, fungi, &c., were taken; in all, more than 60 species of fungi were collected in this gully. During the time we were at lunch, and after when collecting around the place, a pretty little bird, the Rufous-fronted Fantail (*Rhipidura rufifrons*) came fluttering about us, and several times was not far from falling into our fire. We remained for some few hours in this part of the gully, and did fairly well in earthworms, fungi, &c. One of the best finds in the beetle line was a very good specimen of the longicorn, *Athemistus armitagei*, which was found hiding under the bark of a living tree. Several Pselaphidæ, and other minute beetles, also Hemiptera, were captured. Of earthworms seven species were taken, of which two are new, and will be described under the names of *Perichæta dicksonia* and *P. alsophila*. Leeches were fairly plentiful, and a specimen of the large black Helix (*Paryphanta atramentaria*), formerly common in the gullies near the Black Spur, was found amongst some damp bark. Under the bark of a fallen tree in the gully a lizard was found, which on examination proved to be a specimen of *Liolepisma æneum*, previously recorded from New Zealand, but not from Australia. Other lizards found were *Hinulia quoyii*, *Liolepisma mustelinum* and *guichenotii*, and *Siaphos* (sp.) Of birds, Wood Swallows (*Artamus*, sp.), Fantails

*(Rhipidura albiscapa* and *rufifrons)*, Mountain Thrushes *(Oreocincla lunulata)*, Yellow-breasted Robins *(Eopsaltria australis)*, the Brown Tree Creeper *(Climacteris scandens)*, and the Pipit Lark *(Anthus australis)*, were seen, and the harsh notes of the Black and Gang Gang Cockatoos were heard. A few Lepidoptera, as *Xenica kershawi*, and some Lycænidæ and Hesperidæ, were seen, but the place being so damp through the heavy rains of the previous afternoon and evening, but few of the better kinds were to be met with.

As it was now getting late we made a start for the hotel. Our little bird friend, being either unwilling to lose our company or glad to get rid of us, hovered around us when we had already started. The hotel was reached in time for dinner, which, after being out all day, was done ample justice to.

Upon the whole we had been fairly successful, and although other collecting fields are no doubt preferable to this part, we had little cause for complaining, the general dryness of the country being no doubt responsible for the comparative scarcity of specimens.

Had we had time we might have crossed the range to some other good gullies, and where there are some splendid trees. We reached Melbourne shortly after nine o'clock the following (Monday) morning.

The following list comprises the names of the rarer Coleoptera collected:—*Coripera deplanata*, *Mecodema montana*, *Athemistus armitagei*, *Natalis titanus* (our first find), Pselaphidæ (five species), Brontes (two species), Notonomus (two species).

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Note by Baron von Mueller.—The Cryptostylis found by you in the Dandenong Ranges, dear Mr. French, is the very rare *C. leptochila*, named by me from a specimen and coloured drawing furnished long ago by Miss L. Atkinson, and described in the "Flora Australiensis," vi., 335 (1873). It was then known only from New South Wales, Bentham recording it from Springwood, in the Blue Mountains, as collected by Richard Cunningham. Miss Atkinson found it not far from that spot. Mr. Fitzgerald, in his superb work on "Australian Orchids," has given an excellent illustration of this singularly local plant, but that shows the labellum light red and the spots thereon not very dark; while your specimens have the labellum dark purplish, with larger, almost black spots, but this seems a mere variation of colour, unaccompanied by any other characteristics to separate your plant from the typic state; but it might, under the designation var. *frenchiana*, be distinguished, which name should be retained, if specific characteristics are discoverable yet. Mr. Fitzgerald procured specimens at Mittagong. As he further

points out, *C. leptochila* is allied to the Javanic *C. arachnites*, which however has the leaves much broader, and, according to Blume's illustration, not dull red, but pale green underneath, and the spots of the labellum perhaps more numerous and smaller. *C. alismifolia*, which in 1881 I described from Samoa, belongs to the same series in the genus, but is still more disrelated. Whether your plant should be regarded as late autumnal or rather early vernal, remains yet to be decided. Bentham describes the labellum of *C. leptochila* as concave, but it is convex, and only by a twist in drying could become so reversed as to assume a concave form. We have no localities noted for this species, except those alluded to on this occasion.

## LIFE-HISTORIES OF INSECTS.—First Paper.

By C. C. Brittlebank.

(*Read before Field Naturalists' Club of Victoria, 9th May*, 1892.)

The following notes on the life-histories of two insects were taken some years ago in the Dandenong district. In Victoria there yet remains work in this branch which will take many years to complete, though of late years there are several naturalists who have taken up this study. That collections illustrating life-histories are of more interest than those of the ordinary kind nearly every naturalist admits.

The first here dealt with is one of the Curculionidæ, as yet not named. In colour a bright brown, with a bronze tinge in certain lights; length 2 lines, by 1 in width. The ordinary collector, on taking this insect, would, when set, place it in his cabinet, among others of the same species, perhaps not even giving a thought as to the plant or manner in which it passed its former existence. With the "life-history" collector it would be different. He would watch, and if at the right season (October and February) would see the beetle select a tender leaf, and, after a careful examination, would deposit a very minute white egg on the margin, about half an inch from the base of the leaf. After allowing time for the egg to adhere, the insect commences to cut a thin strip, on the point of which is the egg. Having freed about an eighth of an inch, it seizes the free end with the hind legs and draws it forward to the second pair, which in turn pass it on to the first pair. These are provided with a projection or spine on the under surface of the thighs, which keep the roll in place till the beetle can secure it. This it does in a most ingenious manner by uniting the surface of leaf and roll at the point of contact. To do this the insect presses the roll forward, so that the outside edges are level. These it bruises with the mandibles till they are a species of pulp, which is rendered adhesive by the gum contained in the leaf. Having secured the first coil, the insect mounts on the top, thus adding the weight of its body to keep the roll firm, and commences

cutting and rolling as before ; but instead of fastening the edges it unites the roll in two places, just inside the margins. Having rolled a strip of leaf from an inch and a half to two inches, the insect cuts the roll free. In the space of a few days the egg hatches out a small white footless larva, which sets to work on the food provided. The larva grows quickly, and by the time that it has eaten all but the two last coils it is ready to pass into the second or pupa stage ; but before doing so it lines the inside of the case with a fine silken web. This greatly strengthens the few remaining rolls of dry leaf. There are two broods a year—one in spring, the other autumn. The tree on which this insect is most commonly taken is known in country districts as Peppermint.

Having briefly described the above insect we now come to the second—*Eurymela speculum*—one of the " tree hoppers," kindly named for me by Mr. French, F.L.S. This order contains many insects very destructive to trees and plants, as they feed on the sap and do serious injury by depositing their eggs under the bark, causing excrescences, which, as well as being unsightly, may stop the natural flow of sap, and thus cause the plant to become sickly. The insect under notice is one of the most common, it being found sometimes in thousands. In cold, wet weather I have seen them hanging in clusters, like swarms of bees, no doubt crowding together for the sake of warmth and shelter. Clusters of young hoppers may be seen when 150 or 160 would hardly cover the surface of a threepenny piece. If the observer examine the twig below the young insects he will, no doubt, see a slight swelling, having a cut or mark about three-quarters of an inch in length, such as could be made by boring a number of holes side by side with a fine awl. If these punctures are examined closely they will be seen to contain the egg-skin or shell. This can be better done by removing a piece of the bark, when it will be seen that the eggs are placed diagonally, sometimes even at 45°. This position is explained after watching the insect deposit a number of eggs. When doing so, instead of having the head and ovipositor in line with the branch, they are, as stated above, sometimes 45° out. No doubt this position gives the insect greater power when cutting through the bark in the manner described below. The insect having selected a suitable twig, starts operations by expanding the covering of the ovipositor, and by so doing brings the peculiar-shaped auger in contact with the bark, at the same time contracting and lengthening the abdomen, which gives the cutting instrument a saw-like motion. Having made the hole of sufficient depth the knife or auger is withdrawn, leaving two grooved spines buried in the bark. The egg, no doubt, passes down this channel. After remaining perfectly still for a few seconds the ovipositor is withdrawn, and the insect, moving a little higher, repeats the operation, sometimes

laying twenty eggs consecutively. In this case the punctures would make a line about three-quarters of an inch long.

The eggs, when first laid, are a cloudy yellow, some being milky white ; they soon change to a darker colour, being almost black for a few days before the young emerge. Those observed by me took thirty-four days to hatch. No doubt the weather would retard the hatching if cold, and hasten it if genial. The eggs increase in size for the first few days. For this I can give no reason unless they absorb the sweet sap found between the wood and bark—this might take place, and so provide the developing insect with a portion of food. I can see no cause why the eggs should not receive benefit from being surrounded by the sweet juice which forms their only food when hatched. No doubt the eggs find great protection from being buried under the bark, but that they must and do benefit in some other way I am almost certain. Out of a "clutch of hoppers' eggs" I reared a number of minute ichneumons—more, in fact, than there were eggs—so some of these minute eggs must have held two or more parasites, which are so small as to be scarcely visible to the naked eye. Drawings of the above ichneumon's life-history were exhibited by me at a meeting of this Club held on 13th June, 1887.

## DESCRIPTIONS OF NEW AUSTRALIAN PLANTS, WITH OCCASIONAL OTHER ANNOTATIONS ;

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

*(Continued.)*

Trachymene Maxwelli.

Shrubby ; branchlets minutely puberulous ; leaves copious, rigid, linear, rather blunt, flat or somewhat channelled, slightly scabrous, all lobeless ; umbels compound, conspicuously pedunculated ; involucral bracts quite leaf-like, as many as secondary peduncles and often of about half their length ; umbellets few, containing several flowers ; involucellar bracts broadish-linear, stiff, less than half the length of the pedicels ; denticules of the calyx rather conspicuous ; petals of rather firm texture, somewhat dark-coloured, oval, at the base almost truncated, at the inner side traversed by a vertical narrow membranule ; anther-cells ellipsoid ; fruits much compressed, as broad as their length, broadest downward with a slight basal intrusion, scantily reticular-rough, the linear prominence between the marginal and commissural narrow linings faint ; carpophore persistent, cleft at the summit only.

In Eucalyptus-scrubs near the north-side of the Stirling's Ranges ; George Maxwell.

A shrub of about 3 feet in height.

Generality of leaves from ⅔ to nearly 1 inch long, nearly $\frac{1}{12}$-inch broad, hardly or moderately spreading. Primary peduncles 1–2 inches long, rather firm, the secondary peduncles also rigidulous, about 1 inch long, supporting the floral leaves, tardily deciduous. Umbellules never subdivided. Petals long persistent, marginally overlapping before expansion. Stamens and styles about as long as the petals. Fruits measuring about $\frac{1}{10}$-inch, but not obtained in a perfectly ripe state. This species comes nearest to *T. valida*, but the leaves are much smaller, and those which form the involucre hardly shorter than the others, which gives the plant quite a unique appearance among its congeners; further, the involucellar bracts are much shorter than the pedicels, the flowers all becoming fruit-bearing, the fruits smaller with proportionately less width, and the carpophore has only a terminal fissure. From most congeners different in the colour of the petals. In some respects this new plant reminds of some species of Astrotricha, particularly *A. Biddulphiana*.

Trachymene Eatonjæ.

Tuberous, glabrous; branches slender; leaves lax, filiform-linear, hardly acute, lobeless; peduncles thin, surpassing the leaves; involucrating bracts very short, pointed; pedicels capillary; calyx-denticles acute, but minute; base of styles much dilated; fruit considerably compressed, quite as broad as its length, its ridglets filiform-narrow, but prominent.

Near Youndegin; Miss Alice Eaton.

Tuber ovate-roundish, nearly 2 inches long. Leaves numerous, ½–1 inch long, usually very narrow. Pedicels ⅓-inch long, or somewhat shorter. Many of the flowers unproductive. Petals and stamens as yet unknown. Dilation of styles longer than the capillary portion. Fruit measuring about ⅛-inch, but not yet obtained in a fully ripened state. This species is by its tubers already distinguished from all others, except *T. deflexa* and *T. cirrosa*, but systematically it ought to be placed near *T. effusa*, from which the longer, narrower and laxer leaves, as well as the evidently larger fruits, already distinguish it.

*T. deflexa* occurs on the sources of the Blackwood-River (Th. Muir). The tubers of this species are egg-shaped, carnulent, 2–3 inches long, and eaten by the aborigines. *T. tenuissima* was collected by me on the Collie- and Preston-Rivers, as well as on the Shannon. Divisions of root thin and short, seemingly indicating only annual duration. Fruits considerably longer than broad.

*T. effusa* extends inland to Lake Seabrook (Merrall); it occurs also near Mount Rugged (Miss Brooke).

The genus Siebera, among composite plants, as the latest under that name adopted by Bentham, abrogates that generic appellation among umbelliferous plants. It seems therefore best to leave the former generic names undisturbed, more particularly so as Rudge indicatingly comprised modern species of Trachymene

(along with the subsequent *Didiscus albiflorus*) in the genus Trachymene already, further as the designation Didiscus has been in extensive horticultural use for fully sixty years, and therefore could not well be abolished now. Sprengel's name, Fischera, given as far back as 1813, is neither available, as a synchronous genus became indisputably admitted among asclepiadous plants.

DIDISCUS ELACHOCARPUS.

Annual, dwarf, erect, beset with spreading glandule-bearing hairlets; leaves few, minute, trifid; involucral bracts broadly linear, acute, about as long as the pedicels; fruitlets extremely small, dark-brown, almost obovate, turgid, glabrous, but equally tubercular-wrinkled on both sides.

Between the Murchison-River and Sharks-Bay; F. v. M.

Whole plant above ground about 2 inches high, according to an only specimen secured; root almost as long, simple, downward capillary. Leaves including the petiole only ¼ to ⅓ inch long. Flowers not obtained. Styles extremely minute, with capitellar stigmas. Fruits on pedicels of about ⅛-inch length. Fruitlets much shorter than the pedicels, somewhat demidiate, the ridglets concealed.

A remarkable plantlet, similar to minute forms of *D. pusillus*, but with fruits very much smaller than in any other congener, yet bearing well developed albument, hence neither deformed nor of abnormal minuteness, as might be thought at first sight. The smallness of the fruitlets brings our new plant in some contact with Hydrocotyle, especially as *H. corynophora* might be transferable to Didiscus.

GOODENIA FORESTII.

Herbaceous, rather dwarf, spreadingly short-pubescent with or without glandules, sometimes glabrescent; leaves of thin texture, ovate or lanceolar, towards the base cuneate, often grossly indented, particularly towards the middle, of a dark green on both sides; pedicels solitary, axillary or by diminution of floral leaves terminal, devoid of bracteoles, jointed at the summit, the lower much longer than the flowers; calyx small, divided to near the base into lanceolate-linear segments; corolla velutinous-pubescent outside, its lobes all appendiculated, the two upper unilaterally amply scarious, downward at the edge barbellate; anthers apiculate; style rather short and stout, as well as the stigma-cover imperfectly beset with hairlets; fruit small, roundish, hardly surpassed by the calyx-lobes, much compressed, outside beset with hairlets; dissepiment hardly half penetrating the fruit; seeds almost as wide as the cavity, dark brown, their surrounding membrane about as broad as the nucleus, darkish, tender.

Yule-, Fortescue-, and Sherlock-Rivers; Hon. Sir John Forrest.

Nearly allied to *G. melanoptera*, differs in more copious indument,

deeper cleft calyces, upward protracted appendages of the corolla-lobes, the style bearing hairlets, proportionately broader and more compressed fruits, seeds membrane paler and without lustre. Also in some respects cognate to *G. Donnelli.*

## THE PRIZE COMPETITION FOR NATURAL HISTORY SPECIMENS.

*To the Editor of the Victorian Naturalist.*

DEAR SIR,—I was gratified to notice the list of prizes offered by the Club for the best collections in Natural History specimens. Such a step surely will enhance the usefulness of the Society. A few years ago I mentioned in committee the advisability of offering prizes for essays on Natural History. The idea was not entertained. However, the sequel proves I was only a little before my time. There is not much difference between prizes for essays and prizes for collections. But there appears to be a great *hiatus* in the schedule. Birds are not mentioned. I can quite understand the committee being over anvious in what might lead to the destruction of useful birds. But the difficulty may be overcome by offering a prize for the best essay on "Original Notes on Birds Common to Victoria," not to exceed, say, 2,000 words. I hope it is not too late for the committee to make this *addendum* to their schedule.—Yours, &c., A. J. CAMPBELL.

## THE WHISTLING MOTH.

THE habit of producing sound is met with in but few kinds of lepidopterous insects, and quite rarely is this sound of the nature of stridulation. And this being so the fact that a small but select series of Buderum Mountain insects, brought last year to the Queensland Museum by Mr. W. Riebe, contained—as their donor pointed out—a sound-producing moth, was not without interest. This insect was afterwards recognized by the present writer as being *Hecatesia fenestrata*, Boisduval (Fam. Zygænidæ), from acquaintance with the figures of this and the allied species *H. thyridion*, Feisthamel, in Appendix F. (by — White) to Sir George Grey's "Journals of two Expeditions of Discovery in North-west and West Australia." It would appear that even prior to 1841, the date of publication of this work, the special noise emitted by *Hecatesia fenestrata* had been noticed, and the special mechanism connected with its production pointed out; although this fact has escaped the notice of more recent writers on entomological subjects, not excepting Hagen, until that keen observer, the late Henry Edwards, visited Australia in 1889, and afterwards recorded, in "Insect Life," vol. ii., his personal observations. The remarks he makes are of such interest that no apology is needed for their being appended to this note. He writes concerning *H. fenestrata*:—"During my residence in Australia I was collecting

insects in the Plenty Ranges, about twenty miles from Melbourne, and in the burning heat of midday sun had sat down to rest and pin my captures under the shade of a thick acacia tree. I was astonished, and almost startled, at a peculiar sound, apparently very near me, which was unlike anything I had ever heard, and which I at first thought was the voice of some unfamiliar bird. I listened attentively, looking in the direction of the noise, but could see nothing. I took up my net and walked up the opening in the woods, the sound still continuing, and greatly exciting my curiosity. It was very loud and distinct, and not unlike 'Whiz whiz' repeated by the mouth with the teeth closed. I had proceeded about thirty yards when the noise suddenly stopped. I sat down and waited, thinking that I should again hear it and be able to trace it to its source. I was not disappointed, for in a few minutes it again appeared, and this time quite close to me. I looked very carefully, and in an opening, buzzing about with a swaying lateral motion, were two or three insects, which, at first sight, I took to be some species of Hymenoptera. I gave a sweep with my net and made a capture, which was soon safe within my collecting bottle. My heart beat violently, as I found that I had taken a lovely black and orange moth such as I had never before seen. The structure by which the insect is enabled to produce the singular and striking sound is the thickening of the costral membrane about the apical third, behind which and nearer to the centre of the wing is a rather broad vitreous space extending almost to the median nerve, this space being transversely ribbed, as are the bundles of eggs in some species of orthoptera. The antennæ are thickened at the tips into a sort of prolonged club, pointed at the extreme end, and with the under side of the terminal joints horny and devoid of cilia. These striking as they would do in flight at the will of the insect against the tranverse ribs of the transparent space cause the whizzing and characteristic sound that so attracted me, and which is doubtless intended as a call of love to the individual of the weaker sex, who sits enthroned in the branches listening with delight to the noisy homage of her many lovers." Strange to relate, as H. Edwards has pointed out, the geographical distribution of the species of this genus is peculiar. Of the five recorded species, four are Australian and one inhabits Mexico.—*Queenslander*, Brisbane.

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We are requested by Dr. Macgillivray to state that Miss E. C. Jelly (author of "Synonymic Catalogue of Marine Bryozoa") is anxious to dispose of her collection of specimens of Polyzoa. Miss Jelly wishes to sell her specimens in sets of 100 slides each —recent and fossil mixed—the price of each set being five guineas (cost of carriage to Australia paid). Some members of the Club may be glad to avail themselves of this opportunity of securing excellent specimens of Polyzoa.

THE

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## FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Field Naturalists' Club was held in the Royal Society's Hall on Monday evening, 8th August. Professor W. Baldwin Spencer occupied the chair, and there was an attendance of some eighty members and friends.

### LIBRARIAN'S REPORT.

The hon. librarian reported the following donations to the library :—"Journal of Bombay Natural History Society," vii., 1 ; "Technics," July, 1892 ; "Transactions Royal Society of South Australia," xv., 1; pamphlets relating to "Earliest Known Traces of Man in Thames Drift," "Municipal Punishments in the Middle Ages," and "Antiquarian, Scientific, and Historical Notes of Berkshire" (from Miss A. E. Roberts).

### ELECTION OF MEMBER.

After the hon. librarian had read his report of additions to the library a ballot took place, resulting in the election of Mr. Alexander Purdie, M.A., as a member of the Club.

### PAPERS.

The first paper to come before the meeting was one by Mr. Ernest Anderson, entitled "Notes on Some Victorian Lepidoptera." After pointing out the need of enthusiastic and well-directed work in this department of natural history, the author alluded to the great charm which accompanied the rearing out of the Victorian species, since the results were very frequently of a most unlooked-for character, species emerging entirely different to what the appearance of the larvæ would lead one to expect. In fact, the Victorian forms follow the same rule as many plants and animals in having characteristics and habits purely Australian ; and not only so, but they help to bridge over the sharply-defined divisions known in Europe, and merge the various groups so imperceptibly into each other that it is hard to say where one ends and another begins. Then followed details gathered from the author's own experience, amongst which were some interesting particulars concerning the processional caterpillars (*Teara melanosticta*). A female laid some ova in a small box and covered them very thickly with yellow down. Very shortly afterwards a thread-like structure was visible, which close examination revealed

to be composed of newly-hatched caterpillars in Indian file, each having its head close up to the tail of its forerunner, and the whole line moving simultaneously with mathematical precision. The Noctuæ next claimed the author's notice. This group having developed a taste for lettuce and green peas is very obnoxious to the agriculturist. Cannibalistic tendencies also exist amongst the larvæ, and encounters take place, which generally end in leaving one master of the situation—a true case of survival of the fittest. Anyone anxious to obtain specimens of the group may easily do so by a search amongst the pea pods and lettuce delivered in Melbourne and suburbs. Details of the effort to clear up the mystery surrounding the classification of the ermine moths were also given. At the present they are divided into two species —light and dark forms—(*Spilosoma obliqua* and *S. fulvohirta*). Observation extending from October to August upon one set of ova obtained from a light form gave specimens of both light and dark forms (8 per cent. of the latter), whilst larvæ of the dark form only produced the dark form, thus almost marking it out as a distinct species. The paper concluded by a short description of the Victorian Lepidoptera as contrasted with those of Europe, summer here taking the place of the winter of colder latitudes. Excellent coloured illustrations, drawn from life by the author, and shown by Mr. J. Searle, added considerably to the interest of the paper. Professor Spencer and Messrs. F. G. A. Barnard and G. A. Keartland spoke in complimentary terms of Mr. Anderson's work.

A short paper was then read by Mr. T. S. Hart, M.A., on "The Kerrie Conglomerates." Two sections—one in Riddell's Creek and another on the neighbouring range, at a height respectively of 1,240 ft. and 2,000 ft.—were described in detail. The conglomerate consists of a hard, cemented mass of pebbles of a grey sub-crystalline and brown micaceous sandstone, with a little quartz, the pebbles being for the most part rounded, with many of the smaller ones angular. Joints intersect the deposits, which, acting as aids to weathering, have materially influenced the natural features of the hills and valleys. Owing to the absence of organic remains it is difficult to set down the formation to any particular age. Further examination is desirable, not only to determine the direction of the range from which the conglomerate was derived, and its relation to the granite and trap rocks of the vicinity, but also to establish its relation to the conglomerates of more northern localities. Messrs. F. G. A. Barnard and J. Shephard spoke upon the paper.

### MEETING FOR PRACTICAL WORK.

Professor Spencer called attention to the fact that a special evening, 22nd August, had been set apart for general practical

work, and he expressed the hope that it would be of value to all those who were anxious to obtain experience of the practical side of a naturalist's work.

EXHIBITION OF SPECIMENS.

The meeting terminated with the usual exhibition of specimens, of which the following is a list:—By Miss Cochrane.—Gall on acacia and enormous growth of daphne. Mr. C. F. Duncan.—Four species and two varieties of ferns (Adiantum). Mr. F. J. Ellemor.—*Artamus sordidus* (Wood Swallow), male; *Cinclosoma punctatum* (Spotted Ground Thrush); *Pomatostomus superciliosus* (White-eyebrowed Pomatostomus), pair; *Manorhina melanophrys* (Bell Bird), pair; *Podiceps novæ-hollandiæ* (Black-throated Grebe), female. By C. French, jun.—Remarkable eggs of Mountain Thrush. The two eggs were taken out of the same nest; the smaller egg of the two is only about one-third of the size of the typical eggs, and has a large brown blotch on the larger end; collected near Dandenong Ranges, 6th August, 1892. Rev. E. H. Hennell.—Nemertine eggs from Ferntree Gully. Mr. G. F. Hill.—Case of beetles and pair of grasshoppers (Cape Colony). Mr. G. A. Keartland.—Eggs of White-bellied Sea Eagle (King Island). Mr. J. A. Kershaw.—Serpula (Port Phillip). Mr. D. Le Souëf.—Eggs of Topknot Pigeon and Channel Bill (first authentic specimens taken from a nest). Mrs. W. Martin.—"The Fungi of Australia," by Dr. M. C. Cooke; "One Hundred and Ninety Lithograms of Ferns of Queensland," by Mr. F. M. Bailey. Baron von Müeller.—Plants new to science—viz., *Eremophila phillipsii* and *E. merralli*, from Swan River, W.A., collected by Edwin Merrall; also *Goodenia forrestii*, collected at Yale and Sherlock Rivers, by Hon. Sir John Forrest. Professor W. B Spencer.—Honey Ants (Western Australia). Mr. F. Spry.—A case of butterflies, genus Papilio (North Queensland and India). Miss Turner.—Living specimens of *Nitella*.

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That indefatigable orchid hunter, Mr. J. N. M'Kibbin, has made an interesting find at Sandringham. A common blue orchid of that district is *Caladenia deformis* (R. Brown). Mr. M'Kibbin has met with a single specimen of *C. cærulea* of the same authority. *C. cærulea* is found in abundance near Maryborough, but has not been met with near Melbourne before. On a superficial glance the plants might easily be confused; but *C. cærulea* constantly differs from *C. deformis* in possessing a dark red (not green) flowering stem, in the basal leaf being much shorter than the stem, in the stem leaf being bract-like, and in the labellum being trifid (not entire), the middle lobe white and yellow, while in *C. deformis* the labellum is completely blue.

## NOTES ON THE KERRIE CONGLOMERATES.

By T. S. Hart, M.A.

*(Read before the Field Naturalists' Club of Victoria, 8th August, 1892.)*

The parish of Kerrie lies between Riddell's Creek and the Emu or Bolinda Creek, and extends from the Dividing Range, near Mount Macedon, to Lancefield Junction. Extensive beds of conglomerate occur to the north of Riddell's Creek, beginning about a mile and a half above the township. Further north other patches occur as far as the Black Range, on the north-east side of the Emu Creek. They are marked on the geological maps as thin cappings and outliers, and are mentioned by Mr. Selwyn in his "Geology of Victoria;" but, so far as I am aware, no further notice has been taken of them. In these notes I intend to give a short account of their main features, as I saw them in the southern part, near Riddell's Creek. Very fine sections occur on two tributaries of Riddell's Creek (in sections 109 and 118 of the Parish of Kerrie) and on the neighbouring ranges. The lowest level at which I saw them was about 1,240 feet, and the highest 2,000 feet above sea level.

The conglomerate consists of a hard cemented mass of pebbles of a grey subcrystalline sandstone and brown micaceous sandstone, with a little quartz. The pebbles are for the most part rounded, but many of the smaller ones are angular. They vary in size from sand up to over 2 feet in diameter. Many of the pebbles contain thin bands of quartz. Associated with the conglomerates are small, irregular beds of gritty sandstone, which do not appear to be very persistent. At one place beds of sand and clay occur, with small scattered pebbles, up to 2 inches in diameter.

The bedding of the sandstones is irregular, but appears, on the whole, to be nearly horizontal. At one place on Riddell's Creek the conglomerate seems to form thick beds, dipping towards the south-west. Large pebbles are more common in the lower parts, and large, long-shaped pebbles seemed as a rule to be nearly horizontal. The whole deposit is much intersected by joints, which cut straight through the pebbles. The main joints run N. 10° W., and are vertical. Individual stones are often fractured, but the parts not separated.

These joints have a great influence in the weathering, and consequently on the nature of the hills and valleys. The sandstones and gritty parts are easier to wear away than the conglomerate, and the joints both allow the entrance of water and the breaking away of large masses of rock. This leaves the face of the joint as a smooth, vertical cliff, sometimes as much as 40 feet in height. Sometimes another cliff will rise above this, a little further back; so that the side of the hill rises by a series of steps. At one place

a large block of conglomerate may be seen standing on a narrow neck, the softer, gritty rock having been eaten away all round the base. The bed of the creek frequently rises by a vertical step, or up a narrow steep crack along a joint. Sometimes a large pool is formed in the bed of the creek, one noticed being about 30 feet in diameter and about 8 feet deep in the middle. Small ferns in considerable variety occupy any place on the rock where a slight irregularity or hollow enables them to rest, being especially abundant round the edges of these pools.

In examining the relations of the conglomerate to the other rocks of the vicinity, these may be divided into two—those which were or may have been in existence before it and those of more recent formation. It is evidently from the first of these, or from other deposits now entirely removed or hidden, that the materials of the conglomerate were derived. The pebbles are nearly all waterworn. To transport a rounded stone 2 feet in diameter a current of about ten or twelve miles an hour would be required. Mountain torrents in the Alps are known to attain a velocity of eighteen to twenty miles an hour; but to give these velocities a steep fall is required, so that the accumulation of any large extent of such conglomerates needs a high range of mountains in the vicinity, which would supply both the materials and the transporting power. The conglomerates would then be deposited at the foot of the ranges, the gritty bands and sandstones being formed during times when the flow was slower or in places out of the direct current. They would naturally, as a rule, be nearly horizontal, as any great slope would produce a current sufficient to prevent deposition of the finer materials.

The underlying rock, wherever I saw it, was Lower Silurian rock, on which the conglomerate rests unconformably. The materials of the conglomerate are such as occur in the Silurian rocks. Though granite and trap rocks occur over large areas now as surface rocks, no pebbles of either seem to occur in the conglomerate, so that they would appear either to be of later origin than the conglomerates or not exposed on the surface, the part of the range from which the conglomerates were derived consisting of Silurian or similar stratified rocks. I have not yet been able to examine the parts of the conglomerates near the granite and trap sufficiently to ascertain whether they are in any way affected by these rocks.

Of the more recent formations, the principal one is the occurrence of a few thin quartz veins traversing the conglomerates, one of which at least is highly mineralized. These veins vary from a quarter of an inch to one inch in thickness, and are vertical, cutting through the individual pebbles of the conglomerate. One of them has a direction of N. 56° W., the others nearly north and south. Veins of quartz also must have existed before the formation of the conglomerate, in the rocks

from which it was derived, as they are seen in the pebbles, and pieces of quartz occur in the conglomerate.

At one place an irregular mass, and a sheet running along a joint, occur, composed of a fine-grained crystalline rock, apparently intrusive in the conglomerate. This rock is scarcely at all decomposed, but broken into small pieces in a manner similar to that produced by great pressure.

At its southern edge the conglomerate passes under the newer volcanic rock of the plains. At one place the volcanic rock appears to have flowed up an old valley in the conglomerate. The present creek has cut through it again, showing at one place the conglomerate at the bottom of the valley and on the ridge, but volcanic rocks remaining on both sides at intermediate levels.

The age of this conglomerate is doubtful. On the geological survey maps it is marked as oolitic, with a note that it is probably of the age of the mesozoic coal measures. Mr. Selwyn, in his "Geology of Victoria," speaking of the Upper Palæozoic rocks, mentions several localities in which conglomerates occur, including this one, and expresses an opinion that this and the more easterly ones are older than the western ones. The presence of the quartz veins, which do not occur in the Bacchus Marsh conglomerates, is also evidence in favour of greater age, though these may be only a local development. In the absence of any organic remains it would be difficult to refer this formation to any particular age.

The total difference of level of the highest and lowest places at which I observed this conglomerate is 760 feet. This cannot, however, be taken as representing its thickness, for though the sandstone, in which the bedding is plainest, appears to be horizontal, the coarse conglomerate would need a steep slope for its formation, and could accumulate on a considerable slope.

I have not been able to visit the more northern localities in which the conglomerate occurs, but it would be interesting to know their relation to this part and the levels at which they occur. A further examination of the whole formation is needed to determine the direction of the range from which it was derived and its relations to the other rocks, particularly the granite and trap rocks of the vicinity.

## SOME TRANSFORMATIONS OF AUSTRALIAN LEPIDOPTERA.

By James Lidgett.

The present paper embraces the life-history of two species of Victorian moths, both of which are fairly numerous, although the former—*Mnesampela privata*—the most abundant, is difficult to procure; the latter—*Nyctimera amica*—being easily procured.

FAM. GEOMETRIDÆ.

MNESAMPELA PRIVATA.

*Egg.*—Dull white in colour; nearly ovate, flattened slightly on both sides. The mass contains from 50 to 60, agglutinated to the under side of the leaf. I have frequently found these eggs in May and June.

*Larva* (full grown).—A very handsome caterpillar, with the head small in comparison; has 18 pure white tubercular processes, and from the centre of these spring a small bunch of longish white hairs. Body segments mottled with angular black markings, so as nearly to obscure the ground colour, which is yellowish red. From the base of the second segment to the posterior margin of the eleventh run two somewhat broad subdorsal red lines, gradually fading where they touch the posterior part of each segment. On each of these two lines are two chalk-white tubercles, bearing each a fine white hair. Segments 2, 3, and 4 have each 12 tubercles, armed with long fine hairs, those of the subdorsal region being the longest—twice as long as the rest. Segments 5 to 10 have 10 tubercles, being placed so as to form a triangle, in the centre of which are placed the spiracles, which are black. On the sixth segment are two pure white eye-like subdorsal spots. Anal segment and clasps pale yellowish, feet and legs of a lighter tint. Length about 1⅛ inch.

These grubs are well known to be gregarious, living in companies of from 10 to 15. They have a curious habit of drawing the tender shoots of the tree together by the aid of silken thread (produced by the larvæ) in conjunction with the gum of the tree, which forms their particular domicile. The young larvæ then put out threads to descend from branch to branch. They often cause much damage to a plantation of young gum trees, rarely feeding on them after the trees are about three years old. Their "domiciles" would attract the eye of the most casual observer.

*Pupa.*—Reddish brown in colour. Abdomen darker. The segmentation deep and prominently traced by a transverse band of darker brown. The head is largely produced in front. Mouth parts pitchy. Wing-covers smooth, distinctly showing the course of the nervures. Antennal cases highly elevated, transversely wrinkled, of a darker hue than the wing-covers; eye and tongue cases ample; abdomen tapering, terminating in a short, stiff seta. Each segment bears a transverse band of serrated teeth, radiating from the subdorsal region. Length about $\frac{9}{16}$ inch, breadth $\frac{3}{16}$ inch. I have not known this species to form a cocoon any more than a few silken threads, and it spends about four months in the pupa stage. Food plant, *Eucalyptus globulus.*

FAM. BOMBYCES.

NYCTIMERA AMICA. White.

*Egg.*—Globular, almost transparent; are deposited side by side in masses of 80 or 90, on the under part of leaf of food plant.

*Larva* (full grown).—Head black, shining; body velvety black, with three longitudinal lines (dorsal and subdorsal), deep orange or nearly red. Each segment bears six blue-back tubercles, from which spring bunches of hair. The second segment has two long tufts of hair projecting anteriorly beyond the head. Under side slate grey, feet pitchy black.

*Pupa.*—*Vide Victorian Naturalist*, vol. viii., No. 10 (H. Edwards).

*Cocoon.*—Spins a few silken threads together with the hairs of its own body; generally found under fallen leaves and other *débris*. Length, 1¾ inches.

*Food Plant.*—Among other plants I have noticed it very fond of English ivy.

Coloured drawings, illustrating the life-histories of these two insects, were exhibited by me, at this Club, on 14th September, 1891.

## NOTES ON A TRIP TO SOUTH GIPPSLAND.

By R. S. SUGARS.

(*Read before the Field Naturalists' Club of Victoria, 11th July*, 1892.)

I LEFT Melbourne on Thursday, 7th January last, by train from Prince's Bridge at 9.10 a.m., booked as far as the then terminus of the railway line, Leongatha. At Dandenong a transfer was made to the Great Southern line, from whence the journey can now be performed to Port Albert without a break, the railway line since having been opened to that point.

One of my fellow-travellers proved to be a farmer in the Bass district, and during our conversation the Field Naturalists' Club happened to be mentioned. Learning that I was a member, he turned to the subject of the proposed Gun License Act at once, and informed me that he quite agreed with the proceedings of the Club, except on that point, adding that it would be most unfair to deprive a farmer of the use of his gun, or compel him to pay for it, for the destruction of vermin, &c. I explained to him that should such an Act be passed it would in all probability follow the lines of the English Act, as far as applicable to the colony, and that the English Act permitted every farmer the free use of his gun on his own farm for the purpose of destroying vermin, &c.

Leongatha was reached at 2.10 p.m., and payment of 5s. secured a seat in the railway contractor's truck as far as Foster. I might add that the return journey from Toora by Victorian Railways only cost 3s. 11d. Having some cumbersome luggage

I was obliged to make use of the only conveyance that awaited the arrival of the contractor's ballast train, which was from Condon's Hotel. The station is situated about a mile from the township. I reached the hotel about 7 p.m., having had nothing to eat since leaving home at 8 a.m., and for the last 3½ hours I had been shunted hither and thither till I began to feel alarmed for the safety of my internal anatomy.

The next morning—Friday, 8th—a fellow-traveller from Dandenong of the previous day having some business at Toora invited me to accompany him thither and back on foot, and as I was somewhat at a loss what to do next I accepted his invitation. Taking my gun with me in the event of finding anything of interest, we proceeded by way of the railway line as being the shortest, and a fine fat wallaby soon performed his last jump. Within a mile or so of Toora I flushed a bird from its nest in the scrub alongside the line. The nest was just completed in the centre of a bush of Leptospermum, and was beautifully lined with wallaby fur, so, wedging a piece of wood under the rails opposite the spot, I left it, determined to call again, which I did on the following Thursday, and found two eggs therein, proving it to be, as I had anticipated, that of the White-eared Honey-eater.

Saturday, 9th.—From Foster there is laid a tram line to the landing-place, the port of Foster, one of the oldest ports in Victoria. It is situated on the Stockyard Creek, about three miles from Foster. I decided to devote the day to a visit to the landing-place, and was fortunate enough to catch the tram or lorry going down. Schooners from Melbourne come up the creek from Corner Inlet and discharge there, and I was informed that some 15 tons of liquor were landed at the jetty for last Christmas holidays. A fairly comfortable boarding-house is kept here by a Mr. Taylor, from whom I learned that good shooting and fishing is to be had on the inlet. I saw some pike landed fully 2 feet 6 inches long. A short way up the creek there is a miniature waterfall, which I photographed. The only remarkable thing about it, to me, was the immense host of mosquitoes surrounding it—they literally swarmed me, and I was glad to get out on the open from them. Making my way down the creek, I was a good deal troubled with tall nettles hidden in the brackens, which are here over 6 feet high. Coming back nearer the landing-place is a pleasant bend in the creek, where it almost converts a piece of meadow into an island, the creek flowing back towards itself to within about ten yards of its higher course.

Returning to Mr. Taylor's I had tea, and after a short rest I set out for Foster. A quiet three-mile walk through the bush by moonlight ended a pleasant day's outing.

Sunday, 10th.—According to arrangement, I drove to Toora

in the morning. The road lies to the north of the railway line and skirts the hills all the way, many parts being extremely picturesque. Near Foster the road is in some places quite unmade, being simply a track across the country, and although occasionally somewhat dangerous, affords on the whole a pleasant drive. The distance is about nine miles, and nearly half way there is a piece of road which, since the last Melbourne Exhibition, has been called the Switchback. The timber is chiefly blackbutt, and rises clean and straight in the stem to a height of about 80 feet, the diameter at the base being not more than about 12 or 13 inches. All along the road the hills rise abruptly to the left, while to the right the ground slopes easily away and terminates in a marsh or swamp, clothed with ti-tree scrub, across a portion of which the railway line is formed.

After arriving at Toora, and having brushed off the dust collected on the drive, I was accompanied by Mr. Yeomans on a climb up the hills behind Toora, from which a magnificent view is obtained. The hills terminate about a couple of miles off, on the shores of Corner Inlet, which lay calmly spread before us like a huge lake; while behind it rises the bold outline of Wilson's Promontory, the prominent peak being Mount Singapore, playing the noble part of peacemaker between the ceaseless turmoil of the mighty ocean without and the calm serenity of Corner Inlet within.

Sitting with this scene before us, in the long green English grass, studded with bright yellow flowers, but for the surrounding gum trees and the occasional chatter of the *Dacelo gigas* one might fancy they were suddenly transported to the dear old motherland. Revisiting this scene subsequently I endeavoured to portray it under different circumstances, as a slight squall was driving over the inlet. It was one of those days when rain could be observed falling in several different places simultaneously, with bright glimpses of flitting sunshine between.

Sunday afternoon was spent in a ramble through the lower lying ground between Toora and the inlet, where the following shrubs were noticed:—*Coprosma billardieri*, presenting a gay appearance with its thickly studded red berries; *Coprosma microphylla*, in contrast with its yellowish white berries; *Hymenanthera banksii*, quite brilliant with its indigo-coloured berries, a really pretty shrub, of some 15 feet high. Almost everywhere the Kangaroo Apple (*Solanum laciniatum*), with its pretty violet and yellow flower is noticeable, while fireweed and dogweed, in yellow and white, lend quite a feature to the landscape. *Pittosporum undulatum* attracts attention by its large dark green berries.

Amongst the birds noted the chief were:—Brush Wattle Bird (*Anellobia mellivora*), Swift Lorrikeet (*Lathamus discolor*), Gang Gang Cockatoo (*Callocephalon galeatum*), White Hawk, *Dacelo*

*gigas*, Superb Warbler (*Malurus cyaneus*), and Coach Whip Bird (*Psophodes crepitans*).

Monday, 11th, was chiefly devoted to a visit to what are locally known as the Franklin Falls, some four or five miles from Toora. A good stiff uphill walk most of the way had to be accomplished. On the way I stopped at the dairy of Mr. Richards, on whose property the falls are situated. In conversation with Mr. Richards I learned that he turns out some 750 lbs. of butter per week, from about 150 head of cattle, but has accommodation for at least as many more. Appliances for bacon-curing were also being added, capable of dealing with 100 carcasses at a time. The whole work is carried out by steam power. Leaving there I descended at once into the huge valley created by the Franklin.

On the opposite side of the river, a little lower down, is situated the residence of a selector who owns some 1,800 acres of very good pasture land. Following down the stream, the valley becomes more confined, and the banks of the river more steep and covered with tree ferns, principally Alsophilas.

Returning to Toora at about 2 o'clock, I considered it a pity to lose the remainder of a beautiful afternoon, but I was not a little perplexed how to change plates, when the idea of the empty iron tank at the railway station was suggested. Into this I scrambled, closing the heavy iron lid after me, but found it still admitted a lot of light; however, I managed to fumble through, and shortly afterwards emerged almost as moist as if the tank had been full of water; the sun was beaming full on the tank all day, and the heat must have been about 120° at least. The remainder of the afternoon was spent in visiting the Agnes Falls, on the Agnes River. I went by way of Anderson's tram line as far as it is laid, and thence in an easterly direction across the country. Arriving at the falls about 5.30 p.m., I found it necessary to set to work at once, as sunset was fast approaching. Taking up a position on the top of the bank, and looking down on the falls, more or less, a view was secured; but I was dissatisfied with it, and after a good deal of hard work succeeded in reaching the bottom of the gorge and obtaining another view of this very pretty waterfall. I am indebted to some members of the family of Mr. Silcox, on whose property the fall is situated, for their kindness in accompanying me to the place, and thus saving me considerable trouble in finding it. Another moonlight walk through the forest, the silence of which is only broken by the native bears uttering their peculiar grunts, brought me back to Toora, after having performed about 25 miles' walking through pretty hilly country during the day.

Tuesday, 12th. — This morning was ushered in by a smart drizzling rain falling, which bid fair to continue all day,

and was to be regretted, as the day had been selected for a visit to the new falls on the Franklin River, far up in the hill country, and everything had been got in readiness. However, at a little before 11 a.m. it cleared up beautifully, and, accompanied by Mr. Yeoman's two sons, a start was made about 11.15, the three of us being mounted on horseback. The route taken was through very pretty scenery, especially the portion of it which skirted the river, as the whole course upwards is a fern gully, thickly interspersed with musk. We crossed the river about five or six times on our way up, which seemed to amuse the horses as much as ourselves, as they crawled slowly down one bank, and rushed up the other like a shot, evidently trying to leave the riders in the stream. Turning off from the river too soon we struck straight up hill to find ourselves fenced in completely, and some half-an-hour was spent in removing a rail and getting the horses over, only to find the track about ten yards away on the other side of the fence. However, we soon reached the racecutters' camp, on Turner's track, and were glad to alight and have refreshments, our watches indicating 2 p.m. Tea, bread, and butter despatched in bush fashion, we left the horses, and accompanied by a new guide (Bob Vincent), we proceeded along the race for perhaps a mile ; then, indicating our desire to see both falls in the vicinity, we are led sharp to the left, through the thickest piece of scrub it has ever been my lot to penetrate. We go down the side of a huge ravine, and one of the party suggested commencing by going down the stem of a great dead tree, whose surface was like polished glass almost. It would have been rather a rapid means of descent for my taste, and "Bob" says to the proposer, "Just you try it." He is an "old hand," and tells us some interesting yarns of the days when he netted £60 and £70 a ton for cartage from Geelong to Ballarat. We left it to him to lead, which he did, converting himself into something like an animated scrub-roller, for when he could not creep under the scrub, he rolled over it ; in some places we scrambled for yards without touching *terra firma*. Emerging from such hot work into the beautiful fern-clothed flat at the bottom proved enjoyable, and here we found the tree ferns bearing *Fieldia australis* in fruit, imparting to the scene a singular appearence, being something akin to a host of bird's eggs suspended all over the place.

Thence we proceeded up the bed of the river—no easy task, either, I and my camera narrowly escaping one or two duckings ; needless to say, none of us arrived at the falls dry below the knees. When we got there the beauty of the scene amply repaid us for the toil experienced. I was obliged to photograph the fall on the Franklin on two plates, as from its peculiar shape, and the limited field of view, I could not get it all on one.

These were the first photos. taken of this fall. On our return we came back by a slightly different route, and paid a visit to what is called the Falls Creek. This is also the first photo. taken of this fall.

During our climb up to the race again I had the misfortune, in one of my falls, to plunge my hand into a crowd of bull ants, and did not forget it in a hurry. I would suggest that the falls on the Franklin be named the Yeomans Falls, after the gentleman through whose instrumentality, mainly, I was enabled to visit them; and the other on the creek suggests its own name—the Weeping Fall. Neither have hitherto, as far as I could learn, been named, and have only quite recently been discovered. On returning to the camp, where we had left our horses, I endeavoured to secure a view of the party; but the horses were restless and would not stand as still as I could have wished.

Leaving the camp about 6 p.m. we rode through the forest of blue gum (of which some splendid specimens were to be seen on either side of the track), messmate, and blackbutt, by a different route from which we went, and entailed crossing the river only three times. Toora was reached about 7.30 p.m.

Wednesday, 13th, was a red letter day for South Gippsland, as the railway line was to be opened through to Port Albert. Nature wept copiously over the event, for it literally poured all day and all night. When the long looked for locomotive and its freighted carriages arrived at Toora the invited guests who had been selected to represent that important centre cut a sorry figure indeed, being drenched with rain and bespattered with mud; a somewhat sickly cheer arose as the train started off for Port Albert and the banquet. I went duck shooting in the afternoon amongst the mangrove swamps at the inlet; but instead of ducks I got a ducking, and came back saturated.

Thursday, 14th.—The rain was still falling heavily, and a good fire in the sittingroom proved sufficiently attractive to keep me indoors.

Friday, 15th, was occupied by a visit to the selection of Mr. Anderson, who invited me to see a fern gully on his property. Some splendid specimens of tree ferns were observed, ranging from 15 feet to 30 feet in height, and several of them quite 4 feet in diameter at the base. The proprietor, however, took more delight in pointing out a number of fine blackwood trees—one in particular having a clear stem of 40 feet, with diameters of 3 feet and 2 feet at base and top respectively. The ferns are growing too profusely for a photographer to admire, but I took two views merely as souvenirs.

I was struck with the number of Lyre Birds (*Menura victoriæ*) which have chosen this locality for their abode. They whistled away on all sides of us, and on our way back I counted some ten

or twelve beds within five or six yards of each other, where the birds had been quite recently. Notwithstanding their number, however, not a single specimen was seen.

Bullocks are very largely utilized for timber haulage in this particular part of the country, a team of which I photographed.

I returned to Melbourne on Monday, 18th, after a most enjoyable holiday, and as I understand the Club has selected South Gippsland for the annual camp-out I trust this paper may help in inducing many of our members to join in the excursion.

## REVIEW. *

STUDENTS of Australian Fungi have at length obtained their Handbook, and are to be congratulated upon the useful and handsome volume which Dr. Cooke has prepared for them. It comprises over 400 pages of descriptions and 36 coloured plates. About 2,000 species of fungi are described. This is nearly double the number enumerated by Baron von Müeller in the "Fragmenta," vol. xi. A few species are included, by inadvertence, from the Falkland Islands.

That colossal monograph, "The Sylloge Fungorum," published in ten thick volumes by Professor Saccardo, of Padua, describes 30,000 known species of fungi, large and small. (A copy of this work, to which Dr. Cooke constantly refers, has been purchased by Baron von Müeller and presented to the Public Library, where it can be consulted by fungologists.) It will thus be seen that Australia possesses at least one-fifteenth of all the known forms of fungi.

The illustrations are exceedingly good, and the Agricultural Departments of the various colonies, which contributed largely to the cost of publication, will reap abundant reward in the exact descriptions by a competent specialist of these plants, many of which are injurious to crops and to forests, and even to animals. It is to the credit of the Australian governments that such works as the "Flora Australiensis" and the present handbook should have been promoted at the public cost.

This long list of species has only been obtained by the efforts of many workers. Baron von Müeller was already collecting fungi in Australia in 1847. Sir Joseph Hooker published an account of the fungi in the second volume of the "Flora Tasmaniensis." The descriptions were due to the Rev. M. J. Berkeley, who also described species from Western Australia. In the "Fragmenta," vol. xi., Baron von Mueller enumerates 1,069 species, all told. Since then the Baron, by his collectors, and aided by other workers, has obtained many more forms. Mrs.

* "Handbook of Australian Fungi," by M. C. Cooke. Williams and Norgate, 1892.

Martin has worked indefatigably in this department, and has sent home large collections and a great number of water-colour drawings. Mr. F. M. Bailey, admirably situated near the tropical ranges, has made large contributions. Nor must we omit the name of Mr. H. T. Tisdall, who has also forwarded extensive collections and excellent coloured drawings to the home workers.

With these works of Cooke and Saccardo accessible to workers, a fresh impetus should be given to the study of fungi. A large number of micro-fungi especially remain undetermined, and these are amongst the most pernicious members of the class. We trust that workers will rally round the vegetable pathologist, and that no quarter will be given to these destructive and insidious little organisms.

## THE LATE R. D. FITZGERALD.

It is with the deepest regret that we announce the decease, at the age of 62, of Mr. R. D. Fitzgerald, F.L.S., the author of the magnificently illustrated monograph of Australian orchids.

For several years Mr. Fitzgerald occupied the position of Deputy Surveyor-General of New South Wales. He retired from this post two years ago. In 1869 his official work took him to Lord Howe's Island. He was accompanied by Mr. Charles Moore, and assisted the latter in obtaining specimens of the singular indigenous flora. He was successful in making an adventurous ascent of one of the highest of the mountain peaks. One of the plants, *Dracophyllum fitzgeraldi*, a gigantic epacrid reaching forty feet in height, was named after him by Mr. Moore and Baron von Müeller. A sketch of the aspect of the vegetation of the island, by Mr. Fitzgerald, appears in the "Fragmenta" of the latter, vol. vii.

The perusal of Darwin's book on the fertilization of orchids led Mr. Fitzgerald to devote himself to the study and careful delineation of the Australian orchids. His great skill as a draftsman stood him here in good stead. He made all his drawings from living plants, and, in order to observe them in their natural state, he made extensive journeys, not merely in various parts of New South Wales and in the adjoining colonies, but even as far as Western Australia.

In this way Mr. Fitzgerald had published detailed descriptions of one hundred and eighty-three species and sub-species of Australian orchids, illustrated comprehensively by beautiful coloured drawings. A special feature in the descriptions is seen in the tabulated schedules, in which he gives in the fullest detail the comparative characters of allied species. It is deeply to be regretted that he was not spared to complete this valuable work in his life-time, but we understand that he has left behind him a certain amount of material, which, we trust, will be duly published by the New South Wales Government.

Mr. Fitzgerald was an honorary member of the Field Naturalists' Club of Victoria. He was universally esteemed by his fellow-workers, not only on account of the high accuracy and the artistic beauty of his work, but because of his genial nature and the total absence of all selfishness in his relations with others.

## DESCRIPTIONS OF NEW AUSTRALIAN PLANTS, WITH OCCASIONAL OTHER ANNOTATIONS;

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

*(Continued.)*

Eremophila Phillipsii.

Viscid; leaves small, lanceolate-linear, entire flat, bluntish, as well as the branchlets glabrous; pedicels often two or three together, much shorter than the flowers; calyx very small and remaining unenlarged, of firm texture, as well as the pedicels densely beset with minute glandule-bearing hairlets, its outer segments elliptic-lanceolar, the inner narrower; corolla several times longer than the calyx, dull-purplish, outside bearing scattered very short hairlets, its tube about thrice longer than the lobes, only at the base narrow-cylindric, inside downward partially tender-lanuginous; lateral lobes of the lower set slightly longer than the middle one, the two lobes of the upper set shorter but almost as high, all rounded-blunt; stamens enclosed; style scantily beset with hairlets; fruit quite small, hardly as long as the calyx, glabrous, conic ellipsoid, somewhat compressed, with hardly any subdivisions, its pericarp comparatively thin; seeds solitary in each cell.

Eastern sources of Swan-River; Edwin Merrell.

Well developed leaves about 1 inch long. Length of calyx 1/6 to scarcely 1/4 inch, of corolla about 3/4 inch. Fruit rather less than half as broad as long.

This species approaches *E. Clarkei*, which, however, has larger denticulated more pointed leaves, much longer often solitary pedicels, larger flowers, acute proportionately longer calyx-segments and a four-celled more turgid fruit outside beset with hairlets.

*E. myoporoides* is less sticky, has longer leaves, all the pedicels solitary and glabrous, the calyx-segments more pointed, the corolla shorter and the fruit seems also different. The geminate or ternate pedicels call to mind *E. Paisleyi*, which, however, is already by the shape and consistence of the calyx-segments separated, irrespective of some other marks of distinction.

This rare plant is dedicated to the honourable Capt. George Phillips, of Perth, West Australia, in recognition of generously advancing the writer's researches.

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## FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Field Naturalists' Club was held in the Royal Society's Hall on Monday evening, 12th inst. Mr. C. Frost, F.L.S., occupied the chair, and there was an attendance of some sixty members and friends.

### LIBRARIAN'S REPORT.

The hon. librarian reported the following donations to the library:—"Records Australian Museum," ii., 2, 3, from Museum; "Proceedings of Linnean Society of New South Wales," vii. (2nd Series), 1, from Society; "Transactions of New Zealand Institute, 1891," vol. xxiv., from Institute; "Report Smithsonian Institution, 1889," from Institution; "Bulletin of Minnesota Academy of Natural Sciences," vol. iii., No. 2, from Academy; "Proceedings of Academy Natural Science, Philadelphia, 1891," part 3, from Academy; "Phaneropteridæ of Australia," by J. G. O. Tepper, from author; "Technics," Stawell, August, 1892; "Journal of Pharmacy;" "Handbook of Australian Fungi," Cooke, from Department of Agriculture, Victoria.

### REPORTS OF RECENT EXCURSIONS.

Reports of recent excursions to Sandringham, Brighton, and Ringwood were received from Messrs. C. French, jun., J. Shephard, and F. G. A. Barnard.

### SPECIAL EVENING FOR PRACTICAL WORK.

The secretary reported that a meeting of members for general practical work was held in the Royal Society's Hall on Monday evening, 22nd August. There was a good attendance of members, those interested in microscopic work being principally represented, and no less than 24 microscopes were set up. Mr. J. Shephard undertook to give a slight sketch of some interesting forms amongst the rotifera. A typical form was first described, the chief points in its structure being made clear by good diagrams, and then variations in the various orders from this type were briefly referred to—special allusion being made to the modifications in the ciliary wreath and the foot. Mr. Shephard had

fortunately met with a large number of the Australian member of the rhizotic group (*Lacinularia pedunculata*), and at the conclusion of his remarks a slide of mounted individuals was handed to each member for careful examination under the microscope. Half an hour was profitably spent in the endeavour to make out all the points of detail in the specimens, during which time Mr. Shephard also supplied full information as to the best methods of mounting and examining these interesting organisms. Some four or five entomologists had a quiet corner to themselves, where they compared specimens and talked over some plans for future operations. Altogether the evening was a most successful one, and it is hoped that the attendance at future meetings will warrant the committee in permanently allotting an evening every month to work of this nature. Such work cannot well be carried on at the ordinary monthly meetings, yet it is work which will materially strengthen the hands of those members who feel the need of a little practical advice from those whose special leanings and opportunities have enabled them to follow particular lines, and who are willing to impart this special knowledge to their fellow-workers. Hence the need of these special evenings for practical work, and hence the hope that members will systematically and regularly avail themselves of them.

### ELECTION OF MEMBERS.

On a ballot being taken, Messrs. R. A. Bastow, G. Hickman, and G. B. Turner were elected members of the Club.

### PAPER.

The only paper read was one contributed by Mr. Henry Grayson on "The Collection, Cleaning, and Mounting of Diatoms," and as the subject dealt with a branch in which the author has been working successfully during the past few years, the facts and details given were of the greatest value to those who are interested in these lowly subjects of the vegetable kingdom. Mounted specimens exhibited by means of microscopes bore convincing testimony to the excellent character of Mr. Grayson's methods of work. For further details we must refer members to the paper itself.

### NATURAL HISTORY NOTES.

Mr. C. French, F.L.S., drew attention to a valuable series of papers on the Australian butterflies which is now appearing in the *Queenslander*. Four parts have already appeared.

Mr. T. S. Hart, M.A., read a note giving some interesting particulars as to the variations in *Wurmbea dioica*, notably in reference to the number of the carpels and segments of the perianth.

EXHIBITION OF SPECIMENS.

The meeting terminated with the usual exhibition of specimens, of which the following is a list:—By Miss Cochrane.—Paintings of Victorian wild flowers. By Mr. C. Duncan.—Four species of ferns—*Dicksonia antarctica*, *D. davallioides*, *D. menziesii*, *D. squarrosa*. By Mr. F. J. Ellemor.—Mounted specimen of Jameson's Gull. By C. French.—Specimen of new Marsupial Mole (*Notoryctes typhlops*), from Upper Finke River, Central Australia; new Fungus (*Stilbum formicarium*, Cooke, Messer), found on body of ant; illustrations of butterfly life-history, executed in 1793–4; group of rare Australian Longicorn Beetles—viz., *Enneaphyllus æneipennis* (Tasmania), *Enneaphyllus rossi* (Victoria), *Petalodes laminosus* (new for Victoria), *Petalodes* sp. (Western Australia); feather boots of native rain-maker (Central Australia). By Mr. H. Grayson.—Microscopic slides in illustration of paper, together with living specimens of diatoms. By Mr. T. S. Hart.—Species of Pterostylis (probably new), and specimens of minerals—quartz containing zincblende, galena, iron and arsenical pyrites, &c.; arsenical pyrites, crossed crystals (Maldon); iron pyrites in sandstone, brown spar in quartz (Fryerstown); coarse granite with white mica and copper pyrites (Harcourt); quartz and white mica (Expedition Pass). By Mr. G. E. Hill.—18 Victorian Whip Snakes. By Mr. J. Mitchell.—2 cases of minerals, containing about 50 specimens. Exhibited by Baron von Mueller.—Orchid (new to science), *Pterostylis M'Kibbini*, from King's Island and Swan Island, and also from Brighton, collected by Mr. M'Kibbin and T. S. Hart; also *Eriostemon stenophyllus*, from Mallee, St. Eloy D'Alton (new for locality). By Miss A. E. Roberts.—21 varieties of wild flowers, collected at Blackburn. By Mr. F. Spry.—Reared specimens of *Ogyris olane* (Hew.), *Delias harpalyce* (Don.); larva, chrysalis with Ichneumon, and butterfly, *Heteronympha merope* (Tale.)

In connection with Mr. French's exhibit of the boots of native rain-maker from M'Donnell Ranges, it may be interesting to note that it is believed amongst the natives of certain tribes in Central Australia that droughts are caused by the swallowing up of all moisture by a rain-devil. If, however, this personage can be captured and made to disgorge, rain follows at once. The feather boots are worn by the native rain-maker in order that he may steal noiselessly and unawares on the author of the drought and consequent misery. Mr. A. W. Howitt is having drawings made of these boots, which he considers to be one of the most valuable and interesting additions to aboriginal ethnology yet brought to light.

## NOTES ON SOME VICTORIAN LEPIDOPTERA.

By Ernest Anderson.

*(Read before the Field Naturalists' Club of Victoria, 8th August*, 1892.)

The Lepidoptera of Victoria have, so far, had but scanty attention paid them, compared with other branches of natural history. It is true that there have been a few ardent workers in this field, and a few now exist amongst us. To these every honour is due, for it is owing to their efforts, in the face of many difficulties, that we possess whatever information on the subject is now available; but after making the most liberal allowance for what has been done, it will be confessed, and by none more readily than those who take an interest in the study, that our knowledge of the life-histories of the Victorian Lepidoptera is at the present time lamentably deficient.

Taking the Diurni, or butterflies, which come first in the classification, even as they are the first to attract the ordinary observer, I would ask how many of the species computed to occur in the colony have had their larvæ described, their food plants determined, or even their time of appearance correctly recorded? Some of the commonest species, occurring in the utmost profusion all over the colony, are even now shrouded in mystery. They appear regularly at certain times of the year, remain in evidence for a period, and then disappear. That they must exist during the intervening seasons we know; but in what form of existence we know not. It may be that the winter is passed in the ova state, and the young larvæ hatch with the advent of warm weather in spring time; it may be they hatch in autumn, and hibernate through the cold season; or they may brave the weather, and keep feeding steadily throughout the winter—all is mere supposition, for the perfect insects may themselves hibernate, and only deposit ova in the spring, thus sparing their progeny the dangers of storms and cold.

It will be seen, then, what a wide scope for activity and research exists. The committee have already held out inducements to youthful workers in this direction, and it is partly in the hope of helping them, partly in the hope of arousing interest and inducing more of the members to turn their energies to the subject, that I

have been tempted to put together a few rough, indiscriminate notes and illustrations of some species that have come under my observation during the last two years.

The complete life-history of any species, if properly worked out, would be almost enough for a paper; but it has been my object not to be too lengthy with any individual species, but rather to illustrate the leading characteristics of as many as possible in the time at my disposal.

The illustrations, being my first attempt at slide painting, are necessarily crude, but I trust they will serve to convey a better idea of the various species than verbal description.

The Diurni I propose to skip altogether, as I know several members are now working at them, and hope the results may be laid before the society shortly. Coming, then, to the moths, we find that the Sessiidæ, or "Clearwings," appear to be entirely absent—a somewhat remarkable fact, which may be disproved after further research. The species forming this group are extremely interesting on account of being a link between those insects with scaled wings and those with the wings clear; the protective resemblance to various ferocious Hymenoptera is also very curious.

The Sphingidæ, or Hawk Moths proper, are fairly well represented, among them being the European *Convolvuli*, and the beautiful Silver-striped Hawk Moth, *Chœrocampa celerio*, so prized by English collectors.

The larvæ of *Sphinx convolvuli*, as the name implies, feed upon the wild convolvulus. Mr. Lyell, jun., our fellow member, was fortunate enough to discover several specimens at Gisborne, and very kindly sent me a pair for figuring. One of these was of a bright green colour, with oblique violet stripes edged underneath with white, and the horn on the terminal segment of a dull orange; the other was of a drab colour, with the markings darker. Mr. Lyell found them at night time.

The commonest of the Victorian Hawk Moths is *Chœrocampa scrofa*, a neat-looking species, prominent round the electric lights in town; the larvæ feed upon grass and low herbage in the autumn, and both green and black forms may be found, being easily recognised by the swollen appearance of the first three segments, and the eye-like markings thereon. But the largest of our Hawk Moths, measuring seven inches across the wings, is *Cœquosa triangularis*, a species not very likely to be taken near Melbourne, its range being more in the northern portions of the colony. The larva is curious on account of the extraordinary appearance of the last segments, which both in form and markings greatly resemble the head of a lizard, the likeness being completed by the presence of two round, shiny, black projections, like eyes. So complete, indeed, is the resemblance, and so

inconspicuous is the true head, that I have found it a very hard matter to convince friends as to the "right end" of this singular caterpillar. As this species is but a very short time in the pupal state, it departs from the more general habit of the Hawk Moths to go deep into the ground, and merely constructs a flimsy puparium upon the surface.

The Zygænidæ, comprising the Burnets and Foresters, appear fairly well represented, perhaps the commonest being *Procris viridi-pulverulenta*, which first appears on the wing in November, and remains out a considerable time. On a bright sunshiny day the metallic green wings of these little moths, flying slowly along, have a very beautiful appearance.

The Lithosidæ, or "Footmen" group, so called from the gay appearance of many species in both the larval and perfect states, are numerous. Among those that I have met with are *Lithosia alternana*, *Lithosia bicolor*, *Cluaca rubricosta* (Walker), and several species of Anestia, the larvæ of one, *Anestia ombrophanes* (Meyrick), being very abundant, feeding upon lichen on old fences and apple trees; also the delicate *Termessa nivosa*, of which the larvæ may be found during August beneath the bark of gum trees, the perfect insect appearing in November. Nor must I forget to mention the Crimson-speckled Footman, *Deiopeia pulchella* (Lin.), for which I have hunted many a day on the downs near Dover, but always vainly; it is supposed to feed upon the forget-me-not there, but here, I presume, it must find some other pabulum.

*Nyctemera amica* must be familiar to all, and I have seen specimens in every month of the year. The larvæ appear to be most numerous during September, feeding greedily upon *Senecio scandens*. Their colouration of scarlet and black, and the projecting tufts at each side of the head, gives them rather a diabolical appearance, although I think they are harmless enough, both from an economic and personal point of view; in fact, they appear to be great sufferers, a species of small ichneumon fly, probably a Microgaster, thinning their numbers to an enormous extent, each caterpillar when attacked having some dozens of the ichneumons within it.

We now reach the Ermines, or Ermine, for it is a vexed question as to their being one or two species. It seems generally accepted that *Spilosoma obliqua*, the so-called Light Ermine, which is generally common in the lowlands, is distinct from *Spilosoma fulvohirta* (Walker), the Dark Ermine, occurring in the ranges. My experience is as follows:—In the early part of October I captured a specimen of the orthodox *obliqua*, which deposited ova; these hatched on the 13th October, and the young larvæ fed readily upon various low plants. In a month's time they were changing into the last coat, which is darker and

more densely hairy than the earlier ones. In about another week, or five weeks' time from the date of hatching, the larvæ commenced making their cocoons. The first perfect specimen emerged on 9th December, and was followed by the greater part of the brood between that date and the 15th. All of these specimens, about fifty in number, were similar to the parent — light forms of *obliqua*, with just ordinary variation. Some pupæ, however, still remained, and from these I was surprised to breed, on the 19th April, a very dark specimen, which, had it been captured in the open, I should have thought to be *fulvohirta*. On the 26th April another very dark specimen appeared, and then two ordinary forms on the 3rd and 17th of May; finally I bred a very dark form on 3rd August. Without discussing this instance of irregular emergence, though it is a subject of much importance, as illustrating the manner in which a species may be perpetuated through unfavourable seasons, I will proceed to the consideration of the facts mentioned, which at first glance seem to confirm the theory that the two species, *obliqua* and *fulvohirta*, are identical, inasmuch that ova deposited by undoubted *obliqua* produced about 8 per cent. of forms not to be distinguished from *fulvohirta*. Having arrived thus far, I was anxious to secure ova of undoubted *fulvohirta*, in order to ascertain whether they would produce a corresponding percentage of light forms. Up to the present I have failed to obtain ova, but I secured larvæ fairly abundantly in the ranges near Bayswater during November, and the larvæ produced *fulvohirta* without exception, thus apparently proving that the species is distinct, and upsetting the deductions made from the previous experiment. I am, however, inclined to doubt whether

Figures of ordinary forms of *S. obliqua*.

Figure of dark form of *S. obliqua*.

*S. fulvohirta*, ordinary accepted form.

*fulvohirta* may safely be allowed to rank as a species—at the most it is probably only a local form, and the only definite distinction seems to be that *obliqua* has the ground colour of a more creamy tinge. The tendency of this genus to vary is well known, and for dark forms to inhabit mountainous districts is in accordance with the ordinary rule—being probably on account of the greater humidity and moisture experienced there. Further experiments will doubtless elicit the truth, and, as the species is easily reared, we may hope that very shortly the question will be decided definitely.

Walking in the paddocks when the bright sunshine, the golden scented wattles, and the warmth of early spring make all nature look fresh and joyous, we may often observe among the dew-sprinkled grass a number of large caterpillars clothed with a dense garment of soft hairs. The markings and colouration vary with the age of the caterpillar; when young the general aspect is golden, but the older ones have more black about them. These are the larvæ of *Pterolocera amplicornis*. They feed upon the grass, and when full fed, which is generally in October (though I have met with stragglers much later), they construct a tough cocoon just under the surface of the ground or among loose strips of bark, being partial to those places somewhat moist. In this retreat the pupa remains inactive throughout the summer months, and it is not until the fierce heats have given way to the autumn rains that the perfect insects emerge. The male, though having no very brilliant colouring, is nevertheless a very beautiful object, its chief characteristic being the antennæ, which are plumose to a very high degree. It has the rapid, bounding flight of the true Bombyx, and is hard to procure in good condition unless by breeding. The female is a very marked contrast, being quite wingless, and of a brownish-black colour; she is perforce content to crawl about among the newly springing grass, and concentrates all her energies upon the task of depositing her ova in suitable situations, which being accomplished, she dies, having performed her allotted work in the great system of nature. The perfect insects are out in April and May, and are widely distributed.

Another species of grass-feeding larvæ frequently found in company with *amplicornis* is *Darala denticulata* (Newm.), but in this species both sexes have the wings fully developed. The larvæ are hairy but very variable as regards colour and markings.

Most naturalists, even those not taking much interest in the Lepidoptera, have heard of the Processional Caterpillars—indeed, their existence is sometimes obtruded upon the general public by some correspondent to the papers describing their habits with much embellishment and great multiplication of numbers.

The species usually mentioned in books is *Bombyx processionea*, a French insect; but in England there is one species having the same habits when young, though as they reach maturity they disperse and lead solitary lives.

Considering these insects of extreme interest, I was very pleased to come across an Australian species possessing the same peculiar characteristic—namely, *Teara melanosticta*, a species distributed throughout Australia.

From a female captured during November I obtained ova, which were laid in a patch upon the side of a small box, and densely covered with yellow down from the body of the parent, as usual with most of the Liparidæ. Shortly afterwards, upon looking at the box I was surprised to see that it contained what looked like a piece of thick thread. Closer examination revealed that this thread was composed of newly hatched caterpillars in Indian file, each having its head close up to the tail of its fore-runner, and the whole line moving simultaneously with mathematical precision. Not knowing the proper food plant for this species, I tried several, and found that the young larvæ fed readily upon Leptospermum, so I continued to give them that food until they were full fed at the end of February. When first hatched they were of a pale yellow colour with black heads, but during successive moults they developed into very handsome caterpillars indeed; the processional habit was maintained throughout, but they did not make any special habitation for themselves on the elaborate scale some species do—one occurring in Victoria, for Mr. French has in his possession an old nest, though the insect making it has not yet been identified. The common *Teara tristis* apparently does not possess this habit, for I have never found more than three or four larvæ upon the same bush. Though the larvæ of this genus are generally gregarious, I am not aware of this processional habit being previously recorded.

*Urocoma limbalis* (H. S.) is another typical species of the Liparidæ occurring very abundantly in the vicinity of Melbourne. The eggs are deposited in little patches upon the trunks of gum trees, and are densely covered with soft down. When the caterpillars hatch they at once ascend to the higher branches. Some young larvæ of mine hatched on 12th November, but unfortunately I lost them through absence shortly afterwards. Subsequently I obtained full-fed caterpillars during May, so that they appear to be a long time feeding. Early in

June they descend the trees, and seek out positions under the loose bark on the trunks to pupate in. Having found suitable spots they spin somewhat slight cocoons of pale yellow silk, and then turn into yellow chrysalides; these may be obtained during July by peeling off loose bark, and looking for them among the collection of spiders, wood lice, centipedes, and beetles generally revealed by the operation. These uncanny neighbours do not appear to molest either the larvæ or chrysalides, but the species is very subject to the attacks of a large ichneumon fly, a single larva of which is sufficient to consume its unwilling host.

It is a remarkable fact that the *limbalis* caterpillars frequently undergo their transformation into pupæ with these living parasites within them, and the ichneumon maggots then finish them off, and construct their own tough, oblong, banded cocoons within the emptied chrysalides of their victims. The perfect insects may be found resting upon the tree trunks during October and November.

The next insect I would draw your attention to is the Banksia Prominent (*Danima banksii*), an insect that is more frequently observed in the larval than any other period of its existence. As its name implies, it feeds upon Banksia, and is generally to be met with on the heath lands, if carefully sought for. There are two broods in a year, and the larvæ are very rapid and voracious feeders; their peculiar markings, and habit of resting with both head and tail bent over their backs, causes them to be easily identified. When handled or irritated they thrust out a pair of bitorked tentacles from underneath the first segment. These are of a coral pink colour, and when the caterpillar has them fully extended it looks sufficiently dangerous to daunt the uninitiated, though in reality it is perfectly harmless and may be handled with impunity. The use of these organs is probably to dislodge ichneumon flies.

Another "Prominent," a fine handsome moth, is *Hyleora eucalypti*, still somewhat of a prize; for though the larvæ may sometimes be met with in great numbers, they seem so liable to disease that it is only a very small proportion that reach the perfect state. This disease causes them to turn a yellowish red and to become perfectly hard and rigid, though they frequently still remain fastened to the twigs. These caterpillars, though large and apparently conspicuous, so assimilate with their food plant that it is a little hard to see them, and even when on a perfectly bare stem their position is generally such that they resemble a leaf, and unless one was specially searching for them would probably be quite unobserved. Those that escape disease and the other perils of flood and field—or, rather, bird and ichneumon—seek a shelter under ground during September, and, having constructed a compact cocoon, enter the pupal state, which con-

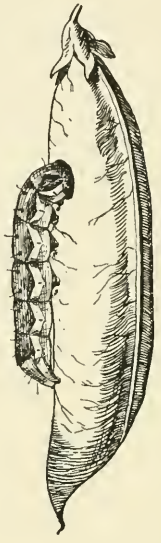
tinues until April. The moths then emerge, and sit by day at the base of the stems of young gum trees. The flight of this moth is extremely swift, and, as might be expected, its range is a wide one, though its chief habitat near Melbourne seems to be along the coast of Hobson's Bay.

*Chelepteryx colesii* is a large, showy species, and appears to be fairly common over a wide range. The larvæ, which attain a very considerable size, may frequently be observed on the trunks of the gum trees during November and December. They seem to descend to that position, or to the under sides of the larger branches, in order to pass through the ordeal of obtaining a new coat; and when this is safely accomplished they again ascend and renew their feeding, leaving the old skin attached to the bark. When full fed, which is generally early in January, they once more descend, spin a long leathery cocoon attached to the bark, and then change to a black chrysalis, from which the perfect insect emerges early in May. This insect, apart from its large size and handsome appearance, is chiefly remarkable for the highly urticating properties of the hairs of the larvæ, making them very objectionable to handle; but this is intensified in the cocoon, which bristles all over with stiff hairs, thrust by the larvæ through from the inside and then fastened at the base, so that, if touched, they at once penetrate the skin, and then, being very brittle, break off, causing considerable annoyance. Even the old cocoons, that have braved the storms and winds of several seasons, still retain this objectionable characteristic, though in a somewhat lessened degree. One experiment on this matter will be quite sufficient to any inquiring mind wishing to prove it by personal observation.

Of the Noctuæ I propose to mention but two examples, both very familiar. It is in this group that we find so many species obnoxious to the agriculturist, and both of the insects now under consideration would be classified as destructive in a collection illustrating economic entomology. The first, *Heliothis armigera*, is almost cosmopolitan in its range, though generally extremely rare in England (except in special seasons occurring at long intervals, when a migration seems to set in); here it seems very abundant—in fact, almost assumes the form of a pest in some districts devoted to market gardening. There are two broods during the year, or perhaps more. The perfect insects may be observed during September and October, and, being very partial to light, may frequently be seen in the city. The larvæ from this brood are found during November and December feeding upon

*Heliothis armigera.*

various vegetables, but more especially lettuce and green peas; they are most voracious, and grow with great rapidity. When full fed they construct a fragile cocoon just beneath or upon the surface of the ground. The moths emerge during January and February, and fly both by day and night. I have observed them on the wing in hundreds during the bright sunshine of February. When confined together the larvæ develop cannibalistic tendencies, so that it is best to give them as much room as possible in rearing. They are frequently enclosed in the pea pods and lettuce delivered in Melbourne for consumption, and there are two forms—one green, the other brown.

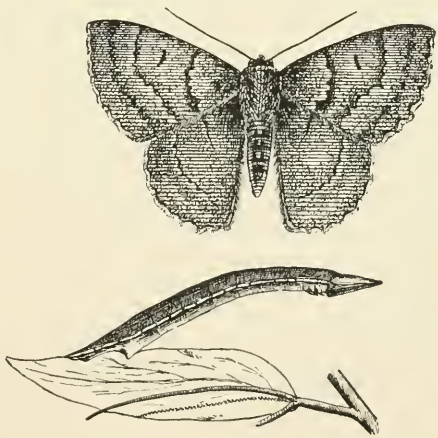


Larva of *H. armigera* on pea pod.

The other species referred to is *Mamestra composita*, a species that is always abundant, and sometimes swarms in pasture lands. The caterpillars feed during June, July, and August upon grass, but are strictly nocturnal in their habits, retiring during daytime underground or under any loose stones or pieces of bark that they can find; at night, however, they are readily found with the aid of a lantern, and when touched invariably fall to the ground and roll into a ring. When full fed, at the end of August, they enter the ground to a depth of several inches, and construct a cell in which to pass the next few months; they do not change into pupæ until December, but about that time the change takes place, and it is not long then before the moths emerge. The larva of *Agrotis mundoides* is generally found feeding in company with the present species; it very much resembles it in appearance, and vies with it in its depredations upon our pastures.

Among the insects sure to be disturbed during a summer ramble are many species belonging to the Geometræ, or "Slender Bodies," and ranked under the name of "Carpets," a name generally understood and accepted by collectors, and, therefore, of use, but the origin of which is somewhat obscure. One of the largest genera of these insects is Hydriomena, containing many of the most familiar forms; another allied genus is Xanthorhœ. As the life-histories of all these are probably very similar, I will merely give a description of one of the commonest—namely, *Xanthorhœ vicissata* (Gn.), which is found everywhere in the ranges. I first met with it at Ferntree Gully, and obtained two worn specimens on the 7th April; one of these deposited about

twenty ova, which hatched upon the 4th May. I put the young larvæ upon Knot Grass (*Polygonum aviculare*), a well-known and highly useful weed to the breeder of Lepidoptera. The young caterpillars grew very slowly, being quite small on the 17th May; at first they made small holes in the leaves, but after the second moult they began to eat from the edges. Owing to the supply of Knot Grass failing, I had to substitute dock, which they ate, but did not appear to relish; and several died at this period, bringing the number down to about a dozen. On the 6th July I found some young shoots of Knot Grass for them, and they then seemed to thrive better, though growing very slowly, and always keeping to the lowest leaves. At this time the weather was very cold in the open—sharp frost on several nights. When first hatched these larvæ were slender and glaucous green. On the 17th July I made the following description, which I give as probably it has never been described before:—Length about ⅜ inch, somewhat stumpy looking; head fuscous, with a cinerous stripe each side; body fuscous; there is a narrow uninterrupted black dorsal line and a double sub-dorsal line of a cinerous colour; the lateral line is also cinerous, edged above with black. Each segment has a few scattered setose tubercles, and the segments are somewhat sharply defined. These larvæ were extremely sluggish in their movements, and upon being handled became rigid and feigned death; by the beginning of September they had attained a good size, and were feeding freely; another month found them all changed to dark pupæ, and the moths appeared during November.



Larva and imago, *Hypochroma occultaria*.

*Hypochroma occultaria*, a handsome species, and common near Melbourne, is very fond of resting outspread upon the rail fences usually enclosing paddocks, and its colour assimilating very closely to the weather-worn wood, it is hard to distinguish when in this position; it may be found from November to May. The larvæ feed chiefly upon the peppermint gum, and have curious cone-shaped heads, which when at rest they hold so

as to form a continuation of the body, which thus seems to end in a point; in colour they are green, with a lateral stripe, sometimes pink, sometimes white, though when young the larvæ are occasionally entirely pink—in fact, it seems to depend very much upon the colour of the stems upon which they find themselves. Two pink specimens found in July changed their skins the first week in September, and then became green with a pink lateral stripe; the following month the lateral stripe of one changed to white, but the other remained unchanged until it went to pupa about the end of October. The cocoon is composed of fragments of leaves and earth, just upon the surface of the ground, and is of so flimsy a character that it is possible to observe the pupa inside; this is of a grey colour speckled with black, and having a blunt head. The pupal state only lasts for a month. This species is generally abundant, but others in the same genus are rarities.

Whilst among the Geometers, I cannot refrain from mentioning the very beautiful Emerald Moths. These, formerly divided into many genera, have quite recently been gathered together in the genus Iodis, as careful investigations into their structure give no reasons for their separation. As the name leads one to expect, all these moths have the ground colour of some shade of green, and they are, without exception, most delicate and beautiful insects. The species selected as typical of the group is *Iodis inspirata*, and the sexes, which differ considerably, were at one time described under different names as distinct species. The larva is of a most extraordinary nature, having two spreading horns on the last segment, and having the other segments extended on each side in a most unique manner. It feeds upon the native cherry in the early part of the year, and when full fed pupates between a few stems connected together by a frail network, the pupa differing in no particular from the ordinary Emerald type. I can lay no claim myself to the discovery of the foregoing particulars, being indebted to Mr. Kershaw, jun., for specimens of the perfect insect and to Mr. Spry for the larva from which I took my figure; but it is such a beautiful and interesting insect that I could not pass it by in silence.

There is one great charm in rearing out the Victorian Lepidoptera, on account of the results frequently being of a most unlooked-for character, species emerging entirely different to what one has been led to expect from the appearance of the larvæ. English collectors, especially, must throw away most of the ideas gained by a knowledge of home insects, be content to begin over again, and to recognize that in Victoria the Lepidoptera follow the same rule as many of the plants and animals, having characteristics and habits entirely Australian. Some of these forms are of more than passing interest, inasmuch that they help to bridge over the sharply defined divisions known in Europe, and, forming

as it were a connecting link, merge the various groups so imperceptibly into each other that it is hard to say where one ends and the other begins. The Geometræ, for instance, with their well-known looping caterpillars, which at home, almost without exception, possess pro-legs on the tenth and twelfth segments only, here include a large number of species in which the pro-legs are present on the eighth and ninth segments also, though generally in a rudimentary form, thus approaching the Noctuæ. As an example of the more usual form we may take *Amelora leucaniata* (Gn.), a species familiar to all who love to ramble over the heath lands between Oakleigh and the shores of the Bay. The larvæ, which occur very abundantly in the early spring, are of the most extreme type of true loopers. They feed on a variety of the plants found in the district mentioned, and the perfect insects appear during March and April.

As an example of the more unusual forms, we will turn to the very beautiful insects comprised in the genus Thailina. This contains some of our most prized species; but there is one *(T. clara)* fairly common wherever wattles occur. The larvæ feed during the spring, and are remarkable for the pointed projections upon each side of the head, and for the presence of pro-legs upon the eighth and ninth segments; they do not, however, seem to make much use of these extra pro-legs, but rest in the manner shown. When full fed—early in September—they either lower themselves by a silken thread or else descend the trunks, and, entering the ground, spin compact cocoons. The perfect insects appear at the end of March and throughout April, and seem invariably to emerge about 9 o'clock at night—a wise provision of Nature, as the intense whiteness of these insects renders them an easy prey to the bats and nightjars, so busy during the twilight. Although the larvæ may be met with abundantly, the perfect insects are not so frequently observed. When disturbed by day they fly very wildly, and generally mount up to a great height.

As a still further advanced and remarkable example, we will take *Mnesampela privata* (Gn.), the larvæ of which draw together the leaves of the blue gum and feed concealed therein. They are handsome larvæ, and generally of extreme abundance, but they have every appearance of being true Noctuas both in shape, markings, and the number of legs, though when young there is a tendency to loop.

The perfect insects, however, appear quite as decidedly to be Geometers. When first hatched these larvæ feed in patches, side by side, upon the underside of the leaves, and render them quite skeletonised and colourless. As they grow larger they construct habitations by doubling the leaves over, or spinning two or three together with a somewhat dense light fawn silk, and

remain hidden during the day, coming out to feed at night. At this period they separate, but two or even three may frequently be observed in one habitation. The larvæ are first to be met with in June, but they may be seen of all sizes as late as the end of August.

When full fed they enter the ground and construct a very tough cocoon, covered with fragments of earth. Within this they change to yellow pupæ, very small in comparison both to the larvæ and to the insects which subsequently emerge from them. The wing-cases of the pupæ become dark previous to the appearance of the moths, which takes place from February to April. This insect, and its congener, *M. comarcha* (Meyrick), perhaps afford the most extreme examples at present known to me; and I am personally of opinion that the various species at present constituting the genus Mnesampela, together with many others, will have to be reclassified at no distant date, when the life-histories are more generally known. I think, however, that I have sufficiently illustrated my remarks on this subject, and will, in conclusion, just say a word respecting the difference in habits.

Larva of *M. comarcha.*

In Europe most Lepidoptera pass the winter as pupæ; and those larvæ found during early spring, in nearly every case, remain but a very short time before appearing as perfect insects. In Victoria it appears to be the rule that larvæ feeding in spring-time remain in the pupal state throughout the summer, and do not emerge until late autumn. Winter here is fairly mild throughout, and consequently there is no need to lack employment during the winter months; for many insects may still be met with, and large numbers of larvæ are feeding.

But in England the Lepidopterist is compelled for a considerable period to give in to King Frost; the trees have no foliage, and most species, in whatever stage, are carefully concealed in their winter retreats. It therefore seems that even as they there retire from the cold, so do many Victorian species escape from the summer's heat, and investigation of this habit would probably prove that the one cause would have much the same effect as the other in destroying the continuance of the various species concerned; but as I have already prolonged these random notes somewhat more than I at first intended, I will defer any further remarks upon this and kindred subjects to some other occasion.

It is my hope that the Lepidoptera will receive greater attention in the future, and that at no very distant date we may be in a position to compile a fairly accurate list of the Victorian species,

together with dates of appearance. Such a work would be of great value to Lepidopterists, and might well be undertaken by our Club.

## DESCRIPTIONS OF NEW AUSTRALIAN PLANTS, WITH OCCASIONAL OTHER ANNOTATIONS;

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

*(Continued.)*

Pterostylis Mackibbini.

Leaves all comparatively large, several crowded near the root, or when the stem much heightens all scattered, but the middle leaves the largest, from ovate to lanceolar; flower of great size, singly terminal, partly chocolate-coloured, slightly puberulous, supported by a large leaf-like bract; upper calyx-lobe and lateral petals upwards arched, bluntish; lower calyx-lobes cuneate-connate below the middle, upwards semilanceolar-subulate, neither divergent nor with any long thread-like termination, the sinus between them narrow and very acute; labellum dark-coloured, glabrous, narrow-elliptical, along the median line upwards folded, its appendage conspicuous fringy-penicillate; ovulary furrowed.

Near St. Vincent-Gulf; F. v. M. (1848). Cardinia-Creek; Ch. French. Southern Tasmania; Gulliver. On King's Island and Swan-Island; J. M'Kibbin Esq. Near Brighton-Bluff; Thos. S. Hart, Esq., M.A.

Flowers here in September. All collectors found the dwarf form of this species, in which then the leaves are sessile or short-stalked and almost crowded into a rosette, the flower hardly reaching beyond these radical leaves, and being almost sessile among them, the bract expanding into a large floral leaf. Some of Mr. M'Kibbin's specimens from King's Island are nearly a foot high, have leaves 3½ inches long, on very conspicuous petioles, whereas in some smaller specimens none of the leaves measure over 1½ inches in length. This species differs chiefly from *P. curta* in the stem, if developed, bearing very expansive leaves, and therefore of far less difference in comparison to the radical leaves, in the larger floral bract, in the more incurved upper calyx-lobe and lateral petals, and in the far less wide sinus separating the lower calyx-lobes.

Our new plant is distinguished from *P. cucullata* in flowering under equal circumstances some weeks earlier, in frequently dwarf habit, again in the more curved upper portion of the flower, reminding rather of *P. nutans*, and in the blunt upwards less

narrowed labellum, resembling that of *P. obtusa*. Besides, from both *P. curta* and *P. cucullata* the partly brownish-dark colouration of the flower, not dissimilar to that in *P. vittata*, distinguish it, although it should be remembered, that *Chiloglottis Gunnii*, *Prasophyllum elatum* and *Orthoceras strictum* vary in this respect as much as could be, green or dark-coloured, whereas in *P. vittata* the tinge of the flowers is not subject to alterations.

Incidentally it may here be observed that Mr. M'Kibbin cultivated a plant from Port-Phillip, which, though more robust and bearing larger leaves, seems also referable to *P. curta*, not without some approach to *P. cucullata*.

*P. curta* occurs in the Australian Alps (Stirling), Brodribb-River (Merrell), Loddon (Dickinson).

Again *P. curta* comes in floral characters, particularly the labellum, near *P. obtusa*. The development of stem-leaves on expense of the radical leaves is no specific note, to separate *P. pyramidalis* from *P. nana*.

In the *Botanical Magazine*, plate 3,085, *P. nutans* is figured as possessing a glabrous labellum, and Bentham describes that organ as merely ciliolate, as indeed it appears when viewed from beneath; the surface however is copiously beset with minute hairlets, by which peculiarity this species is still more easily distinguished from several allied congeners. The lamented Mr. Fitzgerald gave also in this instance a faithful illustration, as we all know, for his superb work. His *P. hispidula* can however not be specifically separated. *P. nutans* has been sent from Mt. Dromedary by the late Mr. Reader, from the Peel-River by Mr. Musson, Glenelg-River (Eckert), Ovens-River (Miss Henley), Hume-River (Jephcott) and Macleay-River (Miss Carter). The ripe fruit and matured seeds of all our native orchids should be studied specially for possibly new diagnostic notes. *P. curta* is delineated in Guillemin's "Icon. Plant. Austral." on plate ii. Extends to Peel-River (Ch. Musson).

*P. cucullata* as well as some other congeners are very variable as regards the length of the thin attenuation of the lower calyx-lobes; grows also at Mt. William (Sullivan), Hume-River (C. French, jun.) and Snowy-River (Baeuerlen). Occasionally flowers smaller. Mr. Ch. French, sen. found this near Port-Phillip in somewhat peaty Melaleuca-thickets drawn up to fully five feet. The distinctions between *P. cucullata* and *P. furcata* are probably not specific.

*P. concinna* has sometimes the radical leaves dispersed upwards, two or three being placed on the stem. It flowers here in June. At the Derwent sometimes the stems attain a length of nearly one foot (Rodway).

*P. pedaloglossa* flowers near Brighton-Bluff already early in April, but really as a vernal plant, when along with it *Eriochilus autumnalis* and *E. fimbriatus* are simultaneously in bloom (Ch. French, jun.)

*P. pedunculata* occurs also on the base of Mt. Kosciusko (Ch. French, jun.), at Loutit-Bay (Mrs. Beale) and on the Clyde (Baeuerlen). Leaves always remarkably dark-green above. *P. semirubra* is most closely allied to this, and occurs also on sandy coast soil at Kardinia-Creek ; flowers in July and August.

*P. nana* has latterly been found on the Lachlan-River (Josephson), at the Grampians (D'Alton), Upper Yarra (Walter), Murray-Desert (Tepper). The form distinguished as *P. pyramidalis* extends to Geographe-Bay (Miss Bussell). This species flowers here from June to August.

*P. grandiflora* or a very closely allied plant has been gathered at Western-Port, where it flowers in June, but at Kardinia-Creek and at Morbunya in August. Delineated by Bauer and Guillemin. *P. Baptistii* approaches in many respects *P. grandiflora.* It has become illustrated in Sir J. Hooker's *Bot. Mag.* on plate 6,351. *P. reflexa* occurs also on the Lower-Yarra (Miss Coghill) and at the Genoa (Baeuerlen) ; was found flowering as early as June on the Loddon (M'Kibbin).

*P. præcox* differs irrespective of some other marks from *P. reflexa* in the less pointed labellum. Flowers at Port-Phillip already in May and June, but seemingly also under exceptional circumstances in October (Ch. French, jun.) Mr. C. French, sen. gave many extensive notes on Victorian orchids in Wing's "Southern Science Record" of 1881.

*P. obtusa* has flowered on the Upper Yarra as early as April, at Port-Phillip it blooms usually in June and July, at the Genoa in May (Reader); extends to East-Gippsland (Howitt), Whittlesea-Ranges (Dixon). Mr. French found it once two-flowering.

*P. parviflora* was noticed on some sources of the Lachlan-River (Dr. Lauterer). Attains in luxuriant culture a height of $1\frac{1}{2}$ feet.

*P. aphylla* grows on various places near Port-Phillip (C. French), extends to the Grampians (Walter). Cultivated it bears flowers here in April already.

*P. rufa*, Blackwood-River (Mrs. M'Hard), Eucla (Batt), Fowler's-Bay (Mrs. Richards), Cornet-River (O'Shanesy), Ovens-River (Falk), Cardinia-Creek (French), Blue Mountains (Woolls), Hunter's River (Miss Carter), Moreton-Bay (Fitzgerald).

*P. barbata* we have now from near Port-Phillip, from the Upper Loddon (Wooster), Mt. Macedon (Moffatt), Omeo

(Stirling), Grampians (Walter), Gerangamete (M'Cann), Anderson's Creek (Coghill), Cootamundra (Fitzgerald), Kent's Group (Gabriel).

*P. turfosa* is extremely close in affinity to the preceding species. Height to 1½ feet. The end of the labellum is dilated. Flowers in September. Figured in G. Reichenbach's "Xenia," on plate 187.

*P. mutica* reaches the Peel-River (Musson) and Fowler's Bay (Mrs. Richards), flowering there in July. *P. cycnocephala* is a mere variety. *P. rufa* occurs also on the Hume-River (Ch. French, jun.), on the Campaspe-River (Berthoud).

*P. longifolia* may exceptionally become one-flowered, which can be said also of the following species. Hume-River (Jephcott), Loddon (G. Johnson), York's Peninsula (Beythieu), Hunter's Island (Atkinson).

*P. vittata* flowers here in June. Mr. Smeaton refers to this well marked plant in the transactions of the R.S. of S.A. vi, 100 (1881). His Honour Sir Lambert Dobson found it on Deal-Island of Kent's Group, Miss Elizabeth Parkinson near the Lower Wimmera. See also Wing's "Southern Science Record," i., 120 (1881). The flowering time also of many South-west Australian orchids was recorded by Preiss already about 50 years ago in Lehmann's "Plantæ Preissianæ," according to the various regions in which they grow. Supplemental notes on indigenous orchids of other genera will be offered on some early occasion.

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Dr. Louis Robinson read a paper at the recent meeting of the British Association on "The Prehensile Power of Infants." Long-continued experiments had proved that the muscles of the hands and arms of a newly-born infant are far stronger in proportion to weight than those of most healthy adults. In many cases a newly-born child would hang and support its weight with ease for a minute. Several infants, less than a week old, hung for over a minute and a half; a few others, a fortnight old, for nearly two minutes. If the child were in a good temper to begin with, it would hang quite placidly until its fingers began to slip, when it at once evinced distress, and screamed lustily, as if from a fear of the consequences of falling. An examination of the foot of an infant showed that it was much more hand-like than that of the adult. The author thought that these features were vestiges of an arboreal state of existence. He believed that they were due to the habit of the young clinging to the body of a parent who would require to use all her limbs for climbing.—*Nature.*

THE

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## FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 10th October, and proved one of the most successful of the present year. Mr. D. Best, one of the vice-presidents, occupied the chair, and there was an attendance of more than 100 members and friends.

### LIBRARIAN'S REPORT.

The hon. librarian reported the following donations to the library :—"Nidifications of *Manucodia comrii*," from A. J. North; "Additions to Avifauna of Tasmania, Norfolk and Lord Howe Islands," from A. J. North; "Journal of Bombay Natural History Society," v., 3; "Guides to Growers, No. 6—Apple Root Beetle," from Department of Agriculture, Victoria; "Guides to Growers, No. 7—Aphis Blight of Peaches," from Department of Agriculture, Victoria; "Smithsonian Report for 1888–9," from Smithsonian Institute; "Report of United States National Museum," 1888, from Smithsonian Institute; "Transactions of the Wisconsin Academy of Science, Art, and Letters," viii., 1888–91, from Academy; "Proceedings of the Nova Scotia Institute of Science," second series, i., 1, from Institute; "Proceedings of the Academy of Natural Science, Philadelphia," October–December, 1890, from Academy.

### REPORTS OF RECENT EXCURSIONS.

Reports of recent excursions to Melton and Cheltenham were presented to the meeting by Messrs. G. A. Keartland and C. French, jun.

### MEETING FOR PRACTICAL WORK.

At the meeting on 26th September Mr. R. A. Bastow gave a description of the natural order Musci, and illustrated the same by means of a large diagram containing the parts of inflorescence and the varied forms of fructification. Great interest was manifested in the subject, and, doubtless, some of the members will be encouraged to pursue the study of these small forms of vegetable life.

There is a wide field and ample scope for investigation and collection of mosses in Victoria, as, with few honourable excep-

tions, these small plants have been almost entirely overlooked. The best method of collecting was referred to, together with full details as to the mounting of mosses in glycerine jelly, the success of the method pursued being fully borne out by the specimen slides exhibited in illustration. Mounted and dried specimens of *Fissidens tenellus* were distributed to each member present. The fruit case of this moss is very minute, yet Mr. Shephard succeeded in cutting a good many sections of one case, which showed its internal structure admirably. These sections were also distributed to members for future examination at home. At least twenty microscopes were set up, and drawings were made, then and there, of the specimens provided so freely by Mr. Bastow.

### ELECTION OF MEMBERS.

On a ballot being taken, Messrs. J. Wilson, A. Black and M. Black were elected members of the Club.

### PAPER.

The only paper of the evening was contributed by Mr. C. French, F.L.S., and had reference to the Coccidæ, or scale insects, of Victoria. The classification and life-history of this family of insects were chiefly dealt with, and coloured drawings of three new genera and twenty-six new species found by him in Victoria were shown in illustration. A list of the above genera and species, with their food plants, was also given. A hope was expressed that Mr. French would, at no very distant date, bring this subject under the notice of members at one of their practical meetings, when these destructive forms of life might be examined microscopically, and their structure and habits noted, together with the best methods for their eradication.

### EXHIBITS OF WILD FLOWERS.

Owing to the success which attended the exhibits of wild flowers held by the Club last year at the October and November meetings, the committee decided to follow the same plan this year. Accordingly exhibits were solicited, and, considering that the stormy weather of Saturday and Sunday not only made it somewhat difficult to gather flowers, but also robbed the flowers of much of their beauty, a very good display indeed was made. The following is a list of the exhibitors:—Miss Cochrane, Mrs. Flatow, Mrs. Martin, Miss Roberts, Baron von Müeller, and Messrs. E. R. Hammett (Alexandra), T. S. Hart, W. Scott, and J. West (Phillip Island), some of whom also exhibited flowers collected by non-members of the Club. Thus, amongst those who contributed to Baron von Müeller's exhibit were:—C. Walter and C. D'Alton (Wimmera), W. H.

Wooster (Ballarat), R. Embelton (Lake Charm), H. King (Murray River), G. W. Knight (Bendigo), Miss M. Henley (Ovens River), W. Oke (Beechworth). An exhibit was also received from Rev. R. Poynder (Parkville).

EXHIBITION OF SPECIMENS.

In addition to the exhibits mentioned above, the following is a list of those presented in other departments:—By Messrs. E. Anderson and F. Spry.—Coloured drawings of *Ogyris olane*, *O. abrota*, and *Hypochrysops delicia*. Mr. R. A. Bastow.—Mounted specimens of mosses. Messrs. Cherry and Sons.—Cabinets and setting boards for entomological specimens. By A. Coles.—Stuffed specimens of birds—pair Golden Plover, White-breasted Oyster Catcher, Copperhead Snake, Bell Bird, Tree Sparrow and Common Sparrow. By Mr. J. E. Dixon.—Specimens of the rather scarce butterfly *Ogyris abrota*; also, longicorn beetles, *Phlyctænodes pustulosus* (Newm.) and *Uracanthus bivitta*, bred from larvæ found feeding in the timber of the European furze used for hedges around Melbourne. By Mr. C. French.—Illustrations of three new genera and 27 new species of Victorian scale insects. By Baron von Müeller.—"Atlas of Diatomaceæ," parts 41 and 42, by Adolph Schmidt. By Mr. Rome.—Specimen of Strophantes (Central Africa). By Mr. G. Sweet.—Plant impressions (aquatic), from Upper Silurian at Wandong; also, from same locality, Bellerophon casts of Spiral Univalves, Trilobites, and two species of Orthoceras.

## EXCURSIONS TO SANDRINGHAM.

To the number of seventeen, members and friends, including four ladies, left Melbourne by the 2.40 p.m. train for Sandringham on Saturday afternoon, 13th August. The route taken was along the Ti-tree on the coast towards Cheltenham. Considering the earliness of the season we were very successful, about twelve species of orchids in flower or fruit being collected, among which may be mentioned the pretty little hooded orchid *Corysanthes pruinosa*, *Pterostylis nana*, *P. vittata*, *P. nutans*, *Cyrtostylis reniformis*, *Acianthus exsertus*, &c. Plants of *Pterostylis barbata*, *P. pedunculata*, *Caleya major*, *Caladenia latifolia*, and several other species, were dug up for cultivation by some of the members. After walking about three miles along the coast we turned into the heath ground, about forty species of plants being noted in flower. Specimens of the strange plant *Phylloglossum drummondi* were collected, and we reached Sandringham station about 5.30 p.m., after a pleasant afternoon's ramble.—C. French, jun

On Saturday, the 27th of August, seven members were undeterred by the showery weather of the earlier part of the day and met the leader at the Brighton Beach station on the arrival of the 2 o'clock train from town. The party at once proceeded in quest of "pond life," and first visited a swamp near Smith's paddock, where, amongst other captures, were taken three well-grown specimens of Apus. A pond by the side of the road leading easterly from Hampton station was next tried and yielded a good number of colonies of *Lacinularia pedunculata*, a rotifier which had been observed as occurring in this pool very plentifully during the previous three or four weeks. Some of the clusters were over a quarter of an inch in diameter and contained hundreds of individuals. The party then made their way to the swamp above Sandringham station, and, after a short time spent in collecting, started homeward by rail about 6 o'clock. Two rotifers—*Mastigocerca elongata* and *Euchlanis macrura*—not previously recorded in Victoria were identified on later examination of the material.—J. SHEPHARD.

## EXCURSION TO RINGWOOD.

FIVE members left town by the 1.20 p.m. train for Ringwood on Saturday, 3rd September, and were joined *en route* by the leader and two other members, together with three lady visitors, so that there was a fair party when gathered together at Ringwood station, though not so large as the leader anticipated, considering the beauty of the day and the rich floral district to be explored.

After a delay of a few minutes, to decide the direction to be taken, the party struck off to the south-east, keeping somewhat parallel to the Ferntree Gully railway. Flowers were soon met with in a bit of scrub round one of the deserted antimony mines, though nothing of particular note was seen. Near here can be found, in the season, the pretty Utricularia. Crossing on to some lower ground several acacias were met with, and a snake disturbed, but not captured. Ascending a hill the orchids *C. deformis*, *C. carnea*, *P. nana*, and *D. maculata* were obtained. Here, also, *Drosera whitakeri* was in abundance, and its snow-white flowers and red leaves had a charming effect. Further on some good scrub was entered and fine bunches of flowers obtained—*Acacia verticilata*, *myrtifolia*, *linearis*, *stricta*, *melanoxylon*; *Euphrasia brownii*, with many leguminous flowers, being obtained, altogether some fifty species of flowers being noted during the afternoon, though none of them particularly rare. The party returned by the 5.10 p.m. train to town.—F. G. A. BARNARD.

## EXCURSION TO CHELTENHAM.—Botany (Orchids).

On Saturday, 1st October, considering the splendid afternoon only a few members—four in all—put in an appearance at the Cheltenham station (owing, probably, to the train leaving Melbourne at ten minutes past 1, being too early for most members). Anyhow, those who attended had a very successful afternoon, 18 species of orchids in flower being collected in the three hours, amongst which may be mentioned *Thelymitra aristata*, *T. antennifera*, *T. longifolia*, *Caladenia patersoni* (several varieties), *C. menziesii*, *C. deformis*, *C. latifolia*, *Diuris longifolia* (a patch about two feet square contained fully one hundred specimens, mostly in flower), *D. pedunculata*, *Pterostylis barbata*, *P. pedunculata*, *Prasophyllum elatum* (green and brownish varieties), *Lyperanthus nigricans*, and other commoner species. The heath ground near Cheltenham at the present time presents a beautiful appearance, and will repay anyone interested in native flowers to visit the locality, fully 60 species of plants being noticed in flower (not including the orchids) during our few hours' ramble. I may mention that on the two orchid excursions to Sandringham and Cheltenham no less than 25 species of orchids were collected in flower.—C. French, jun.

## VARIATIONS IN WURMBEA DIOICA.

*(Communicated to the Club, 12th September, 1892.)*

Baron von Mueller, in his "Fragmenta," mentions that this species sometimes has 2 or 4 carpels and 7 or 8 segments of the perianth. Bentham mentions that it is a very variable species. I have examined a large number of specimens collected indiscriminately near Brighton, and find the carpels frequently 2, 4, or 5, with 4 to 8 perianth segments, these variations occurring separately or together, but when both vary it is in the same direction. The number of stamens is sometimes increased to 7, 8, or 9. I found one flower with 5 sepals, 5 petals, 10 stamens, and 5 carpels. The anthers are sometimes 4-lobed instead of 2. These variations may affect all or some only of the flowers in the spike, and different flowers to different extents, but in the same direction. About 21 per cent. of the pistillate spikes vary in some way, and 14 per cent. of the total number. Variations also occur in the colouring of the flowers, the most usual being that the ring is divided into dots. The whole of the perianth is sometimes tinted with a ring of darker colour. In a few flowers the ring was absent or very pale, rarely yellow. These variations in colour affect the whole spike alike. I found one spike branched.—Thomas S. Hart.

# DIATOMS: NOTES ON THEIR COLLECTION, CLEANING AND MOUNTING.

By Henry Grayson.

*(Read before the Field Naturalists' Club of Victoria, 12th September, 1892.)*

The subject before us to-night is a formidable one, and one I have found it difficult to approach without a feeling of diffidence. So much has been said and written about diatoms that now, in certain quarters, one is almost afraid to mention the name, lest the not very complimentary term "diatomaniac" should be applied to one. I am not going to deny that valuable time is often wasted upon them—in fact, I do not know that I am wholly innocent in this respect myself. So much conceded, we must all admit that the possessor of a microscope has a perfect right to purchase a slide of diatoms if he chooses, and spend an hour or two now and again in trying or testing first one and then another of his objectives upon it. Time so spent need not be regarded as wasted; for to properly display objects under a microscope is to a certain extent an art, for it not only demands dexterity in the manipulation of the instrument and its appliances, but also requires knowledge of what sort of illumination is best suited to the objects to be examined. Dr. Dallinger very truly says:—"For learning the manipulation of the instrument no class of objects are as suitable as diatoms. They are also an excellent means of training the eye to appreciate critical images."

Having learnt so much, it would be extreme folly to advance no further. Much remains to be done even in connection with the study of diatoms. This particular study may not be so "absorbing" as the study of the sponges, for instance; but, considering the number of years naturalists have been working at both sponges and diatoms, the amount of information "squeezed" out of diatoms will bear favourable comparison with that obtained from sponges. Moreover, the time and patience given by a devoted band of enthusiasts—I will not term them "diatomaniacs"—has not been by any means lost to workers in other departments of scientific research. We are entirely indebted to diatomists for the splendid results recently achieved in the purely optical part of microscopical work. The demand for more and yet more "angle" and "light" has resulted, not so much as was supposed in the ultimate resolution of diatom markings, or the discovery of final structural details, as that it has opened up new avenues of research, and has even placed us in possession of all that is now known under the term of Bacteriology, while the

biologist—and, in fact, every worker with the microscope—has been correspondingly benefited.

But in regard to diatoms, as I said before, much remains to be done. Finality, even in respect to a knowledge of their structure merely, has not yet been attained. To quote Dr. Dallinger again:—"It would be extremely unwise to give absolute adhesion to any present interpretation of what is now held by some students of diatom structure, of no mean repute and of unrivalled manipulative skill, to be the absolute structure of some of the larger forms."

We have also much to learn as to their mode of reproduction. Reproduction—or, more correctly, multiplication—usually takes place by autofission or division, and until recently was supposed to result in the production of a series of diminishing frustules, which, on reaching their minimum size, gave rise to what was called an *auxospore*, which, having been preceded by conjugation, was capable of reproducing two sporangial frustules of considerably larger size, these again giving rise by fission to a new series of diminishing frustules. This unconfirmed auxospore theory (for it does not appear ever to have been founded upon actual observation) rests—1st, upon the supposed inability of the silicious walls of diatoms to expand; secondly, on the idea that all diatoms are capable of binary subdivision; and, thirdly, on the supposition that there is no mode of reproduction except by auxospores. That the silicious valve is capable of distention may be proved by an examination of some of the many varieties of *Melosira*, particularly the varieties *subflexilis* and *varians*; and that binary subdivision cannot take place in genera with unequal valves is universally acknowledged, as the two valves which are formed in the process of binary subdivision must stereotype themselves on the old valves, and for this reason this process cannot take place in those genera in which the axes cross one another, like *Campylodiscus*, and is confirmed by the fact that while there are recorded not less than 75 observations of the process of division, not one of them affords an exception to the rule.

I may explain that binary subdivision consists in the elongation of the cell and the formation of a hoop adherent to each end valve, so that the two valves are separated by a band which progressively increases in breadth by addition to the free edges of the hoops, until the original form of the cell is completely changed, leading to a separation of the endochrome and nucleus into two halves; the primordial utricle folding in, and finally forming a complete double partition, upon the adjacent surfaces of which a new silicious valve is formed, so that the original frustule is replaced by two frustules, each of which has one old and one new valve. Generally speaking the new valves are a little

smaller than their predecessors, so that a diminution in diameter becomes obvious; but sometimes the new valves are a little larger, thus accounting for the progressive increase in size observable in the case of the filamentous species already noticed; while, in the free forms, frustules of different sizes may be met with, the larger being the more numerous, the increase in number having taken place in geometrical progression, while that of size was uniform. Instructive illustrations of the foregoing in the case of *Biddulphia* may be found upon some slides representing a gathering of diatoms I obtained from Corio Bay last Easter.

Reproduction in the true sense—*i.e.*, preceded by conjugation, and resulting in the fertilization of sporules or gonads, which, after a period of repose or incubation, enclosed within a cyst, attain a condition of living and independent life, and resembling in every respect the parent cell—we have not time to touch upon. I can only refer you for information to the recent works of specialists in this particular branch of study, as those of Count Castracane, O'Mera, and others.

I have been at some little pains to show, in as few words as possible, that the auxospore theory as applied to the whole family of diatoms is not accepted by eminent diatomists, although it has found its way into nearly every botanical text book, since it is not, as already mentioned, founded upon or supported by actual observation; and, further, to show that even in the matter of a knowledge of the reproductive process, supposed to have been set at rest years ago, we have yet very much to learn.

Not less interesting than the problems connected with reproduction are those belonging to the power of spontaneous movement possessed by some genera. Everyone who has examined living diatoms, particularly the Navicula and allied forms, must have noticed the peculiar jerking movement with which they are endowed. In the case of the Pleurosigma, and some other genera, this movement is smooth and equable, and proceeds for about the length of the frustule and then back again. If any small obstacle is met with in its course it is usually pushed aside; if, however, the object is too large, the frustule is detained for a length of time equal to what it would have taken if it had completed its forward course, and then retires from the impediment as if it had not been so detained. By Mr. W. Smith this power of movement is referred to forces operating within the frustule, and originating in the vital operations of growth, &c.

Light and heat are also the causes of certain movements—more particularly, I think, the latter. Confirmatory of this, I may mention that I have in my possession at the present time a gathering of *Pleurosigma decorum* obtained from the sea, from a depth of three fathoms or so. They were found about the middle of

last April near Geelong, and are living in a tumbler of sea water. When first placed in this tumbler they were, of course, mixed up with the mud in which they were found. The latter having settled in the course of a day or two, the diatoms could be observed as a dark olive coloured film upon its surface, and during daylight could always be seen in this position. After a time it occurred to me to examine them after nightfall, and I was much surprised to find they had all disappeared beneath the surface of the mud. Examination on successive days showed this disappearance to be of regular occurrence from day to day. After the lapse of a few days I placed the glass on a ledge against the garden fence, shaded from the sun, and on the following day noticed my friends had not come to the surface as usual, the day being fine, but dull and cold. The same conditions prevailed on the succeeding day, the diatoms still keeping below; but on the third day, which was warm and clear, they came to the surface as before, and could easily be seen with a pocket lens actively sliding over each other and up the sides of the glass to the surface of the water. After repeated observations I have noticed that their movements in an even temperature, and screened from direct sunlight, are fairly constant and regular—that is, they come to the surface during daylight, and at night disappear among the surrounding mud, making their way usually right to the bottom of the glass. If exposed to any marked change of temperature they appear to be at once affected thereby, remaining imbedded in the mud for days together, provided the cold continues, even though the sky may be bright and clear. I may remark that although limited to not more than a quarter of a pint of sea water they appear both as healthy and numerous as when first placed therein. I tender these observations merely in the hope that they may be useful and suggestive to others. No one seems to have studied very carefully the effect of light and heat upon these low forms of life, or, at least, no record of such observations has come before my notice, although it has often been noted that diatoms rise to the surface of any water containing them, being carried thither apparently by the gases they evolve when exposed to bright sunshine.

Our time will not permit of any further reference to these at present unsolved problems; nor yet to the interesting, but interminable, controversy as to the nature of the fine sculpturings, or markings, as they are more generally termed, upon the surface of the valves.

I am the rather desirous of giving you something more practical in the shape of my own experience, such as it is, upon the various methods of collecting, cleaning and mounting diatoms. And, first, as to their collection.—Diatoms are, I need scarcely say,

universally distributed, abounding in both fresh and salt water, certain species being peculiar to each, while certain others appear to thrive in an admixture of the two, or are more abundant in what we term "brackish" than in purely salt or fresh water. The forms found in the sea are more numerous, are larger, and more attractive, in the ordinary sense of the term, than the freshwater varieties. Some species appear to be confined to certain limits of latitude and longitude, while others are universally distributed over the surface of the globe. Generally they would appear to be more abundant in the warm and temperate latitudes than further north or south, this being what one would expect. They are also more plentiful in a climate like that of New Zealand than upon our own continent. This naturally follows upon the greater presence or absence of water and its permanence. I am also inclined to think they are less abundant in our bays and rivers, owing, I imagine, to the greater amount of loose sand. In this I am merely giving the results of my own experience as a collector, but I must now state where they may be found in so far as our own immediate district is concerned. I have at various times obtained excellent gatherings from Lakes Wendouree and Burrumbeet, the Gong Gong waterworks at Ballarat, the Moorabool and Barwon Rivers, and also from sundry pools and permanent waterholes, &c., too numerous to mention, in the neighbourhood of Melbourne. From the sea and brackish water I have met with success at the mouth of the Yarra, Williamstown, Geelong and locality, Queenscliff, Frankston, Elwood, and St. Kilda, making the circuit of the bay. In fresh water such species as *Surirella*, *Stauronia*, *Navicula*, and *Pinnularia* may be found upon the surface of the mud in lakes or pools, and obtained if the water is deep by means of a small dredge and line; a pound of lead or iron being secured to the line about a yard from the point of attachment to the dredge, this latter merely consisting of an old mustard or jam tin, which will serve the purpose quite as well as a more costly apparatus. The filamentous forms are usually found attached to the larger algæ, sticks, stones, &c.; the dirtier such objects appear to the eye the more numerous the diatoms. The finer water plants and weeds yield the best results, whether in fresh or salt water. Such plants should not be washed in any way, but carefully raised from the water and merely drained and packed away in tins or jars for treatment on arrival at home. Marine forms may be obtained much in the same way as those from fresh water. Sometimes the froth or foam left by the retreating waves gives good results. Sand ripples and tide pools are also worthy of inspection. Some collectors, too, have been successful by skimming the surface of the sea with a net. Others, again, levy upon the stomachs of various Molluscs, Holothurians and

Ascidians, but I was only once successful with any of these latter methods, and this was with stomachs of some fish of the flounder family.

I have not, so far, said anything as to fossil deposits. These, as you know, are very numerous in different parts of the world, and in some cases very rich in forms not now existing in the living state. I propose only to allude to the more important deposits which have so far been noted in Victoria. Those most worthy of attention are the brackish water deposits of South Yarra and West Melbourne, the latter being very extensive and containing many fine species. Freshwater deposits have been found at Amherst, Talbot, and Lancefield, and several other deposits of minor importance are recorded from Gippsland. What appears most remarkable to me is that, so far as I know, and certainly as far as I have myself sought, no trace of diatoms exists in any of our tertiary deposits at Mornington, Bairnsdale, or Muddy Creek. Nor have I seen any trace of silicious sponge spicules; it would thus appear that, if ever present, they had been dissolved by the chemical action of water, or otherwise destroyed. So much for collection.

Now as to the cleaning of diatoms.—It would be impossible within the limits of this paper to give anything like a detailed description of the many processes for accomplishing this end. The mere enumeration of the chemicals and apparatus regarded by some operators as needful would weary you. I therefore propose to take two typical examples, one recent and one fossil, and describe my own method of dealing with them. I may say at the outset that scarcely any two gatherings, either recent or fossil, require precisely the same treatment; slight modifications are necessary in nearly every case, in accordance with the nature of the material to be dealt with. As to apparatus and acids, the following are necessary:—Two strainers (preferably of silk), one sufficiently coarse to pass the largest diatoms, the other as fine as possible, so as to retain the smallest; several conical glass jugs of about a quart capacity, one or two small beaker glasses, a glass syringe, and circular glass dish; a lamp or other source of heat must be at hand, together with a plentiful supply of clean water. We shall require two acids only, sulphuric and nitric, both of ordinary commercial strength; and a small quantity of chlorate of potash and some crystals of common washing soda complete the list of what is absolutely essential. We will treat, first of all, a recent gathering of diatoms in mud, such as might be obtained from Hobson's Bay, and regard this as fairly representative of any recent gathering. Our material, consisting, say, of about half a pint of liquid mud containing a fair sprinkling of diatoms—of the presence of which we are assured from previous examina-

tion—is first passed through the coarse sieve, thus separating the coarse material from the fine. This latter is next passed through the fine sieve, an operation requiring plenty of water and patience. The portion retained in the strainer may now be examined, and if much mud, &c., still appears to be present we had better boil it with a little soda in a pint of water, using, preferably, an ordinary kitchen pan and fire or gas stove. After this we again pass it through the fine strainer. The residue this time will probably consist of fine sand, diatoms, and other insoluble material. We now transfer a portion of this to the circular glass dish or rotary glass, keeping it in motion for a while by a circular movement of the hand. The sand, &c., will quickly make its way to the bottom, while the upper stratum, still in motion, may be withdrawn by means of the syringe and placed in the beaker glass. Sufficient material may be dealt with in this manner to give about an inch in depth in the beaker after settling. All the water having been drawn off, we carefully pour in an equal bulk of sulphuric acid, mix thoroughly, and boil for ten or fifteen minutes, or even longer, adding more acid if needful. When the liquid has become thoroughly blackened chlorate of potash may be added, very cautiously, so as to avoid explosions, until the mixture appears of a yellowish colour. After cooling somewhat, we may pour the liquid into one of the jugs, fill up with water, and pass through the fine strainer as before. It may sometimes be desirable to set aside the water which passes through the fine strainer after treatment with acid, in order not to lose the finer diatoms; but usually a sufficient proportion of these are retained within the strainer. After all trace of acid has been got rid of, we repeat the rotary process with the glass dish, in order to eliminate any further sand or fine silt not previously got rid of, transferring the white floating material, consisting now mainly of diatoms, to the beaker, in which it must be again allowed to settle. The water having been withdrawn to within an inch of the sediment, four or five crystals of soda, about the size of peas may be thrown in, and the whole reboiled. Care and judgment are required as to the length of time this boiling should continue. Delicate species, like *Pleurosigma*, will not with safety bear more than three or four minutes, while in the case of the larger and heavier kinds it may be continued for ten if needful. The object of this boiling in an alkaline solution is to thoroughly free the diatoms from all flocculent matter yet adherent, after which they may be finally strained and transferred to a suitable phial with distilled water preparatory to mounting. The treatment of a fossil deposit differs from the foregoing only in regard to the presence or absence of lime, or in respect to its degree of hardness. If lime is present, treatment with nitric acid may be first resorted to. If the deposit is hard and compact, but free from lime, as is

the case with some samples from Oamaru, New Zealand, small pieces may be dropped into a warm saturated solution of soda and afterwards dried. The effect of this drying is to recrystallize the soda, and so break up the deposit without injuring the diatoms. In no case must such a deposit be crushed or in any way pulverized by mechanical force, or the larger diatoms will, of course, be crushed and broken. Some very refractory samples may require boiling in liquor potassæ, or other strong alkaline solution, the aim throughout being to prepare the material for the straining processes previously described. These I need not again repeat, the treatment of a recent and fossil deposit from this point being almost identical. The whole process is really more simple and easy than would appear to be the case from my description of it; and with reasonable care, mainly in the use of sulphuric acid and chlorate of potash, no inconvenience or mishap need be apprehended. I have tried, I think, nearly every published method of any promise, with more or less success, but none have yielded such satisfactory results, though often requiring far more time and labour to carry them through, than the plan I have endeavoured to describe. There are several matters of detail I should like to touch upon, but must now pass on to a brief consideration of the method of mounting diatoms.

Diatoms may be mounted in various ways—as "spread" or "selected" slides, dry, or put up in some suitable medium. Generally speaking it is better to mount in one or more of the several mediums now in use, and whenever diatoms are to be mounted for examination with immersion lenses this is imperative. I will first of all refer to the several media in general use. The oldest, and I might say the best medium but for its low index of refraction, is Canada balsam. Mr. Morland, an authority on matters of this sort, says that "for the coarser kinds, say four out of five species at the very least, Canada balsam, taken all round, remains as good as any other medium yet brought forward." Next to Canada balsam styrax may be regarded as a suitable mounting medium. Its refractive index being considerably higher than that of Canada balsam, renders it serviceable where it is desirable to bring out difficult or obscure points of structure. Its chief drawbacks are that it is usually very dark in colour and requires a long time to harden. American styrax is said to be free from these disadvantages, but I have had no experience of it, nor have I seen it used. Monobromide of naphthaline has a refractive index higher than either of the foregoing, but being a very fluid oil it requires care and skill to secure it permanently. But a mixture of this medium with Canada balsam is in my opinion the best medium I have tried. It will stand almost any degree of heat without the formation of bubbles, and is not discoloured thereby. It possesses great brilliancy, and the further advantage of a higher

refractive index than Canada balsam alone. My experience of it is, however, brief, for I have only used it in the preparation of slides in illustration of this paper. Various other media have been tried from time to time, but all have so far proved either difficult to manipulate, or, what is of more importance still, are not permanently reliable. Diatoms, I need hardly say, should always be mounted on the cover, no matter what the medium used may be. The finer kinds scarcely require any further attachment than what is provided by drying them upon the cover glass over a spirit or other lamp. The larger forms require that this be first smeared with a very weak solution of gelatine by means of a needle. The exact strength of this solution can only be determined by experiment. This applies also to the preparation of selected slides. The mode of procedure I adopt with "spread slides" is to take a slip, breath upon it, and then place thereon one or more covers. Upon these I drop from a pipette the water containing the diatoms, distributing the latter evenly over the surface by means of a needle, keeping the slide meanwhile perfectly horizontal and steady. They may be left to dry spontaneously or heat may be applied. The covers are then taken up in a forceps and placed in position on a slide, upon which there has previously been placed a sufficiently large drop of Canada balsam. No pressure must be applied to the cover, as if the balsam is of the proper consistency it will flow to the edge of the cover without this. Nor is it desirable to smear the slide with balsam unnecessarily, nor yet is it a difficult matter to guess or otherwise find its centre to within an inch or so. These are, of course, merely matters of detail, but are nevertheless worthy of attention. The slide may now be put away to dry, secured from dust, &c. Should any bubbles be present in the balsam at the time of mounting, they will generally make their way in course of time to the margin of the cover, or otherwise disappear. After the slide is thoroughly dry, it will contribute to its neatness and permanence if a ring of some cement or other be run round the cover by means of a turntable. This, I know, is a practice that is sometimes "universally condemned" as savouring of the amateur and *dilettante*—a species of reproach an otherwise well-mounted slide will generally survive.

A word or two as to selected or picked slides. This method of mounting enables us to isolate certain species for special examination or naming, or for the purpose of reducing the number of slides in a series, or even for effect. It is easily accomplished, requiring only practice, patience, and a steady hand. To effect this I use a mounted bristle obtained from a well-worn clothes brush. Formerly, on the recommendation of Dr. Carpenter, I used a cat's whisker, but as the cat was not always on hand or agreeable, I found the brush hairs served the purpose

even better. The cover, smeared with a trace of gelatine, is placed in a convenient position, and the diatoms one by one are dropped upon it, having been selected by the aid of the microscope and inch objective. After being breathed upon, they may be arranged according to taste under a hand lens or simple microscope, the principal difficulty to surmount being the reverse movement of the bristle as seen under the instrument—a difficulty easily overcome by a little practice, or perhaps better still, by the use of an erector eyepiece. When finally arranged the slide may be mounted and finished after the manner directed for spread slides.

In conclusion, it only remains for me to say that I have endeavoured, as concisely and clearly as I could, to give you an outline of some of the problems yet unsolved in connection with one of the lowest, but by no means the least interesting, forms of life with which the microscope has made us acquainted, together with such information from my own limited experience as may, I trust, be of some little advantage should any of you feel disposed to give any further attention to the matter.

## BRIEF NOTES ON SOME NEW PAPUAN PLANTS.

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

Already towards the end of last year I described for the tenth part of the "Papuan Plants" several remarkable novelties, but as more urgent direct official obligations caused the completion of the mentioned publication to be postponed, it is deemed desirable to offer preliminary succinct notes in the *Victorian Naturalist* on some of the new plants elucidated.

Antholoma Tieghemi.

It came from Mount Yule; the leaves are almost ovate or somewhat lanceolar, narrowly acuminated and distantly denticulated; the longer setule of the anthers and the three-celled ovulary separate this species also from the New Caledonian *A. montanum.*

Sloanea Forbesii.

This was found at Sogere, and comes near *S. tomentosa* and *S. sterculiacea*; the leaves are ovate or verge into a roundish form, soon glabrescent above, but puberulous beneath; the sepals are lanceolar and on both sides velvety; the petals are somewhat longer and also velutinous; the stamens number from 25 to 30, are beset with minute hairlets throughout; the anther-cells are scarcely longer than the filaments, the terminating setule is hardly shorter; the pistil except the summit of the style is velutinous.

Quintinia Macgregorii.

This occurs high up on Mount Suckling, and is nearest to *Q. Fawkneri*, but the leaves are larger and on much longer stalks, the calyces are less angular, the style is much shorter, and the fruit-valves are more emersed.

Biophytum albiflorum.

This was gathered on watercourses of Mount Obree. As the name implies, it differs in its white petals from the few other known congeners, but stands systematically near *B. Reinwardti*, from which it is distinguishable further by leaflets more inequilateral, of more sameness of colour on both sides, by longer pedicels and by fruits nearly as broad as long. If Biophytum is to merge into Oxalis, then our plant should receive the name *O. Papuana*.

## NOTE ON THE WEST AUSTRALIAN FAN-PALM.

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

It is known since the discovery of the Hammersley-Ranges, fully thirty years ago, that a Livistona-Palm occurs on the Mill-stream there, far isolated from any other species of that genus; but former incomplete specimens led to the surmise that this palm might be identical with *Livistona Mariæ*, a species restricted to the Palm-glen and several valleys of the Macdonnell-Ranges in Central Australia. The last mentioned palm we know now through Mr. J. Edgar, of the Rockhampton Botanic Garden, to be, while in a young state of cultivation, much more robust and upright in foliage than *L. australis*, besides the leaves at the early age of the plant being of a "rich bronzy colour." This particular characteristic seems neither to apply to the West-Australian species, as ascertained by the Hon. Captain Phillips and Mr. H. Keep from Sergeant J. Beresford, stationed near the Hammersley-Ranges. Moreover, I have always found transmitted fruitlets considerably larger than those of the genuine *L. Mariæ*, and further some minor differences exist also in the flowers of the two species, as recently ascertained. The West-Australian Fan-Palm has therefore now been named *L. Alfredi*, in honour of H.R.H. the Duke of Edinburgh, at whose nuptial festival the Central Australian Palm became dedicated to the Princess Marie of Russia. What applies to many other palms, holds good also for *L. Alfredi*—namely, that the leaves are more strongly spinous in the young than in the aged plant. Mr. Beresford records this palm now also from the Fortescue-River and its tributaries, from the sources of the Robe-River, and from Cave's Creek.

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## FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Field Naturalists' Club was held in the Royal Society's Hall on Monday evening, 14th November. Mr. D. Best, one of the vice-presidents, occupied the chair, and there was an attendance of some 100 members and friends.

### LIBRARIAN'S REPORT.

"Transactions of New Zealand Institute," vol. xxiii., 1890; Papers on Oology.

### REPORTS OF RECENT EXCURSIONS.

Reports of recent excursions to Springvale, Gisborne, and Mount Corranwarrabul were presented by the Rev. E. H. Hennell and Messrs. G. Lyell and F. G. A. Barnard.

### MEETING FOR PRACTICAL WORK.

Mr. J. Gabriel essayed the task of interesting some of his fellow members on the evening of 24th October. He chose as his subject "Notes on Polyzoa: Where to Find Them, and How to Mount Them," and illustrated the same by diagrams and practical demonstrations. A set of mounted specimens was distributed to each member present, together with unmounted samples intended for individual practice in mounting. During the progress of the meeting, complimentary references were made to the manner in which Mr. Gabriel had brought forward the subject, and regret was expressed at the unavoidable absence of a good many of those who usually attend these practical meetings.

### ELECTION OF MEMBERS.

The usual ballot for new members resulted in the election of Mr. T. A. Forbes-Leith as an hon. member, and Messrs. A. Bastow, J. Blackburn, W. Griffith, and J. Sutherland as ordinary members, whilst 14 nominations were received for election next month.

### PAPER.

The first paper communicated to the meeting was by Messrs. F. Spry and Ernest Anderson, and embraced an introduction to and list of species of Victorian butterflies. The authors had already established a reputation as lepidopterists amongst their fellow members, and their contribution, which covers the work of

many years, was received with great satisfaction, and will prove of extreme value to the Victorian lepidopterist. The descriptive portion of the subject, which is promised at an early date, will be eagerly looked for.

The second paper treated of "The Structure, Collection, and Mounting of Mosses," and was contributed by Mr. R. A Bastow. It was illustrated by means of a large diagram, containing the parts of inflorescence and varied forms of fructification, as well as some beautifully mounted specimens, and some fine examples recently gathered in some of the gullies near Croydon. Great interest was manifested in Mr. Bastow's method of presenting the subject, and, doubtless, some of the members will be encouraged to pursue the study of these forms of vegetable life, constituting as they do a "glad luxuriance of humble beauty in niche, on bank, on rock, and everywhere." In concluding his remarks, the author alluded to the very complete collection of mosses in the Herbarium at South Yarra, which is always open to those anxious to inspect it.

EXHIBITS OF WILD FLOWERS.

The committee had hoped that a good collection of wild flowers would have been on view, but exhibitors did not come forward in any numbers, and the display was disappointing. Amongst those who did exhibit, however, should be mentioned Mr. T. S. Hart, who had a fair gathering frem the Keilor Plains (including the rare orchid *Diuris alba*), also an orchid in flower (*Cryptostylis longifolia*) from Cheltenham; whilst Mr. J. West sent some interesting forms from Phillip Island; Mr. H. T. Tisdall exhibited some from Portland, collected by Miss Wingrove; and Rev. R. Poynder also sent specimens. Mr. F. G. A. Barnard exhibited the flower of the Native Iris (*Diplarrhena morea*), grown at Kew, and Mr. C. French, jun., sent in three varieties of the orchid *Prasophyllum fuscum*, from Dandenong Creek.

The following is the summary of Miss Cochrane's exhibit at the October meeting. About 30 species were displayed, the following being the most important:—*Diuris pedunculata*, *Prasophyllum patens*, *Thelymitra elizabethii*, *Microtis minutiflora*, *Comesperma ericinum*, *Ranunculus rivularis*, *Utricularia dichotoma*, *Euphrasia brownii*, *Tetratheca ciliata* (white specimen), *Drosera glanduligera*. Ringwood was the collecting ground. Mr. T. S. Hart's exhibit at the same meeting consisted of 55 species from Sandringham, and included:—A peculiar growth of *Epacris impressa*, with a solitary large flower on the end of stalk; *Chamæscilla corymbosa*, with white variety; *Correa speciosa*, very late in the season; *Caladenia menziesii*, some with three flowers; also *Brachycome diversifolia*, *Myoporum viscosum*, *Podolepis acuminata*, *Lasiopetalum baueri*, *Thelymitra flexuosa*, and *Pterostylis mackibbini*.

EXHIBITION OF SPECIMENS.

In other departments the exhibits were :—By Mr. R. A. Bastow.—Mosses (some of which were microscopic preparations) in illustration of paper. By Mr. A. Coles.—Tawny-shouldered Podargus and Black-faced Grauculus, with nests and young as collected. By Mr. J. E. Dixon.— 28 species of Coleoptera, including 2 rare longicorn beetles, *Eburigera octo-guttata* (White), *Aphneope sericata* (Pascoe), collected recently at Oakleigh, Beaconsfield, and Dandenong Creek. By Rev. W. Fielder.—Microscopic preparations of sponges from Beaumaris and Geelong (*Sycon raphanus*, *Grantessa hirsuta*, *Leucilla australiensis*, *Leucosolenia stipitata*, and others being represented). By Mr. C. French.—Timber-feeding moths from New South Wales and Victoria. By Mr. G. E. Hill :—Victorian longicorns and buprestidæ and snakes. By Mr. H. F. Hill.—Case illustrating the life-history of six Victorian house-builder moths (*Metura elongata*, *Entometa ignobilis*, *Clenia tenuis*, and three unnamed varieties) ; also, parasitic Hymenoptera and Diptera. By J. A. Kershaw.—*Ogyris orœtas* (Hew.), Wimmera District, male, female, and pupa. By Baron von Mueller.—*Drymaria filiformis* (Bentham), new for Victoria, obtained in the Wimmera District by Mr. Ch. French, Mr. St. Eloy D'Alton, and Mr. F. Reader ; *Bossiœa prostrata* (R. Br.), a large-leaved form, reminding of *Platylobium formosum*, discovered at Western Port by Miss Annie Stirling ; *Thelymitra ixioides* (Swartz), var. *albiflora*, found by Mr. Ch. French, jun., at Dandenong Creek ; *Triglochin calcitrapa* (Hooker), Wimmera District, new for Victoria (Mr. F. Reader).

## MELTON EXCURSION.

Saturday, 17th September, was the day set apart by our ornithologists for a trip to Melton, but a combination of circumstances prevented its being the success anticipated when the programme was drawn up. In the first place the train arrangements make the return journey rather late, and the weather in town was rather threatening, but those who stayed at home for the last reason made a mistake. We left our overcoats in care of the station-master, and did not regret it, as we only had a slight sprinkle for about five minutes during the whole day. Punctual to time our leader was at his post, and a few minutes later the rank and file, embodied in one individual, arrived. After looking in vain for several others who had promised to start, a move was made for the train and seats secured, our party comforting itself with the reflection that, if not numerous, it was, at all events, select. Nothing remarkable occurred until, passing Rockbank station, we

saw several hundred Straw-necked Ibises (*Geronticus spinicollis*) disturbed by the train. It would be interesting to ascertain if these birds intend breeding in this locality, as their laying season is very near, and they do not show any signs of migrating. On alighting at Melton we discovered that two more members had travelled in the same train, but had not seen us until the train stopped. A start was soon made along a course frequently travelled by members of this Club. Skirting the racecourse is a nice belt of timber, in which I think more varieties of birds are to be found than in any other place within a similar distance of Melbourne. Here several species of Parrakeets were seen, and the Little Geobasileus had family cares in full swing. Nests were frequently found containing either young birds or eggs. As we wandered through the timber a Brown Hawk attracted notice, screaming and perching near us. His nest was soon discovered, with his mate sitting upon it. Although several shots were fired in close proximity to the tree, the bird never left her nest. Red-capped, Flame-breasted, Scarlet-breasted, and Hooded Robins were seen, but had not commenced nesting. A little delay was made here in the hope that a member from Myrniong would catch up to us, but while we were waiting for him here he was a mile ahead waiting for us. In crossing the open land several Black-breasted Plovers rose, but so far away that the locality of their nests could not be discovered. A slight shower passing over caused us to take shelter for a few minutes under the thatched roof of an old stable, from which a Little Geobasileus flew. Its nest was soon found amongst the thatch—a very unusual place for these birds. Some Blue-banded Parrakeets were now seen, but as one shot proved them to be in very bad feather no more were fired at. Another addition was now made to our party by the arrival of Mr. Lidgett, from Myrniong, who had seen us in the distance, and we now ascertained that he had ridden across on horseback, leaving his steed at Mr. Raleigh's (who is ever obliging to members of this Club), and had been hunting for some time. A start was now made in earnest along the gullies. The party made an involuntary split, but on rejoining at lunch time it was found that this season the birds are all very late, so the oologists did not get much for their trouble. Many nests of various kinds of Honeyeaters were found, some just commenced, others complete and ready for laying, whilst a few contained eggs. As the party again proposed to separate, it was agreed that two should go along the gullies, whilst the others worked round in a semicircle, in a general westerly course. A few rabbits were now seen, and a shot at one disturbed a Sulphur-crested Cockatoo from its nest. Here the White-winged Chough and Pomatorrhinus were found in considerable numbers, but their nests could not be seen. It will perhaps be remem-

bered that when we visited this ground last year in October the deserted nests of both these birds were seen. A flock of Pennant's Parrakeets were disturbed in the mallee, and numbers of small birds, principally Acanthizas, Robins, and Honeyeaters, were met with. With the exception, however, of the New Holland Honeyeater, very few of them had started building. Crossing the gully a fine fox was seen, but he did not like the appearance of our party, and cleared out before his skin got damaged. Time was now up for a start on the homeward track, and on reassembling at Mr. Raleigh's for tea it was found that, although our captures were not very numerous or valuable, many interesting notes had been taken. After bidding farewell to Mr. Lidgett, and enjoying Mr. Raleigh's hospitality, a fresh start was made for the station, where we amused ourselves (and other folks too) catching beetles which flew against the station lamps. The following is a list of the birds noted :—Straw-necked Ibis, Red-capped Robin, Flame-breasted Robin, Yellow-breasted Robin, Scarlet-breasted Robin, Hooded or Pied Robin, Brown Hawk, Nankeen Kestrel, Allied Harrier, White-winged Chough, Rosehill Parrakeet, Red-rumped Parrakeet, Pennant's Parrakeet, Blue-banded Parrakeet, Musk Lorikeet, Spotted-sided Finch, Red-eye-browed Finch, Pallid Cuckoo, Bronze Cuckoo, Fantail Cuckoo, Wattled Honeyeater, Spiny-cheeked Honeyeater, Yellow-faced Honeyeater, New Holland Honeyeater, Lunulated Honeyeater, White-plumed Honeyeater, Spinebill Honeyeater, White-eared Honeyeater, Black-faced Grauculus, White-eyed Crow, Collared Crow Shrike, White-throated Tree Creeper, Brown Tree Creeper, Black-breasted Plover, Southern Stone Plover, Sulphur-crested Cockatoo, Pied Grallina, Temporal Pomatorrhinus, Chestnut-crowned Pomatorrhinus, White-backed Crow Shrike, White-fronted Ephthianura, Frontal Shrike Tit, Varied Turnix, Superb Warbler, Spotted Pardalote, Striated Pardalote, Yellow-tailed Acanthiza, Buff-rumped Acanthiza, Lineated Acanthiza.—G. A. KEARTLAND.

## EXCURSION TO SPRINGVALE.

FOUR members arrived by train from Melbourne on Saturday, the 29th October, another joining at Springvale, having walked from Brighton, collecting on the way ; with two local residents, we were thus seven in number. About one mile from the Railway station we entered the fields and made our way to what is known locally as Kelly's scrub. Here in season is a good field for the egg-collector, entomologist, &c. Insects, however, on this day were very scarce, owing to the heavy rains which had fallen during the week, and perhaps we were too early for them, not a single insect being noted that was worth capturing. Two lizards were noted,

*Hinulia quoyii* and *Liolepisma metallicum*. Mr. T. S. Hart, of Brighton, has kindly named some of the principal plants found, of which altogether there were sixty-five species :—Orchids.—*Diuris pedunculata*, *D. sulphurea*, *Thelymitra ixioides*, *Caladenia carnea*, *C. patersoni*, *Prasophyllum patens*, *Microtis parvifolia*, *Pterostylis cucullata*, *P. longifolia*; also, *Plagianthus pulchellus*, *Podolepis acuminata*, *Arthropodium paniculatum*, *Limnanthemum exaltatum*, *Patersonia longiscapa*. We were favoured with a beautiful day, and the trip proved more of a pleasant afternoon's outing than one for collecting. Two of the members tried some waterholes for pond life, but so far nothing of importance has been reported. Some of the members returned by an early train, the remainder leaving by one at 6.30 p.m.—E. Halford Hennell.

## EXCURSION TO MOUNT CORRANWARRABUL.

Three members left town by the 7 a.m. train on Prince of Wales' Birthday to take part in the first Club excursion to this part of the Dandenong Ranges, and were joined by the leader and other members at various stations, so that when gathered together on the Croydon platform the party numbered eight members, including one lady, and four friends, two of whom were ladies. Owing to only two names having been given in to the leader previously, no arrangements had been made for a conveyance over the four miles and a half of somewhat uninteresting country which has to be traversed before the ascent of the mountain is commenced. Consequently this distance had to be done on foot, and gave time for glancing at the flora as we went along. About a mile from the station the ladies gallantly allowed the gentlemen to go on ahead, with the hope of meeting later on; but, unfortunately, this did not take place. In due course we arrived at the scene of the land-slip of twelve months ago. Here we halted for a few minutes for refreshment, and then followed the road up the side of the spur to the crest of the ridge, noting on our way such plants as *Clematis aristata*, *Pultenæa juniperina*, *Lobelia browniana*, *Grevillea alpina*, *Veronica derwentia*, &c. On arrival at the crest we decided to make for the "trig." station and get what view we could of the distant city, &c. On our way we obtained good specimens of Marchantia, with both male and female organs, and noted *Glycine clandestina*, *Goodia lotifolia*, *Pimelia hypericina*, *Senecio bedfordi*, &c., tree ferns and other smaller kinds. On arrival at the cairn we found the country to be so clouded in mist and haze that little was to be seen, so we made our way down to the head of a beautiful fern gully, on the eastern slope of the range, where we found a good spring of water, and camped for lunch, which was despatched with apparent relish. Here we found the orchid *Chiloglottis gunnii* growing on

the fern stems; also another, seemingly *Corysanthes pruinosa*. We then started to follow this gully down to one of the main branches of the Olinda Creek, which we proposed to follow round to where it runs near some raspberry gardens, from whence a track leads up to the crest of the ridge again. After proceeding some distance along the creek, through very thick scrub, fallen trees, *Pteris incisa*, &c., amongst which *Tecoma australis* was entwined, we found two of our companions were missing, and some time was spent looking for them. Meanwhile others prospected our position, and finding we were within sight of some clearing on a distant hillside we felt reassured after our ramble. We now left the creek to cross a spur and strike it again lower down. We passed through some splendid bracken (*Pteris aquilina*), in many places more than breast high, and of a fresh bright green colour, being principally young fronds. Here the searchers after cryptozoic life were rewarded with good success, Planarians, Peripatus, earthworms, and land shells all being obtained. Insects were very scarce, but this was hardly to be wondered at after the very wet season experienced so far. Here we passed one of the dancing grounds of the Lyre Birds—a cleared space in the bracken about three yards in diameter. We again struck the creek, and followed it down to where the track mentioned before crosses it. Here we halted for a short time, while one of our party made arrangements for a search for his missing friends. We now turned westwards, up the range, to our starting point, getting some good flowers of *Tecoma australis* on the way; also, *Chiloglottis gunnii* and *Pterostylis pedunculata*. On arrival at the top rain commenced, and increased as we descended the hill, consequently those who were unprovided with umbrellas hurried on to Croydon as fast as their burdens would allow. About halfway the two missing members of the party were overtaken and one of them brought on to Croydon, the other going back to the mountain to inform the search party of their safety. From Croydon we returned in detachments, the ladies evidently returning first, as we did not meet them again; whilst some stayed there for tea.

Mr. T. S. Hart has furnished a list of species of plants noted in flower, which contains about 90 names, while possibly many species on the lowlands have been omitted :—*Ranunculus hirtus*, *Pittosporum bicolor*, *Zieria smithii*, *Australina pusilla*, *Pultenea juniperina*, *Sium erectum*, *Sambucus gaudichaudiana*, *Lobelia browniana*, *Convolvulus marginatus*, *Veronica notabilis*, *Tecoma australis*. Orchids.—*Gastrodia sesamoides*, *Chiloglottis gunnii*. Lycopod.—*Tmesipteris tannensis*. Ferns. — *Pteris incisa*, *Asplenium bulbiferum*, *Aspidium capense*, *Polypodium australe*. Besides these, *Pimelea hypericina*, *Veronica derwentia*, *Senecio bedfordi*, were seen in bud; *Hovea heterophylla* and *Persoonia*

*juniperina*, seed unripe; *Thelymitra carnea*, just over; *Lomatia ilicifolia*, *Atherosperma moschatum*, *Hedycarya cunninghami*, *Panax sambucifolius*, and *Acacia melanoxylon*, not in flower.

F. G. A. Barnard.

## EXCURSION TO GISBORNE.

Cup Day dawned inauspiciously for the Field Naturalists' Club excursion to Gisborne. Threatening weather, however, failed to deter the assembling of four members at the Spencer-street station. Before Gisborne was reached rain commenced to fall, but at our destination we found another member (from Kyneton) and our leader awaiting us, and at once decided to brave the elements. The party, now numbering half a dozen, lost but little time in making a start, and, paying the orchids prior attention, were fortunate enough to find *Caleya major* in flower, besides *Calochilus campestris*, *Caladenia carnea* (both varieties), *Caladenia patersoni*, *Diuris longifolia*, *Diuris maculata*, *Glossodia major*, *Thelymitra aristata*, and several others in bud. The rain holding off for an hour rendered this part of our trip the most enjoyable of the day; but the respite was brief, and the showers returned with seemingly renewed vigour, and gave us little rest for the remainder of our trip, the only point noticed being that each succeeding shower was heavier than the last, till just before our return to the township a regular downpour completed our discomfiture, drenching us to the skin. In Lepidoptera, *P. kershawii* was the only butterfly noticed. Moths were much more numerous. *Taxeotis isophanes*, *Philobota arabella*, *P. crypsichola*, *P. herodiella*, *Chærocampa scrofa*, *Mecyna polygonalis*, *Hebluta undalis*, *Hednota achroa*, *Hydriomena mecynata*, *Mamestra composita*, and a good number of other species were captured. The damp weather appeared to bring out numbers of the smaller moths, but was not equally favourable to the Coleoptera—the only beetle of note taken during the trip being the ant-like longicorn, *Aphneope sericata*. Birds were fairly numerous, but the absence of a member versed in ornithology prevents our giving a list of those noticed. Specimens of the Scarlet and Yellow-breasted Robins, the White-fronted Flycatcher, the Black-faced Grauculus, and Pennant's Parrakeet were secured. After a tramp of some eight or ten miles we reached Gisborne, thoroughly drenched, and were glad indeed to parade in borrowed garments while our own were wrung out and dried. With more seasonable weather our trip would no doubt have been more productive, but the rain quite failed to damp our spirits, and we reached Melbourne at 7.30 p.m., after considerable amusement *en route* at the bedraggled appearance of excursionists who like ourselves had been, but unlike us still remained, wet to the skin.—George Lyell, jun.

## A LIST OF VICTORIAN RHOPALOCERA.

By F. Spry and Ernest Anderson.

*(Read before the Field Naturalists' Club of Victoria, 14th November, 1892.)*

In presenting the subjoined list of the Rhopalocera of Victoria, we have endeavoured to supply a want long felt.

Considerable time and care having been expended in its compilation, we are hopeful that it will be found comprehensive and accurate. Nevertheless, owing to the small amount of collecting done in the remote parts of the colony up to the present time, it is more than probable that additions will have to be made later on, either of butterflies not previously recorded from Victoria or perhaps of new species. All those now included are well authenticated.

We have been indebted to many authors for the information required, and especially to Mr. Miskin, whose labours to place the Australian Rhopalocera on a satisfactory footing are well known and universally appreciated. Synonyms are only given in a few special cases.

As this list is but the preliminary step towards a work descriptive of the various species enumerated, we shall be grateful to receive during the next few months any corrections or additions that may suggest themselves to entomologists. The receipt of ova or larvæ of any species, excepting the common ones, will also be much appreciated, and acknowledged in due course.

Family — PAPILIONIDÆ, Leach.

Sub-Family — Papilioninæ, Swain.

Genus Papilio, Lin.
* erectheus, Don.
* anactus, Macl.
* sthenelus, Macl. †
macleayanus, Leach.

Sub-Family — Pierinæ, Swain.

Genus Elodina, Feld.
angulipennis, Luc.
Genus Terias, Swain.
smilax, Don.
Genus Pieris, Schr.
teutonia, Fab.
Genus Tachyris, Wall.
ega, Bois.
Genus Delias, Hubn.
aganippe, Don.
harpalyce, Don.
Genus Callidryas, Bois.
* pyranthe, Lin.

Family—NYMPHALIDÆ, Swain.

Sub-Family—Danainæ, Bates.

Genus Danais, Latr.
* petilia, Stoll.
* erippus, Gram.
syn. *plexippus*, Lin.
syn. *archippus*, Lin.

* The species marked thus * are probably not truly indigenous, but, having been introduced, are now of regular occurrence.

† This species has been known here as *P. erithonus*, Cr., with which it is almost identical.

Sub-Family—Satyrinæ, Bates.

Genus Xenica, Westw.
achanta, Don.
kluggii, Ceur.
hobartia, Westw.
lathoniella, Westw.
orichora, Meyr.
kershawii, Misk.
correæ, Oll.
Genus Epinephile, Hubn.
abeona
syn. *Hipparchia abeona*, Dbl.
Genus Heteronympha, Wallen.
merope, Fab.
philerope, Bois.
banksii, Leach.
affinis, Lucas.
cordace, Hubn.
Genus Hypocysta, Westw.
euphemia, D. H. & W.
Genus Pyrameis, Hubn.
itea, Fab.
kershawii, M'Coy.
lucasii, Misk.
Genus Junonia, Hubn.
vellida, Fab.

Family — LYCÆNIDÆ, Stephens.

Genus Lucia, Swains.
lucanus, Fab.
syn. *limbaria*, Swain.
syn. *Chrysophanus discifer*, Herr Schff.
Genus Chrysophanus, Hubn.
aurifer, Blanch.
ænea, Misk.
Genus Lampides, Hubn.
bœticus, Lin.
palemon, Cr. ‡
Genus Lycæna, Fab.
biocellata, Feld.
Genus Lycæna—*continued.*
labradus, Godt.
syn. *alsulus*, Herr Schff.
syn. *phœbe*, Murray.
serpentata, Herr Schff.
agricola, D. H. & W.
Genus Holochila, Feld.
xanthospilos, Hubn.
absimilis, Feld.
erinus, Fab.
mœrens, Rosen.
Genus Hypochrysops, Feld.
delicia, Hew.
hecalius, Misk.
euclides, Misk.
Genus Ialmenus, Hubn.
evagoras, Don.
ictinus, Hew.
inous, Hew.
syn. *icilius*, Hew.
myrsilus, Dbl.
Genus Ogyris, Westw.
idmo, Hew.
orœtes, Hew.
olane, Hew.
abrota, Hew.

Family — HESPERIDÆ, Leach.

Genus Apaustus, Hubn.
agraulia, Hew.
lascivia, Rosen.
Genus Trapezites, Hubn.
iacchus, Fab.
symmomus, Hubn.
idothea, Misk.
phillyra, Misk.
phigalia, Hew.
Genus Hesperilla, Hew.
donnysa, Hew.
ornata, Leach.
orachmophora, Meyr.
atromacula, Misk.
phlæa, Plotz.

‡ There is some doubt as to the affinity of this species.

Genus HESPERILLA—*contd.*
tasmanicus, Misk.
humulis, Misk.
compacta, Butl.
syn. *scepticalis*, Rosen.
Genus HESPERILLA—*contd.*
eclipsis, Butl.
flammeata, Butl.
Genus TARACTROCERA, Butl.
papyria, Bois.

## DESCRIPTION, COLLECTION, AND PRESERVATION OF MOSSES.

By R. A. BASTOW.

(*Read before the Field Naturalists' Club of Victoria, Nov.* 14, 1892.)

THE subject appointed for this evening's consideration is one that has afforded my friends and myself many happy hours, and, like all other subjects of natural history, is laden with charms. The great natural order of mosses is ever at our side. On almost every wall top these tiny plants rear their capsules, holding them aloft to inhale the passing breeze or to reap the benefit of the maturing sun-ray; as we wander through the fields they are under our feet, forming a carpet far more luxurious than that of any Oriental loom; they are over our heads as we thread our way through the bush; they throw a gentle mantle over their brethren of larger growth, and who have succumbed to the stormy blast, that none may mock the dead; they enlighten the storm-beaten cliff of sombre grey; they glisten on the sides and roof of the cavern; they twirl in the purling stream; and form a glad luxuriance of humble beauty in niche, on bank, on rock, and everywhere.

INFLORESCENCE.—The antheridia of these humble plants are minute, oblong bodies, intermixed with a number of jointed filaments, termed paraphyses. These are enclosed by leaves, and altogether form a small bud-like flower, or they are sometimes surrounded by short spreading leaves, and in the latter case the antheridia are visible from above. Some species of these latter flowers cannot fail to attract the attention of the most casual observer, appearing as they do to the unassisted vision, even at the distance of two yards, as glittering green or reddish stars dotted about on the darker green masses of moss that cushion the moist and clayey bank.

The archegonia, or female inflorescence, consists also of small oblong bodies, swollen at the base; individually they are not unlike a flask in appearance, the upper portion or neck being in some respects analogous to the style and stigma of a flowering plant; these are also mixed with paraphyses, and in some species they may be found with antheridia in the same flower; they are then synœcious. When the antheridia are on the same plant with the capsule, the moss is called monœcious, and when on separate plants dicœcious.

The contents of the antheridia are of vital importance to the

commencement of growth of the germen in the archegonia, hence they become interesting objects for investigation with the microscope. When the archegonium has been fertilized the interior seed-vessel rapidly advances in growth, and the young seta or fruit-stalk may be seen developed at the base, its summit gradually forcing the seed-vessel upwards. As the young capsule rises, the strain on the outer coating of the archegonium is so great as to rupture it transversely, the upper part adhering to the young capsule in its ascension ; this forms the beautiful object known as the calyptra, or veil, which adorns the ripe capsule.

Calyptra.—Every capsule of moss is at one time clothed with a veil of vastly more delicate texture than the finest gauze ; and this veil or calyptra conceals the fruit-case and contents for a time. The calyptra is of varied form, and constitutes an excellent character for identification. It may be dimidiate, or mitriform, or fringed, or lobed, or hairy. The beautiful Campylopus, or Swan-neck Moss, which grows on old stumps, and invariably bends its fruit stalk so as to hide the capsule amongst the leaves—hence its name—has a fringed dimidiate calyptra, which forms a lovely object for the microscope, either as a dry mount or in glycerine jelly ; and many of the Arthotrichums and Polytrichums have a calyptra not unlike the form of Robinson Crusoe's hat as represented in story books. They are easily removed with a needle point, and should always be examined and their form determined, as the form of calyptra is sometimes the only or main specific difference in two plants of one genus.

Capsule.—The capsule, or fruit-case, is sometimes borne on the top of the stem ; it is then called acrocarpous. Sometimes it is borne on the side of the stem ; it is then called pleurocarpous. These characters must be noted for the purposes of identification. Usually the capsule is symmetrical and urn-shaped, and of all shades, from light green to almost black. One beautiful species, *Cyathophorum pennatum*, bears its capsules in small cups, and these may be seen lining the stem of this fern-like moss in great profusion in Ferntree Gully. When the calyptra is taken away from the capsule, a neat, well-fitting lid, or operculum, will be seen. These are of varying forms, some having long beaks—*i.e.*, rostrate ; others are conical, and others flat, or convex. In two genera, Andreæa and Phascum, the capsules have no lid, the former splitting in four valves to allow the spores to escape, and the latter bursting for a similar purpose.

Peristome.—The majority of the moss-capsules bear one, two, or three peristomes, or rows of teeth, around the mouth of the capsule. If the lid be gently removed, or, better still, if we are fortunate enough to meet with a few capsules that have passed the youthful stage of existence, and have reached the prime of

moss-life—*i.e.*, with the lid cast off—the peristome will be at once revealed, and the brow of royalty was never decked with such a perfectly beautiful crown as this; it may be single, or double, or triple; it may be scarlet, or golden, or silvery; and in all cases admirably adapted for sowing the spores when the surrounding conditions, atmospheric and otherwise, are favourable. One of the most beautiful peristomes is that of Funaria: it is single, and the tips of the teeth are joined in the centre; if this object be placed under the microscope, the teeth may be seen to move on the centre with the slightest disturbance of the atmosphere; they are of a fine red colour, and are trabeculated—*i.e.*, each tooth has tranverse bars.

Leaves.—Some few mosses have distichous leaves, as Fissidens and Cyathophorum; but there is great variety in their arrangement. They are destitute of a footstalk in all cases, and are attached to the stem by their lower edge, sometimes folding over and clasping by the sides. They are also simple and undivided, but are often serrate or dentate. There are sometimes two nerves, sometimes one, and frequently none, to the leaves; and stomata have not yet been observed, except in the capsule. One of the most beautiful forms may be found in the genus Sphagnum. Each leaf of this plant appears as beautiful lace-work. One form appears to be altogether destitute of leaves, but at the base of the fruit-stalk there are some fine shreds, which serve the purpose of leaves. The plant to which I allude is *Buxbaumia aphylla*, a rare plant, with a curious oblique, gibbous capsule.

*Fissidens tenellus.*—The plant is very minute, say ¼ inch high; the leaves are linear-lanceolate and acuminate; the margin is not thickened, but is crenulate, and the sheathing base leaves are denticulate. The nerve is stout and continues to the apex, excurrent, and the cells are minute. The capsule is erect, and the operculum has a beak nearly as long as the capsule. The calyptra is papillose at the apex. The male inflorescence is basilar. At the meeting for practical work, held a few weeks ago, mounted and dried specimens of this moss were distributed to the members present, who were thus enabled to examine all the parts of fructification quite easily. It was a similar plant to the above—viz., *Fissidens bryoides*—which inspired Mungo Park with trust in a Heavenly Father's care as he espied it on the sultry soil of Africa. Sad, faint, and weary, one tiny tuft of moss fixed his gaze; he took fresh courage as he beheld that "He who kept that green" could "its fellow-exile save."

Collection of Mosses.—In the autumn and winter months the mosses in low-lying localities will generally be found in their greatest perfection, whilst in the spring and summer months those growing in more or less mountainous districts are at their best, and it is probable that Victoria is as highly favoured as any country in the world for its vast profusion of mosses. Extensive

plains, alpine and sub-alpine heights, damp forests, and fern-tree gullies are characteristic of the colony; there is, therefore, every inducement to make a closer acquaintance with such delightful forms. A necessary equipment for such excursions consists of a good pocket lens, a large knife, capacious pockets, a piece of carpet or oilcloth, and some papers cut in squares to wrap each specimen in.

It is well to remember that a tuft of moss without fruit is teasing and vexatious, and a very small specimen in fruit is almost as bad; a medley specimen is worse than either. *Good-sized specimens in fruit, and of one species only*, should be sought for, and they are usually abundant. When a fair specimen has been secured, it should be folded up in paper and pocketed. Medley specimens look beautiful, and are beautiful, consisting as they do of a tuft of low-growing mosses of various species, with brilliant hepatics creeping over them, and perhaps here and there a crimson-fruited or sulphur-coloured lichen thallus; they are attractive on the pages of an album, but as botanical specimens they are useless, and it is quite as easy to collect one specimen in each tuft.

On returning from a moss-hunt, each specimen should be washed under the tap, if necessary, and then placed between sheets of blotting-paper, and changed every day for two or three days; they will then be ready to packet and label with locality, date, &c. It is a good plan to make two or three packets of each species, bearing the same number, so that, if difficulty is found in identification, a packet may be sent for examination, and, after identification, the name and number will be returned, the packet being retained by the identifier.

Mounting for Microscope.—1. Pick out a few perfect plants and wash them well in a saucer, so as to free the rootlets from all earthy matter. This may be expedited by shaking the plants in water in a wide-necked bottle. Then place them in a white saucer and lay them aside.

2. Clean some ¾ in., ⅝ in., or ⅞ in. covering glasses and glass slips, and with a self-centreing turntable and common pen and ink make an ink circle on one side of each slip. This will be a guide for arranging the mosses and for placing the cover on; also, the ringing with asphalt will be done much easier than when the cover is put on by guesswork. Incline the slips with the inked circle downwards always.

3. Place equal parts of pure glycerine and water in a boiling tube and shake well. Pick out the cleaned moss-plants, with all the lids and calyptras that may have been separated, and put them in the glycerine and water and hold them over an ordinary paraffin lamp and boil them until the plants sink to the bottom of the boiling tube a moment after they are taken away from the

lamp; the air is then displaced by water and glycerine. Place them in another white saucer from the boiling tube.

4. Place the glycerine jelly bottle up to the neck in a cup of hot water, so that it may liquefy.

5. Place one of the glass slips with the inked side downwards on a sheet of note paper, and drop a little glycerine jelly in the circle. Pick out a few plants from the contents of the boiling tube, and arrange them in the circle with a brush of only one bristle, drop on a little more glycerine jelly, and put the covering glass on. Fix on a brass wire clip so as to secure the cover. Take hold of the slip with a pair of tweezers, and hold over the lamp until the jelly splutters out, then withdraw from the lamp, and place the slide on a cold stone outside, taking care not to disturb the cover.

6. In half an hour the superabundant glycerine jelly may be washed off gently with a soft toothbrush and water; wash the ink ring off; dry the slides with a cambric hankerchief, and let them stand a little while to allow the moisture to evaporate.

7. Ring the slides with brown cement.

8. Ring the slides with asphalt or any coloured cements as a finish.

9. Label.

## DESCRIPTIONS OF NEW AUSTRALIAN PLANTS, WITH OCCASIONAL OTHER ANNOTATIONS;

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

*(Continued.)*

Velleya Salmoniana.

Herbaceous, erect, except the flowers glabrous; branches wiry-thin; leaves thinly linear-filiform; flowers solitary, axillary, constituting leafy racemes; peduncles capillulary, as long as the flowers or somewhat longer, unprovided with bracteoles, jointed with the very much shorter pedicels; segments of the calyx subulate-linear; corolla outside beset with very short hairlets, inside bearing capillulary descending scattered and ciliolating setules, the lobes bearing acute forward membranous appendages; style beset with spreading hairlets; stigma-cover at the orifice glabrous; fruit small, ovate-globular, by nearly one-half or about one-third longer than the calyx-segments, outside imperfectly pubescent; dissepiment rudimentary; seeds 6 or less ripening, pale-brownish, prominently margined and surrounded by a rather broadish membrane.

Near the Gascoyne-River; Lady Margaret Forrest.

Root and basal leaves unknown. Lower leaves to 1½ inches long, upper gradually lessened to about half an inch length. United peduncle and pedicel ¾–1¼ inch long. Calyx slightly beset with hairlets, about ⅛ inch long, except at the very base quite free. Corolla about half an inch long, the appendages of

all the lobes conspicuous, in the only available specimen bleached already, but likely yellow; undivided portion of the corolla much shorter than the lobes. Stigma-cover bearing some few hairlets at its base. Fruit turgid, about 1/6 inch long or little longer. Seeds of equal height, nearly 1/8 inch long, flat, pyriform-ovate, when placed into tepid water emitting a copious tough whitish mucus.

This evidently rare plant would have perhaps no claim to bear, as now wished, the celebrated name of the Rev. Dr. George Salmon, were it not for the rarity of the species; but the writer was eager, yet within the year of the three hundredth anniversary of the Dublin-University to bestow on some new plant of the Australian Flora also in phytographic commemoration the name of the illustrous divine, who as President of the Royal Irish Academy and of Trinity-College was so leadingly connected with this memorable jubilee.

This Velleya connects that genus still more closely with Goodenia; indeed it would be a genuine congener of the latter, if the segments of the calyx coalesced into an even only short tube.

At a mere passing glance *V. Salmoniana* might be taken for *Goodenia filiformis*, so great is the habitual resemblance, and this confusion would be all the more excusable, as no other species exist in the genus Velleya at all of such an aspect. Nevertheless the distinctions are in various respects well marked, *G. filiformis* having the leaves broader, the calyces adnate, the corolla outside less pubescent, but unilaterally its tube protruding, the style glabrous, the fruit surpassed by the calyx, the seeds smaller blackish outside with much narrower margin.

GLOSSOSTIGMA TRICHODES.

Erect; leaves in tufts, from linear- to elliptic-spatular; peduncles very long, thinly capillulary, numerously crowded together; lobes of the calyx very unequal, much shorter than the tube; corolla-lobes conspicuously extending beyond the calyx, unfringed; stamens four, their upper portion emerged; style conspicuous; capsule enclosed; seeds ellipsoid, their testule subtle clathrate-streaked.

Near Parker's Range; Edwin Merrell.

This plant is in habit very different from the three other Glossostigmas, inasmuch as the leaves and peduncles are close together in great numbers, no creeping offshoots being observable on the specimens received. The flower stalks are generally several inches long, and it would appear, that the plant grew submergedly, and elongated its peduncles in the striving of its flowers, to reach the surface. In most other respects this Glossostigma approaches very near to *G. drummondi*. The extreme thinness of the peduncles renders them so laxe as hardly to be able to bear the weight of the flower.

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## FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Field Naturalists' Club was held in the Royal Society's Hall on Monday, 12th December. The President (Professor W. Baldwin Spencer) was in the chair, and there was an attendance of more than 100 members and friends.

### LIBRARIAN'S REPORT.

"Bibliography of Australian Economic Botany," part 1, by J. H. Maiden, F.L.S., from the author; "Proceedings of the Royal Society of Victoria," vol. iv. (new series), part 2, from the society; "Proceedings of the Linnæan Society of New South Wales" (second series), vii., part 2, from the society; "Report on New Zealand Native Birds," by H. Wright, from the New Zealand Government; "President's Address to the Royal Society of Tasmania," November, 1892, from the society; "Catalogue of Described Hymenoptera of Australia," part 2, by W. W. Froggatt, from the author.

### REPORTS OF RECENT EXCURSIONS.

Reports of recent excursions to Frankston and Heidelberg were presented to the meeting by Mr. C. French, F.L.S., and Rev. W. Fielder.

### MEETING FOR PRACTICAL WORK.

The hon. secretary reported that a very good attendance, which included several ladies, welcomed Dr. Arthur Dendy when he rose to describe "The Structure of a Sponge" at the usual monthly meeting for practical work on 28th November. A lecturette entitled "Introduction to the Study of Sponges," delivered by Dr. Dendy before the members of the Club in July of last year, had somewhat prepared the way for a more detailed account bearing specially upon microscopic work in this department Passing, therefore, rapidly in review typical examples of the two great divisions of sponges—calcareous and non-calcareous—Dr. Dendy concluded this portion of the subject by reference to a specimen of the glass sponge (Hyalonema), a remarkable example of adaptation to environment, the sponge proper being anchored to the rocks by means of a long stem made up of a bundle of long and large silicious fibres, twisted together. Minute description of the canal system and general anatomy of some of the simple forms amongst the Calcarea was then entered upon. In illustration of the Homocœla, the "Olynthus" type was described as consisting essentially of a thin walled tube perforated by pores, which communicate with the central or gastral cavity, which, in turn, communicates with the exterior by means of an osculum. The

wall of the tube was shown to be made up of three layers—ectoderm, mesoderm, and endoderm—the structure and function of the "collared" cells constituting the endoderm being specially dwelt upon. The examples cited as affording good examples of this group were *Leucosolenia lucasi* and *L. stolonifer*—forms obtained recently near Port Phillip Heads by Mr. J. B. Wilson, M.A., and described, together with other members of the group, by Dr. Dendy, in the "Transactions of the Royal Society of Victoria," vol. iii., part 1.

In the case of the Heterocœla, it was shown that the simple canal system of the Olynthus type is considerably modified, and there is a series of tubes or thimble-like chambers radiating from the gastral cavity, each chamber being lined by a layer of "collared" cells. In some forms, such as *Sycon raphanus* and *Sycon carteri*, these radial tubes or chambers project freely towards the exterior, so that the sponge externally has the appearance of a pine-apple; but in such a form as *Sycon gelatinosum* the chambers are enclosed in a common cortex, which extends from chamber to chamber. Still further modification as regards the arrangement of the chambers was shown in the case of *Leucandra phillipensis* and *Vosmaeropsis mascera*, where they are round or oval in shape, and are scattered irregularly throughout the mesodermal tissue lying between the external cortex and the central gastral tube. Reference to the arrangement of the skeleton, the histological elements and development of sponges brought an extremely interesting and instructive address to a close, and a vote of thanks was unanimously accorded Dr. Dendy for the trouble he had taken to make the evening a success.

A series of preparations for the microscope, designed to illustrate some of the facts set forth in the lecture, was distributed to those who had microscopes, and included mounted specimens of *Sycon raphanus*, a spread of calcareous spicules, and stained sections of *Sycon carteri*, and *Sycon gelatinosum*. Little time remained, however, for examination of these preparations, so it is proposed to devote another evening, at a future date, to this special work, when a few additional typical sections will be described and distributed, that the series may be somewhat more complete.

THE EDITOR OF THE "VICTORIAN NATURALIST."

The Chairman then announced that Mr. A. H. S. Lucas, M.A., B.Sc., who has edited the *Victorian Naturalist* since its inception nearly nine years ago, had tendered his resignation as editor, owing to his election to the head-mastership of Newington College, Sydney. Testimony was borne to the great services Mr. Lucas had rendered to the Club in this department; and, on the proposition of Professor Spencer, seconded by Mr. H. T. Tisdall,

F.L.S., the Secretary was directed to convey to him a unanimous vote of thanks, together with an expression of the regret of his fellow-members at his departure. Professor Spencer then announced that Mr. F. G. A. Barnard had consented to act as editor for the present and in doing so emphasized the fact that Mr. Barnard had always taken a very prominent part in the affairs of the Club, both as secretary (a post he held for six years) and librarian, and was, therefore, specially fitted for the work. The announcement was most favourably received by the meeting, and Mr. Barnard will enter upon his duties at once.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Eileen Maloney, the Rev. R. Poynder, Dr. W. H. Johnstone, and Messrs. C. Allen, H. Best, R. Cheeseman, A. C. Danks, J. Guilfoyle, W. Jones, R. Lowe, A. F. Thiele, A. Tulk, C.E., J. West, and J. Williams were elected members of the Club ; no less than twelve of these being nominated by Mr. C. French, F.L.S.

PAPERS.

A lecturette by Professor Spencer on "How Different Animals See" followed. Before proceeding to details the lecturer remarked that any part of the body specially modified for the purpose of being influenced by rays of light may be looked upon as an eye, and one of the strangest and most beautiful things in nature is the curious way and the very different parts of the body in which eyes are developed in different animals. In every eye, however, two structures are essential. There must be a little mass of pigment in the skin, and a nerve fibre in connection with the spot containing the pigment. The latter absorbs the ray of light, and the nerve-ending is affected, setting up a sensation which we know as "light." Every gradation may be seen in different animals, from the simple structure above described, which can only serve to appreciate differences in the intensity of light, to the most complicated eye, by means of which perfect images of external objects are formed and the most complex sensations of sight are produced. Three different types of eyes were then referred to ; the first type, that of the "pin-hole," being illustrated by reference to the Jelly-fish, Limpet, and Pecten, whilst it was pointed out that the eyes of some of the Chitons vary in number from 360 to more than 1,000. The second type, the "compound" eye, occurs amongst crabs, lobsters, spiders, &c. In these forms each eye has a great number of facets, every one of which corresponds to a separate eye-like structure placed immediately beneath it. The theories as to "sight" in this group were briefly discussed, the mosaic vision theory meeting with the greatest consideration. In the earliest condition of the crustacean Branchipus only a single median eye is present ; later on an eye is developed on either side, and all three persist throughout the animal's life. This example led up

to the third type, or vertebrate eye ; for although, as a rule, the higher forms of life are characterized by having two highly-developed eyes placed in the head, it has been shown that a third eye, not so elaborately formed as its companions, exists in certain animals—notably in the New Zealand lizard (Hatteria)—but, as it is covered by skin, it is not functional. Knowledge of the general structure of the vertebrate eye being assumed, Professor Spencer dealt with an extremely interesting portion of the subject—that associated with forms living in the deepest abysses of the ocean. Here, where sunlight never penetrates, some fish possess eyes and some do not—the latter having eye-like structures covered over by a scale. Those possessing eyes, however, are furnished with phosphorescent organs, which enable them to flash out light at intervals, and so dispel the gloom which surrounds them. The most remarkable example brought forward was that of *Ceratius bispinosus*, which has a leaf-like structure projecting between and in front of the eyes. This modification functions as a bait, and any other fish preying upon it is usually swallowed by the owner. A phosphorescent organ placed near it renders it clearly visible to any fish interested. The lecturette was illustrated by slides prepared by Professor Spencer and exhibited by Mr. J. Searle, who was accorded a hearty vote of thanks for his display.

Messrs. E. Anderson and J. Strickland contributed to the discussion which followed, the former adding his testimony to that of Professor Spencer as regards "sight" amongst butterflies.

A second contribution to the evening's programme was by Mr. T. Steel, F.C.S., who read a few "Remarks on Some Zoological Gardens." During a late trip to Europe and America, Mr. Steel visited the principal zoological collections. In the London collection the arrangements of the insect-house claimed appreciative attention. Here the living insects are in glass cases, in which are placed earth, &c., and the plants on which the larvæ feed. Beautiful butterflies and moths, both British and foreign, many of which are the produce of successive generations bred in the cases, are under prominent notice ; whilst above each case is a smaller one in which are placed preserved specimens of the insects in the main cases, all the stages from the egg to the perfect insect being represented. Mr. Steel expressed the hope that an exhibit of this nature might soon be found in our Melbourne collection. In his visit to the bird section, Mr. Steel met with the "most characteristic Australian thing he had seen since leaving this country." It was the Laughing Jackass. The collections in America as a whole did not please him, that of New York being particularly disappointing. A good word, however, was given to the Philadelphian collection, which contains splendid specimens of the Bison, Elk, Prairie Dog, and Sea

Elephant. Naturally the local gardens came in for comparison, and it was declared that "nowhere was evidence given of more attention to the rational housing and the comfort of the animals" than is visible in the Melbourne collection.

EXHIBITION OF SPECIMENS.

At the close of the meeting, the chairman announced that Mr. C. French had obtained a supply of the Diamond Beetle *(Entimus imperialis)* from Brazil. The splendid lustre of this beetle is due to minute brilliant scales, which are objects of great beauty when specially mounted for the microscope. Specimens for mounting will be distributed at the next meeting of the Club. The meeting terminated with the usual exhibition of specimens, of which the following is a list:—By Messrs. E. Anderson and F. Spry.—Eggs and young lava of *Pieris teutonia*; also eggs laid on four different kinds of Capparis. By Mr. A. Coles.—Birds, nest, and eggs of Sacred Halcyon and Superb Warbler. By Department of Agriculture (Entomological Branch).—Coloured illustrations of life-histories of Victorian insects for the Imperial Institute, London. By Rev. W. Fielder.—Specimens of Infusoria. By Mr. C. French.—Two new Australian longicorn beetles and four exotic Cetoniadæ. By Mr. H. F. Hill.—Case of Victorian Lepidoptera. By Mr. G. A. Keartland.—*Moloch horridus* (Devil Lizard), from Central Australia; *Acanthophis antarctica* (Deaf Adder), *Pseudechys porphyriacus* (Black Snake), *Hoplocephalus spectabilis* (Port Lincoln Snake), *Delma impar*, and eggs of *Hoplocephalus superbus* (Copperhead Snake), killed at Bayswater, 9th August, 1892. By Mr. J. N. M'Kibbin.—Fifty species butterflies, two of which have not been obtained in Victoria previously, namely—*Xenica ovichora* and *X. porrea* (1889), Mt. Hotham; also three others, yet unnamed. By Baron von Müeller, K.M.G.—Fungi prepared for the herbarium by G. Herpell, Germany; and a plant new to science (*Velleya salmoniana*), from Gascoyne River, W.A., collected by Mrs. M. Forrest. By Mr T. Steel.—Bloom spike of *Banksia serrata*, from Coogee Bay, Sydney; and aboriginal stone axe from Harrow, Victoria.

## EXCURSION TO FRANKSTON.

On the morning of Saturday, 9th of November, two members of the Club (Messrs. D. Best and C. French) put in an appearance on the Princes Bridge railway station *en route* to Frankston. The morning was most unpleasantly warm, and as the sun gained power the heat became well nigh unsupportable. A start was made at 9.15 a.m. from Melbourne, and at Frankston we were joined by Mr. Hart, who had got into the train at East Brighton. On approaching Frankston a deal of swampy country has to be crossed, acres of reeds *(Arundo phragmitis)*, also bulrushes

(Typha), covering the surface of the water, whilst Claytonia, Lobelia, and other plants which frequent these pools of saltish water grew in abundance. The pretty little Reed Warbler is to be seen here, with Blue Wrens and others of the feathered tribe, these little creatures hopping about as cheerfully as ever. Times with them will soon be changed, however, as the idiotic army of "pot-shooters" are getting ready for their diabolical work of the extermination of bird life all and sundry. If the members of the Field Naturalists' Club have any true interest in the protection of our native birds, now is the time for them to be up and doing. The gun tax, if only in the interests of the growers, must come, and we hope it may come quickly. Frankston having been reached, a start was made towards the township, which was passed through, and we then turned in through the recreation ground, in which there is a large swamp, called, I believe, by the good people of Frankston, the Public Lake, and on the edge of which the rare orchid, *Spiranthes australis*, is found, although sparingly and later on in the season.

We could find little in plants, and as for insects of use, they were not to be found at all. Pushing through a splendid lot of scrub (Leptospermum) in full bloom, we found it to be swarming with the little green beetle, *Diphucephala colaspidioides*, and with nothing else. It would seem as if this beetle, when plentiful, is not troubled with the company of other kinds of beetles, or in fact insects of any kind. This singular fact has often been remarked by collectors. The common Tea-tree, *Melaleuca ericifolia*, also the handsome yellow Limnanthemum, were in splendid bloom. The two singular ferns, *Schizæa bifida* and *S. fistulosa*, also *Drosera binata* and other bog plants, grow here in abundance. The day was now intensely hot, nearly 90° in the shade and 143° in the sun, this being for most people, our leader included, much too hot for comfort. Having found little or nothing in either plants or insects, we ascended the hills, going towards Silverwater Creek, a pretty stream which empties itself into the sea near where it is crossed by the main road to Schnapper Point. A few years since and one could find Orthoceras and Calochilus, two pretty orchids, but our bad luck seemed to follow us the whole day, for we could not find a single plant of either; and although we beat hundreds of bushes for insects, none were to be found. We were now getting tired of searching and not finding anything, so we headed for home after having lunched in the usual happy-go-lucky style peculiar to people of our class. Coming to a public (?) spring, well known to those travelling in these parts, we found the door in which the tap is enclosed to be locked, so that we were at a loss to know how to get a drink of water. Near this spring grows a pretty scarlet-leaved Drosera, also a minute species of Pterostylis, not

yet in bloom, and which may yet prove new to Victoria, as it was unknown to any of the party. The pretty little *Utricularia dichotoma* and *U. lateriflora* grew about here ; and on the whole, the Frankston and Mount Eliza districts are, as collecting grounds for plants, equalled by very few places in Victoria. On the way to the station we noticed many plants of Gahina, Schœnus, *Comesperma ericinium* and *C. calymega*, Xyris, Leptocarpus, Juncus, and a host of other small plants. In the moist flats the elegant shrub *Viminaria denudata* was very common. A couple of specimens of *Pieris teutonia*, the common Caper Butterfly, were taken ; and whilst one friend was lamenting the fact of our not having seen even an ant, he having by accident put his hand on a jumping ant (Myrmeca) whilst taking a wasp from the nest, became suddenly aware of the presence of an old friend in the form of a "jumper" of considerable activity. The clouds were now gathering around us, and over seawards lightning flashes were most vivid, and for a while we were expecting a regular drenching ; the storm, however, passed over Cranbourne way. The sun was now obscured, but a hot dry wind made matters very unpleasant, and after a stroll on the pier we got into the train and reached Melbourne in good time, having had one of the most disappointing trips of the year. Those who perhaps wisely decided not to face what after all proved to be the hottest day of the season, had no reason whatever to feel disappointed. Mr. Hart left us at Brighton, and, as might be expected, the leader landed the remainder of the party safely in Melbourne at about 7 o'clock.—C. French.

## EXCURSION TO HEIDELBERG.

December 3rd was the date set apart for the excursion to Heidelberg in search of pond life, and glorious weather invited a good attendance ; yet only eight, of whom two were ladies, essayed the trip. On reaching the station we decided to make at once for the River Yarra, and the first casts for specimens were made on the southern side of the bridge which crosses the Yarra at this spot. Plenty of tadpoles and a few Rotifers were captured, and then a remove to the other side of the bridge, under the welcome shade of the willow trees, brought us to a veritable treasure house. Leeches, freshwater Planarians, Hydra and Rotifera were clearly visible, and a hand lens showed further that a great many forms of Vorticellidæ and other Ciliata, together with Heliozoa, were present. Subsequent examination of the material carried home revealed the presence of many representatives of the Vorticellidæ. Thus *Vorticella microstoma*, a solitary form, was very plentiful; as was also *V. nebulifera*, a social variety. Among the colonial forms Carchesium, with its contractile stalk, and Epistylis, with its

rigid stalk, recurred in large numbers; whilst among the Vaginicolinæ the graceful Thuricola, with a door-like valve to its tube, was indicated by two or three specimens. Other members of the Ciliata were noted, one being a very sluggish form of the trumpet-shaped Stentor, somewhat intermediate in colour from the forms usually found in the neighbourhood of Melbourne. The prevailing tints are white and greyish-blue, whilst the form under notice was yellowish brown—a colour probably due to the food and conditions under which it lived. The chain-like character of its nucleus was clearly visible. The Heliozoa were represented by one form only, which was present in considerable numbers—viz., Actinospherium; whilst we looked in vain for the curious form of *Clathrulina elegans*, with its lattice-like case, which is so numerous here at some seasons of the year. *Hydra oligactis* was fairly plentiful, but we looked in vain for the green variety. One of our number, who has hitherto been fortunate enough to find specimens of this somewhat rare form in this locality, was certainly expected to provide his companions with a supply; but even he was unsuccessful, and, failing the green, had to be content with a Copperhead Snake, which was basking in the sun by the water side. The debatable point afterwards was whether the snake or the rod he was carrying suffered most in the encounter. At any rate the snake escaped to narrate his version of the affair to his companions and probably to be captured on our next visit. Of the Rotifera there were not a few, the species most plentiful being known as *Megalotrocha alboflavicans*, one of the group Melicertadæ. As this is a colonial form, and the individuals are fixed, they can be fairly easily studied. Moreover, the size and number of embryos present certainly favoured the study of the development of this form, if only time had allowed. A free-swimming colonial form was also met with, which Mr. Shephard is inclined to record as a new one. We can only hope that further examination will confirm this view.

Altogether, the afternoon's outing was most pleasant, and the results encouraging to those who wished to renew acquaintance with small but interesting forms of life; and we can only regret that more of our fellow-members were not with us to enjoy a typical summer day's excursion and the delights of a few odd half-hours with the microscope afterwards.—W. Fielder.

## NOTES ON SOME VICTORIAN COCCIDÆ, OR SCALE INSECTS.—Part I.

By C. French, F.L.S.

*(Read before the Field Naturalists' Club of Victoria, 10th October*, 1892.)

When I first promised a short paper on *Aspidiotus rossi*, one of our worst insect enemies, I had no intention of preparing these notes,

partly through want of time, and partly from a feeling of reluctance to write upon the subject of a family of insects, the scientific history of which, as yet, I am not too familiar with. With the practical part I have had unfortunately too much experience, as the scale insects are about the most difficult of all insect pests to deal with, especially when in the orchard, vineyard or garden, to say nothing of our forests, whose trees for hundreds of miles in extent are often badly infested—so bad, indeed, as to be in many cases killed outright.

In another part of the paper I have given my reasons for extending these notes, the greater part of the scientific matter for which having been taken from Mr. Maskell's book, and it is due to the friendship and assistance of this gentleman that the idea of my preparing some notes on so important a family of insects originated.

In part ii. I shall give popular descriptions of the species dealt with, these being taken mostly from my own observations and experience, together with illustrations enlarged from plates which Mr. Maskell has kindly had prepared for me. It is not my intention to say much to you about the imported species of scale insects, and which are unfortunately too numerous, as my book on insect pests, part ii. of which will soon be published, will contain notices, with coloured figures, of the kinds which have been found by experience to be the most injurious to plant life.

In preparing these few brief notes on the subject of our scale insects (and which I trust someone else having more time for field work than I have will supplement), it may be remarked that the Coccidæ are most of them injurious to plants, both under cultivation and in the natural state.

The origin of the name "Coccidæ," as Mr. Maskell explains in his most valuable work on this family of insects, is found in the old Greek word "kokkos," denoting a rich red dye, which was much admired by the Greeks and Romans, and which was procured from the insect now known as *Kermes vermilio*—the *Coccus ilicis* of Linnæus.

When the cochineal insect was discovered in Mexico it soon overpowered all the others producing commercial dyes, and from it has come the title of "Coccid," now applied to the whole family. Cochineal itself has of late years been pushed aside to a great extent by the aniline (coal-tar) dyes, yet it is still used for many purposes. This insect lives on an Opuntia, a sort of cactus, to which the prickly pear also belongs. Mr. Maskell mentions a New Zealand species, *Dactylopus alpinus*, as producing a red dye similar to, though probably not equal to cochineal, and he also remarks that before the discovery of aniline dyes it might possibly have been worth while to cultivate this insect for its dye.

In Victoria many of our Dactylopids (greyish, downy insects commonly known as "mealy bugs"), and the genus Eriococcus, which make such havoc amongst our native gum-trees and acacias, is one, especially in the case of eucalypti, which furnish a red dye of a peculiar orange shade; and even a few specimens, if placed in clean spirit, will dye quite a quantity of the alcohol, but whether any use could be made of the dye I am not prepared to say, further than that an unlimited supply of the scale may be obtained within a few miles of Melbourne.

To the field naturalist who would like to take up a subject alike both useful, interesting, and instructive, the study of this family of insects affords ample scope for research. Botany, with the exception of some of the lower cryptogams, in which there is yet much to be done, has been so well looked after by our worthy patron, the Baron, that there is practically nothing left to us. In zoology, however, we have yet a vast field before us, and as a proof of this we have only to refer to the splendid ublications issued by our president (Professor Spencer), also by Dr. Dendy, during the very short time that these two gentlemen have been with us. Anyone, therefore, may see for himself how much yet remains to be done, as even many of our Reptilia require working out, and at which Messrs. Lucas and Frost are now engaged. In insects, the Lepidoptera have been well dealt with by both Australian and European specialists. The Coleoptera have had many good workers, and are in a fair way of the revision so long required. Diptera, although started so well by our friend Mr. Skuse in Sydney, seems, owing to pressure of other work, to have come to a temporary standstill. The Hymenoptera and other orders are being worked out, the former by Mr. Froggatt and others, also by certain European specialists; and it appears to me that in the homopterous Hemiptera the field is, in Australia, practically unworked. As an example, showing how much is to be done, even by those having little time for field work, it may be mentioned that during the last two years or so I have discovered in Victoria and forwarded to Mr. Maskell for his opinion and identification no less a number than three new genera and twenty-seven new species of scale insects. I merely mention this to show you that the field for observation here is yet a very vast one, and is by no means worked out, as some persons would have us believe.

At the end of this part of my paper, for convenience sake, I have added a list of the new genera and species above alluded to, and the illustrations which you see on the blackboard my good friend, Mr. Maskell, has kindly had coloured specially for me, the descriptions of the new insects themselves being in the "Transactions of the New Zealand Institute." The list will afterwards be attached to the end of the paper. To those who

feel inclined to take up the study of this family of insects Mr. Maskell's book is simply invaluable, everything being written and explained in the same lucid and careful manner which so distinguishes any work this gentleman undertakes. Dr. V. Signoret's great work, "Essai sur les Cochinelles," is one which every student of coccids ought to have in his library, as also the American works of Professors Riley, Comstock, Cognillet, Howard, and others, which teem with valuable scientific and useful information. To enable those who may not have access to the works above alluded to, I have included in this part of my paper some information as regards the characteristics of the family, with a systematic arrangement as adopted by Mr. Maskell, feeling assured that such information will be useful to those about to study this large and interesting group of insects.

The first principal characteristic separating the Coccidæ from the rest of the Homoptera, and distinguishable without microscopic examination, is the absence of wings in the females at all stages of their existence. The second is the absence of any apparatus for feeding and digesting in the males. From these two characteristics it follows that the females can only extend their operations by, at the best, crawling from plant to plant, or by being carried about by birds or other agency; also, that the males cannot enjoy more than a very short existence. Hence, in any endeavours to destroy these insects, the males may be disregarded and the females only attended to.

Other distinguishing characteristics, chiefly microscopic, are :—

1. The presence of only one joint in the tarsus, or fourth joint of the leg, in both males and females.
2. The presence of only two wings, with two halteres, in the full-grown males.
3. The presence of only a single claw terminating the leg in both males and females.
4. The presence of two or more eyes or ocular tubercules, in addition to the ordinary pair of eyes, in the full-grown males.

In general outward appearance the female insect presents very variable forms. They may be either naked or covered over with some kind of shield, which may be fibrous, waxy, or cottony; or they may have a thin, powdery meal scattered over them. The covered insects are, of course, stationary, although, in some cases, before reaching their full development, they move about, carrying their houses with them. The naked insects may be either stationary or active. They attach themselves either to the bark or stem of a plant or to the leaves. In the latter case it is rare to see them on the upper side; but, on turning over a leaf, the under surface is frequently found covered thickly with them. There are, however, many exceptions to the above statement

mentioned by Mr. Maskell, as in Victoria, at least, *Aspidiotus rossi*, *A. neri*, Chionaspis, and many other kinds, are always as thick, or thicker, on the upper surface of the leaf than on the lower. Some kinds, especially amongst the soft Dactylopidæ, are very destructive to roots of daisies, carnations, and other garden plants; whilst our native eucalypts are often killed outright by the united efforts of millions of Eriocci, which swarm all over the tree, commencing from the lower branches upwards; whilst other genera—as Mytilaspis, Pulvinaria, &c.—are on the stems also.

In many cases they exude, in the form of minute globules, a whitish, thick, gummy secretion, answering probably, as Mr. Maskell thinks, to the so-called "honeydew" of the Aphididæ. This secretion drops from them on to the plant, and from it grows a black fungus, which soon gives an unsightly appearance to the plant. This is often called the "Soot Fungus," and is a species of Capnodium. (The common one, on orange, being *C. citri*, as ascertained by me from Dr. Cooke, to whom, many years ago, I had sent economic fungi; some of which, I am informed, are to be found in "Grevillea," the valuable publication upon which is partly based the excellent work of Dr. Cooke, just issued by the Victorian Department of Agriculture.)

The manner of feeding upon the plant is the same as in all families of Homoptera—namely, by means of a protruding rostrum, beak, or trunk, situated on the under side of the insect. As there is not in the female Coccidæ any well defined division between the head and the rest of the body, this rostrum is seen on turning over the insect, in the form usually of a minute conical projection between, or nearly between, the first pair of legs (if the legs are present), or a little within the circumference (if the legs are absent). An ordinary lens will generally show, springing from the point of the conical rostrum, three or four longish, very fine, curling bristles. These bristles are, in fact, hollow tubes, and the insect, inserting them into the leaf or bark of the plant, sucks its food through them.

The efforts of the Coccidæ are not confined altogether to damaging plants, as there are some species producing materials useful to man. For example, *Carteria lacca* produces shellac; *E. viceres* (Pé-la) is used by the Chinese for candles, and others might be mentioned. In Mr. Maskell's work on the Coccidæ, he has divided them into the following groups, which, for the benefit of those who may feel inclined to make a study of the family, I have copied, together with notes on their life histories, from the work above alluded to. These extracts will now be doubly valuable, as Mr. Maskell informs me of the loss by fire of the remaining volumes of his book, together with other valuable publications issued by the New Zealand Government, and many of which are now difficult to obtain.

GROUPS.

1. Female insects constructing for themselves shields composed partly of secretions, partly of the pellicles discharged from earlier stages; abdomen not cleft; legs lost at full growth.
DIASPIDINÆ.

2. Female insects naked, or covered with shields of secretion, either waxy, horny, cottony, or felted; abdomen in all stages cleft; legs either lost or retained at full growth.
LECANIDINÆ.

3. Female insects naked, or covered with shields of waxy secretion; abdomen of larva ending in prominent processes; abdomen of adult cleft; legs either lost or retained at full growth.
HEMICOCCIDINÆ.

4. Female insects naked, or covered with secretion, either waxy, cottony, or felted; abdomen in all stages ending in prominent processes; legs either lost or retained at full growth.
COCCIDINÆ.

LIFE HISTORY.

All of them pass through four stages of existence :—1, the egg; 2, the young larva; 3, the second stage of life, or pupa; 4, the adult or full-grown insect.

1. *The Egg.*—This is, in all cases, of regular oval form, the colour varying from white to yellow or red. It may be produced in great numbers, and in some cases several times in a year. As a general rule, the female ejects the eggs from the body; but there are some species, notably in the group Lecanidinæ, where the eggs are hatched within the body, the insect being thus, in a manner, viviparous.

2. *The Young Larva.*—This is of precisely the same form both for the male and the female; or, rather, it should be said that no definite character has yet been discovered to show which are male and which are female larvæ. Neglecting slight variations of form, the larva is very minute—seldom more than about one-thirtieth of an inch in length, often as small as one-hundredth of an inch—oval, flattish, possessing a rostrum and accompanying bristles (setæ), six legs, and two antennæ; in all species it is fairly active, travelling as soon as hatched over the plant in search of food.

3. *The Second Stage.*—Here the first distinction is noticeable between the male and the female in most cases; but this distinction usually depends not so much upon the form of the insect as upon the character of the covering it makes for itself. Confining ourselves at present to the female, there are differences more noticeable between the groups. In the Diaspidinæ the insect begins by slipping out of the skin of the larva, but it does not cast it aside altogether; it makes use of the old skin as a part of its covering. Adding to it a small portion of fibrous secretion —produced by organs called "spinnerets," which will be noticed

presently—it attaches itself to the plant by its rostrum and setæ, and lies inert and stationary, under a little shield composed of half of its old skin and half of secretion. As it also, in entering this stage, loses its legs altogether, it must remain in the position it has chosen for the rest of its life. In the Lecanidinæ and in the Coccidinæ the skin of the larva is thrown away altogether, and the female, in her second stage, takes up a new position, in which she may be either naked or covered with a thin coat of secretion, active or stationary, retaining her legs in most cases, or losing them in some instances. In all the groups there is almost always some approach to the form of the full-grown insect noticeable in this second stage.

4. *The Full-grown Insect.*—Here there is almost unlimited variety of form, colour and habits. The insects may be naked or covered, active or stationary. In the Diaspidinæ the process just described is repeated; the female slips out of her second skin, but still keeps both it and the first over her, adding more fibrous secretion from the spinnerets; so that, in fact, she lies an inert, legless, slug-like object, under a covering composed partly of the two skins, partly of secretion. In the Lecanidinæ (except in one single genus) and the Coccidinæ the second skin is discarded altogether; but the insect may either construct a new shield or remain naked, may be either with or without legs, either active or stationary. Once this last stage of her existence entered upon, the female prepares for laying her eggs. In most species the male is present; in some, as far as can be made out, after investigation of many years, no males are found. The female is naked; either hatches the eggs in her own body or lays them on the plant; if covered, she fills her shield with the eggs themselves—*e.g.*, *Lecanium hemisphæricum;* or, again, deposits them in an ovisac, a mass of cottony secretion—*e.g.*, *Pulvinaria camellicola* or *Icerya purchasei.*

II.—THE MALE INSECT.

It has been remarked elsewhere that, as the full-grown males of the Coccididæ are destitute of any organs for feeding whatsoever, there is no reason for making systematic attacks on them for economic purposes. It will suffice in this place to observe that in all cases these males are small two-winged flies, their size varying from about one-fortieth of an inch to one-fourth of an inch in length; colour, usually yellow or red; wings longer than the body, hyaline (glassy) and often iridescent, and in repose, lying flat, partly crossing each other. The antennæ are long, slender, and hairy, the tarsus having only one joint and terminating in a single claw. The insects are generally very active. The males are thus so small and rapid in their movements that it is difficult in most cases to find them in a free state. The usual way to procure them is by hatching them from the pupæ. In their course of life they pass through four stages, as

do the females, viz.:—1, the egg; 2, the larva; 3, the pupa; 4, the full-grown insect.

The egg is, as far as can be made out, precisely the same as that of the female, though Dr. Signoret believes that in one or two species there may perhaps be minute differences.

The larva is, as previously stated, similar to that of the female.

*(To be continued.)*

## NOTES ON THE LIMITS OF THE GENUS HUMEA;

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

When, in 1804, this genus was established by Sir James Smith, and also simultaneously recognized as new by Ventenat, the characteristics were mainly derived from the absence of a pappus, and from the remarkable foliage and inflorescence of the only species then rendered known—namely *Humea elegans* (*Calomeris amarantoides*, Ventenat), a native of south-eastern Australia. When, in 1839, Professor Lindley described as new the genus Pithocarpa, from south-western Australia, also containing a solitary species only, it could not be expected, that two plants so differently looking and from places so widely apart should be considered congeneric. When, in 1852, a third species turned up, this time in South-Australia, and was then defined by me, it was also thought, on account of its peculiar habit and headlets, that it was the type of a new genus (Haeckeria), though the alliance to Humea was already recognized. But when soon, subsequently a fourth and a fifth were found in Victoria, I saw the necessity of uniting Haeckeria with Humea, but maintained the genus Acomis, with two species discovered not much later in New South Wales and Queensland, the habit being again so very different from that of any of the other Humeas. Quite recently however a sixth species, with much of the outer appearance of an Acomis, and much also resembling *Helipterum Jesseni*, was brought from south-western Australia, so that it now seems best, to place all eight under one genus. We obtain thus four sections for Humea, though the genus still continues so small; but these sectional divisions correspond precisely to groups in the genera Helichrysum or Helipterum or Cassinia. In the last-mentioned genus, *C. sputabilis* stands similarly as much alone as *Humea elegans* among its congeners. Pithocarpa resembles, as regards its flower-headlets, much *Helichrysum obtusifolium*, though the lower involucral bracts are narrowed somewhat like those of *H. collinum* and *H. oxylepis*, reminding also of Leptorrhynchus. Moreover, within the genus Helichrysum occur, as in Haeckeria, also species with few-flowered headlets, for instance:—*H. baccharoides*, *H. ferrugineum*, *H. cuneifolium*, *H. rosmarinifolium*, *H. selaginoides*. Perhaps future researches, particularly in Central Australia, will add yet to the genus Humea; but the eight species, hitherto known, might be arranged in the following sequence:—Section Calomeris—

*H. elegans*; section Haeckeria—*H. ozothamnoides, H. cassiniacea, H. squamata*; section Pithocarpa—*H. carymbulosa*; section Acomis—*H. rutidosis, H. marra, H. gracillima.* Let me yet add, that Humea, thus extended, differs from Helichrysum, Helipterum and Rutidosis only in the complete absence of the pappus; the form of that organ being also the only mark for distinguishing these three genera from each other.

December, 1892.

## "NATIVE BREAD."

UNDER the heading of "A Mystery Solved," the following paragraph appeared in the *Gardeners' Chronicle* of 20th October, 1892:—"For the past fifty-three years a curious production has been known to mycologists as occurring buried in the ground in Australia, and known to the colonists as 'Native Bread.' In 1839, Berkeley described in the 'Annals of Natural History' (p. 326) as *Mylitta australis*, under which name it was figured by Corda, in his 'Icones Fungorum.' Although no fruit has ever been discovered, there was a suspicion of its being related to the Truffles, from the fact of its being subterranean, and from the mottled appearance of its internal substance. It has often been found as large as a child's head; but when dry, it is as hard as stone. Latterly, there have been many insinuations of a suspicion that this production was nothing more than a large Sclerotium, a suspicion now proved to be true. Nearly twelve months since I was informed that a specimen had been found, with a mushroom growing from it; and now that a specimen has been sent to me, with the fungus growing upon it, the whole mystery is clear. The Sclerotium or Mylitta was about 6 inches in diameter, and from it was growing a pure white Polyporus, closely allied to *Polyporus ovinus.* In the present instance, there were two individuals growing so closely together as to appear but one, and the pair almost as large as a man's fist, perfectly white and fleshy, but becoming tough when dry. The pileus was convex, almost hemispherical, and finely velvety on the surface, supported upon a short thick stem not exceeding an inch in length. The tubes of the hymenium 7 millimètres long, and the angular pores about half a millimètre in diameter, with an acute edge. It is intended to describe this new species fully and technically under the name of *Polyporus mylittæ* (Cooke and Massie), but such an interesting discovery should be made known at once. The specimen alluded to was found in South Australia, but I have heard of another in Victoria.—M. C. COOKE."

[Mrs. W. Martin reports having sent to Dr. Cooke for identification a specimen of Native Bread *(Mylitta australis)*, with the fruiting form attached to it, and which has been named *Polyporus mylittæ*, and having observed the curious gathering of the hyphæ, which start from the spores and gradually form the so-called "Native Bread."—ED. *Vict. Nat.*]

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## FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Field Naturalists' Club was held in the Royal Society's Hall on Monday, 16th January. The chair was taken by Mr. F. Wisewould (hon. treasurer), and there was an attendance of about 60 members and friends.

### LIBRARIAN'S REPORT.

The hon. librarian reported the following additions to the library :—"Hints to Growers : vii.—Peach Aphis," by C. French, F.L.S., from Department of Agriculture ; Paper on Oology, describing three new species of birds' eggs, by A. J. Campbell, F.L.S., from author ; "Transactions Royal Society, South Australia," xv., 2, and xvi., 1, from Society ; "Transactions of Geological Society of Australasia," i., 6, from Society ; "Report of Smithsonian Institute" (U.S.A.), 1890, from Institute; "Canadian Entomologist," xxiv., 10, from editor; "Journal of New York Microscopic Society," viii., 4, from society ; "Proceedings of the Academy of Sciences, Philadelphia," 1892, part 1, from society ; "Journal of Pharmacy," December, 1892, from society.

### EXCURSION REPORT.

In the unavoidable absence of the leader (Mr. C. Frost, F.L.S.), Mr. F. G. A. Barnard gave a verbal report of the Club excursion to the Plenty Ranges *viâ* Whittlesea on Saturday, 17th December. The excursion was fairly attended, but previous cold and wet weather rendered the efforts of the entomologists almost fruitless. The botanists found that most plants and shrubs were past their flowering stage, the only notable exceptions being *Lomatia illicifolia* and *Xanthorrhœa australis* (the large Grass Tree). Fine ferns of many species were noted, and a fair number of birds seen. Altogether it was thought the locality would be worthy of a more extended visit earlier in the season.

### ELECTION OF MEMBERS.

On a ballot being taken, Messrs. A. D. Hardy and W. Stone were elected members of the Club.

### PAPERS.

The first paper was contributed by Mr. J. Gabriel, and gave an account of a late "Holiday Trip to Benjeroop," in company with Mr. A. J. Campbell, F.L.S., in search of ornithological rarities. Mr. Campbell's labours in this branch of natural history are well known, and Mr. Gabriel's account of their experiences was

followed with great interest by those present. Full descriptions were furnished of the nests of the Semi-palmated Goose (*Anseras melaleuca*) and the Bittern (*Botaurus poicilopterus*)—the "Bunyip" of the aboriginals—and details of a raid on an ibis rookery, gave an insight into some of the delights of an ornithologist. The photographic camera formed a valuable adjunct to the outfit of the excursionists, and some excellent photographs of nests *in situ*, and rookeries in active work, were shown in illustration of the paper. Altogether Mr. Gabriel's paper roused the enthusiasm of members in ornithological pursuits, which should bear good fruit in the future.

Mr. T. S. Hart's paper on "Some Rock Sections of Brighton and Moorabbin and the Adjoining Districts" followed. The order of succession of the various strata at Beaumaris, from bottom upwards, was given as—first, ferruginous and calcareous sandstones and shelly marls, with an abundance of fossils; secondly, a series of ferruginous sandstones, with ironstone bands, and no fossils; thirdly, a deposit of sand, grey, white, yellow, and red in colour; fourthly, a second deposit of loose white sand, with a layer of recent shells at the top. The various strata were then considered in detail, not only as regards their formation and nature, but also in reference to their relative position at different parts of the coast. Mr. Hart considers that the movements causing the variations may have been only local, and certainly that they were unequal within comparatively small areas. Thus the fold at Beaumaris shows a difference of elevation in a very short distance of nearly 100 ft., and same holds good at Picnic Point, although to a somewhat less extent. The instability thus clearly shown is set down to volcanic activity near at hand.

### THE CLOSE SEASON FOR QUAIL.

At the close of an interesting meeting, Messrs. D. Best, R. Hogg, and G. A. Keartland were appointed representatives of the Club in approaching the Commissioner of Customs on the subject of the close season for quail, and the hon. secretary was directed to supplement their efforts by a written communication to the Commissioner. The meeting was unanimous in its desire that the present close season should not end till the 1st March, and the members of the deputation were asked to urge upon the Commissioner the necessity, not of altering the present law, but rather of taking steps to insure stricter supervision in the administration of it.

### EXHIBITION OF SPECIMENS.

The meeting closed with the usual exhibition of specimens, of which the following is a list:—By Messrs. E. Anderson and F. Spry.—Ova, larvæ, and imagines of *Lampides bœticus*, Lin.,

and larva and imago of *Xenica lathionella*. By Mr. A. Coles.—Stuffed specimens of Hoary-headed Grebe, Black-throated Grebe (with young), Great Sandpiper, and Little Sandpiper. By Mrs. Flatow.—*Magellus anticus*, from Mauritius; *Trochus imperialis*, with serpula, also *Trochus imperialis*, with lepas, from New Zealand. By Mr. C. French, sen.—Minute Coleoptera (collected during season of 1892 by C. French), and *Stigmodera fortunei* (male and female), with eggs. By C. French, jun.—Eggs of Singing Honey-eater, N.S.W.; Black-capped Honey-eater, Tas.; Yellow-throated Minah, S.A.; Orange-winged Sitella, Vict.; Little Water Crake, Vict.; Spotted Water Crake, Vict.; also Lesser Noddy Tern, W.A. (collected by Mr. A. J. Campbell, F.L.S.) By Mr. J. Gabriel.—Eggs collected at Benjeroop, and photographs taken by Mr. A. J. Campbell, and shown in illustration of paper. By Mr. H. Grayson.—Specimen of the elytra of the Diamond Beetle (*Entimus imperialis*), mounted for the microscope. By G. A. Keartland.—Crocodile (three weeks old), from Queensland. By Mr. J. Shepherd.—Living Sponges (*Grantessa hirsuta*, &c.), exhibited under the microscope; and Legless Lizard and Earthworms (Horsham). By Mr. T. Steel.—Peripatus (*novæ-zealandiæ*) and abnormally thick-shelled hen's egg.

## REMARKS ON SOME ZOOLOGICAL GARDENS.

By Thomas Steel, F.C.S.

*(Read before the Field Naturalists' Club of Victoria, 12th December, 1892.)*

During a recent trip to Britain and America I was interested in visiting, amongst other places, the Zoological Gardens of the cities through which I passed.

In the great London gardens there have been carried out sundry alterations and additions within recent years, which considerably add to the interest and educational value of the institution. Notably are the new insect and reptile houses of great attractiveness. The insect house is a fine, handsome, well-lighted building, kept at a suitable temperature by means of artificial heat. It is devoted to the display of insects in the various stages of their growth. The living insects are in glass cases, or vivaria, in which are placed earth, &c., and the plants on which the larvæ feed. Here are displayed beautiful moths and butterflies, both British and foreign, and many of these are the produce of successive generations bred in the cases. Above each case is a smaller one, in which are placed preserved specimens of the insects in the main cases, all the stages, from the egg to the perfect insect, being represented. This department is a most popular one, and inter-

ested groups of visitors are constantly around the cases, particularly those containing such creatures as the tropical "leaf" and "walking stick" insects and the larger and more active caterpillars.

Some Australian moth chrysalids which I took to the gardens from Mr. Le Soüef were very acceptable, as they arrived safely and soon commenced to hatch out, they being the only representatives of Australia in the house. The curator was in hopes of being able to breed from them, as the food-plant of the species sent—the common gum tree—is cultivated in the gardens, so that the natural food of the larvæ will be available.

The new reptile house is specially designed for the comfort of its reptilian and batrachian inmates. The cases are somewhat like the tanks of an aquarium, being glass-fronted recesses around the walls. Here I felt, comparatively speaking, at home, because of the presence of a few species of our common Australian snakes. The bottoms of the cases are covered with fine gravel, and suitable baths and climbing stumps are provided for the snakes. All the snakes appeared to be healthy and contented looking. Smaller table-stands, with growing plants in them, formed the cases for frogs, toads, and such like creatures, of which there are representatives from many parts of the world.

Naturally, the sections of the gardens containing animals and birds from Australia interested me a good deal. The kangaroos have very small quarters compared with the fine paddocks which they enjoy in our Melbourne "Zoo," but they appeared to be fairly healthy and sleek, though it is obvious that the smoke and fogs of London are not altogether as conducive to their health as the sunny skies and pure air of their native climes. I was much pleased to see a pair of Australian Brush Turkeys, evidently quite at home in their enclosure. The birds having made signs of desiring to make their egg-mound were supplied with several cart-loads of leaves, &c., and soon constructed a fine mound, in which were laid several eggs. The curators were greatly exercised in mind because the cock bird occupied all his spare time in what was described as "humbugging" about the mound, scratching the leaves away at one time and back again at another, but continually engaging in this apparently superfluous task. It was intended to try and get some of the eggs out of the mound and endeavour to hatch them in an incubator. I am afraid that the climate of London is against the generation of sufficient natural heat in the mound to hatch the eggs. I suggested that probably the old cock turkey knew his business best, and had very good reasons for his scratching operations. Possibly he was wanting to let the sun's heat into the mass. It was with quite a thrill of pleasure that I recognized a well-remembered voice as I passed along by some of the large aviaries, for there was our old friend the

Laughing Jackass, looking as sedate as if in his far-away Australia, and "laughing" with a heartiness that was quite enchanting to me. I stopped a long while by this spot; the Jackass, somehow, seemed to me the most characteristically Australian thing I had seen since I left Australia. Amongst the parrot cages were quite a number of our Australian Parrots and Cockatoos, and even far-off Fiji was represented by the Green and Red Lories of the South Seas.

The next zoological collection of any importance which I visited was that in the Fairview Park, in Philadelphia. To me quite the most interesting object in this garden was the great American Bison. This noble animal is well represented by a number or healthy individuals, which have a fine roomy paddock and shelter sheds, and are evidently well cared for. Another animal of the greatest interest is the American Elk, or Wapiti, fine examples of which are here preserved.

Perhaps the strong point in this gardens is the fine collection of birds, particularly the Parrots and Cockatoos, and the brilliant Macaws, of which there is a superb series. There are very many Australian birds, including our friend the "Jackass" and numbers of our pigeons. The kangaroos were the most healthy-looking collection I saw out of Australia, and were represented by six or seven species. An animal which interested me a good deal was the Prairie Dog, a curious, little burrowing rodent, and afterwards, in the course of the railway journey across the Western Prairie, I saw the same animal in its native haunts. Some of the main buildings are very fine and substantial, in particular the house for the large carnivora and the reptile and monkey houses. I must not omit to mention the very beautiful group of bronze statuary which stands in front of the main entrance. It is entitled "The Dying Lioness," and represents a lioness stricken by an arrow; some cubs are scrambling about her, and the old lion is standing over her in an attitude of protection. The group is finely designed and executed, and forms a most attractive and appropriate ornament. There is a splendid seal pond, in which are many seals, and also the Sea Lion and the scarce and interesting Sea Elephant.

The collection of animals in the Central Park, New York, is scarcely worth mentioning. I was much surprised that a mighty city like New York, which excels in the magnificence of its great public works and in its lovely Central Park, should be so far behind in a matter of this kind. I greatly pitied the dejected-looking lions, cooped up in the smallest of cages, with no proper shelter and no exercising yard. One of them was obviously dying of lung disease, and was coughing in a pitiful manner, while the other was thin and half-starved looking. The Hippopotami are perhaps the finest specimens in the collection, and are about

the only ones provided with something like adequate accommodation.

Although Chicago has, amongst its other attractions, a series of splendid public parks and gardens, I could not learn of there being any collection of living animals.

In the great Golden Gate Park of San Francisco there are a few large enclosures for animals. In one is a fine lot of American Elk, with young ones in various stages of growth. There is also the largest semi-open-air aviary I have seen, in which are growing trees and shrubs, amongst which are domiciled many tropical birds in a state of comparative freedom. The aviary is a large glass building, in which the walks for visitors are fenced off with wire netting. Just outside the Golden Gate, as the entrance to San Francisco Harbour is named, is the Seal Rock, which is quite crowded with seals. The rock is close to the beach, and the seals form a great attraction to visitors, as they are plainly visible at all times.

*(To be continued.)*

## A HOLIDAY TRIP TO BENJEROOP.

By Jos. Gabriel.

(*Read before the Field Naturalists' Club of Victoria, 16th January*, 1893.)

On 4th November, after a tedious journey of 190 miles, Mr. A. J. Campbell and myself alighted at Lake Charm railway station, on the Bendigo to Swan Hill line, and after waiting a short time had the pleasure of greeting Mr. Geo. Morton, who had come some eleven miles to meet us with his horse and buggy. In the latter we proceeded to stow ourselves and luggage, and a pleasant drive soon brought us to Murray Meadows homestead, where we received a hearty welcome from Mrs. Morton and household. The welcome possibly was not quite so hearty as that of the mosquitos on the journey, but was far more pleasant.

Tea over, we were very glad to turn in to rest our weary limbs.

Early morning found us turning in again, but this time into the beautiful Murray River, which was running a banker within a stone's throw of the homestead.

A hearty breakfast prepared us for the day's exertion, and, being joined by our host, we crossed over the river into Dennis's Swamp. In doing this we were assisted by the *Pride of the Murray*, a flat-bottomed boat made to carry two, but if extreme care is exercised will carry three. This boat had a sail attached, whose mainsheet was composed of hay-band, which perhaps was an advantage, for, if it parted when we had the strain of an extra puff of wind, it would possibly save us a capsize and our joining the ducks. In going over the swamp we were impeded very much

by the water weeds, which grow very thickly here, but after a little perseverance, assisted by two poles, we came to a tree where we got our first take, viz.—nests of *Sauloprocta motacilloides* (Black Fantail), three eggs; *Artamus leucopygialis* (White-rumped Wood Swallow), three eggs; and *Grallina picata* (Pied Grallina), young birds. This wood swallow, like the others of this genus, is not inclined to spend much labour in building her nest, but is cunning in that she selects a deserted home of the Pied Grallina, which she lines with grass, making a snug nest. We found several nests of these birds during our stay in Benjeroop, and all of them were built after the manner described. We then made for the Ibis rookery, and were very disappointed to find we had arrived somewhat too early, as the birds had not started to work, so we determined to visit it again in ten or twelve days. We then went ashore, and after lunch worked along the bank of the Murray towards the homestead, our captures for the day being—*Biziura lobata* (Musk Duck), two eggs; *Threskiornis strictipennis* (White Ibis), one egg; *Corcorax melanorhamphus* (White-winged Chough), five eggs; *Ardea novæ-hollandiæ* (White-fronted Heron), two eggs; *Grauculus mentalis*, one egg; *Entomyza cyanotis* (Blue-faced Entomyza), two eggs.

The Grauculus had chosen an unfinished nest of a Grallina as a foundation for her own. On taking the eggs of the Corcorax we were saluted with the cries of seven of these birds, which suggests the fact that several birds lay in the same nest, and further observation will probably confirm this. The nest, which is built of mud, is shaped like that of the Grallina, and is of considerable size and weight, and would entail a considerable amount of labour for one pair of birds. Again, later on in the afternoon I picked up a young bird, and his screams of fright soon brought around no less than ten of the old birds, whose plaintive whining screams were too much for me, and I soon gave the young one its liberty.

Sunday, the 6th, was passed in quiet, except that just as a nice hot dinner was being served up our artist photographer rushed off to photograph two passing bullock teams. The faces of the ladies were pictures to see! But later they had their revenge, for the bullock-drivers were bashful, and would not be taken.

Monday, the 7th, was very warm, and after a long tramp through the Polygonum *(Muehlenbeckia muelleri)* scrub, our takes were few, viz.:—*Malurus cyaneus* (Blue Wren, or Superb Warbler), several eggs; *Malurus leucopterus* (White-winged Superb Warbler), two eggs; *Xerophila leucopsis* (White-faced Xerophila), three eggs; *Zosterops cærulescens*, eggs hard set. The nest of the Zosterops was beautifully placed, being protected by a canopy which the bird had built over it. The eggs were hard set, but if they had been fresh I believe neither of us would

have taken them, so pleased were we with the ingenuity of the little architects. We also saw a Grauculus' nest in a tree, but as our artist was too lazy after the long walk, and I was too busy killing mosquitos and flies, we decided that the "grapes were sour," and left it.

Tuesday found us walking along the Murray River bank before breakfast, but with no other result than taking a few eggs of the Garrulous Honey-eater *(Myzantha garrula)*, and later on we tramped nearly around Dennis's Swamp with still worse results.

Wednesday was dull and rainy, and a little before noon we went up the river to fish, and returned with a good basket of fish, weighing twenty pounds.

On Thursday, the 10th, we drove over to the salt lakes and a pine ridge adjoining. These salt lakes yield a considerable quantity of salt, but there does not seem to be a ready sale for it, for several heaps of many tons each have been lying there many months awaiting buyers. These salt heaps look very peculiar standing alone, and the other night as we were passing presented quite a weird and ghost-like appearance. Our takes to-day were *Artamus superciliosus* (White-eyebrowed Wood Swallow), several eggs; and *Artamus sordidus* (Sordid Wood Swallow), three eggs. We also noted Black Fantail's nest with eggs, Zosterops' nest with eggs, White-winged Wren's nest building. We also saw the Singing and Lanceolated Honeyeaters, but, unfortunately, could not find their nests. Around the salt lakes there was an abundant growth of Saltbush (*Salicornia australis*), and here we expected to find many nests of the White-winged Wren, but were disappointed. Reward, however, came in the shape of some rabbits, which we found trapped, and which were served up next day as rabbit-pie.

Friday.—Photography and fishing occupied the whole day.

Saturday found us on Pental Island, and after a long, hot tramp we were fortunate in taking a nest with four eggs of the White-rumped Wood Swallow. We then searched for a shady spot to boil the billy and have lunch, but found on starting that the matches had been left at home. After killing two snakes a few feet away from our camping ground we turned for home again, being hospitably treated by Mr. Hamilton on the way, who also kindly forded us across the Little Murray.

Sunday was again passed in quietness.

Monday, 14th.—After another hot walk we arrived at Essex Farm, Pental Island, owned by Messrs. Sayce Brothers, one of whom had kindly volunteered to show us round. A short trip was proposed before dinner, and being joined by the other brother, who could not resist the temptation to accompany us, we took boat for about a mile down stream. After photographing a lovely little lake scene (a copy of which you can see

here this evening) we divided into two parties, and became representatives of the order Grallæ, or Waders. Our party soon had cause to rejoice, for as we approached the long reeds in the centre of the swamp up rose a couple of *Anseras melaleuca* (Semi-palmated Goose) and a small flock of White Ibis, and we shortly afterwards found their nests and rookery. The nest of this goose is wonderfully constructed by apparently so clumsy a bird. They bend down the reeds, *Typha angustifolia*, from all directions to a common centre, interlacing them and adding short pieces so as to form a hollowed centre. They also prepare an approach gradually rising from the water and facing the south-west. We found three nests during the day, and each of them was built in the manner described. The bird after alighting on the water ascends its nest by means of this approach, thus avoiding the risk of breaking the eggs. The nest, of which you will see a photograph here to-night, measured about 3 feet across, and with its approach about 4½ feet long, and the top of it was about 2 feet above the surface of the water, and was so strongly constructed that it would readily bear the weight of a fair-sized man. Soon after this we met the other party, who had so far not been successful. Forming a line, and all working in the same direction, we came across a nest containing five eggs of the "Bunyip." The aboriginals until a few years ago explained that the boom of the Bittern (*Botaurus poicilopterus*) was that of the Bunyip. This boom sounds very weird, especially on close, murky nights, and it is not surprising that the natives, who are usually so afraid of the darkness, should fall into this mistake. That so small a bird should make so loud a noise passed their comprehension; and not only so, the bird itself is rarely seen except when flushed. It is asserted that this booming sound is only heard during the breeding season, and that the birds begin with one boom, increas- the number of sounds as the days go on, until they give four, at intervals of a few seconds, then after a few days they gradually diminish to one again; and we ourselves noticed this diminishing before leaving the district. The assertion, however, needs still further confirmation. Our next find was a nest of six eggs of *Porphyrio melanotis*. We then went back to Essex Farm, where we did justice to a good farmer's dinner. After a little rest, we started down river again and into the swamp as before to photo-graph the Ibis rookery and other nests near by. Whilst this business was proceeding we were attacked by innumerable leeches, which, whenever we stood in one place for a few minutes, industriously commenced operations. Most of us objected, but our artist stood manfully to his task and suffered in consequence. My guide and I left the photographers and went about a mile away, to another portion of the swamp, where we found six more eggs of the Porphyrio, and another nest of the Semi-palmated Goose; just

before finding the latter we flushed a flock of about eight of these fine birds, but with the exception of the one nest they had only started building. Later on a few more Bitterns were flushed, but no more nests were discovered. Rejoining our friends, we returned to Essex Farm, where hostess Sayce had tea ready, and having partaken of this with relish, we commenced an enjoyable tramp of three or four miles, which brought our first really successful day to a close.

Tuesday, 15th, was spent in again working Dennis's and Gonn swamps. This second attempt was as unsuccessful as the first, very few wild fowl being met with. Two years before these swamps were literally teeming with feathered life, whilst to-day we could count them only too well. We, certainly, deserved better luck, for we had to pole our boat with great difficulty through the water weeds, which were very abundant here and were a great drag. Frantic were our efforts to get along, and as the wind went down and the sun shone out hot and fierce, we enjoyed ourselves immensely, frequently stopping to admire the beautiful little yellow flower of the Water Lily, *Limnanthemum crenatum*, which, growing in great abundance, gives a rich, beautiful golden appearance to the surface of the swamp. We gradually, however, got into clearer water and drew on towards the Ibis rookery, where we plainly heard the croak of the birds who were now busy nesting and seemed to pay little attention to our approach. It was our purpose, if possible, to take a photograph of their flight some time during the afternoon, but on witnessing their contemptuous treatment of us we decided upon operating at once, and in spite of the fact that the *Pride of the Murray*, influenced by the wind, would persist in going to port, our artist on their rising in response to our by no means musical yells, successfully took a snap-shot. We then entered the rushes and soon found the rookery and photographed one of the nests. A couple of bitterns were also flushed here, and after a little search we found a nest containing five beautiful eggs, this being the second nest of five found on the trip, although authorities speak of clutches of four only. Since our return Mr. Morton has taken three more eggs from this same nest. The nest of this bird is very symmetrical, and is fairly well protected from observation; short pieces of rushes are laid across and across, being slightly interlaced and concaved. The bed of the nest is about 12 inches above the surface of the water, width about 14 or 15 inches, while the points of the reeds, *Typha angustifolia* in one place and *Arundo phragmitis* in another, meet above, forming a dome-like canopy, and giving the nest a snug and comfortable appearance. We now proceeded to wade into Gonn Swamp, but with no other result than that of cooling our ardour. After this we took boat and slowly drifted down the Murray,

taking on the way clutches of the Pied Grallina and White-plumed Honeyeater, thus finishing up a fairly successful day.

On Wednesday we had another hot tramp through the polygonum scrub, finding only another clutch of 4 eggs of the White-winged Wren, a find, however, which amply repaid us. These birds build very similar nests to the Blue Wren, but much more comfortable and cosy, being lined and intertwined with wool.

THURSDAY, 17TH.—After taking a clutch of 4 eggs from the nest of *Epthianura albifrons* conveniently built in the grass of the back yard, about 40 yards away from the house, we reluctantly bid good-bye to Murray Meadows, where we had been so hospitably treated—a hospitality and kind treatment we shall ever remember with the greatest pleasure; and taking a last look round the neighbourhood, which is a perfect paradise for birds, protected as they are by distance from the murderous assaults of pot-hunters, we were driven by our hostess to the railway station, stopping on the way at the pine ridge to photograph a nest of *Artamus superciliosus*, which we had previously noted prettily placed on a horizontal fork of a large bare bush, but found someone had been there since our former visit and taken it away. Passing the salt lakes we saw the Australian Bee-eater (*Merops ornatus*) in large numbers, busily at work, where they tunnel into the banks of the lakes, which consist principally of gypsum. However, we did not trouble to take their eggs, having them already in our cabinets, and so kept on our way to the station, which we reached in good time for the train. At Bendigo I left Mr. Campbell to continue his journey to Melbourne, whilst I stayed the night and spent the next day visiting the sights of "Quartzopolis." Among these I visited the museum at the School of Mines, which contains a very creditable collection, and I was pleased to see that the names of several members of our club figure as donors of specimens. I almost omitted to mention that we held a permit from the Colonial Secretary of New South Wales in order to be able to collect on that side of the Murray eggs of game birds for scientific purposes only. Appended is a list of the birds noted during our stay at Benjeroop :—

| | | |
|---|---|---|
| Haliastur sphenurus | ... | Whistling Eagle |
| Hieracidea berigora | ... | Brown Hawk |
| Artamus sordidus ... | ... | Sordid Wood Swallow |
| „ superciliosus | ... | White-eyebrowed Wood Swallow |
| „ leucopygialis | ... | White-rumped Wood Swallow |
| Malurus cyaneus ... | ... | Blue Wren, or Superb Warbler |
| „ leucopterus | ... | White-winged „ |
| Merops ornatus ... | ... | Australian Bee-eater |
| Dacelo gigas ... ... | ... | Great Brown Kingfisher |
| Halcyon sanctus ... | ... | Sacred Kingfisher |
| Pardalotus striatus ... | ... | Striated Pardalote |

| | |
|---|---|
| Grauculus mentalis ... ... | Varied Grauculus |
| Colluricincla harmonica ... | Harmonious Shrike Thrush |
| Platylea flavipes ... | Yellow-legged Spoonbill [panion) |
| Grus Australasianus ... ... | Australian Crane (Native Com- |
| Ardea Pacifica ... ... | Pacific Heron |
| „ Novæ Hollandiæ ... | White-fronted Heron |
| Botaurus poicilopterus ... | Australian Bittern |
| Porphyrio melanotus ... | Black-backed Porphyrio |
| Cygnus atratus ... ... | Black Swan |
| Anseras melaleuca ... ... | Semi-palmated Goose |
| Biziura lobata ... ... | Musk Duck |
| Anus superciliosus ... ... | Australian Wild Duck |
| Sauloprocta motacilloides ... | Black Fantail |
| Hirundo frontalis ... ... | Welcome Swallow |
| Geronticus spinicollis ... | Straw-necked Ibis |
| Threskiornis strictipennis ... | White Ibis |
| Hydrochelidon leucopareia ... | Marsh Tern |
| Pomatostomus temporalis ... | Temporal Pomatostomus |
| Plictolophus roseicappilla ... | Rose-breasted Cockatoo |
| Ægialitis nigrifrons ... ... | Black-fronted Dottrel |
| Grallina picata ... ... | Pied Grallina |
| Cracticus torquatus ... ... | Collared Crow Shrike |
| Sarciophorous pectoralis ... | Black-breasted Plover |
| Lobivanellus lobatus ... | Spur-winged Plover |
| Podiceps gularis ... ... | Black-throated Grebe |
| Tribonyx ventralis ... ... | Black-tailed Tribonyx |
| Phalacrocorax melanoleucus | Little Cormorant |
| „ strictocephalus | Little Black Cormorant |
| Psephotus hæmatonotus ... | Red-rumped Parrakeet |
| Platycerus zonarius ... ... | Banded Parrakeet |
| Entomyza cyanotis ... ... | Blue-faced Entomyza |
| Corcorax melanorhamphus ... | White-winged Chough |
| Xerophila leucopsis ... ... | White-faced Xerophila |
| Zosterops cœrulescens ... | Grey-backed Zosterops |
| Myzantha garrula ... ... | Garrulous Honeyeater |
| Epthianura albifrons ... | White-fronted Epthianura |

## NOTES ON THE ROCKS OF BRIGHTON AND MOORABBIN AND THE SURROUNDING DISTRICTS.

By T. S. Hart, M.A.

*(Read before the Members of the Field Naturalists' Club on 16th January, 1893.)*

The subject of these notes is the Upper Tertiary deposits which occur in Brighton and Moorabbin and the surrounding districts.

The order of succession of the various strata is best seen on the coast at Beaumaris, where the following appear in order from the bottom upward:—1st, ferruginous and calcareous sandstones.

and shelly marls, with an abundance of fossils; 2nd, a series of ferruginous sandstones, with ironstone bands, and no fossils; 3rd, a deposit of sand coarser, and usually less firmly cemented, than the lower rocks—grey, white, yellow, and red in colour—which I have, in what follows, referred to as the lower sand; 4th, a second deposit of loose white sand, referred to in what follows as the upper sand, with a layer of recent shells at the top, principally mussels. These do not appear directly over each other at one place, but by a fold in the rocks are shown in succession. Following the coast from Rickard's Point to Mentone, the upper sand is almost or quite continuous, and unaffected by the fold, but in the others the following changes occur:—At first we see the ferruginous sandstones, the second series above mentioned, overlaid by the lower sand. Going towards Beaumaris the strata rise gradually, the lower sand becomes thinner and soon appears only in patches; the greater part of the cliffs is formed of the ferruginous sandstones below it, and the fossiliferous rocks below it appear at the surface. Then the rocks are sharply bent over, dipping S. 20° E., at about 30° at the steepest part, being much cracked and slightly faulted. The lower sand re-appears, dipping with the underlying rocks, which with part of them sink below the beach. The strata then soon resume a horizontal position, and then dip at a low angle in the opposite direction. At the end of Charman's-road the upper sand can be seen resting on the denuded edges of the strata of the lower sand. The fossiliferous beds at the bottom of the series appear nowhere else at the surface in this district, but have been passed through in bores at Mordialloc, at a depth of about 130 feet, and appear to be about 45 feet in thickness.

The second series, consisting of ferruginous sandstones with a thickness of about 70 feet, appears at intervals along the coast, forming the base of nearly all the points, which seem to be due to their greater resistance to the action of the sea. At the end of Park-street, Brighton, they contain a few fossils similar to those found at the Royal Park; and a few casts of small shells also appear at the Red Bluff, Sandringham, and to the north of Black Rock. At the Red Bluff I also obtained from this bed a portion of a tree, about 5 feet long, 4 inches thick vertically, and 9 inches wide. From the nature of the wood it appears to be a conifer.

The surface of these ferruginous sandstones is more or less eroded, and on it rests the next series—the lower sand. This is the most extensively developed deposit throughout the district. Between Beaumaris and Mentone these rocks form cliffs about 60 feet high, and allowing for the part which is seen to disappear below, at the fold at the end of Charman's-road must have a thickness of over 100 feet. The lower parts are of

a grey colour, sometimes nearly black, and contain frequently traces of carbonaceous matter, which at Mentone form thin seams ; with these are patches of a pale yellow mineral, probably basic sulphate of iron. Near Mentone these lower beds at one place pass into a ferruginous sandstone. At various places on the coast between Beaumaris and Sandringham a similar rock occurs to a small extent, and at Red Bluff again we have distinct patches of carbonaceous matter. These pass gradually at Mentone into a friable sand rock, formed of coarse quartz sand and more or less iron oxide, and varying in colour from white to yellow and red. Similar rocks occur throughout the district, and form the main part of the lower sand ; but only at Mentone does the complete series appear without a break. In other places there is a break between this and the underlying portion of this series, or the lower portions are entirely absent. The lower portions of the sand frequently are finer and more compact, with ironstone bands, and at Windsor and St. Kilda beach contain thin beds of ferruginous sandstone, resting on the Silurian rocks. The greater part of this deposit consists of coarse sand, with a few rounded quartz pebbles, and varies greatly in colour and consistency. Its colour is white, yellow, or any shade of brown or red, according to the quantity of iron oxides present. Sometimes it is very friable, sometimes hard and compact; and this hardening may take place along certain beds or in irregular bands and patches. The present surface is very irregular and usually covered by gravel, which seems to have been formed by the removal of the finer and softer parts of the rock. The gravel varies in amount and nature according to the variations in the underlying rocks. At some places, as in the cutting south-east of Elsternwick station, a large mass of sandstone is left on the top of the sand, projecting into the newer deposits, being a hard portion of a higher bed which has resisted breaking up and has been too heavy to remove. The sand sometimes contains a large amount of clay, and at one place, between Brighton Beach and Picnic Point, it is very calcareous ; but this calcareous rock passes gradually into the ordinary sands. The lime percolating through has here filled all the cracks in the underlying rocks forming vertical and horizontal sheets and irregular patches of impure crystalline limestone among them.

After the erosion of these deposits to near their present form there followed another series of deposits, the upper sand, referred to before, associated with which are two shell beds. The lower of these, which I have seen only at Picnic Point, contains all recent species, though some are not found or are rare there now. It, at first sight, appears to run into the lower sand ; but further examination shows that this is not the case. It is a few feet above the present water level at its highest part, and descends to

a little below. Over it is the upper sand, which here also contains a few shells of recent species, and consists of a loose white sand. This deposit—but without the shells—continues along the coast and inland, and in some places seems to have been deposited on land. Part of the alluvial deposits on the Carrum swamp and other low-lying places are probably contemporaneous with this. Above this a line of recent shells of a few species occurs, which continues all along the coast, with few interruptions, from Point Ormond to Mordialloc.

The deposits in progress consist chiefly of alluvial on the swamps and blown sand hills at low parts of the coast. During the progress of these deposits various movements must have taken place. The ferruginous sandstones, or the second series, were uplifted and denuded to some extent, after which the deposit of the carbonaceous beds of the lower sand commenced, south of Picnic Point, probably in swamps or salt lagoons. A slight elevation interrupted this deposit north of Beaumaris, but in the southern part it continued. On subsidence again taking place the main portion of the lower sand was deposited over a large area, extending as far as the ranges beyond the Koo-Wee-Rup. Elevation followed and this deposit was eroded, the gravels being probably formed by marine action during the movement. The lower sand on Picnic Point was then formed and the upper sand of the district; after which the land was again submerged to a depth of about 60 ft. at least when the raised beach along the top of the cliffs was formed. The gravel at Point Ormond may also have been formed at the same time. From that time there appears to have been a gradual elevation. Many of these movements may have been only local, and it is certain that the elevations were not equal, or nearly so, at different parts of this district. Thus the fold at Beaumaris shows a difference of elevation, in a very short distance, of nearly 100 ft.; and the lower shell bed at Picnic Point shows that more recent movements were also unequal. In particular, the last subsidence appears to have been local; so that, though contemporary marine deposits may occur up to some hundreds of feet, it does not follow that this district has been raised to that extent as well. But though no volcanic rocks appear in this district, there was great volcanic activity near at hand, for two series of volcanic rocks are found in the Yarra Valley of more recent date than the lower sand; and these irregular movements are only another evidence of the unstable state of the country at that time.

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## DESCRIPTIONS OF NEW AUSTRALIAN PLANTS, WITH OCCASIONAL OTHER ANNOTATIONS;

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

*(Continued.)*

Aristolochia Holtzei.

Herbaceous, erect, dwarf, nearly glabrous; leaves comparatively long, almost sessile, laxe, linear, much narrowed towards the upper end; flowers axillary, solitary, mostly on a rather long stalklet; basal portion of the calyx obliquely ovate-globular, thence the tube slender, and about half as long and wide as the broad-linear upwards narrowed flat termination; fruit almost globular, rather small, prominently filiform-streaked; seeds deltoid-cordate.

Near Port Darwin; N. Holtze.

Closely allied to *A. Tozetii*, but all the leaves lobeless and sessile, the pedicels elongated, the flat part of the corolla occupying a proportionately greater length, and the constricted portion more slender.

*A. Tozetii* seems to be entirely an eastern species, *A. Holtzei* only a north-western.

Cymodocea zosterifolia.

Of this plant several specimens with pistillate flowers were recently received from J. Bracebridge Wilson Esq., M.A., F.L.S., to whom the writer had recommended the search for floral organs during that gentleman's zealous algologic excursions. I now find the style of each of the two fruitlets terminating in from 3 to 6 setulaceous rather long stigmas. The female flowers had only once before been obtained, then in a fruit-bearing state, and were thus described in the "Fragm. Phytogr. Austral." ix, 196 (1875). The staminate flowers are as yet only known from Gaudichaud's "Botanique" of Freycinet's "Voyage Autour du Monde," 340 t. 40 (1826). That these minute organs have hitherto eluded observation so much, is explained by their being concealed within the axils of leaves, and clasped by the longitudinal-incurved petioles. In adopting the above given specific name already in the first "Census of Austral. Plants" 121, ten years ago, as transferred from Agardh's *Amphibolis zosterifolia*, and in discarding the specific designation *antarctica*, given by Labillardière to this oceanic monocotyledonous plant of our warm temperate zone, it was desired, to discontinue the erroneous notion, conveyed by the original name; because we might just as well call any lowlands plant peculiar to the remotest part of South-Europe an arctic one. *Cymodocea zosterifolia* does not grow further south than Tasmania, being there still more than twenty degrees of latitude distant from the antarctic circle; indeed, the same geographic remark applies to our *Dicksonia Billardieri* (*D. antarctica*, Lab.; *Cibotium Billardieri*, Kaulf.), which, though reaching New Zealand, does not even extend to the Auckland- and Campbell-Islands.

January, 1893.

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## FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Field Naturalists' Club was held in the Royal Society's Hall on Monday, 13th February. The President (Professor W. Baldwin Spencer) occupied the chair, and there was an attendance of about fifty members and friends.

### MEETING FOR PRACTICAL WORK.

The Hon. Secretary reported a good attendance at the meeting for practical work held on 23rd January. The subject, "Sponges," again claimed the attention of members, and, in the unavoidable absence of Dr. Dendy, the general histology of the calcareous group was briefly touched upon by the Rev. W. Fielder, and then four types were described in detail, with special reference to their canal system, the forms chosen being *Leucosolenia stolonifer*, *Sycon carteri*, *Sycon gelatinosum*, and *Leucandra phillipensis*. Those present were supplied with mounted sections of these examples, and drawings were made then and there from the sections under the microscope, Mr. J. Shephard and Mr. Fielder acting the part of demonstrators. Those members who attended the two meetings on which "Sponges" formed the subject of study have thus material in hand which will enable them to understand some of the intricacies of the anatomy of these interesting forms as will constitute a fitting introduction to the study of the other groups in this large kingdom.

### ELECTION OF MEMBERS.

On the proposition of Mr. C. French, F.L.S., seconded by Mr. D. Best, Mr. A. H. S. Lucas, M.A., B.Sc., the late editor of the *Victorian Naturalist*, who has just entered upon his duties as Head Master of Newington College, Sydney, was unanimously and enthusiastically elected an honorary member of the Club.

### EXTENDED EXCURSION TO THE FURNEAUX GROUP.

After some discussion on the notice of motion by Mr. F. G. A. Barnard, it was decided to hold the next encampment on the Furneaux Group, Bass Straits, in November next, being part of a scheme drawn up by a sub-committee in 1890. A new sub-committee, consisting of Dr. A. Dendy and Messrs. A. J. Campbell, C. Frost, J. Gabriel, G. Sweet, and the Secretary, was appointed to arrange the necessary details.

PAPERS.

The first paper was entitled "Natural History Notes from the Townsville District" (Northern Queensland), compiled by Mr. H. Kendall from correspondence, extending over several years, of Mr. E. M. Cornwall. Ornithological jottings occupied considerable space, reference being made to the habits, eggs, and song of no less than about fifty different kinds of birds. Exception was afterwards taken by Mr. A. Coles and Dr. A. Dendy to an assertion as to the non-permanence of colour in some birds. Reptilia, of course, came in for notice, and amongst the specimens sent down Mr. C. Frost, F.L.S., identified the somewhat rare Black-headed Snake (*Aspidiotes melanocephalus*), an examination of which proves the species to be non-venomous. Mr. Cornwall's observations on the subject of hornets were not only amusing but interesting, and led to the hope that he will furnish additional particulars at some future time. A study of their habits is certainly more easily carried on there than with us, since they so often take up their abode within the precincts of those northern homes. Altogether, the paper called to mind very forcibly the interesting contribution by Mr. Dudley Le Souëf of this time last year, which narrated experiences in Central Queensland, the respective papers showing unmistakably how genuine is the pleasure enjoyed by the true naturalist in the prosecution of his investigations. Mr. Kendall merits the thanks of members for labour in putting Mr. Cornwall's observations in such an attractive manner before the Club.

The second paper, "Notes on Some Victorian Coccidæ, or Scale Insects," by Mr. C. French, F.L.S., was a continuation of a paper on the same subject read before the Club in October last, and gave particulars and illustrations of some new species. A cosmopolitan form *(Aspidiotus rossi)* was specially alluded to as being found on the foliage of olives, cork oaks, blackwood and shrubs innumerable—a modified form of which has lately been found feeding on the juices of the well-known native shrub *Ricinocarpus pinifolius*, growing near Cheltenham. This change of form to surroundings is worthy of further attention. The hardy nature of the Scale Insect is shown by the fact that it flourishes upon the leaves of a shrub (Alyxia) which grows on the sea coast and is repeatedly covered or washed by sea water. Mr. J. E. Prince, on the authority of Mr. Belt, called attention to the association which exists between some kinds of ants and these scale insects—an association which probably furnishes the former with a supply of food. Messrs. F. G. A. Barnard and C. Frost added similar testimony.

The last paper was contributed by Mr. James Lidgett, "On the Colour Variation in Some Australian Lepidoptera." The author placed in review some of the facts bearing upon the specific

distinctness of *Pyrameis kershawi*, M'Coy, from *Pyrameis cardui*, Lin., showing that the characteristic blue spots of the former were not always to be relied upon to distinguish the two, and coming to the conclusion that a study of the early stages is probably the only course whereby we may settle this question.

Taking one of the swifts (*Porina fusco-maculata*, Walk.) as his next example, the results of rearing a brood from ova were tabulated, showing a wide range of variation; the remarks on this species being supplemented by drawings. Finally, the author gave an account of his experience in breeding *Spilosoma obliqua*, by which he had confirmed the results arrived at by Mr. E. Anderson, as given in a paper previously. The paper was cordially received, and in the subsequent discussion the President, Mr. Anderson, and Dr. Dendy were the chief speakers—the latter laying stress upon the necessity of a more complete examination of the structure and anatomy of insects, as well as the mere wing markings, before giving specific rank.

### NATURAL HISTORY NOTES.

The Rev. R. Poynder contributed a note on an alleged Snake Tree found in Mexico, in the neighbourhood of the Sierra Madre Mountains; Mrs. Cochrane furnished a cutting in reference to "Digging for Fish" during the dry season in some parts of India; Mr. A. Coles read an interesting note on the "Food of the White-bellied Sea Eagle," showing that it usually took the food which lay nearest to hand, not exclusively confining itself to a fish diet; and Dr. Dendy recorded the "hatching out" of an egg of the Victorian species of Peripatus some sixteen or seventeen months after it was laid.

### EXHIBITION OF SPECIMENS.

The meeting terminated with the usual exhibition of specimens, of which the following is a list:—By Mr. A. Coles.—Specimens of White-bellied Sea Eagle (*Haliætus leucogaster*), New Holland Snipe (*Gallinago australis*). By Mr. C. French, F.L.S.—Life-history specimen of Victorian Psyllidæ; illustrations of four new species of Victorian Coccidæ, or Scale Insects (in illustration of paper, part ii.) By Mr. C. French, jun.—Large fossil shark's tooth in stone, from Cheltenham. By Mr. R. Hall.—18 species of land and freshwater shells, from New Britain; eggs of Fantail Cuckoo, and Red-eyebrowed Finch, from Box Hill. By Mr. G. F. Hill.—Four White-lipped Snakes from Gippsland, and 26 young Copperhead Snakes from a snake killed lately at Cheltenham. By Mr. H. Kendall.—Case of butterflies collected near Townsville; nest of Sun Bird, Townsville. Also the following snakes:—*Morelia variegata*, Gray (Carpet Snake); *Nardoa*, sp. (Rock Snake); *Vermicella annulata*, Gray (Black and White Ringed

Snake); *Cacophis blackmanii*, Krefft (Blackman's Snake); *Dendrophis punctata*, Gray (Green Tree Snake); *Dipsas fusca*, Gray (Brown Tree Snake); *Aspidiotus melanocephalus*, Krefft (Black-headed Snake). Also Lizards—*Chlamydosaurus kingii*, Gray; *Diporophera australis* (Steindw.); *Œdura robusta*, Blgr. By Mr. J. A. Kershaw.—Specimen of *Holochila heathii*, Cox, male, from larva taken at Trafalgar, Gippsland, December, 1892, with pupa; first time recorded from Victoria. By Mr. Lidgett.— Coloured drawing showing the variations of the moth *Porina fusco-maculata* (in illustration of paper); illustration of the various stages of the butterfly *Belenois teutonia*, Fabr. (with its food plant); coloured drawing of a Victorian orchid (from Lerderderg Ranges); snake in spirit; an agglutinated mass of cocoons of a species of Victorian Sawfly. By Baron von Mueller. —The following Australian plants (new to science) :—*Utricularia holtzei*, *U. kaminskii*, from Adelaide River, collected by M. and N. Holtze; *Aristolochia holtzei*, near Port Darwin, collected by N. Holtze; *Solanum lucani*, from Cambridge Gulf, collected by A. Lucanus; also *Cymodocea zosterifolia* with pistillate flowers, collected by J. Bracebridge Wilson at Western Port. By Mr. J. E. Prince.—Fossil nuts from the Working Miners' Gold Mining Company, Homebush, from a depth of 300 feet, extracted from the alluvial drift. By Mr. G. Sweet.—Fossil Starfish; from Upper Silurian rocks of Kilmore—*Petraster smythi*, M'Coy; *Urasterella selwyni*, M'Coy; specimens of the latter also from Moonee Ponds. [Sir Frederick M'Coy, in his "Decades," mentions Petraster from Moonee Ponds; by these specimens we now have Urasterella for that locality. The same authority also gives Urasterella for East Kilmore, but by these specimens we also have *Petraster smythi* from that locality; indeed, both Petraster and Urasterella are contained on the same stone.—G. S.]

## REMARKS ON SOME ZOOLOGICAL GARDENS.

By Thomas Steel, F.C.S.

(*Concluded from page* 150.)

In Sydney the Zoological collection at Randwick Park is by no means large. There are, however, some very fair specimens of various kinds, especially amongst the large carnivora and the monkeys. A visitor from abroad would, however, be disappointed in the small representation of our indigenous animals.

Adelaide possesses a very good collection, of very much the same character as that in the Melbourne Gardens, and the animals are evidently intelligently and well cared for.

I am pleased to bear testimony to the good order and attrac-

tiveness of our own Melbourne "Zoo." In none of the gardens which I visited was greater neatness and good taste displayed in the general ornamentation and arrangement of the animals' houses and of the show plots, and nowhere did I see more attention given to the rational housing and to the comfort of the animals.

In going through America, I was naturally anxious to see as much as possible of the purely American fauna, and to the display of such the officials in the Philadelphia Gardens have given a praiseworthy amount of attention. The curators of both the Adelaide and Melbourne Gardens endeavour to, as much as possible, give prominence to our own fauna; and this is as it should be. Naturally our Australian animals will thrive best in their own climate, and it is after seeing them in the collections in foreign countries that one is able to appreciate their natural and healthy appearance when seen in a garden like our Melbourne one. To this end the collections become more valuable when the rarer species of our own country are represented, as not only do we Australians living in the cities have an opportunity of seeing the scarcer animals of our own country, but the collection becomes doubly interesting to the visiting naturalist, who naturally looks to seeing those animals representative of our country which he cannot see in any moderately good collection in Europe or America. Seeing the healthy-looking kangaroos in the paddocks of the Melbourne Gardens gives one a far more adequate idea of what a kangaroo really is like in nature than do the poor cooped up specimens which I saw in some of the foreign collections.

## NATURAL HISTORY NOTES FROM THE TOWNSVILLE DISTRICT (NORTHERN QUEENSLAND).

Compiled by Mr. H. Kendall.

*(Read before the Field Naturalists' Club of Victoria, 13th February, 1893.)*

The following notes have been compiled from letters received during the last three years from our former member, Mr. E. M. Cornwall. They record some of his observations made whilst living at Roseneath, a place about seven miles from Townsville, and, as he says, "very, very suburban"—so countrified, in fact, that he was usually the only passenger to enter the train or alight where the platform should have been. Possibly some items may be of interest to members of the Club.

The neighbours one reads most about in the letters are the birds—

> "Shadows, colours, clouds,
> Grass-buds and caterpillar-shrouds,
> Boughs on which the wild bees settle,"

and cognate subjects are not neglected ; but the old love for the birds is supreme. In the first letter we read :—"The most plentiful of his kind is, perhaps, the Black-throated Crow Shrike (*Cracticus nigrogularis*), who makes the bush resound with songs in the mornings ; but my wife's particular bird-friend is a Black Fantail, who flits about all day long, and even comes indoors ; and many are the flies, spiders, and "nasty little things with nasty little stings" which his keen eyes discover whilst seeing into every nook and cranny. A Banded Finch has virtually joined our establishment. When food was scarce he discovered that seed was sometimes spilled from the cages of our pets, and now he comes regularly, and has become very tame. He takes good care not to inform his fellows and let them benefit by his sagacity. A pair of Blue-faced Entomyzas dropped in one day and sat upon a pale a few feet from our door. *Grauculus melanops* is a regular visitor ; so, also, is his white-breasted kinsman. Two or three varieties of Leatherheads frequent the adjacent bush, and their peculiar—almost human—notes may nearly always be heard. The large silvery-crowned one sits alone on a dead branch and utters his far-reaching double note. We often hear the Swamp Pheasant, or Coucal (*Centrapus phasianus*), whose note is something like the gobble of a turkey, but in a lower key and continued for a longer time. A pair of Wood Swallows have a nest in an old dead limb quite near my house, and it seems to take the male bird all his time to keep intruders away—an occupation only varied by an occasional swoop after a beetle or fly. The stunted tree which holds his nest is evidently a favourite with the birds, and I am afraid Artamus has not been happy in his choice of a home. The preference which birds exhibit for a certain tree is surprising. The tree may not differ from its fellows to our eyes, yet the birds show a marked preference for it, feed near it, and take shelter in its branches. One such tree I remember in Victoria—an old red gum, standing among many others. Near the top a pair of Brown Hawks (*Hieracidea berigora*) had their nest, whilst Tree Swallows and Pardalotes found a dwelling in hollow limbs. Nor was this all : on moonlight nights I could go to that tree perfectly certain of finding opossums among its branches. Another tree was loved by parrots, and when disturbed in a feast of ripening oats they always flew to its branches."

The little Red-eyebrowed Finch (*Ægintha temporalis*) is a neighbour, and nests in July. Wrens come too, some males of the common northern red-backed variety being in full or "nuptial plumage" the whole year round. August is a busy time with Roseneath birds, as with our own. Black-headed Pardalotes (*P. melanocephalus*) had been breeding for some weeks, and several clutches of eggs taken. Bee-eaters had then become plentiful and showed signs of nesting, though I do not find mention of eggs

being taken until November. The Pallid Cuckoo (*Cacomantis pallida*) is chronicled as being heard for the first time early in September [he was with us, near Melbourne, on the same date of the year referred to], and as recalling many southern memories. Writing in October, my friend says:—"The Roller (*Eurystomus pacificus*) is again here on his annual visit and will remain until after the wet season. A pair have taken up their quarters in a corner of our paddock and seem intent on nesting in a hollow tree. Flinders's Cuckoo is also here again. I have occasionally heard the Pallid Cuckoo call on moonlight nights, but this dark-robed fellow sings whether it be moonlight or not. Last night I heard him several times. *Merops ornatus* is very common here now. No eggs have yet been taken, though the birds are nesting everywhere. Each hole yet dug out has proved almost or quite ready for eggs. The nest of the Red-backed Superb Warbler, a structure very similar to that of the common Blue Wren of Victoria, was taken a few days ago. The eggs were smaller than those of the Victorian bird and rounder in form. Whilst wandering over the flats near Cromarty one morning I found a nest of a Native Companion. Here they build a very large nest of rushes and water weeds, all woven into a mass and floating in the water. I also saw several Grebes. Wild Geese and Ducks were plentiful, as well as many specimens of the beautiful Shieldrake, usually called Burdekin Duck." About the same time of year a pair of White-headed Ospreys (*Pandion cucocephalus*) were found nesting at Armidale Creek, some thirty-six miles away; but the tree was too hard to climb, and, in the absence of "niggers," the eggs could not be obtained. Speaking of Armidale Creek, surprise is expressed that the Laughing Jackass of the southern colonies (*Dacelo gigas*) was quite as plentiful there as anywhere in Victoria —in short, seemed to have full possession of the place, since the "discordant yells" of the northern bird were rarely heard there. "It seems strange," Mr. C. says, "that these birds should be so plentiful here, whilst a few miles down the road one scarcely sees or hears them." At Roseneath a fresh visitant, noted early in November, was the Channel Bill, and as rain followed within two days of his appearance, his reputation of rain bird was regarded locally as well sustained.

Some eggs much desired—those of the Roller—were obtained early in December; as well as those of Leach's Dacelo. Eggs of the Pelican were procured in the same month from an outlying portion of the coast, with the curious information from a resident there that "these birds breed every three months regularly, regardless of seasons." The informant also said the Curlew proper builds near where the Pelicans nest. On both points my friend wants further evidence. Nests of Grallinas, Orioles, Bee-eaters, Pardalotes, Kites, Warblers, Thickheads, Kingfishers,

Friar Birds, and several Finches were seen, and some taken, during the last week of November; and the birds were busy with domestic duties till well into December, but owing to the denseness of the foliage nests are very much harder to find than in Victoria. At the beginning of December young Orioles were found in a nest, and a pair of little Mangrove Bitterns built in a tree near the house, which could be easily climbed. Brown Hawks were laying in a giant Melaleuca, far out of reach A Jabiru's nest then found was described as an enormous structure of coarse sticks, bark, and grass, occupying a horizontal branch of a Leichhardt tree. A pair of these birds, which had been frequently noticed feeding round a small lagoon near the railway, were absent for some weeks, until the rains came, about the middle of December, then they again stalked proudly through the shallows, not even deigning to look up as their old acquaintance—the train—went by. Kites go away for some months also, but towards the end of the year return in large numbers. Their absence can hardly be, as first thought, for breeding purposes, since their nests were found close at hand. To preserve in some measure the balance of Nature, Nankeen Kestrels, which were plentiful during October and earlier months, take a Christmas vacation, supposed to be spent on Mount Stewart or Castle Hill. During January, in an ordinary season, the flats between Roseneath and Townsville are covered with water, when "Pelicans perch with stolid unconcern close by the belt of Mangroves, whilst White Cranes and Grey Herons dot the ground and trees alike." Ducks abound. About the beginning of the rainy season it is noted that, on sultry days, the birds hide in the trees till the sun is well on his downward way, and even then are not as noticeable as a month or so before, the reason assigned being that food in the shape of insects, &c., is then so abundant as to require very little search. Of parrots there is not much mention in the letters, but Mr. C. says of one in captivity:—"There is one remarkable fact about a Goolah Cockatoo belonging to a friend, which must be told. It last week managed to injure its wings when flapping them, as birds love to do after a shower. The wound bled profusely, causing the bird, judging from his screams and contortions, great pain. The tip of the wing was broken, and hanging only by a thread of skin. His mistress, full of compassion for poor cocky, cut off the injured portion and dressed the wound. The bird seemed better after this; but it was soon noticed that the whole of one side of his plumage was becoming a darker colour, and two days after the injury the pink of the injured side had turned a dark red, and the grey of the back was distinctly darker on that side. What is most remarkable is the fact that the eye on the injured side (usually of a beautiful light pink) turned a dark blood red,

as did the fleshy parts surrounding it. The bill also assumed a darker colour on that side. Was the inflammation from the wound the reason for such change of colour? Yesterday the colours seemed to be fading again, and will, I think, soon regain their normal tint. That all birds' colours are not fixed is proved by the fact that the white will come off a freshly killed White Cockatoo; whilst I have read that the Great Scarlet Macaw, if dropped when newly killed into a pool, will stain the water with its own hues."

Several birds are mentioned as having pleasing song, and that "the whistle of a woodland bird" has still power to make our friend's "pulses dance" is evident from such a passage as the following:—"I learned for the first time soon after coming here that the leaden-coloured Flycatcher had a very sweet voice—faint and low, but full of liquid melody. The bird listened to sat so high in a sheoak tree that one had to 'hearken diligently' not to lose the lower lispings. No doubt he was singing to an unseen mate, but the nest was so cunningly hidden that search was vain. The whistle—warble, one might call it—of that dainty little sprite, the White-eyebrowed Robin, who has been about since July, also struck me as never before—short, rippling notes, that seem to bubble out of a heart overflowing with happiness. He occupies the place of the Yellow Robin in Victoria, and peers and pries about with the same fearless persistency. The song of the Queensland Shrike Thrush, a bird resembling the Victorian Harmonious Thrush *(Colluricincla harmonica)*, but smaller, is not quite so full and rounded, nor yet so sustained as that of the southern bird; but it appears richer in melody, more sonorous, and somehow suggestive of tropical voluptuousness."

Snakes abound as early as September; deaf adders being also noted as having a nasty habit of lying upon garden paths or tracks at night. Concerning the snakes captured no information has come to hand save the remark that one is "a large and rather rare snake, about 7 feet long, of a light colour, marked with black bands, but its most prominent feature is its head, which is jet black. The black not only covers the head, but extends about two inches down the back." Mr. Frost, who has kindly taken the trouble to examine the specimens forwarded, has identified this reptile, of which the head only has been sent, as *Aspidiotes melanocephalus*, commonly known as the Black-headed Snake (non-venomous), of which Mr. Le Souëf brought back a live specimen on his return from Queensland. A Carpet Snake *(Morelia variegata)*; a Rock Snake, very similar in appearance to the Carpet Snake, but stouter (Nardoa, sp.); a very dark green Tree Snake, found also in Victoria *(Dendrophis punctulata)* and a Brown Tree Snake *(Dipsas fusca)*; a Black and White Ringed Snake, found also in Victoria *(Vermicella*

*annulata)* and Blackman's Snake *(Cacophis blackmanii)* are amongst the exhibits this evening, which also include the Large-frilled Lizard *(Chlamydosaurus kingii)*, with a young one of the same species; *Diporaphera australis*, a small long-tailed lizard; and a Gecko *(Œdura robusta)*, very common about the houses in North Queensland, where it has a habit of lying in wait on the wall-plate of these wooden structures for prey in the shape of flies, &c. One of these Geckos, which became almost a pet, cast its skin—a thin film one would almost fear to breathe upon, for fear of blowing it away—three times in very little over as many months.

Summer begins, so far as insect life is concerned, during September; but from November till March is the real season for the finer and more showy sorts of butterflies, moths, beetles, &c. During the rainy season, usually January, February, and March, "the great exotic butterflies flit on lazy wing from flower to flower, and deposit their eggs beneath protecting leaves." Combined heat and moisture seem necessary for their existence. They are not "so true to days, so true to hours," as responsive to the rain drops. Delay of the wet season means delay in the appearance of these beautiful creatures. Writing in the middle of December, 1889, Mr. C. says:—"Rain fell last night, and how the insects enjoy it. They come out in thousands to greet it. The other day the air was thick with flying ants during a shower—all flying in the same direction as the rain went, as if to be with it as long as possible. There were none to be seen before. They vanished completely when the rain ceased. Did they crawl back to their holes, or follow the shower as it climbed the southern hills and visited the parched land beyond?" Six days later:—"To-day the air is full of butterflies, but nearly all of one variety, black and white, with a streak or two of yellow on the under surface. They all fly in the same general direction, from south-east to north-west; whilst another variety, but in smaller numbers, fly in the opposite direction. I have frequently noticed that on plains or open forest country, away from creeks, the flight of butterflies all tends in one direction, not always the way the wind is blowing—more often at right angles to it. Why is this? Along the creek, the great black and white Papilios, with spots of red on the hind margin of the wings, fly in an erratic manner beneath the shadow of the trees, sometimes keeping low beneath the bank, at others mounting amid the dense branches of the figs and Leichhardts. The great Bull's-eye also loves the shadows. One never finds him in the glaring sunlight; but where the densest vegetation grows, and semi-darkness reigns, the Bull's-eye loves to be. Overhanging a pool, some 300 yards from my house, some hornets have a nest—a pendent dome of mud, containing many cells and one large

tubular entrance in the middle, like the mouth of a cornet; it is beautifully finished off, and a marvel of constructive skill; the difficulty of building so dainty a structure being greatly enhanced by the friability of the mud of which it is composed."

Hymenoptera seem to be numerously represented in the district; and with two or three more extracts on the subject of hornets I will close this paper. Mr. Cornwall wished to obtain a particularly fine nest to send to Melbourne, and writes concerning it:—"I had an adventure over the hornets' nest. Immediately after dinner one day I set out, feeling at peace with all mankind, though the fact that I carried gun, tomahawk, and sheath knife might make you doubt the assertion. Beneath the tree on whose branches the coveted specimen was suspended, the question arose, "How is it to be obtained?" To smoke the insects out seemed the most feasible plan; so dry and green boughs, grass, twigs, &c., were piled up and set on fire. As the smoke began to curl around them the hornets felt uneasy, and carefully kept within the circle of smoke. As they did not hurry to leave their home, I resolved to cut down the limb on which the nest hung. At the first blow there was great commotion, and it was well I ran for dear life, as the hornets swarmed in multitudes where I had been standing; had I remained they would have had sweet revenge. They soon settled down, however; so once more I went into the imminent and deadly breach, but had again to run. A third time and down came the limb, yours truly running harder than ever, not daring to return for a long time. Finding their home gone, the hornets swarmed in exactly the same way as bees do, and soon there was a bunch of them half the size of my head. After watching them from a distance for some time I decided to leave for the day and return when the commotion was over. That decision was my undoing; for, on returning, it was to find the treasure smashed to atoms, some animal having trodden upon it, with an utter disregard for the interests of science.

"While on the subject of hornets I have another tale to tell of a family who have taken up their abode in an outhouse. They are of a different species to those previously mentioned, being larger and more noble looking, and not so numerous. At first there were only two, who set to work and soon completed two or three cells; then a third hornet joined the first two; but next morning one was found dead on the floor. Deciding, after close examination, that he died a natural death, I put his body into the spirit bottle. The two hornets remaining seemed disinclined to go on building without more help, and evidently had an advertisement in the morning papers for hands as shortly afterwards three or four more workers augmented their numbers. Progress was then more rapid. For four weeks they have gradually gained in numbers, until now twenty-two are at work; but the adage, 'Too

many cooks spoil the broth,' seems true in this case, for during the last week only two cells have been added."

A fortnight afterwards we read :—"The hornets have progressed steadily, and bid fair to prosper and multiply upon the rafters. There are now two communities, at the first of which the females have laid eggs in the centre cells, which are furnished with a goodly store of spiders and insects, upon which the young hornets must subsist until old enough to venture forth into the wide world."

The next chronicle reads :—"Our families of hornets seem to have settled down to life's business very quietly. The limit of numbers to a nest seems about sixteen. The first nest is about the size of a large teacup, and for some weeks has not increased, the insects appearing to have ceased adding cells."

"Some time ago we took a large mud (hornet's) nest out of the chimney and laid it on the box on the verandah. Very soon a large hornet, of another sort to that which built the nest, took possession, and began adding cells thereto. It would complete one cell with the exception of a small hole at one end, and then deposit in it an egg, after which the hole was soon closed up. After building some half-dozen cells the busy one came to grief. It evidently wished to moisten some of the clay with which to build, and went to the tank for water. By some means it fell in and was drowned. The most remarkable thing about this incident was that there was never more than the one insect engaged. That it worked without any mate I am quite convinced, as both my wife (who has been deeply interested in these insects) and I watched the nest very closely."

## NOTES ON SOME VICTORIAN COCCIDÆ, OR SCALE INSECTS.—Part II.

By C. French, F.L.S.

*(Read before the Field Naturalists' Club of Victoria, 13th February, 1893.)*

*The Pupa.*—Here the first distinctions between the sexes may be noted, and these are principally observable in the cocoons, or puparia, rather than in the insect itself—at least to outward appearance. The male pupa is, in all cases—even in those where the female is naked—enclosed in some kind of covering. In the Diaspidinæ the pupariam is formed partly of fibrous secretion and partly of discarded skin ; only as the full-grown male emerges from it as a fly, and does not remain on the plant, there can be only one such skin—that of the larva ; consequently it is easy to distinguish the male puparia from the shields of the adult females by the presence of only one discarded pellicle instead of two. In the Lecanidinæ and the Coccidinæ the male puparia are dis-

tinguishable usually by a narrower and more cylindrical form than those of the females, when these latter are covered; in the naked species the males are generally in white waxy or cotton cocoons. Examinations of the pupæ in these coverings will generally show more or less developed processes on the back and sides, which are so evidently the rudiments of the future wings that the presence of a male is not doubtful. In other respects the male pupæ are not always to be distinguished from the females.

The full-grown male has been described in part i. of this paper (*Victorian Naturalist*, vol. ix., p. 142). It is, as Mr. Maskell says, usually easy to procure specimens, provided the pupæ are obtained. If any of these in their coverings are put into pill boxes with glass tops, or any place where light reaches them, they will generally produce the full-grown insect—sometimes in a few days, sometimes after several weeks. The time of year seems very variable. Males emerge from the puparia indifferently (in New Zealand) in summer or winter. (It would probably be the same in Victoria.—C. F.)

GROUP.—DIASPIDINÆ.

Genus.—Aspidiotus, Bouche.

ASPIDIOTUS SUBRUBESCENS, Maskell, sp. nov.

Female puparium reddish-brown, sub-circular, flat and smooth; the pellicles in the centre small, forming a small slightly elevated boss, which is rather yellower than the rest. Diameter of puparium variable; specimens reach from $\frac{1}{25}$ inch to $\frac{1}{18}$ inch.

Male puparium white, slightly elongated, not carinated. Length, about $\frac{1}{20}$ inch.

Adult female of the usual peg-top form of the genus, the terminal segment shrinking up at gestation; colour, brown. Abdomen ending in six rounded lobes, with a number of scaly serrated hairs between them; these hairs extend also a short way along the margin, and where they end is another lobe, which is denticulate and pointed. Spinneret groups four, the upper pair with 16 to 18 orifices, the lower pair with 10 to 12. Many single spinnerets.

Adult male unknown.

This scale was found by myself on leaves of *Eucalyptus gunni*, which grows sparingly in certain parts of the district near Mordialloc, on Port Phillip Bay. In some cases this scale is very thick on both the upper and under side of the leaves, but beyond turning the affected leaves partly yellow it does little harm, as the saplings at least would appear to outgrow the effects altogether. Mr. Maskell, from whose work the whole of the scientific descriptions here given have been taken, states that this species is not far removed from *Aspidiotus ficus*, one of the "Red Scales of Florida," so that we must be on the strict look-out for this insect, and which may in all probability tackle our fruit trees. A number

of the puparia of this species were kept under glass, but unfortunately no male specimens were developed, many of the puparia having borne evidence of an attack from some minute hymenopterous fly.

ASPIDIOTUS FODIENS, Maskell, sp. nov.

Female puparium circular, slightly convex, greyish or reddish-brown ; the pellicles in the centre rather more convex, forming a slight boss, and bright orange, but often covered with a thin greyish scaly coating. Diameter of puparium averaging about $\frac{1}{25}$ inch. The puparia occupy depressions in the leaf which have the appearance of being caused by the insect.

Male puparium slightly elongated, similar in colour to that of the female, but smaller ; not carinated.

Adult female of the normal peg-top form, orange-coloured, the abdomen somewhat acuminate. Abdomen ending in six rather narrow floriated lobes, set rather close together, with many scaly serrated hairs between them ; at a little distance away on the margin is another lobule on each side, which is denticulate, as in the last species. Spinnerets in four groups ; upper groups with three to two orifices, lower groups with one or two. Many single spinnerets.

Adult male unknown.

On isolated specimen of *Acacia linearis*, the seeds of which have probably been brought down from some of our mountain districts, where it is very common. This scale is a fairly conspicuous one, and the depression in the leaves, also alluded to by Mr. Maskell, are very striking. This species has probably a much wider range than where I found it, but although the bushes of *A. linearis* have been searched no further specimens could be found, although I looked very carefully for them on the above and under part of the leaf. Mr. Maskell thinks this species approaches that of *A. uvae*, an insect infesting vines in Indiana, U.S. of America.

*(To be continued.)*

## ARTICLES OF INTEREST TO VICTORIAN NATURALISTS IN RECENT PUBLICATIONS RECEIVED.

IN "*Proceedings of Linnean Society of New South Wales*," 2nd series, vol. vii., part 2 :—

"A Viviparous Australian Peripatus," by J. J. Fletcher, M.A., B.Sc.

"Catalogue of Described Hymenoptera of Australia," part 2, by W. W. Froggatt. Enumerating 488 species, belonging to thirteen families and 70 genera, principally wasps and bees.

"On the Oviparity of the Larger Victorian Peripatus," by A. Dendy, D.Sc.

## DESCRIPTIONS OF NEW AUSTRALIAN PLANTS, WITH OCCASIONAL OTHER ANNOTATIONS;

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

*(Continued.)*

Solanum Lucani.

Somewhat frutescent and diffused, bearing a very thin, almost velvety vestiture, beset except on the leaves with short prickles; petioles mostly long but slender; leaves from cordate-ovate to elliptic-lanceolar, often repand at the margin, almost of equal green on both sides; peduncles conspicuous, 2- to 4-flowered; pedicels soon elongated; calyx during anthesis small, copiously beset with prickles, its lobes minute, acute, its tube enlarging all round the fruit; corolla very much exceeding the calyx, unarmed, white, hardly lobed, the greater portion outside glabrous; anthers slender, discoherent; style capillary, almost glabrous; berry spherical; seeds renate-orbicular.

At Cambridge-Gulf; Aug. Lucanus.

Stem to 1½ feet long. Prickles on the petioles, peduncles and pedicels usually very small; leaves laxe, occasionally bearing some few prickles, their maximum length 4 inches, their greatest breadth 2 inches, the stellular hairlets on the upper page rather scattered; racemes including the peduncles attaining to 4 inches length; pedicels finally lengthening to 1 inch and distant; corolla about ¾ inch wide, of very tender texture; berries quite concealed by the calyx, measuring fully ½ inch, their colour as yet unascertained.

This species differs chiefly from *S. Cunninghami* in lesser indument, copious prickles, thin texture of the leaves, shortness of the calyx-lobes, smaller, almost lobeless corolla, and the fruit of *S. Cunninghami* will probably prove also different, and be more like that of *S. cataphractum*. Our present plant is already distinguishable from *S. sporadotrichum* in closer vestiture, absence of prickles on the leaves, but presence on the inflorescence, form of the calyx, and probably also in fruit characteristics.

Utricularia Kamienskii.

Dwarf, annual; root very short, capillularly fibrilliferous; stem 1- to 3-flowered, extremely thin; leaves early evanescent or undeveloped; bracts and bracteoles basifixed, narrow, finely pointed, pedicels longer than their flowers; upper sepal orbicular-ovate, lower slightly and acutely bifid; corolla white, its upper portion narrow, slightly and bluntly bilobed; lower portion somewhat longer than the upper, nearly to the middle divided into three rather narrow bluntish lobes; basal protrusion cylindric-conical, blunt, hardly shorter than the upper expansion.

Near the Adelaide-River; M. and N. Holtze.

Height 2 to 6 inches. Length of pedicels generally from ½ to

1 inch. Lower expansion of the corolla ¼–⅓ inch long. Fruit not yet obtained.

This delicate and evidently rare species is dedicated to Dr. F. Kamienski, professor in the University of Odessa, who was the first to furnish a complete morphologic account of a terrestrial Utricularia (the Australian *U. lateriflora*), who elaborated the Lentibularinæ for Englers and Prantl's "Pflanzen-Familien," who travelled as far as south-eastern Asia for the study of this order of plants, and who is now engaged on the monographic elucidation of the species from all parts of the globe.

*U. compressa* may possibly be represented by this plant; but R. Brown's notes, probably from Solander's manuscripts, are so extremely brief as to admit of no safe identification, and specimens of the particular plant from Cook's first expeditions exist nowhere now.

Utricularia Holtzei.

*Polypompholyx Holtzei*, F. v. M. coll. Dwarf; pitchers few or undeveloped; stem capillulary-thin, usually one-flowered; bracts and bracteoles extremely minute, rather acute, basifixed; pedicels slightly thicker than the stem, shorter than the flower; sepals minute, blunt; corolla small, cream-coloured, its lower expansion deeply cleft into five lobes, all of these narrowly elliptic-cuneate, rounded-blunt or somewhat truncate, the two outer considerably shorter than the others, and but slightly exceeding the narrow blunt or at the summit denticulated upper portion of the corolla; basal protrusion several times shorter than the long lobes, blunt, proportionately turgid.

Near the Adelaide-River; M. and N. Holtz.

Height 1½-2 inches. Corolla ¼-⅓ inch long. Fruit as yet unknown. Root very short, fasciculate-capillular; but some specimens placed with this plant show a tender flexuous rhizome elongated to several inches, minutely ramified, which really seems to belong as a nutritive organ to this species. The aspect of the plant is very much that of *Polypompholyx tenella*, particularly on account of the fissurated lower expansion of the corolla, and leaves will doubtless yet occasionally be found to be formed as well by this delicate plantlet.

Messrs. Holtze further detected on the Adelaide-River also *U. albiflora* or a closely allied species; it agrees with the brief definitions given by R. Brown and by Bentham for Sir Joseph Banks's plant, except that the lower expansion of the corolla is produced into five almost semi-lanceolar divergent lobes; therefore the Holtzean plant might be distinguished as a variety or possibly as a species by the designation *quinquedentata*. Its extreme tenuity is that of *U. capilliflora*; the corolla in drying assumes a slightly yellow hue; the minute fruit is nearly globular; the seeds are extraordinary small, ellipsoid, and when ripe outside dark-brown.

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## FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Field Naturalists' Club was held in the Royal Society's Hall on Monday evening, 13th March. Mr. D. Best (one of the vice-presidents) occupied the chair, and there was an attendance of some sixty members and friends.

### LIBRARIAN'S REPORT.

The hon. librarian reported the following donations to the library:—"Catalogue of Australian Mammals," by J. Douglas Ogilby, F.L.S., from Australian Museum; "Records of the Australian Museum," ii., 4, from Australian Museum; "Contributions to Queensland Flora," Bulletins 6 and 7, by F. M. Bailey, F.L.S., Department of Agriculture, Brisbane; "Journal of Pharmacy," January and February, 1893, from Society.

### MEETING FOR PRACTICAL WORK.

The hon. secretary reported that a successful meeting for practical work was held on Monday, 27th February, when Mr. Barnard, sen., laid before those present a few notes on the mounting of micro-fungi. His remarks were chiefly confined to the class of fungi known as epiphyllous, the first example taken being a form (*Œcidium senecionis*) commonly found on the under surface of the leaves of the common groundsel (*Senecio vulgaris*) as a group of yellowish cups (cluster cups) filled with bright yellow spores. For a dry mount the use of the card or paper cell method was advocated whilst carbolic acid was mentioned as a good medium for preparing transparent objects. A useful series of mounts for each fungus was proposed, as the leaf as found, detached spores as found, and sections of the leaf through the affected part. Plants affected with fungi were distributed at the meeting for examination, and altogether Mr. Barnard may be congratulated on having furnished an interesting and profitable subject for consideration.

### PAPER READ.

By Messrs. Ernest Anderson and Frank Spry, entitled "The Rhopalocera of Victoria," part i. Four families of butterflies are represented in Victoria, but only two families claimed the attention of the authors on this occasion. Of these the "swallow tails"

(*Papilionidæ*) first came under notice, three species of which are worthy of the attention of those who possess orangeries, seeing that they support themselves in the caterpillar stage upon the foliage of the orange tree. All the species of this family, however, must not be regarded as pests, since some forms have a partiality for the mistletoe, whilst others feed upon the native cherry, caper tree, &c. Amongst the "whites" the Imperial (*Delias harpalyce*) had a chief place, full details being given of its habits and powers of flight. In the second family, the wonderful migratory powers of the Wanderer (*Danaus erippus*) from its native haunts in South America to our own shores were fully described. The advance guard, travelling eastwards from America, reached England in 1876, whilst ten years later captures were made in Spain and Portugal. The westward march, by way of the islands in the Pacific, can be clearly traced, Queensland being reached in 1890, and Melbourne two years later. It can with a fair amount of confidence be predicted that the pioneers of these eastern and western contingents will, ere long, meet each other face to face, and then will come the tug of war. The history of the march of this form is particularly interesting to the student of the distribution of animal life over the surface of the globe, showing the ways and means by which a local form may become cosmopolitan within a comparatively short space of time. Those lively little brown butterflies, so familiar to those who have paid a visit to the ranges near Melbourne, were accorded an enthusiastic notice, one genus (*Xenica*) being strictly Australian. Perhaps the most striking feature about the paper was its very full descriptions of the life-history of many forms previously undescribed. To the young naturalist the collection of specimens undoubtedly gives a great deal of pleasure, but the authors clearly proved that the chief place of value must be given to the study of the life-history of these forms. For in some cases, as cited above, these interesting and beautiful forms prove themselves veritable pests; a knowledge, therefore, of their food plants, would often locate them in one or other stage of their existence, and so enable, if necessary, measures to be taken for their destruction. No less than 31 species were mentioned, and every one of them was fully illustrated by means of a series of coloured lantern slides prepared by Mr. Anderson and exhibited by Mr. J. Searle.

### EXHIBITION OF SPECIMENS.

The meeting closed with the usual exhibition of specimens, of which the following is a list:—By Messrs. E. Anderson and F. Spry.—Specimens of *P. kershawi* with dark spots, also typical form; *X. achanta*, with abnormal ocellus on right anterior wing; *X. kluggii*, female type, also var. *gemini*; also "Victorian Butterflies," vol. i. (by Messrs. Anderson and Spry). By Mr.

A. Coles.—Mounted specimens of Chestnut-backed Thrush (*Cinclosoma castaneonotum*), Australian Swift (*Cypselus pacificus*), and Clinging Parrot, from Calcutta; also 10 Sea Balls, collected on the beach of Kangaroo Island. By Mr. W. D. Davies.—Eggs, beetles, birds' skins, leaf insect, shell, and fossil bone, from Western Australia; and Sea Horses (*Hippocampus*), from Singapore. By Mr. C. French, F.L.S.—Collection of the destructive insects of New Britain, including the beetles which destroy the cocoanut and coffee trees. By Mr. J. Gabriel.—An Hydrozoa dredged at Western Port, and parasite of Leatherjacket. By Mr. T. S. Hart.—Fossil wood from Sandringham. By Baron von Mueller.—"Iconography of Candollaceous Plants" (first decade); collection of plants from Mt. Mueller, Gippsland, recently collected by J. G. Luehmann and C. French, jun. By Mr. J. Shephard.—Microphotographs of sections of embryo chick. By Miss Turner.—Curious fish and insect larvæ. By Mr. H. T. Tisdall, F.L.S.—Cast formed by new wood grown over a surveyor's mark cut forty years ago on a eucalyptus.

## NOTES ON SOME VICTORIAN COCCIDÆ, OR SCALE INSECTS.—Part II.

(*Concluded from page* 174.)

By C. French, F.L.S.

Aspidiotus bossiæ, Maskell, sp. nov.

Female puparium circular, convex; colour varying from dirty-white to yellow, and sometimes to dark brown, texture soft and woolly-looking; pellicles central, very small and inconspicuous, yellow. Diameter of puparium averaging about $\frac{1}{18}$ inch. Male puparium whitish, slightly elongated, smaller than that of the female; not carinated.

Adult female dark brown, of normal peg-top form. Abdomen in two not large rounded lobes, and perhaps after a small interval another inconspicuous lobule on each side. Margin slightly serrulate. No groups of spinnerets on each side.

Adult male unknown.

On the well-known creeping *Bossiaea procumbens* this very distinct species was first found by myself near Berwick, where it was thickly covering the upper surface particularly of the plant, the leaves of the latter having quite a whitened appearance. Later on it was found near Nhill by Mr. C. Walter, who kindly sent me a good supply of specimens, but so far I have been unable to rear any males from those placed by me in the little boxes. In examining the pupæ of this species I have not noticed any indication of the same having been attacked by any parasitic enemy. It is possible, as Mr. Maskell observes, that *A. caldesi*

(Targioni) may be very near this species. I may remark that on the specimens given to me by Mr. Walter the scales were quite thickly covering the under side of the plant, and from what I could see it would seem to be confined to this one host plant.

Aspidiotus cladii, Maskell, sp. nov.

Female puparium rich dark brown, the margin orange-red and the pellicles dark yellow. Four, circular, rather convex; pellicles central; diameter about $\frac{1}{16}$ inch.

Male puparium, similar in colour, but narrower and elongated; length about $\frac{1}{20}$ inch; not carinated.

Female dark brown, almost black, the abdominal extremity lighter coloured. Form of the usual peg-top shape of the genus, shrivelling at gestation. Abdomen acuminate, ending in four small terminal lobes and another pair rather higher up. Margin serrated, bearing at each side two rather long hairs. A few hairs also on the cephalic segments. No groups of spinnerets, but a few small single orifices.

Adult male unknown.

This is a very handsome and distinct species—it being, owing to its bright colours, very conspicuous. During a trip to the Wimmera district I found this species to be very common around Dimboola and Nhill, where the Cladium rushes, which in these parts are common on flat ground, are covered with them, so thickly indeed that very little of the surface of the rush is visible, at least from a little distance. When this scale attacks one of the rushes, they seem to swarm on to the leaves in great numbers, and immense numbers of the rushes have thus been killed by them. Fortunately, however, this insect would seem to be peculiar to this one plant, as a very careful search failed to reveal the presence of a single scale of this species on any other plant save the Cladium; and should this theory hold good, the grower, we hope, may have little to fear from this new pest.

Aspidiotus rossi, Crawford, sp. nov.

Female puparium normally circular, very slightly convex, colour a dull deep brown, almost black, fading into a lighter shade at the edge; pellicles central, small, forming a little boss, which is sometimes yellowish. Diameter of puparium averaging about $\frac{1}{16}$ inch, but varying a good deal. When on narrow leaves the form is sometimes irregular, oblong or elliptical.

Male puparium slightly elongate; smaller and lighter in colour than that of the female.

Adult female of the normal peg-top form; dark orange, often dark brown, in colour. Abdomen somewhat acuminate, the margin having a rather deeply serrate appearance, with six floriated terminal lobes, beyond which are three very small denticulate lobules; a few serrated scaly hairs. Four groups of

spinnerets; upper groups with eight orifices, lower groups with four; several single spinnerets.

Adult male unknown.

A very common and remarkably cosmopolitan species, which I first saw named in the collection of my late esteemed friend, Mr. T. S. Crawford, in Adelaide. The deceased gentleman, according to his friend and colleague, Mr. Maskell, had, before his death, named the insect; but the description, it appears, was never published until Mr. Maskell kindly undertook to furnish and publish the above scientific description of the insect in its several stages.

Of all the scale insects which are natives of Victoria, *Aspidiotus rossi* would appear to be about the most common, also the most widely distributed, and it is to be found on the foliage of olives, cork-oaks, blackwood, and shrubs innumerable; and a most singular form of this insect has lately been found by myself, feeding on the juices of the well-known native shrub, *Ricinocarpus pinifolius*, growing in great numbers about Cheltenham and other sandy districts. Here we have an almost circular scale insect changing its form to enable it to live on the needle-like foliage of the Ricinocarpus. This is a most interesting subject, and a study of the means of its transition would be both useful and instructive. Specimens of both forms are here for inspection this evening. This scale would appear to be of a remarkably hardy nature, as near Sandringham, on the sea coast, and only a few miles from Melbourne, it may be found covering the leaves of Alyxia, a very rigid and hard-wooded shrub, whose leaves, with the scales attached, are at high tide often either partly submerged or soaked with spray, but still these singular little insects adhere closely to the leaves, and would appear to be quite unhurt by the continuous action of the sea water.

This is one of the scale insects which must be watched, lest it once finds its way into our orchards—it is already in many gardens—as, once established, it will be a difficult matter to eradicate it. It is a most singular fact that hitherto—at least, so far as I am aware—very few of our native Coccids have yet attacked our fruit trees, the imported pests being responsible for the greater part of the damage done both here and in the other colonies.

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We learn that Baron F. von Mueller, K.C.M.G., M. and Ph. D., &c., Government Botanist of Victoria, has recently received further honours, having been elected President of the International Academy for Botanical Geography of Le Mans, France; also, one of the thirty members of the International Commission for Botanic Nomenclature at Genoa, besides which he has been elected foreign member of the Academies of Science at Boston, Copenhagen, and Stockholm respectively.

# ON THE COLOUR VARIATIONS OF SOME AUSTRALIAN LEPIDOPTERA.

By James Lidgett.

*(Read before the Field Naturalists' Club of Victoria, 13th February, 1893.)*

[*Abstract.*]

The observations recorded in this paper refer to the butterfly *Pyrameis kershawi* (M'Coy), commonly known as the blue-spotted Painted Lady butterfly, and the moths *Porina fuscomaculata* (Walker), and *Spilosoma obliqua*, var. *fulvohirta*. Whether this latter should be a distinct species is still undecided.

Every entomologist, when classifying and arranging his Lepidoptera must have experienced the difficulty of distinguishing between varieties and distinct species—difficulties which are not cleared up even by the best authorities. Take the butterfly *Pyrameis kershawi* (M'Coy), for instance: many Australian lepidopterists, especially those of the northern colonies, classify this as *Pyrameis cardui* (Linn.) In a letter recently received from Mr. A. S. Olliff, of Sydney, he says:—"My opinion regarding the point you raise is that it is of very little consequence whether we call *P. kershawi* a species or a variety. The point is, and it is a very interesting one, that the form *kershawi* is clearly a geographical race of comparatively recent development. Specimens of *P. cardui* and *P. kershawi* have been taken in Europe—I mean, specimens undistinguishable from the Australian form. I myself prefer to call the insect *P. cardui*, var. *kershawi*. *P. lucasi* (Misk.) is only, I think, an aberration of the same species." Further, Mr. Olliff, in the "Proceedings Linnean Society of New South Wales," 2nd series, vol. iii., contributes a paper entitled "Two Instances of Colour Variations in Butterflies," in which are discussed several interesting questions regarding *P. cardui*. He states that a butterfly was captured at Bombala, N.S.W., which accurately agreed with a typical specimen of *P. cardui* from Europe, while he captured a specimen in Holland which, if taken in Australia, would have undoubtedly been regarded as *P. kershawi*.

Professor M'Coy in "Prodromus of Zoology of Victoria," decade xx., says that *P. kershawi* is a distinctly smaller species than *P. cardui*, and there are other constant differences, still some curious coincidences. But on the whole I have no doubt of the specific distinctness of the Australian form.

The late Mr. Henry Edwards, in the *Victorian Naturalist*, vol. viii., page 150, points out several important differences between the chrysalis of the two types, and says that *P. kershawi* approaches more closely the allied species, *P. caryæ* (Hubn.), found on the Pacific Coast of America.

It is strange to note how the larvæ of *P. kershawi* prefer the Cape Weed (*Cryptostemma calendulacea*), an introduced plant, to any indigenous food plant, and a study of the early stages is, I think, the only way by which we may settle this question. Meanwhile I prefer regarding *P. kershawi* (M'Coy) as a distinct species.

The second instance is the moth *Porina fuscomaculata*, a species pretty generally distributed throughout Victoria. In a typical form the ground colour of this insect is dark fuscous or occasionally inclining to cinerous ochreous; fore wings brownish grey, mixed with cinerous. Being a somewhat plentiful insect, it allows a good scope for observations regarding variation. I have taken many specimens on the wing showing great differences, and in May, 1889, succeeded in rearing some larvæ from eggs deposited by a typical *P. fuscomaculata*. From these I obtained twenty-three moths, eighteen of which were ordinary forms, while five were abnormal. The fore wings of the latter were light grey, mottled and banded with cinerous, dark fuscous, and white markings. The hind wings were almost entirely white, distinctly showing the course of the nervures, with several oblique bands of ground colour near the abdominal margin. Had these five insects been taken on the wing their identification might have caused me some little trouble. Specimens and drawings are on view this evening.

The third example I shall refer to to-night is the Ermine Moth, or moths, as it is a question whether *Spilosoma obliqua* and *S. fulvohirta* are identical or not. As far as my experience goes, I am forced to the conclusion that the latter is only a variety of the former, inasmuch as I have reared undoubted *S. fulvohirta* from ova deposited by a typical *S. obliqua*. Mr. Ernest Anderson, in a paper read before this Club, and published in the *Victorian Naturalist*, vol. ix., page 80, has recorded similar facts. I find if the pupa of *S. obliqua* be kept in the dark, 20 per cent. of the imagos will emerge as typical *fulvohirta*. The results of further observations regarding these moths I hope to bring before the Club on some future occasion. Meanwhile I incline to the name *Spilosoma obliqua*, var. *fulvohirta*, for the dark Ermine.

In conclusion, I trust these few remarks will be sufficient to indicate the direction for further scientific investigation, and to induce others to bring their observations before this Club.

## THE "FLORA AUSTRALIENSIS."

We are pleased to learn that the publication of a completing volume to Bentham's "Flora Australiensis" is likely to be shortly undertaken in Melbourne. It has long been the

intention of Baron von Mueller to furnish such a volume, more especially as after fifteen years' previous botanical researches in Australia he was the collaborator of Mr. Bentham in the "Flora," the first and as yet the only one for any of the great divisions of the globe. A vast proportion of the plants thus rendered known were from his own writings ; and moreover the illustrious author, in the preface to the seventh volume, expressed a particular wish that the Baron should continue this great work. Ever since the last volume appeared, in 1879, the Government Botanist of Victoria has zealously and perseveringly followed up his elucidation of the Australian native vegetation with the final object before mentioned.

The issue of a supplementary volume has hitherto been deferred, as new plants continued to be discovered, of which fact the pages of the *Victorian Naturalist* bear witness, thus showing that an early supplement would soon have proved incomplete, and further, as the novel species, gradually and connectedly added through the "Fragmenta Phytographiæ Australiæ" and other publications, were all given in von Mueller's first and second "Census of Australian Plants" up to 1889, a third being soon due, so that with the utmost ease the gradually accumulated material for an additional volume of the "Flora Austr." could be utilized. Indeed, these publications were all furnished as so many contributions towards an additional volume. Hitherto, with a single exception, no desire for a compact supplement was expressed, and this is not surprising, as Queensland, Victoria, and South Australia have all had their special "Floras" by local authors for some years, and as one for New South Wales has just gone through the press ; each "Flora" bringing the botanical knowledge for its colony up to the time of publication. As few unexplored parts of Australia now remain, to afford additional material for novelties, the intention of Baron von Mueller, so long cherished, will be early carried out. For this task his position is unique. He has gained personal experience by long exploratory travels in each of the Australian colonies, his researches in this part of the world having commenced in 1847, after seven years' previous home studies. Bentham's wish, previously alluded to, is expressed in the following words :—"The additional species have moreover been described by Baron von Mueller in his 'Fragmenta,' and it is to be hoped that, in order to render these descriptions readily accessible to those who have to make use of my 'Flora,' he will consolidate them into a methodic synopsis, in conformity with the system I have adopted. This would give him the opportunity, to rearrange my genera with reformed characters in those cases where his views have proved at variance with mine."

## THE LATE REV. W. WOOLLS, PH.D., F.L.S.

IT is with great regret that we record the death of the Rev. Dr. Woolls, the Nestor of Australian botanists, being almost an octogenarian, on the 14th of March, after a severe but very short illness, though he had been ailing for the past year or two.

He was born in Hampshire, England, and emigrated to New South Wales in 1832, where he resided ever since. His life was devoted to educational work. Starting as teacher of the ancient languages at the Sydney Grammar School, he afterwards established a school of his own at Parramatta, in which several of our Victorian colonists received their education. This he conducted till 1873, when he was ordained for the Anglican Church, his incumbency being Richmond, on the Hawkesbury River; from which ecclesiastical position he retired into private life ten years later, borne down with the weight of age and long, laborious work.

The late Dr. Woolls spent, particularly in earlier years, considerable time in literary pursuits, being the author of several works, amongst which were "A Contribution to the Flora of Australia" (1867), which was printed for him by the University of Gottingen, and earned for him the honorary degree of Doctor of Philosophy; "Lectures on the Vegetable Kingdom" (1879), "Plants Indigenous to the Neighbourhood of Sydney" (1880), and "Plants of New South Wales" (1885). Some idea of the magnitude of his phytographic engagements may be gained from the fact that, from 1857 to some few days before his death, he wrote more than one thousand letters to Baron von Mueller, who has kindly furnished notes for this brief memoir.

He was elected a fellow of the Linnean Society of London in 1865, and in January, 1884, became an honorary member of the Field Naturalists' Club of Victoria, in the welfare of which he always took a great interest, contributing the following papers to its Proceedings :—April, 1884—"Notes on the Classification of Eucalypts," *Victorian Naturalist*, vol. i., page 30; June, 1884—"Double Flowers," *Victorian Naturalist*, vol. i., p. 60; September, 1885—"On the Sanitary Properties of Eucalypts," *Victorian Naturalist*, vol. ii., p. 84; July, 1887—"Plants of New South Wales having Medicinal Properties," *Victorian Naturalist*, vol. iv., p. 103; March, 1890—"Notes on the Distribution of Aquatic Plants in New South Wales," *Victorian Naturalist*, vol. vi., p. 176; and April, 1891—"The Destruction of Eucalypts," *Victorian Naturalist*, vol. viii., p. 75. He was also a contributor to the "Proceedings of the Linnean Society" of his own colony.

Among his numerous botanical observations may be mentioned the discovery of several entirely new plants, some of which bear his name.

The large assemblage of mourning friends at his grave amply testified to the high esteem in which he was held by the community.

## "VICTORIAN BUTTERFLIES."

It is with great pleasure we welcome the first part (80 pp.) of what promises to be an excellent popular handbook on the Victorian Rhopalocera, which will be completed by the early issue of a second part. The authors, Messrs. E. Anderson and F. Spry, are to be congratulated on the clear yet concise descriptions of the 26 species mentioned, each of which is excellently figured. Besides the description of the perfect insect, wherever possible notes of the larvæ, food plants and habits are included, thus adding greatly to the value of the work from an entomological point of view. In order to meet the wants of beginners it commences with a brief introductory chapter on collecting and preserving insects, more especially butterflies. The illustrations are a great feature in the book, having been produced in excellent style and, so far as we can find, with few errors—the drawing of the female of *Delias harpalyce* being perhaps the most questionable, while that of *Epinephile abeona* hardly conveys to the reader the richness of its darker markings. In many cases both male and female insect is figured, and a large number of the larvæ and chrysalides are delineated for the first time. The spelling "*kershawii*" differs from that of Prof. M'Coy in the Prodromus—viz., "*kershawi*." Another excellent feature is the addition of an English name for each species, which, if their adoption can be made universal will do much to popularize this group of insects among the young people of Victoria. The part is well indexed, though the addition of a systematic list similar to that published in the *Victorian Naturalist* for December, 1892, would have increased the usefulness of the book, though perhaps the authors intend to include it on the completion of the second part. The printing of the book leaves nothing to be desired, and we trust this little work may be the forerunner of many other handbooks on the different departments of Victorian Zoology, for which there is much need.

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A New Victorian Butterfly.—A butterfly known to Victorian collectors for some time past, and much resembling *Heteronympha banksii* (Leach), has been named *H. paradelpha* by Mr. O. Lower, of Adelaide. It is probable that Dr. Lucas intended to name this insect when he described *H. affinis* (Lucas), but his description agrees with a typical specimen of *H. banksii*, as described by Leach in 1815, the principal distinction between the two insects being that in *H. paradelpha* the large black spot in the anal angles of the secondary wings has *no* outer encircling ring.

## DESCRIPTIONS OF NEW AUSTRALIAN PLANTS, WITH OCCASIONAL OTHER ANNOTATIONS;

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

*(Continued.)*

Atriplex lobativalve.

F. v. M., "Iconogr. of Austral. Salsolac. Plants," t. vi.

Prostrate, grey from a very short somewhat lepidote and papillular vestiture; leaves small, mostly somewhat rhomboid in outline, cuneated into the short petiole, often upwards bluntly short-lobed; clusters of staminate flowers at and towards the summit of the branches, hardly exceeding the leaves or shorter; pistillate flowers in lower positions, sessile, only few together in each axil, their two segments divergently and deeply cleft into five lobes but devoid of appendages, the two lower lobes almost deltoid, the three other lobes nearly semilanceolar; radicle ascending.

Near the Marshall-River, Winnecke; at Lake Yantara, Bauerlen.

Seemingly annual. Allied to *A. velutinellum* and *A. fissivalve.*

Although this and the following plant were illustrated already 1889 and 1891 respectively, as yet no diagnoses of them had been furnished.

Bassia longicuspis.

F. v. M., "Iconogr. of Austral. Salsolac. Plants," t. 24.

Nearly glabrous; branches streaked; leaves rather long, almost cylindric-filiform, acute; flowers solitary; stigmas two; fruiting calyx with ample and hollowed base sessile, usually by about half longer than broad, terminated by four setaceous-subulate spinules, two of which several times longer than the calyx, the other two or one much shortened; seed longer than broad; radicle ascending and considerably extending beyond the cotyledons.

Charlotte-Waters, Rev. H. Kempe; Beltana, Mrs. Richards; Darling-River, Mrs. Kennedy.

Fruiting occasionally at a height of some few inches already, and probably never tall. Allied to *B. Forrestiana.*

Leucophyta Lessingi.

De Candolle in 1837 mentions both for Leucophyta and Calocephalus the first specific names as given by Lessing, but Kuntze in his "Revisio Generum Plantarum" (1891) has shown, that already Cassini in 1832, therefore nine years earlier, gave a specific name to Leucophyta, whereas Calocephalus was then left yet without any appellation for its species. Kuntze therefore makes Leucophyta supersede Calocephalus, and consequently the 10 species of the latter genus appear in his work (p. 351)

under Leucophyta. His transfer, as may be seen from the second edition of the writer's "Census of Australian Plants" (p. 140) affects 11 species; but in the "Key to the System of Victorian Plants" the desirability of uniting *C. citreus* and *C. lacteus* has already been indicated four years ago, limiting the species to 10. The differences between the two plants just mentioned do not seem to be specific, as even the delineations by Decaisne in the botanic Atlas to the "Voyage de la *Coquille*" show only diversities indicative of varieties, so that the colour of the flower-clusters seems to remain the only distinctive characteristic. But in the "Fragm. Phytogr. Austral." iii. 136 (1863) it was already remarked, that many of our Everlastings with yellow involucres are varying with white involucral bracts. Therefore the *Calocephalus Lessingi*, of the "Key," combining *C. lacteus* and *C. citreus*, should now be called *Leucophyta Lessingi*, after the restoration of that genus.

## ARTICLES OF INTEREST TO VICTORIAN NATURALISTS IN RECENT PUBLICATIONS RECEIVED.

In "*Proceedings of Linnean Society of New South Wales*," 2nd series, vol. vii., part 2 :—

"Notes on Australian Coleoptera," part 12, by Rev. T. Blackburn, B.A. Contains descriptions of several new Victorian species.

"On Twelve New Species of Australian Lepidoptera," by Dr. T. P. Lucas. Describes a number of new Queensland moths.

In "*Transactions of Royal Society of South Australia*," vol. xv., part 2 :—

"The Gryllacridæ and Stenopelmatidæ of Australia and Polynesia," by J. G. O. Tepper, F.L.S. Continues his papers on the Australian orthopterous insects. Enumerates the species, and describes several new ones of the last two families of the tribe Locustodea.

"The Effects of Settlement and Pastoral Occupation in Australia upon Indigenous Vegetation," by Samuel Dixon. An interesting paper, containing many reasons why the indigenous flora should be preserved.

"Further Notes on Australian Coleoptera," part 12, by Rev. T. Blackburn, B.A. Describes a number of new beetles, including many Coccinellidæ (ladybirds) from Victoria, &c.

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## THE JOURNAL AND MAGAZINE

— OF —

## The Field Naturalists' Club of Victoria.

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**Editor: A. H. S. LUCAS, M.A., B.Sc.**

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