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THE

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OF THE

Field Naturalists' Club of Victoria.

VOL. XXI.

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Hon. Editor: MR. F. G. A. BARNARD.

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

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ERRATA.

Page 1, line 13—For "*Diffulgia*" read "*Difflugia.*"
Page 117, line 20—For "Phalanasterium" read "Phalansterium."
Page 153, line 28—Omit word "moss."
Page 153, line 29—For "*Symphogyna*" read "*Symphyogyna.*"
Page 162, line 21—For "Phycomium" read "Ptychomnion."
Page 162, line 21—For "binium" read "bimum."
Page 162, line 23—For "Pathecium" read "Isothecium."
Page 162, line 23—For "tormentella" read "tomentella."
Page 162, line 27—For "Trichostomon" read "Trichostomum."
Page 162, line 27—For "Camphylopsis" read "Campylopus."

The Victorian Naturalist.

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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, 11th April, 1904.

Mr. F. G. A. Barnard, one of the vice-presidents, occupied the chair, and about 60 members and visitors were present.

REPORTS.

A report of the Club excursion to Deepdene on Saturday, 26th March, was read by the leader, Mr. J. Stickland, who stated that the party first visited the Kilby Lagoon, close alongside the Yarra, and about two miles distant from the station. Here they found plenty of water, with quantities of aquatic weeds, and, consequently, abundance of animal life. Among the Rhizopods *Diffulgia globulosa* was rather numerous. Of Heliozoa, *Clathrulina elegans* and *Actinophrys sol* were taken. Many flagellate protozoa of several species were observed, among them *Dinobryon sertularia* and the rare and beautiful forms *Phacus triqueter* and *P. longicaudus*. Of ciliated protozoa, *Stentor roesellii* and *Opercularia nutans* were the most important forms taken. Tube-building rotifers of different species were plentiful, while among free-swimming forms one identified as *Taphrocampa selenura* is probably new to Victoria, if not to Australia.

Reports of the Club's excursion to Yarra Glen on Saturday, 2nd April, were read by Mr. J. A. Kershaw, F.E.S., who gave a general outline of the trip, together with some notes on the zoology of the district generally, and Mr. A. D. Hardy, who dealt with the aquatic and sub-aquatic plants; while Miss K. Cowle furnished a list of some of the terrestrial plants noticed, more particularly those in bloom. Mr. J. Shephard, who acted as co-leader with Mr. Kershaw, and who devoted his attention to the pond life of the locality, with some very satisfactory results, was unavoidably absent, and his report was held over. The locality as a general collecting ground was not a good one, particularly at this time of the year, but for workers in pond life the lagoons which border the River Yarra, close by the township, furnish plenty of good and interesting material, which would well repay further search.

ELECTIONS.

On a ballot being taken, Dr. J. C. Kaufmann, LL.D., "Kooyong," 21 Kooyong Koot-road, Hawthorn; Mr. F. Norris, Drummond-street, Carlton; Miss Hughston, "Fintona," Bourke-road, Camberwell; Mr. J. T. Haynes, State school, Homebush,

near Avoca (country member) : Mr. R. E. Trebilcock, "Leopold," Geelong (country member) ; Master Eric C. Mercy, Canterbury (junior member), were duly elected members of the Club.

On the motion of Messrs. G. Coghill and J. F. Haase, Mr. H. T. Tisdall was voted to take the chair while Mr. Barnard read his paper.

PAPER.

By Mr. F. G. A. Barnard, entitled "Some Early Botanical Explorations in Victoria."

The author, in a very interesting paper, described the botanical explorations in Victoria in 1852–5 of the late Baron Sir F. von Mueller, Government Botanist of Victoria (then Dr. F. Mueller), and with the aid of several maps traced as closely as possible the routes followed on each journey. Reference was also made to the unreliability of some of the earlier maps of Victoria, several of the errors in which he pointed out, and said that Dr. Mueller's description of the country traversed led him to believe that the Mount Hotham of Dr. Mueller is the peak we now know as Bogong, while his Latrobe is probably our Wills.

Mr. H. T. Tisdall (acting chairman) complimented Mr. Barnard on his interesting paper, and remarked on the completeness of the late Baron's researches. He stated that, though he had collected for some years in the country east of the Baw Baw Mountains, he did not find a single species of plant that had not already been found by Baron von Mueller.

Mr. C. French, F.L.S., gave some details of the Baron's early travels and the difficulties that he had to encounter in his long journeys. He said that one could not but admire the great work he accomplished, which was carried out with such completeness that he left little to be done after his death.

Mr. A. D. Hardy complimented Mr. Barnard on the large amount of interesting material he had accumulated, and remarked on many of the difficulties the author must have encountered in his endeavours to satisfactorily determine some of the localities visited by the Baron. He thought that much of the late Baron's geographical data was not too reliable, and explained his reasons for arriving at that conclusion.

Mr. T. S. Hall, M.A., also spoke to the paper. Owing to the lateness of the hour, Mr. J. C. Goudie's paper, "A Summer in South Gippsland," was postponed.

NATURAL HISTORY NOTES.

Mr. H. T. Tisdall read a note dealing with the fungus known as "Native Bread," *Mylitta australis*, and promised to give a paper on the subject at an early date.

Mr. T. S. Hall drew attention to the discovery of fossil dicotyledonous leaves by the British Antarctic Expedition, which

had just reached New Zealand on its return journey. The presence of these leaves showed the former existence of a highly organized flora, and two conclusions were deducible. The climate must have been much warmer than at present, for Borchgrevinck's only terrestrial plant was a lichen, and this came from much further north, namely, at Cape Adare. The other conclusion was that there must have been land connection with some continent to the north, or, at any rate, a very close approach, to enable the plants to pass south to where the leaves were found. The desirability was pointed out of comparing the leaves with those of southern plants rather than with those of the north. The latter plan had been followed in the past in the case of Australian fossil leaves, with disastrous results, and the error should not be repeated. The discovery of the leaves had been alluded to in the press as perhaps the most important one made by the expedition, and the reason of its value is evident.

EXHIBITS.

By Mr. E. Barker, F.R.M.S.—Specimens of the Giant Silk Moths, *Attacus atlas*, showing male, female, cocoons, and eggs. The cocoons were received from Ceylon, the male hatching out on 2nd February, 1904, and the female on 7th February, 90 eggs being laid on the same day. The larva feeds on the leaves of the cardamom, tea, cinchona, cinnamon, castor oil tree, &c. The female measures 8¾ inches across the wings.

By Mr. F. G. A. Barnard.—Maps in illustration of his paper.

By Mr. C. L. Barrett.—A specimen of the scarce Mistletoe Blue Butterfly, *Ogyris abrota*, female, captured at Brighton recently.

By Miss S. W. L. Cochrane.—An orchid, *Cryptostylis leptochila*.

By Mr. P. C. Cole.—A very old Victorian "return" Boomerang.

By Mr. A. Coles.—Skins of African Weaver-birds: *Vidua principalis*, *Barbaton sacabula*, *Chera procne*, and *Steganura paradisea*.

By Mr. C. Coles.—Fifteen young Tiger Snakes, *Notichis scutatus*, taken from mother after capture.

By Mr. C. French, F.E.S.—New Australian Buprestid beetles: seven species of Chalcophora, and one species of Paracupta (this genus new for Australia).

By Mr. C. French, jun.—Rare Victorian orchid, *Cryptostylis leptochila*, from Gembrook, collected March, 1904.

By Mr. T. S. Hall, M.A.—A live specimen (male) of the Black-tailed Parrakeet, *Polytelis melanura*, Vig.

By Mr. A. D. Hardy.—Reptiles and insects from South Africa.

By Mr. Jas. A. Kershaw, F.E.S., for National Museum.—Young and eggs of Brown Snake, *Diemenia textilis*, from Bright,

Victoria. A number of eggs were found under a stone, several of which hatched out in confinement.

By Mr. A. Mattingley.—Specimen of Echinoderm, *Goniocidaris tubaria*, from Western Port, Vic.

By Mr. B. Nicholls.—Snow-berries, *Gaultiera hispida*, from Matlock, Vic.

By Mr. F. P. Spry.—Butterflies, *Lucia lucanus* and *Hesperilla donnysa*, from Altona Bay, Vic., collected 3/4/04; also flaked flints from various aboriginal camps in Victoria.

By Mr. H. T. Tisdall.—Specimens of fungus known as "Native Bread," *Mylitta australis*, in illustration of his note.

By Mr. H. B. Williamson.—Dried specimens from Hawkesdale, collected 12th March, 1904, and new for S.W. Victoria: *Isoetes drummondi*, A. Braun, and *Heliocharis acicularis*, R. Br.

By Mr. F. Wisewould.—Eggs of a species of Victorian Sting Ray.

After the usual conversazione the meeting terminated.

PRESENTATION OF THE MUELLER MEDAL.

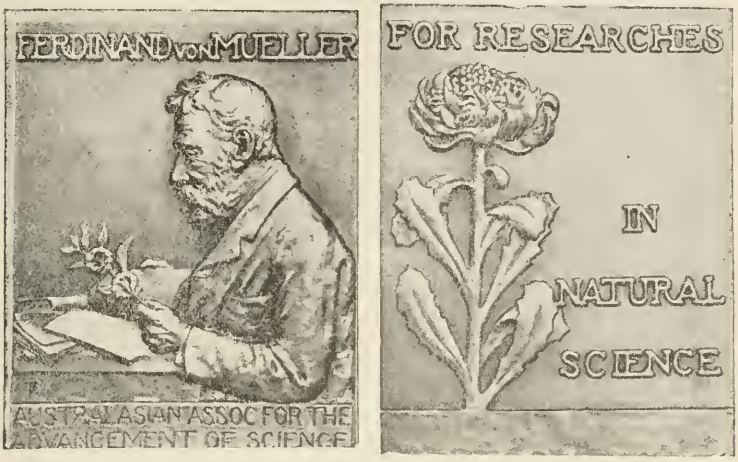
A JOINT meeting of the Royal Society and the Field Naturalists' Club was held in the Royal Society's Hall on Thursday evening, 21st April, 1904, on the occasion of the presentation of the Mueller medal to Mr. A. W. Howitt, F.G.S.

The platform was occupied by Professor Baldwin Spencer, F.R.S., president of the Royal Society, and Mr. O. A. Sayce, president of the Field Naturalists' Club, and there was a good attendance of members of both societies.

Professor Spencer gave a short history of the foundation of the Mueller medal, which is the outcome of a fund raised by the scientific friends of the late Baron von Mueller, Government Botanist of Victoria, in order to, in some tangible way, perpetuate his name. It had been decided that the Australasian Association for the Advancement of Science, as the most representative scientific body in Australia, should take over the fund, and should, not oftener than once in two years, award a medal for distinguished work in natural science, having special reference to Australasia. The first award of the medal was made at the Dunedin meeting of the Association in January last, when the choice unanimously fell upon Mr. A. W. Howitt, whose name as a scientific worker in Victoria, in botany, geology, and ethnology, has been familiar to Australian scientists for nearly fifty years, and he said that he had been deputed to make the presentation on behalf of the Association.

Prof. Spencer then gave some account of Mr. Howitt's work in the several branches of science he had followed, and announced

that Mr. Howitt had in the press a great work dealing with the native tribes of south-eastern Australia, which would doubtless be a classic in Australian anthropology. He then, in the midst of considerable applause, handed the medal to Mr. Howitt, with the congratulations of the meeting.



Mr. Howitt, in thanking the meeting for its good wishes, said that he had been fortunate in being able to pursue his studies under exceptional circumstances. He had seen Victoria in the old gold-digging days ; he had done some exploration in the Lake Eyre district, South Australia, and he had been sent out to rescue the Burke and Wills Exploring Expedition, when he had been fortunate in meeting with King, the sole survivor of the party, and bringing him back to Melbourne. Then, again, his official duties in Gippsland had made him conversant with the geology and botany of that region, and at the same time he had been able to study the customs of the few surviving members of the original inhabitants of the land. With regard to the latter portion of his work, he had been greatly assisted by his association for many years with Dr. Lorimer Fison.

Mr. Howitt was elected an honorary member of the Field Naturalists' Club of Victoria in 1882, and has occasionally contributed to its proceedings.

The Mueller medal, which is of appropriate and handsome design, and is in the form of a tablet of silvered bronze, slightly larger than the illustration, was designed by Mr. J Tranthim Fryer, of Melbourne, the die being executed by Messrs. Janvier and Duval, of Paris.

SOME CONSIDERATIONS OF THE ORIGIN OF OUR ALPINE FLORA.

By G. Weindorfer.

(*Read before the Field-Naturalists' Club of Victoria, 8th Feb.*, 1904.)

Having in the course of my visits to the Buffalo Mountains, Mount Bogong, and Mount Hotham observed some of the peculiarities of the Australian alpine flora, the thought arises, How did the alpine flora originate, and where is the cradle of this fairy army?

I think it would therefore be of general interest to say a few words on that subject, taking for the basis of my remarks such authorities as Hooker, "On the Flora of Australia: its Origin, Affinities and Distribution; being an Introductory Essay to the Flora of Tasmania;" Lendenfeld, "An Exploration of the Australian Alps" ("Trans. Geological Society of Australasia," vol. i., p. 119); and Professor David, Helms and Pittman, "Geological Notes on Kosciusko, with Special Reference to Evidences of Glacial Action" ("Proceedings Linnean Society, N.S.W., 1901," p. 26).

In order to approach this question we have to consider that plants in alpine regions occur under three conditions. First of all there are those which, forming a very minute fraction of this flora, occur exclusively in alpine regions, which are there endemic, as, for instance, *Helichrysum stirlingii*, *Oxylobium alpestre*, *Aciphylla glacialis*, and others. A second part has ascended from lower elevations into higher ones, either keeping their habitus or exhibiting only the characteristic growth of alpine plants. Among such we may count *Wahlenbergia gracilis*, *Candollea serrulata*, and many others. Finally, a third section of alpine plants occurs also in other countries far removed from our Alps—as, for instance, *Herpolirion novæ-zealandiæ*, *Aster celmisia*, *Lomaria alpina*, and others, which we find represented in Tasmania and New Zealand, while some species have even strong affinities to species growing in the South American Andes.

For the answer to our question the two first points are of lesser importance. Let us therefore consider how it is possible that certain species or their nearest relatives are represented in different parts of the world which are separated by an immense expanse of ocean.

The possibility that one and the same species of different isolated parts could have each for itself originated from one primitive form is very doubtful. On the other hand, the possibility seems to be a greater one that each species had its origin on a certain point only (centre of creation). The proof for this hypothesis is supplied by the observation we make on all living beings, that they try to enlarge their dissemination area, which

ability to migrate is for our question of the greatest importance.

We have therefore to look back to times long past and to hear what geologists have to tell us about the Tertiary period, with regard to which I quote Prof. E. A. David :—"We would here like to emphasize the opinion that it is out of the question to refer either the Hedley Tarn glacial epoch or the Lake Merewether glacial epoch of Kosciusko to Tertiary time. We are strongly of opinion that these epochs belong to the Post Tertiary. If, however, later examination proves that there was a much earlier and far more extensive glaciation which affected the whole of the Kosciusko plateau, and extended even as far down as Lake Coolamatong, near Berridate (Plate VI.) (about 2,500 feet above sea level), as one of us (Mr. Helms) thinks, it is quite possible that this older glaciation may belong to Tertiary time."

It is not, however, within the scope of a botanist to examine the statements of geologists as to whether they are right or wrong. Be it as it may, so much is certain that all the respective indications point to the fact that a glacial epoch extended during Tertiary times over the greater part of the Australian Alps. It is to us of less importance if Australia was visited by only one glacial period (the Post Tertiary) or by two or more of older ages, which each in its time of advance must have caused a retreat of the flora to a climate more suitable for them ; *vice versâ*, at the retreat of the glacial epoch the plants will have returned more or less to their former territory. How often may have followed, in different geological periods, a tropical vegetation on one of a sub-tropical or antarctic character ; how often may have, under such circumstances, perished and disappeared our evergreen forests with their lofty crowns ; how often may have mighty glaciers covered the slopes of our valleys on which our present alpine vegetation has finally settled itself. For our case only the most recent of the glacial epochs in Post Tertiary time is to be considered, for mostly through this the present character of our alpine flora has been determined.

Referring to this glacial epoch, the lowlands extending from the Alps to the south at this time must have had a temperature which was very similar to the one at present prevailing in higher altitudes. On this tract of land a quite distinct flora has settled itself, which again succeeded the preceding species, partly succumbed or altered in their characters through the cold temperature setting in with the glacial period. It was that flora of which a great part now inhabits to-day our alpine regions.

The extreme limit of the drift ice in the Southern Ocean lies at present at about 50° S. lat. An advance of a few degrees must have brought it in contact with the southern shores of Aus-

tralia and New Zealand, whereby undoubtedly seeds of plants, which were carried by heavy storms from South America in a southerly direction to the antarctic glaciers, could subsequently have been transported with the antarctic drift ice eastward, and which on their arrival in Australia found the same climatic conditions as in the country from which they had departed. The occurrence of certain species, which we find common to most of the southern islands of the Pacific, New Zealand, and the southern part of Australia (Hooker), strongly indicates that the trend of this drift must have passed through these parts. How is such a close relationship of some of our genera, such as Gaultiera, Colobanthus, Caltha, Claytonia, Oreomyrrhis, Azorella, &c., with South American alpine forms to be otherwise explained?

With the retreat of the glacial period came hand in hand an increase of warmth, which gave the flora in the north and north-west of the Alps the opportunity to again recover their lost territory, from which they had with the advance of the glacial period to retire step by step. The struggle could now begin, and thus were these new arrivals from the east, which had mixed with our flora in the extreme south, where, during the culmination point of the glacial period, there was yet sufficient room left for their livelihood, driven to higher altitudes, for only in such situations could they find the cool climate to which they were accustomed, only there could they remain as masters of the battle-field, where they at present make their show as witnesses of that grand phenomenon, the glacial period.

The fact that the Antarctic had—as it is often assumed—in Miocene time a climate which could have given higher developed plant forms the necessary conditions for their existence cannot be entirely overlooked in our question, and it is quite certain that under such conditions an exchange of species of the South American and Australian flora over the Antarctic could have taken place. As the geographical situation of South America is more favourable for such a distribution than that of Australia, the relation of Antarctic species to South American and *vice versâ* should have been greater than to those of Australia. For that reason it does not seem probable that our Australian flora would have been influenced directly by the Antarctic flora at the above-mentioned period, but that the glacial period (in Tertiary times) was the main factor to establish a relationship between the Australian alpine and the South American flora.

As long as our knowledge in phyto-palæontology remains stationary, the discoveries of which are of invaluable importance in the question of the history of our plant life, so long will we walk in the dark and have to depend on hypotheses which throw only an uncertain light on the wonderful work of nature during

past times. May one or the other theory be accepted or not by a severe critic, so much is certain, that even an insignificant contribution on the subject will be gladly received, so that it may be used as a stone in the building which our forefathers have begun, which we in our turn have inherited, and which our generation ought to be proud to continue and complete.

ON THE OCCURRENCE OF THE MOSQUITO ANOPHELES IN VICTORIA.

By J. A. Leach.

(*Read before the Field Naturalists' Club of Victoria, 14th March*, 1904.)

While attending to my duties as nature study teacher under the Education Department, my attention was attracted by a mosquito larva which persisted in remaining at the surface of the water. Suspecting an Anopheles larva, it was examined microscopically, and proved to be identical with the larva figured in Theobald's "Monograph of the Culicidæ of the World" as that of Anopheles.

Its horizontal position when floating at the surface, its habit of shooting off horizontally when disturbed, the very short breathing tube with its two spiracles, the peculiar branching hairs on the thorax and abdomen, the remarkable "dorsal organs," five pairs of stellate hairs on the top of the abdomen, the strange appendage with long branching hairs on the last segment—these features, so striking, left little doubt as to its being the larva of an Anopheles.

One strange habit, mentioned by Howard in his very interesting and valuable work entitled "Mosquitoes," viz., that of floating with the under side of the head uppermost, and then rotating it at intervals, apparently to swallow, was often seen.

More larvæ were collected from the same place—a pot-hole in the path on the north side of the Zoological Gardens. On the surface of the water in this small hole were over a dozen egg-rafts of Culex, while hundreds of Culex larvæ hung head down, or moved actively about. Twelve Anopheles larvæ were taken on this visit.

The dorsal organs or stellate hairs were found to vary in number. Generally five or six pairs were present. Their function seems to be unknown, but, as the result of close observation, it seems probable that they assist the larva to maintain the horizontal position, by holding on to the skin of the water.

Professor Spencer, under whom I have had the honour and privilege of working for some time as a science student, advised me to allow these larvæ to develop to the adult state. Soon several pupated, forming a pupa somewhat similar to that of

Culex, but floating in a more extended position. Microscopic examination showed a difference in the breathing trumpets, for, while each trumpet in the Culex pupa has a characteristic curved opening, these had a square-cut ending.

After two or three days the adults emerged from the pupal skins, the mosquito standing with its first two pairs of legs spread widely on the skin of the water while it drew the last pair of legs from the case, and not, as is so often stated, standing on tiptoe on its empty pupal skin while it waited for its wings to harden. It runs about on the skin of the water just as freely and safely as animals run about on dry land. These adults at once assumed the typical position of Anopheles, standing on their heads, that is, keeping all parts, the proboscis, head, thorax, and abdomen, in the one line.

The outdoor recognition of Anopheles, whether in the larval or adult state, is rendered much simpler by these characteristic positions—the larvæ floating horizontally, and the adult resting with the body roughly vertical.

Microscopic examination showed these adults to have the palpi in both sexes of about the same length as the proboscis, the head to have flat and narrow curved scales, in addition to large upright forked scales, as mentioned by Giles ("Gnats or Mosquitoes"). The wings, as noted by Theobald in the monograph already referred to, were found to be "covered with small scales; the first submarginal cell was longer and narrower than the second posterior cell; both the second and third long veins ran past the cross veins into the basal cells," a character which that author has found to be very marked in all species of Anopheles examined by him.

I next obtained a larva in a child's specimen bottle at the Brunswick West State School. From the puddle from which it was taken fourteen more were obtained.

Since then the larvæ have been obtained from Footscray, Ascot Vale, Brunswick, Royal Park, Carlton, Kew, Deepdene, Toorak, Camberwell, Richmond, and Sandringham—all within a few miles of Melbourne, and in different directions, so they seem well distributed. In fact, the only place from which I failed for some time to take them was the University grounds, but a last look in the last remaining surface-water pool resulted in twenty being obtained after a close search. Hence they have been taken in every locality in which they have been searched for.

I wrote to several country teachers who attended my lectures at the last summer school, and so far have received the larvæ of Anopheles from Johnsonville, near the Gippsland Lakes, from Emerald, and from Elphinstone, near Castlemaine. They have also been taken at Dromana, on the eastern shore of Port Phillip.

The puddles in most places have now dried up, killing

enormous numbers of larvæ and pupæ, so that very little collecting can be done until after the next good rain.

In only two instances did the Anopheles larvæ form any considerable proportion of the larvæ present. Generally they ranged from one to two per cent. At Richmond Park, however, they formed fully ten per cent.—over a hundred were taken. At Deepdene, in the irrigation tanks in a market garden, they also formed about ten per cent. of the total number of larvæ, and several hundreds of them were taken.

It is said that the larvæ of Anopheles and Culex are seldom found together, but as every puddle and pot-hole this year was swarming with the larvæ of Culex, they necessarily occurred together.

Theobald, in his "Monograph of the Culicidæ," says:—"The only district where malaria occurs from whence collections have been received which contained no Anopheles is Victoria. The specimens from the malarious districts of the uplands of Victoria were *Stegomyia fasciata.*" Again, he says:—"Amongst the small collection of mosquitoes sent from Victoria no Anopheles are included, but a series of *Stegomyia fasciata*, the Yellow Fever Mosquito, bears a label—'Abundant in the malarious districts of the uplands of Victoria.'"

Giles, in his book, "Gnats or Mosquitoes," second edition, also mentions Victoria as the one "notable exception" of the distribution of malaria agreeing with that of Anopheles.

Now, according to all who are competent to express an opinion, there are no malarious districts in the uplands or any other part of Victoria. Attached is a note* from Dr. Jamieson, Lecturer in Medicine at the Melbourne University, and Health Officer of the City of Melbourne, giving a denial to the unauthorized statement on that unfortunate label referred to by Theobald. Victoria always has been, and probably is, quite free from endemic malaria. So the facts are the other way round. Instead of having endemic malaria and no Anopheles, we have Anopheles and no malaria.

Theobald, in his Monograph, and Giles ("Gnats or Mosquitoes") record but four species of Anopheles from Australia. One species is confined to New South Wales, leaving three as occurring in Queensland, where malaria is endemic. One or more of these three species must be concerned in the

* 96 Exhibition-street, Melbourne.

DEAR PROFESSOR SPENCER,—So far as I am aware there is no district in Victoria where malaria occurs as an endemic disease. When we get cases they seem always to be imported from Queensland or elsewhere. It is quite possible, of course, that the disease may become naturalized if we have the right mosquito.—Yours sincerely,

JAMES JAMIESON.

spread of malaria, though none are mentioned by Theobald as having been proved to be hosts for the malarial parasite. Much more work remains to be done on the Australian mosquitoes.

The Anopheles occurring in the neighbourhood of Melbourne seems to be identical with one of these three species — *A. annulipes*, Walker. The agreement is very close, and the white spots on the wings are very characteristic.

The presence of Anopheles in Victoria, even supposing it to be a true malaria-carrying species, fortunately does not imply an immediate outbreak of that dreaded disease. First it is necessary for the mosquito itself to be infected with the sporozoan before it can transmit it to man. There is always a possibility of this infection, however, for malaria patients frequently visit Melbourne from the hotter parts of the continent.

Should malaria become endemic here it may prove, for the mosquito-tortured residents of certain suburbs, a blessing in disguise. For, undoubtedly, it would result in a great diminution in the numbers of that troublesome insect. This would not be a very difficult matter if the ruling bodies and individual residents set themselves to accomplish it.

First, all standing water, if possible during the mosquito season, would be drained—an easy matter here in a normal summer. Then permanent water, pools, lagoons, dams, tanks, and reservoirs would be stocked with small fish, water boatmen, and beetles. Dragon-flies, frogs, toads, insectivorous birds, bats, and other natural enemies would be protected and encouraged. Lastly, all low-lying, swampy ground and puddles would be filled or treated with kerosene, thus preventing the female from laying eggs and the larvæ and pupæ from breathing.

The very small amount of water that will suffice to maintain great numbers of larvæ and pupæ is surprising. Recently I took seven egg-rafts of Culex from the hoof-print of a horse. An instance is recorded where the eggs, larvæ, and pupæ in a water-barrel were counted and numbered over 17,000, and a fortnight later the same barrel yielded over 19,000.

Howard, "Mosquitoes," mentions a case where, all the water being kerosened, even to the drinking water, Anopheles were found breeding in a flower vase on the dinner table. A careless servant, when putting in fresh flowers, had neglected to change the water.

To enable members to distinguish the various individuals readily all stages in the life-history of Culex—egg-rafts, larvæ, pupæ, and adults—are exhibited, as well as the larvæ, pupæ, and adults of Anopheles.

Let us hope that with prompt and vigorous treatment of the surface waters, this discovery may be followed by the practical extinction of a veritable pest.

The Victorian Naturalist.

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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, 9th May, 1904.

The president, Mr. O. A. Sayce, occupied the chair, and about 60 members and visitors were present.

CORRESPONDENCE.

The hon. secretary read a letter from the Secretary for Lands, received in reply to a communication from the Club in January last, asking that certain land at Malleson's Glen, near Launching Place, be permanently reserved for the permanent protection of the native fauna and flora. The communication stated that the land referred to "will be reserved as far as is necessary."

REPORTS.

A report of the Club's excursion to Camberwell on Saturday, 16th April, was read by the leader, Mr. T. S. Hall, M.A., who stated that it was attended by over 20 members. The object of the excursion was geology, and the party first traversed the railway cutting towards the East Camberwell station, where the banks afforded a good opportunity for the examination of the beds, which were pointed out and explained by the leader. Crossing the valley to the eastward the same relationship of the beds was again seen in a small gully. Further on the top of the hill at Highfield road was reached, where a good view of the surrounding country was obtained. Here the leader gave a general outline of the geological features of the district, pointing out the difference in the nature of the country to that of the lava plains on the west, and the consequent effect on the flora and fauna of the two areas. A pleasant afternoon's ramble was profitably spent, and was especially interesting to those members who had attended the excursion to the basalt country at Keilor in March last.

The hon. librarian acknowledged the receipt of the following donations to the library:—*Journal of Agriculture*, Victoria, vol. ii., part 6, from the Department of Agriculture, Victoria; the *Geelong Naturalist*, vol. i. (new series), part 1, March, 1904, from the Geelong Field Naturalists' Club; "Forest Flora of New South Wales," part 7, by J. H. Maiden, F.L.S., Government Botanist, from the author; *Nature Notes*, March, 1904, from the Selborne Society, London; and "Missouri Botanical Gardens," 14th report, for 1903, from the Director.

ELECTIONS.

On a ballot being taken, the following were duly elected members of the Club :—Miss J. Rollo, 65 Tivoli-road, South Yarra ; Miss M. Stock, "Thorley," Holmes-road, Moonee Ponds ; Mr. C. H. Edmondson, Victoria-road, Hawthorn ; Mr. G. G. Mercy, Balwyn-road, Canterbury. Country members—Mr. Clifton P. Brown, G.P.O., Bendigo ; Mr. John Knight, Alexandra.

GENERAL BUSINESS.

Nominations for office-bearers for 1904-5 were received, and Messrs. D. Best and G. Weindorfer were elected to audit the accounts for the past year.

The President drew attention to the recent action taken by Mr. C. French, jun., in instituting a prosecution against a person for shooting a number of Magpie Larks, *Grallina picata*, and took the opportunity of expressing the Club's approval of Mr. French's action.

Mr. A. D. Hardy drew attention to the threatened destruction of the native fauna and flora by the leasing of the river frontages, and thought that some action should be taken to prevent this before it becomes too late.

PAPERS.

1. By Mr. J. C. Goudie, entitled "A Summer in South Gippsland."

The author, in a very useful paper, gave an account of his observations during a short residence in the country a few miles south of Warragul. The author dealt particularly with the birds and insects, and commented on the lack of variety of the former in this district. Most of the species noticed were mentioned, and a detailed list of Coleoptera collected was given.

In the discussion which followed, Mr. G. A. Keartland, in answer to a query by the author, stated that the males of Pennant's Parrakeet, *Platycercus elegans*, assume the mature plumage at about one year old, the females taking somewhat longer. He mentioned, as an unusual occurrence, that a specimen he had in captivity for eleven years never assumed the mature plumage.

Mr. C. Coles stated that he had kept this species in confinement, and he found that the males took from one to two years to assume the mature plumage, the females rather longer.

Messrs. F. G. A. Barnard and Jas. A. Kershaw, F.E.S., also discussed the paper, the former asking what shrub was referred to under the name of "Cotton-bush," but the term did not seem to be generally known.

2. By Mr. H. T. Tisdall, entitled "A Few Notes on the 'Native Bread,' *Polyporus mylittæ*."

The author gave a very interesting account of the history of the fungus known as "Native Bread," gathered from his own observations extending over many years, introduced by some remarks on the growth and reproduction of certain fungi.

Messrs. D. M'Alpine, F. G. A. Barnard, F. Pitcher, and the President discussed the paper, the former stating that Mr. Tisdall, in his paper of November, 1885, was undoubtedly the first person to suggest this fungus being a Polyporus.

Owing to the lateness of the hour, Mr. T. S. Hall's paper, entitled "Note on Some Victorian Echinoids," had to be postponed.

NATURAL HISTORY NOTES.

Mr. J. Shephard drew attention to his exhibit of a mounted microscopic slide of the Rotifer, *Stephanoceros eichornii*, which he had obtained on the Club's excursion to Yarra Glen in April last.

Mr. G. A. Keartland mentioned that a lady in Carlton has a fine specimen of the Satin Bower-bird in captivity, which is in splendid plumage. It is very tame, and talks and mimics animals. It is now twenty years old, and has been in mature plumage over sixteen years, thus upsetting the theory that they die soon after assuming the brilliant blue-black plumage. It is fed on boiled potatoes, raw carrots, and apples.

In connection with his exhibit of two young Brown Snakes, *Diemenia textilis*, Mr. Keartland furnished the following note :— "On 26th March two prospectors found 28 of these eggs amongst some stones at Brookside, near Bright. Two of the eggs were forwarded to the *Age* office, with a note from Mr. O. V. Briner, saying that he had already hatched some, which were alive and active. When these eggs were handed to me on 30th March they were somewhat wrinkled, with no sign of life. I made a small opening in one, and, finding the snake alive, put it back in the box which I had carried about town for two hours in the sun. On arriving home I placed them in the sun for a short time, when both hatched, and were very lively. When alive they measured 9½ inches, but on being killed immediately they were found to have stretchsd to 10½ inches."

EXHIBITS.

By Mr. H. H. Baker.—A new and ingenious mechanical stage for microscope, which can be applied to almost any instrument.

By Mr. A. Coles.—Specimens of the following birds from South Africa :—*Promerops cyanomelas*, *Porphyrio lophus*, *Coliphemus concolor*, and *Teracus albocristatus*.

By Mr. C. French.—"Native Bread," from Emerald.

By Mr. C. French, jun.—Liquorice sticks destroyed by beetles, *Anobium paniceum*, together with specimens of the beetles.

By Master French.—*Styphelia ventricosa*, Lueh., collected at Emerald, April, 1904.

By Mr. C. J. Gabriel.—Specimen of the shells *Conus anemone*, *C. segravei*, and *C. rutilus*, from Western Port.

By Mr. T. S. Hall, M.A.—Specimens of Victorian Echinoids.

By Mr. A. D. Hardy.—Twig of *Acacia melanoxylon*, from Berwick, showing production of small pinnate leaves on old branch.

By Mr. G. A. Keartland.—Egg-shells and young of Brown Snake, *Diemenia textilis*, from Bright; also, a lizard, *Hinulia whitei*, with forked tail, captured at Myrniong. A fortnight later another specimen was captured with a similar tail, but one of the points have since become detached, and the tail is now assuming a normal shape.

By Mr. A. Mattingley.—Specimen of Echinoid, *Amblypneustes ovum*, from Western Port.

By Mr. D. M'Alpine.—Specimen of "Native Bread," showing *Polyporus mylittæ*, collected by Miss Cowle in Tasmania.

By Mr. B. Nicholls.—Gang-Gang Cockatoo, *Callocephalon galeatum*, from Gilderoy, Victoria.

Mr. J. Shephard.—Mounted microscopic slide of Rotifer, *Stephanoceros eichornii*, collected on Club's excursion to Yarra Glen, 2nd April, 1904.

By Mr. F. Spry.—Three well-marked varieties of under side of butterflies, *Ialmenus evagoras*, from Victoria.

By Mr. H. T. Tisdall.—Coloured drawing of the fungus, *Polyporus mylittæ*, in illustration of his paper.

By Mr. R. E. Trebilcock.—Collection of Lepidoptera collected at Geelong.

After the usual conversazione the meeting terminated.

National Forests Protection League.—The first annual report of this organization has been issued, and shows encouraging results for the year's work. The hon. secretary, Mr. J. Blackburne, has been indefatigable in his efforts to call attention to the destruction of valuable timber taking place in all parts of the State. During the year several papers dealing with forest conservation were printed and distributed, and further work in this direction was only limited by the want of funds. A strong executive council, thoroughly representative of the mining and timber interests, was appointed for the ensuing year. We trust that members of the Field Naturalists' Club will express their sympathy with the movement by handing their subscriptions to the hon. secretary for transmission to the League.

SOME EARLY BOTANICAL EXPLORATIONS IN VICTORIA.

(With Map.)

By F. G. A. Barnard.

(*Read before the Field Naturalists' Club of Victoria, 11th April*, 1904.)

My visit to the Victorian Alps in December, 1902, interested me in more ways than one. The biological results of the trip have already been given in the paper, "Among the Alpine Flowers," read before the Club just twelve months ago (*Victorian Naturalist*, xx., p. 4). In the present paper I propose to refer to some historical questions which arose in my mind when I subsequently had occasion to turn up the literature in connection with the early history of some of our Alpine plants.

The first reference to the mountains we know as the Alps seems to be in Hume and Hovell's account of their journey to Port Phillip in 1824, when they passed between Mt. Stanley and the present site of Beechworth and saw snow-capped mountains away to the south-east, but did not visit them, keeping to the westward of the Buffaloes. Angus M'Millan, the discoverer of Gippsland (Caledonia Australis, as he called it), doubtless saw the Alps on his journey in 1839 from the Maneroo Plains, N.S.W., to what is now the Tambo Valley, where he formed a cattle station at Numbie Munjee, about 50 miles south of Omeo (see "Letters from Victorian Pioneers," published by Melbourne Public Library Trustees, 1899, also "Report on Physical Characteristics and Resources of Gippsland," by A. Skene and R. Brough Smyth, Melbourne, February, 1874), but he probably travelled on the southern side of the mountains. Count Strzelecki explored in the Omeo and Kosciusko districts about 1840, pursuing mainly geological investigations, but our late patron, Baron von Mueller, then Dr. F. Mueller, was the first white man to ascend our highest Victorian peaks, in 1853 and 1854, and reveal their botanical treasures.

Few people are, I think, aware of the amount of ground Dr. Mueller covered in those early days, and searched so thoroughly as to leave but little in the way of unnoticed plants for those who followed after, and it seems incredible, when we consider the sparseness of the population and the absence of roads, how he managed to carry out his trips with so much success. I had hoped that some abler pen than mine would have given ere this some fuller account of his life and work than appeared in the Club's journal some years ago (*Victorian Naturalist*, xiii., 1896–7, p. 87 ; also xiv., 1897–8, p. 94).

However, up to the present, such a work has not appeared, and I have therefore taken the liberty of reviving for your benefit his first three annual reports, which are buried away, along with

probably many another interesting item, in the Parliamentary records of the time.

Dr. Mueller came to Victoria in 1852, when about 28 years of age, and was soon afterwards appointed Government Botanist by Governor Latrobe.

He at once decided to explore the new territory for himself, and in the spring of 1852 started on a trip to the North-East. This journey he records in his first annual report, dated 5th September, 1853, which can be referred to at the Public Library in the "Votes and Proceedings of the Legislative Council of Victoria, 1853–4," vol. i., part 2, page 897.

In this he says that he proceeded more or less along the track towards Sydney, now closely followed by our North-Eastern railway, till reaching Futter's Range, at the southern extremity of which is situated the now historic hamlet of Glenrowan; thence he proceeded to the May Day Hills, the present site of Beechworth; thence to the Buffalo Mts., named by Hume and Hovell, which have been too recently mentioned before this Club to need any further indication of their position. Whereabouts he made the first ascent is not recorded, but he mentions being the first white man to ascend the highest peak, which he calls Mt. Aberdeen, but now known as "The Horn." He also ascended another peak over 4,000 ft. high, presumably the Hump. On this range he discovered the glorious *Grevillea victoriæ*, which he loyally dedicated to his Queen, then in the early years of her reign. As far as this he was accompanied by Mr. Dallachy, the Superintendent of the Melbourne Botanic Gardens, who had then to return to Melbourne. Not being satisfied with the alpine flora of the Buffaloes, he proceeded, travelling quite alone, to Mt. Buller (5,934), which he says is over 5,000 ft. high, and obtained his first glimpse of the true alpine flora, remarking *Ranunculus gunnianus*, Hooker; *Euromyrtus alpinus*, now *Baeckea gunniana*; *Celmisia astelifolia*, now *Aster celmisia*; *Gentiana diemeniensis*, now *G. saxosa*; *Podocarpus montanus*, now *Nageia alpina*, F. v. M.; and the grass *Trisetum antarcticum*, now *T. subspicatum*, as being analagous to the alpine flora of Tasmania. He also collected there *Phebalium podocarpoides*, now *Eriostemon alpinus*, F. v. M.; *Hovea gelida*, now *H. longifolia*; *Oxylobium alpestre*, F. v. M.; *Brachycome nivalis*, F. v. M.; and *Anisotome* (now *Aciphylla*) *glacialis*, F. v. M. This was the first time Buller had been botanically explored. Thence he proceeded towards the Goulburn, and down that river to its junction with the King Parrot Creek, up which he worked to its source, near the present village of Kinglake; here he crossed the Plenty Ranges into the Yarra watershed, and following round the Dividing Range towards the head of the Yarra, struck the head of the Latrobe, and followed that river down for some distance, reaching the sea-coast

between the Lakes and Port Albert; thence to Wilson's Promontory and back to Melbourne by the coast—a journey which he estimated at 1,500 miles.

He gives as an appendix to his report a list of the Victorian plants to date, in which he enumerates 715 species of dicotyledons, belonging to 83 orders and 286 genera; 201 species of monocotyledons, belonging to 21 orders and 100 genera; with 47 species of ferns, belonging to 27 genera, or a grand total of 963 species, more than half the species listed in Part 2 of the "Key to the System of Victorian Plants," published in 1885. Those who knew him can picture with what enthusiasm he must have collected on the hitherto untrodden slopes of the Buffaloes, Mt. Buller, &c. No wonder that a large proportion of our Victorian plants bear, as the mark of their sponsor, F. v. M.

In the summary of the results of the first trip he calls attention to the fact that more than half the plants enumerated were known to inhabit Tasmania (then Van Diemen's Land), and that some of these were considered to belong exclusively to that island. Other affinities are also pointed out, such as a Panax resembling a species in the Moluccas; the genera Psoralea and Crantzia as connecting links with America; while *Myrsine howittiana* is nearer to the New Zealand species than those of New South Wales. Then again *Anisotome* (*Aciphylla*) *glacialis* is representative of a genus found in the Auckland and Campbell Islands, south-east of New Zealand. His most noteworthy additions to our flora he regards as *Grevillea victoriæ*, *Correa lawrenciana*, and *Basileophyta frederici augusti*—rather a singular name for such a man to bestow on an indigenous plant, but now known as *Fieldia australis*. As a commencement of the policy which he advocated in later years, he points out certain plants which either in their present state or by cultivation could be made useful to man either as medicinal remedies or as food plants, &c.

His second annual report is dated 5th October, 1854, and is printed in the "Notes and Proceedings of the Legislative Council of Victoria, 1854–5," vol. i., part 2 (A 18), page 931.

The second journey was commenced on 1st November, 1853, Mount Sturgeon, at the southern extremity of the Grampians, being his first point in hilly country. He traversed the Serra, Victoria, and Grampian Ranges, in order to see if Sir Thomas Mitchell, who ascended and named Mount William in July, 1836, on his journey towards the sea at Portland, had left anything for future explorers, and then intended to travel through the Mallee towards the Murray, but, owing to the heat and want of water, was obliged to make for the Avoca River, which he followed down almost to the Murray, when, still wishing to observe the Mallee, he turned west to Lake Lalbert, and through the Mallee fringe to the Murray, reaching that river below Swan

Hill in December, and continued along past the present Mildura as far as the junction of the Darling (near the present Wentworth). He now turned eastwards, and making a short detour to the granite area of Mount Hope, midway between the Loddon and Echuca, continued on his easterly course, and reached Albury in the middle of January, 1854. From there he worked up the Mitta Mitta valley, turning aside to visit the Gibbo Range, which he crossed at an elevation of about 5,000 ft., thence back to the Mitta and on to Omeo. From there he attempted to reach Bogong, but was driven back by bush fires, so turned eastwards to the Cobberas Mountains, part of the main divide, near the New South Wales boundary. Here he added *Phebalium* (now *Eriostemon*) *phylicoides*, and *Asterolasia* (now also *Eriostemon*) *trymalioides* to the Victorian flora. Thence he travelled south-east to the Snowy River, probably into New South Wales territory, and found *Brachychiton populneum*, or *Sterculia heterophylla*, of Cunningham, "a beautiful tree from the tropics, growing out of bare granite rocks washed by melting snow." Turning towards the Tambo, he followed that river to the south for some distance, then turning east again crossed the Snowy River, and about the middle of March reached Cabbage-tree Creek, the southern limit of palms in Australia, and collected specimens of the only Victorian palm, *Corypha* (now *Livistona*) *australis*. Thence he collected along the Buchan River, and made his way back to Melbourne by the main Gippsland track, reaching town about the middle of April, 1854, after a journey which he estimated at 2,500 miles.

During this trip he added 391 species of dicotyledons and 105 species of monocotyledons to the Victorian list, at least one-quarter of which were previously unknown.

His next report is a special despatch, dated Omeo, 16th December, 1854, in which he records his successful ascent of some of the highest peaks of the Alps, forming part of his third journey. This will be found in "Votes and Proceedings of the Legislative Council of Victoria, 1854–5," vol. ii., part 1 (A 45), page 233, but I will refer to it in its proper place as part of the third journey.

His third journey is recorded in the third annual report, "Votes and Proceedings of the Legislative Council, Victoria, 1855–6," vol. i., part 1 (A 10), page 415.

He left Melbourne on the 1st of November, 1854, travelling by way of the Dandenong Ranges and the fern gullies to the head of the Latrobe River. Down that river to the Avon, then up the Avon to Mount Wellington, 5,363 ft. (named by M'Millan), which he reached on the 14th November, only a fortnight after starting, which seems very good travelling for those times. Spending about a week there, he left the lower Avon on the 22nd

of the same month for the Mitchell, travelling up that river, the Wentworth, and the Dargo to the foot of the Alps, which he evidently crossed somewhere to the south-east of Mount Hotham, and struck the Cobungra Creek, a tributary of the Mitta, then made his way, probably over the Bogong High Plains, to Bogong itself on the 3rd December, 1854; from there he made back to Omeo, and wrote the special despatch previously referred to. This portion of his third journey I shall have occasion to refer to again, but will first finish the itinerary of the trip. He refers to the large numbers of Bogong Moths, *Agrotis spina*, among the rocks covered with the spreading Alpine pine, *Adocarpus montana* (now *Nageia alpina*), and says one of the main branches of the Mitta Mitta has its sources in Mt. Latrobe (? the Big River), and those of another, as well as those of the Ovens and Mitchell, lay in lower country not far distant. During this part of the journey he added 60 species to the flora of Victoria. Spending a day or two at Omeo, from whence he sent a long account of his alpine treasures to Sir W. Hooker—published in Hooker's "Journal of Botany and Kew Garden Miscellany," vol. vii. (1855), page 233—he left that place about the middle of December, travelling in a north-easterly direction towards Kosciusko. He ascended Mt. Tambo on 17th December, and then visited the Munyang Mountains, which I believe is the old name for the group in which Kosciusko is situated, and now known as the Snowy Mountains. Here he ascended "the most northern alpine hill" on New Year's Day, 1855, but whether it was the peak of Kosciusko, named by Lendenfeld Mt. Townsend, 7,357 feet, is uncertain; however, the next highest peak is now known as Mueller's Peak, in his honour, and is only 85 feet lower than Australia's best (Kitson, A.A.A.S., vii. (1898), p. 367; also Curran, Proc. Lin. Soc. N.S.W., 1897, part 4, page 796; and Lendenfeld in "Reports of Mining Registrars, Victoria," March, 1866, page 72). From Kosciusko he returned to the Buchan River, whence he wrote to Sir W. Hooker again, under date of 22nd January, 1855. In this he says:—"I am now preparing to revisit the Cabbage-tree country beyond the Snowy River, which I had (on account of many unforeseen adversities—the hostility of the natives, and the unfavourable weather) but little opportunity in exploring last year," and concludes by saying:—"After having traversed now the main chains of the Snowy Mountains in so many directions that I am led to believe that the plants mentioned in this and the two previous letters, and those mentioned in my reports, comprehend almost completely the Alps flora of this continent, I wandered for days over the Snowy Mountains without being able to add a single species to the collections." No wonder collectors in later years had few chances of immortalizing themselves when they had to follow such a man

as this. After revisiting Cabbage-tree Creek, he travelled along the coast to Lake King, finding Acronychia (Rutaceæ), a genus from Eastern Australia and New Caledonia, remarkable for its splendid wood and aromatic properties. Thence back to Melbourne, apparently by the ordinary Gippsland track, regretting his inability to ascend Baw Baw on account of illness.

He remarks that the Victorian truly alpine and sub-alpine plants exceed 100 species, of which at least half are endemic, while the larger part of the rest comprise such as inhabit Tasmania, or are likewise natives of New Zealand. Thus the genus Drapetes (Thymeleæ), thought to belong exclusively to Fuegia, is now ascertained to exist, with other plants from the cold zone of South America, in the Australian Alps, Tasmania, New Zealand, and Borneo.

He adds :—" A most surprising fact is the sudden reappearance of several European plants in the heart of the Alps, which may be searched for in vain in intervening country, such as *Turritis glabra*, *Sagina procumbens*, *Alchemilla vulgaris*, *Veronica serpillifolia*, *Carex echinata*, and *Botrychium lunaria*. I may also refer to *Lysimachia vulgaris* in Gippsland morasses as a singular instance of the enigmatic laws which rule the distribution of plants, and I cannot suppress the opinion that such facts tend to annihilate all the theories in favour of the migration of species from supposed centres of origin." He estimates the Victorian plants at 2,000 species, and says 15 genera had been added to flora of continent during the year (1854).

I will now return to the special despatch, dated Omeo, 16th December, 1854, from which I make the following extract :—" Left the Avon on the 22nd November, thence up the Mitchell, Wentworth, and Dargo Rivers, and crossed the Dividing Range between the waters of Gippsland and the Murray, near the upper part of the Cobungra. Thence I traversed a grassy table-land in a north-easterly direction, along the Cobungra downwards, until the country appeared practicable towards the north, to reach the highest part of Bogong Ranges. The ranges hereabouts have never been traversed by civilized men. They are timbered with Mountain Gum-tree, *Eucalyptus phlebophylla*. On 3rd December I ascended the south-east of the two highest mountains of the Bogong Range, and believed it to be nearly 7,000 feet high. The much more abrupt and yet higher summit of the north-west mount I ascended from the Upper Mitta, which skirts the base, on 6th December; unquestionably several hundred feet higher. On both mountains mighty masses of snow lay far below summit. Considering that mountains of such altitude, probably the two highest on the Australian continent, deserve distinctive names I solicit His Excellency's permission to name the grandest of both Mt. Hotham, and the second in height Mt. Latrobe, as I trust

to be entitled to the great honour of being the first man who ever reached these commanding summits of the Australian Alps."

He gives the following bearings of different peaks, &c., as taken from his Mounts Hotham and Latrobe :—

Bearings from Mt. Hotham.—Mt. Aberdeen (The Horn), W. 10° N. ; most northern peak of Buffalo Mts., W. 30° N. ; Mt. Buller, W. 35° S. ; Mt. M'Millan of Townsend, or Castle Hill of Tyers, due S. ; the Cobberas, E. 12° N. ; Mt. Wellington, S. 10° W. ; Mt. Latrobe (distant 8 miles), S. 25° E. ; Mt. Leichardt, E. 30° N. ; Mitchell's Plateau (about the distance of Mt. Buller), S. 40° W. ; Kennedy's Height (a rocky hill in the Snowy table-land), E. 5° S. ; and Hooker's Plateau (15 miles distant), N. 25° E.

Bearings from Mt. Latrobe.—Mitchell's Plateau, S. 15° W. ; Mt. Aberdeen, W. 5° S. ; Clarke's Peak, between Mitchell's Plateau and Buffalo Ranges, S. 30° W. ; and Mt. Hotham, N. 25° W.

Bearings from Mt. Tambo (17th December, 1854).—Mt. Hotham, due W. ; Mt. Latrobe, W. 4° S.

On reading this, and comparing his data, a doubt arose in my mind as to whether Dr. Mueller had really visited and named the mountain we know as Hotham. He makes prominent mention of two mounts, Hotham and Latrobe, in his report, evidently as being the most prominent peaks in the district, but the latter name does not now appear on our maps, and in trying to fix its identity I found his remarks would not fit in with the present Hotham. He gives the bearings of these two peaks with regard to others in the district, notably Mt. Aberdeen (now the Horn) on the Buffaloes. In order to satisfy myself on the point I recently communicated with Mr. Jas. Stirling, formerly Government Geologist, who, when mining surveyor in charge of the Omeo district, traversed the whole of the Alps, and constructed an excellent map, full of detail, of his district, which also may be consulted at the Public Library, while collecting both botanically and geologically. He (Mr. Stirling) appears to have had some doubts of a similar character years ago, and kindly forwarded to me some original letters of the late Baron, from which I have been permitted to make the following extracts.

The first is dated 2/11/82. In this he acknowledges "excellently coloured and clearly indicated geologically a geographic map of the Alps," and goes on to say :—

"It does you infinite credit to have worked out, with the help of Mr. Howitt, the geology of your district so well. In one respect I cannot help expressing regret when looking on this map ; it is the systematic manner in which all my early and toilsome work for the geography of the Australian Alps has

become suppressed even to the extent of the real Mt. Hotham and to Mt. Latrobe, though they were named in a special despatch from Omeo as far back as 1854, after my having ascended the two mountains, fixed approximately their position, and measured their height near enough, though with the most scanty of instruments. That despatch was at the time at once placed before the then Council by Sir Charles Hotham, long before I came back to Melbourne, printed irrespective of my fuller account of the Alps in my annual report of 1855, written and printed before I went to Arnheim's Land. You will kindly understand that arbitrary and unjust changes in the nomenclature of several of our highest mountains occurred or were brought about long before your time. Still it must be a source of lasting regret that in this way also the names of Sir Thos. Mitchell and Sir Andrew Clarke, two of the three first Surveyors-General of our territory, became obliterated. Is there no means of remedying this yet? Priority should also be recognized in geography.—FERD. VON MUELLER."

The second is dated 18/10/84, and reads:—

"Let me thank you, dear Mr. Stirling, for the trouble you have taken in marking a copy of your district map, geologically, for me. Thus it has become exceedingly valuable for me. What is called now Mt. Feathertop is my Mt. Hotham of 1854, and what is named Mt. Bogong I called then already Mt. Latrobe. My rough observations made them higher in proportion to Mt. Buller, which I ascended in 1853.—FERD. VON MUELLER."

From these you will see that the present Feathertop was what he originally called Mt. Hotham, in honour of the then Governor, and Mt. Bogong was called Latrobe, in honour of the first Lieutenant-Governor of Port Phillip (now Victoria). This substitution of names to a certain extent alters the first-recorded localities—viz., Mount Buffalo, Mount Hotham, and Mount Latrobe—for certain plants, notably *Grevillea victoriæ* ("Transactions Philosophical Society of Victoria," vol. i. (1855), p. 107), and might lead botanists astray when collecting in the Alps at the present time. I had hoped that this shrub would have afforded some clue to the original Mount Hotham, as Mr. Stirling does not include it in his flora of our Mount Hotham (*Victorian Naturalist*, vol. iv., p. 76), but Mr. C. Walter informs me that he has collected it on the mountain, and Mr. Weindorfer notes it as occurring on Bogong (*Victorian Naturalist*, xx., p. 147). However, if the bearings are printed correctly in his Omeo despatch, there is a still further discrepancy, for he gives Latrobe (Bogong) as 8 miles S. 25° E. from Hotham, *i.e.*, our Feathertop, which, according to our present maps, is totally wrong, being fully 16 miles N. 40° E. Now the present Feathertop and

Hotham are about 8 miles apart, but are almost N. and S. from one another. The only bearing which he gives which seems to agree with our present map is Mt. Aberdeen (the Horn) W. 5° S. from his Latrobe (Bogong).

Mr. Stirling, in an accompanying note, says that he has no doubt in his own mind but that Dr. Mueller ascended and named Feathertop as Hotham, and Bogong as Latrobe; and, further, that during the visit of the Australasian Association to Mount Hotham, in 1891, the late Baron pointed out all the points he had ascended in 1855. A report of this visit will be found in "Proceedings Geographical Society of Australasia (Victorian Branch)," vol. viii., part 1, p. 43, with a map in part 2.

As the Baron remarks in his letter, priority of naming in geographical matters should be as much respected as in biological matters, and though I do not advocate any attempt to restore the name of Hotham to its original mountain, still I should like to say that, after carefully reading the Omeo despatch, and comparing it with maps of the district, notably that in Dr. Lendenfeld's report of a visit to Mount Bogong in "Reports of Mining Registrars of Victoria," March, 1886, I have come to the conclusion that Baron von Mueller, in his letter of 18th October, 1834, to Mr. Stirling, suffered from a lapse of memory, and that instead of ascending Feathertop and naming it Hotham, he really ascended our Bogong, and bestowed that name (Hotham) upon it, while his Latrobe is either Mt. Wills, nearly 6,000 ft. high, about 10 miles S.E., or Mt. Nelson, both peaks of the Bogong Range. I must admit that this conclusion does not perfectly fit in with his bearings as printed, but seeing that these mountains were being located for the first time, and that he was viewing a landscape which he had not seen before, I am not surprised at the wrong peaks being named for the bearings given; and when we recall the words of his report already quoted, "I traversed a grassy table-land in a N.E. direction, along the Cobungra downwards," these cannot possibly refer to the "Razor-back," the only possible approach to Feathertop from where he crossed the Alps from Gippsland.

Risking the remark that my paper is becoming too geographical, I should like to be allowed to give a few facts in the evolution of the map of Victoria, with which my searches at the Lands Department and the Public Library have made me conversant.

The first map of Victoria printed after Dr. Mueller's visit to the Alps in 1855, which I have come across, is contained in Proeschel's "Atlas of Australasia," published in London in 1863. As this was engraved by Brown and Slight, Emerald Hill, Melbourne, it was probably drawn a year or two earlier. It is on a scale of about 25 miles to 1 inch, and gives most of the names mentioned by Dr. Mueller in his reports, and the information

must therefore have been derived to some extent from his field notes. Hotham is named on this along with Latrobe, but both are south of the 37th parallel, and consequently the positions do not agree with my contention. However, as the Bogong Range is marked in almost its present position, and Dr. Mueller distinctly states that he ascended the two highest peaks of the Bogong Range, I think I may be permitted to regard them as wrongly placed, especially as Mt. Buller is undoubtedly in the wrong place.

I have constructed a sketch map of the Alps, as at present laid down, on a scale of 4 miles to 1 inch, and have marked upon it in brown the different mountains and names as given on Proeschel's map, which, you will see, places the main chain of the Alps considerably further south than shown on our latest maps.

The next map, "Victoria, geologically coloured under the direction of A. R. C. Selwyn, Government Geologist," dated Lands Department, Melbourne, 1st July, 1863, is on the scale of 8 miles to 1 inch. The only alpine mountains named are Howitt, Selwyn, Twins, and Smyth, with the Bogong Range almost in its present position.

In 1865 the Department of Lands published a map of Victoria, dated 31st March, on a scale of 16 miles to 1 inch. This is photo.-lithographed by W. Collis, and is practically a reduction of the previous map. Neither Hotham nor Feathertop is named.

In 1866 was published Bailliere's "Atlas of Victoria," which contains a map of the Murray and Gippsland districts engraved at the Department of Lands, Melbourne. The names Bogong and Hotham do not appear on this. Feathertop appears for first time, Nelson is about the present position of Bogong, and Smyth in the present position of Blowhard.

In 1872 a "Sketch of a New Geological Map of Victoria," under the direction of R. Brough Smyth, dated 20th September, was published, on a scale of 16 miles to 1 inch. On this the position of the Alps is entirely wrong. Hotham is not mentioned, and Nelson takes the place of Bogong. Other names given are Feathertop, Twins, and Wills.

In 1875 was published "Victoria," under the direction of A. J. Skene, Surveyor-General, engraved by James Slight, and dated October, 1875. This is on the scale of 16 miles to 1 inch, and is practically our present map. This is the first map since Proeschel's which contains the name of Hotham. Feathertop and Bogong appear, while Smyth and Nelson are omitted.

Another edition of this map, on the scale of 8 miles to 1 inch, was published by the Lands Department in June, 1876, since which the only alterations have been to mark the progress of settlement in various directions.

To show how unreliable are the maps published in standard

works of reference, let me briefly refer to a few which have come under my notice recently.

Collins's "International Atlas" (1873) contains a map of New South Wales and Victoria by J. Bartholomew, a recognized chartographer, in which Buller is entirely wrong, and Hotham, the only mountain named in the vicinity, takes the place of our Bogong.

Chambers's "Encyclopædia" (1874) map of Victoria, by W. and A. K. Johnston, Edinburgh. Only peaks given are Hotham and Latrobe, corresponding to the present Feathertop and Battery.

"Blair's History of Australasia" (Edinburgh, 1879) contains a map of Victoria by W. and A. K. Johnston; places Hotham in present position of Bogong and Latrobe in position of Wills; names Mitchell's Plateau—Mt. Buller is entirely wrong, should be Cobbler; and calls the Horn (Buffalo Peak) Mt. Aberdeen.

"Chambers's Encyclopædia (1895) map of Victoria, by J. Bartholomew. Hotham in place of Feathertop, and Latrobe in place of Battery; while Townsend (Kosciusko group) is entirely wrongly placed.

My last reference will be to the maps accompanying Dr. Lendenfeld's "Report on an Exploration of the Australian Alps," already quoted. This contains two maps. The one of South-Eastern Australia, taken from Petermann's map of Australia, contains several old names, and shows one or two important errors—thus, Buller is in wrong place. The other map of Mt. Bogong and the surrounding ranges (4 miles to 1 inch) seems to be reliable. Unfortunately, it does not include Hotham or Feathertop. Mt. Nelson (height not given) is shown about 5 miles S.S.E. of Bogong, in a line with Mt. Battery, about 20 miles distant, while Mt. Wills (5,738 feet) is about 10 miles E.S.E. This map gives an excellent outline of the Bogong High Plains, which have an average elevation of over 5,500 feet. From these references you will see that the fixing of the original Mt. Latrobe is a difficult matter. Singularly enough, the majority of the maps drawn in England—the data, of course, must have been obtained from here—make Hotham and Latrobe appear as peaks of the Bogong, and therefore support my contention that the original Hotham is the present Bogong, and Nelson or Wills was Dr. Mueller's Latrobe.

The question at this date may not be very important, but it is nevertheless interesting in its bearing on the evolution of the map of Victoria.

In conclusion, I would add that Dr. Mueller made other trips, which are mentioned in his later reports, but only meagre details

are given. In September, 1860, he visited the Genoa River, East Gippsland. On 25th December of the same year he ascended Mt. Baw Baw, one of the peaks of which is now known as Mt. Mueller, returning to Melbourne by the Yarra track, and in March, 1861, he visited the sources of the Macallister River, towards Mt. Howitt, in company with Angus M'Millan, the discoverer of Gippsland.

The accompanying map shows, approximately, the routes of Dr. Mueller's three journeys, distinguished by one, two, and three dots respectively, with their direction marked by arrows.

A Fungus Note.—Entering Albert Park, South Melbourne, by the north-east gate on Good Friday morning, my attention was at once attracted by numerous white patches, which at first glance appeared as if some persons had been tearing up white paper into small pieces and scattering it broadcast. On approaching closer it was found that these patches were fungi of the species *Coprinus comatus*, Fries., and that they were there in hundreds, if not thousands. The fungus is one which is listed as edible in Cooke's "Australian Fungi," but I fancy few people would care to sample it. Young specimens are pure white, but they gradually become darker and deliquesce, emitting a peculiar odour. A peculiar characteristic of this fungus is that it always follows the close occupation of land by man. At one time it was proposed to print the Bank of England notes with ink containing the spores of this fungus, as they are so very minute—very much smaller than those of an ordinary puff-ball—that the ink would contain such quantities of them that the notes would be readily identifiable on microscopic examination.—F. G. A. Barnard.

A Giant Eucalypt.—The *Leader* of 14th May contains an excellent reproduction of a photograph by Mr. N. J. Caire of a giant eucalypt, said to be the largest in Victoria, recently discovered near the Cumberland Falls, in the Yarra Ranges, at an elevation of 2,600 feet, and about 11 miles from Marysville. The tree is a fine specimen of the White Manna Gum, *E. viminalis*, and, at about six feet up the trunk measures, with the tape tightly drawn, 58 feet in circumference. It has been a very tall tree, but the top has been blown off at a height of about 180 feet from the ground. Even there the trunk is probably four or five feet through. Scientists have estimated the age of these giant trees at from 1,200 to 2,000 years. It is to be hoped that the new giant will not share the fate of the "Neerim Giant," "Big Ben," on the Black Spur, and other notable trees, which have been destroyed by fire.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The twenty-fourth annual meeting of the Club was held in the Royal Society's Hall on Monday evening, 13th June, 1904.

The president, Mr. O. A. Sayce, occupied the chair, and about 65 members and visitors were present.

REPORTS.

A report was furnished by Mr. C. French, jun., of the Club's visit to the Entomological Branch, Department of Agriculture, on Saturday, 14th May, the object being economic entomology. There was a large attendance, about 50 members and friends being present, who were shown the collections by Mr. C. French, jun., in the absence, through illness, of Mr. C. French, F.L.S., Government Entomologist. Many additions to the collections were noticed since the last visit of the Club, notably among the life-histories of Victorian insects, while the collection of insectivorous birds had also been materially increased. The afternoon was fully occupied in the examination of the various objects shown.

ELECTIONS.

On a ballot being taken, Miss Turner, "Torridge," Domain-road, South Yarra, and Miss A. Westmoreland, Stawell-street, Kew, were duly elected ordinary members; and Mr. G. A. Waterhouse, B.Sc., F.E.S., Royal Mint, Sydney; Mr. M. Montgomery, Post-Office, Foster; Mr. J. P. M'Lennan, State school, Emerald, country members of the Club.

ANNUAL REPORT.

The hon. secretary, Mr. J. A. Kershaw, F.E.S., then read the twenty-fourth annual report for 1903–4, which was as follows :—

"To the Members of the Field Naturalists' Club of Victoria. Ladies and Gentlemen,—In presenting to you the twenty-fourth annual report, embracing the work of the Club for the year ending 30th April, 1904, your committee are once again in the happy position of being able to congratulate you on the steady and successful progress which has marked the Club's efforts during another year of its history, and the encouraging prospects for a continuance of its onward movement.

"During the past year 33 new members were added to the roll, while 21 names were removed, owing to resignations and other causes, leaving us with an increase over that of the previous year of 12 members. The total membership of the Club is now 193, comprising 9 honorary, 2 life, 157 ordinary, 22 country, and 3 junior members.

"It is with very great regret that we have to record the death of Mr. H. P. C. Ashworth, which occurred on 20th August, 1903. Mr. Ashworth filled the office of hon. secretary of the Club from January, 1894, to May, 1896, when, owing to failing health, he was compelled to relinquish the position. His enthusiasm as a lover of nature, and his genial disposition, won him many friends, who deeply regretted his death at the early age of thirty-two.

"The attendances at our usual monthly meetings during the past year show a most satisfactory increase, and are a striking indication of the lively interest manifested in the work of the Club. The attendance averaged about 72, as against 48 for the previous year. The greatest number at any one meeting was 150, while on four occasions the attendance numbered 100 or over.

"The exhibition of specimens continues to be a valuable feature, and keen interest is always taken in the various objects shown. Your committee desire to impress upon members that there is room for a still further expansion in this direction, and exhibitors may feel assured that the time and trouble involved is duly appreciated.

"The number of papers read shows a decrease, as compared with that of the previous year. The cause of the falling-off is mainly attributed to the length of many of the papers, and the discussion excited, rather than to any lack of workers; several papers having had to be postponed to a future meeting for this reason.

"Altogether twenty-five papers were read, of which 7 related to zoology, 5 to botany, 1 to geology, 5 to general subjects, and 7 to trips and excursions. Of the zoological papers, 1 was devoted birds, 1 to fish, 1 to molluscs, and 4 to insects.

"Several papers were well illustrated with large series of lantern views, which added considerable interest to the subjects dealt with; and we are again indebted to the hon. lanternist, Mr. J. Searle, for providing and working the lantern on these occasions.

"The authors were Miss K. Cowle and Messrs. E. E. Barker, F.R.M.S., F. G. A. Barnard, A. J. Campbell, F. Chapman, A.L.S., and H. G. Grayson, J. H. Gatliff, R. Hall, F.L.S., W. Hopkins, G. A. Keartland, J. A. Kershaw, F.E.S., A. E. Kitson, F.G.S., J. A. Leach, Professor Baldwin Spencer, M.A., F.R.S., C. Walter, G. A. Waterhouse, and G. Weindorfer.

"In addition to the papers, Natural History Notes on various subjects have been read at nearly every meeting, while remarks on specimens exhibited have been rather more numerous than usual, and have added materially to the interest of our gatherings.

"The field excursions have again attracted good attendances, and the reports by the various leaders show that good practical work is being accomplished through the advantages afforded by these short trips. Included on the programme were two extended excursions, one of which was again held at Launching Place from the 7th to 9th November last, where the good work accomplished on the previous January excursion to the same place was continued with equally satisfactory results. The other, a ten-days' camp-out on the Buffalo Ranges, extending from 24th December to 4th January, proved a great success in every way. A party of twenty-six took part in the camp, including eleven ladies, and the work accomplished, as shown by the detailed reports published in the *Naturalist* for March last, has added considerably to our knowledge of the fauna and flora of that highly interesting country, and is a lasting record of the valuable field work being achieved by the Club through the medium of our field excursions.

"The twentieth volume of the Club's journal has been completed under the able editorship of Mr. F. G. A. Barnard, who continues to devote his careful attention to this most important part of the Club's work, and to whom the hearty thanks of the Club are again due. This volume completes the second decade of our journal.

"During the year several matters of public importance have been considered by your committee, and the necessary action taken. Acting upon reports received regarding the destruction of native game on Lake Moodemere, the Minister of Public Works and the Rutherglen Shire Council were written to, with satisfactory results. Through the medium of the press the attention of the authorities was again directed to the destruction of the wattles.

"The question regarding the threatened destruction of the fauna and flora by the proposal of the Government to lease the river and creek frontages throughout the State, which includes the right to cultivate these areas, was discussed at one of the general meetings, and referred to your committee to take such action as they deemed necessary. However, until some definite information is obtained as to the provisions of the leases, it is impossible to decide upon a line of action.

"The Minister of Lands was also approached with a view to securing the permanent protection of Malleson's Glen, near Launching Place, which is now protected only so far as the

cutting of timber is concerned, but which affords exceptional opportunities for the proper preservation of the local fauna and flora.

"Similar action was also taken regarding portion of the land at Gembrook, over 600 acres of which was originally reserved for the Zoological and Acclimatization Society of Victoria. Our efforts, however, have not been attended with very satisfactory results so far. Your committee recognize the urgent necessity of suitable areas in different parts of the State being permanently set apart for this purpose, and for the preservation of any natural features of scientific value, and trust that something may be accomplished in this direction before it becomes too late to be of value.

"In connection with this matter we have to acknowledge the sympathy and co-operation of the National Forests Protection League, which has done all in its power to support our action.

"In consequence of a deputation of sportsmen having waited on the Commissioner of Public Works to advocate the opening of the shooting season for ducks and quail at an earlier date than was provided by the *Game Act*, your committee, in December last, appointed Messrs. T. S. Hall, M.A., G. A. Keartland, and the hon. secretary, Mr. J. A. Kershaw, F.E.S., to act as a deputation to wait on the Commissioner to protest against the suggested alteration. Your representatives were ably supported by delegates from the Zoological and Acclimatization Society of Victoria, and the Australasian Ornithologists' Union, while the sportsmen were strongly represented, and were supported by several members of Parliament and delegates from various shire councils. The decision of the Minister, however, was, as already reported at our meetings, far from satisfactory. It was therefore gratifying to learn that after only two months' trial the Government, following the advice tendered by your Club, which was supported by numerous letters in the daily press from all parts of the State, decided to revert to the old dates.

"A special joint meeting of the Club and the Royal Society of Victoria was held on 21st April last on the occasion of the presentation of the Mueller medal to Mr. A. W. Howitt, F.G.S., for distinguished work in Natural Science. The award of the medal was made at the Dunedin meeting of the Australasian Association for the Advancement of Science in January last, when Mr. Howitt was unanimously chosen as the first recipient. Professor Baldwin Spencer, M.A., F.R.S., president of the Royal Society, made the presentation, and was accompanied on the platform by your president, Mr. O. A. Sayce.

"In recognition of the valuable assistance rendered to the Club for many years by Mr. J. Searle, in placing his lantern and services at the disposal of the Club free of cost, your committee

in October last asked him to accept the position of hon. lanternist to the Club.

"The thanks of the Club are due to the various authors of papers, leaders of excursions, and others who have materially assisted in forwarding the objects of the Club. To Messrs. T. R. B. Morton and G. Coghill our Club is also greatly indebted for continuing to place their office, free of cost, at the disposal of your committee.

"The hon. librarian reports that during the year the library has been well availed of by members, and the new purchases seem to be much appreciated. During the year 148 volumes and parts have been added by exchange and 54 volumes and parts by purchase. Binding has been kept up to the usual standard, but more should be done during the current year. The cost of binding has been somewhat reduced by adopting a cheaper cover for new series, which will serve all requirements. The original style is, however, continued in all old serials, but to keep down expense where desirable two volumes are bound in one cover. Owing to residence at a greater distance from town he had not been able to give much time to the library except on Club nights, consequently the card catalogue has made little progress. He desires members when consulting books to be careful and replace them in their proper positions, as failure to do this frequently causes disappointment to members wishing to borrow, through being told that the book is out, and he further requests members desiring to borrow to attend early, and make their requisitions before the business of the evening, and thus allow the librarians the opportunity of seeing the exhibits and joining in the general conversazione, instead of being rushed with applications for books at that time.

"We are pleased to report that the financial position of the Club is still most satisfactory. Starting the year with a balance of £41 14s. 3d. to our credit, we conclude with one of £53 1s. 8d., with all accounts paid. The receipts amounted to £130 6s. 11d., while the expenditure was £118 19s. 6d.

"In conclusion your committee would again congratulate you on the sound position of the Club, and the importance of the work accomplished during the past year. They trust that the new year will find additional workers coming forward to add still further to our knowledge and stimulate us in our work.

"O. A. Sayce, *President.*
"J. A. Kershaw, *Hon. Secretary.*

"Melbourne, *6th June*, 1904."

The report having been received, Mr. D. Best, in moving its adoption, congratulated the members on the satisfactory nature of the report, as indicating the continued prosperity of the Club,

and alluded to the important work accomplished during the year. Mr. H. T. Tisdall seconded the resolution, which was carried unanimously.

FINANCIAL STATEMENT.

The hon. treasurer, Mr. J. F. Haase, read the financial statement for 1903–4, which was as follows :—

RECEIPTS.

To Balance, 30th April, 1903				£41 14 3
,, Subscriptions		£109 6 0		
,, *Victorian Naturalist*—				
Subscriptions ...	£5 9 8			
Sales	6 17 9			
Reprints	1 15 6			
Advertisements ...	4 10 0			
		18 12 11		
,, Sale of Microscope		2 2 0		
,, ,, Club's Badges ...		0 6 0		
				130 6 11
				£172 1 2

EXPENDITURE.

By *Victorian Naturalist*—				
Printing	£69 13 3			
Reprints	2 15 6			
		£72 8 9		
,, Rooms—Rent and Attendance ...		9 5 0		
,, Library—Books ...	2 2 6			
Periodicals ...	7 2 6			
Binding ...	4 19 0			
Microscope ...	9 2 0			
Insurance, &c.	0 11 0			
		23 17 0		
,, Expenses Joint Meeting with Royal Society		0 15 0		
,, Wreath, late Mr. H. P. C. Ashworth ...		1 0 0		
,, Postages, &c.		11 13 9		
				£118 19 6
,, Balance London Bank		23 1 8		
,, ,, Melbourne Savings Bank ...		30 0 0		
				53 1 8
				£172 1 2

J. F. HAASE, *Hon. Treasurer.*

30*th May*, 1904.

Audited and found correct.

D. BEST,
G. WEINDORFER, } *Auditors.*

2*nd June*, 1904.

The following statement of assets and liabilities was also read :—

ASSETS.

Balance in hand	£53	1	8
Arrears of Subscriptions (£37 4s.), say	20	0	0
Library and Furniture	120	0	0
	£193	1	8

LIABILITIES.

Outstanding Accounts ... ... *Nil.*

The financial statement having been received, it was favourably commented upon by Messrs. G. A. Keartland and D. Best, the latter stating that the Club was greatly indebted to Mr. Haase for the careful manner in which he had carried out the duties of hon. treasurer, and which reflected great credit on him. On the motion of Messrs. H. T. Tisdall and W. Stickland the statement was adopted.

PRESIDENT'S ADDRESS.

The president, Mr. O. A. Sayce, then delivered the following address :—

"Ladies and Gentlemen,—In thinking of a subject for a presidential address, which you have done me the honour of requiring of me, I have desired that I might make it of practical everyday value—at least, to the growing numbers of young or inexperienced naturalists who fortunately are continually joining our ranks. I realize that few of our numbers have been grounded in a systematic training in the natural sciences, and that most, perforce of circumstances, make the study of natural history but an incident in a busy life ; the opportunity for field or laboratory work is often intermittent with them, and such are apt to think that they cannot be of any real value to others than themselves, nor do they feel the stimulus which helping to further scientific knowledge brings. He who looks on nature with the sole end of gaining interest from it for himself alone is scarcely one to be esteemed by his fellow-men, nor is his interest likely to be maintained.

"Our responsibility, as an association of naturalists, is to help, and inspire if possible, all those who come amongst us, and it has seemed to me that I could not do better than point out some work of importance that could be done by anyone with sufficient interest and application to do it. Hence I have chosen to speak briefly on

"THE COLLECTING OF NATURAL HISTORY SPECIMENS.

"There are at least two widely different kinds of collectors—one who collects only such objects that may appear of interest to him because of their form, size, or colouration, and judges each in the light of its own apparent merit, apart from its place in

nature, or attempts to get as many different kinds of a group—say, for instance, butterflies—as possible, to arrange fantastically as pretty objects. Others collect with the object, more or less sincere, to learn what they can of their specimens by serious work, or send them on to some scientific worker.

"It is to those of this latter group, or who desire to be of this group, that I now speak.

"Latterly most of my spare time has been given to systematic classification, and I have had but little opportunity for field observation and collecting, so that in offering advice upon it I am unable to proudly point you to myself as a living example of what a perfect specimen of collector should be. My advice must therefore be taken at its face value. I have, however, in my work as a sytematist realized the important help that a collector might often have given if he had but known that it would have been helpful.

"But you may ask what special importance lies in the classification of specimens? Doubtless you will be satisfactorily answered when you think that before the interesting and important studies of life-history, comparative anatomy, and zoogeography can be well done it must be exactly known what animal or plant is being studied. Now I hold that, at any rate in our State, there is great need for systematic collecting and the accurate identification of the species of many groups of at least the Invertebrata. In plants and the higher animals little possibly remains to be done in this particular.

"One has but to take a seaside or country walk, and attempt to get a specific determination of very many of even common specimens of many groups of invertebrate animals, to find himself beset with almost insurmountable difficulties. This should not be.

"For the doing of this work it is first of all necessary to collect specimens, and although the collector may unfortunately not expect to be able to do anything himself with the specimens, he may know of some reliable person who is working the particular group to which his specimens belong, to whom he may send them, or, failing this, there is the National Museum, where he may rest assured that his material will be well preserved, and will be valuable, if not now, in time to come, as specialists of energy and ability come forward to examine and record matters of interest concerning them. By either method his work will not be wasted, and also it will be recorded in his name, with his field notes made use of.

"It is, I think, an unfortunate thing that the importance of the collector's work is not sufficiently realized by some systematic workers, and this is often so because of his having furnished practically no data with the specimens. The co-operation of

collector and systematist should be closer, and it can only be done by supplying field observation notes. Of course, whenever a field naturalist, in the literal sense, is sure of his specific determination, it is within his power to record any facts concerning it that he may desire, but it is necessary that his determination should be unquestionably right, and this is often a serious business, far more so than some are inclined to think. Hence co-operation with a specialist of the group to have his specimen or specimens named before publishing, with the statement by whom it has been done, is necessary, not for the honour and glory of the specialist, but because it is often important to know definitely who has identified the specimen, and also if it varies in any important degree from the type. It is doubtless, just because of the inability to get the right name of many organisms that records are not made concerning them. Field naturalists will thus see the importance of helping on this work.

"It is usually not long before a field naturalist becomes inclined specially to some one group of organisms, and pays more or less attention definitely to it, and it is well that such should be the case. Once a subject is chosen, observations accumulate with surprising rapidity, and next to the selection of a subject nothing is so important as system in pursuing it; order and method are absolutely necessary, and the making of full and exact notes of your specimens is essential for good work. This, unfortunately, is very often neglected with collectors, as I have already pointed out, but I wish to particularly emphasize the importance of writing observations about the specimens at or about the time of their capture.

"With all natural history specimens it is essential to label them securely, showing at least the exact locality where they were found, and the date when taken, but there is also other information of fundamental importance that should be noted whenever possible, and effort made to obtain it. As but a comparatively few words can be put on a label, it is better to add, beside the locality and date, a number, and write any additional remarks in a note-book kept for the purpose. Of course, if you are absolutely sure of the specific identification of any of your specimens it would be sufficient to mention it alone by name, but as accurate identification is often impossible, and error apt to arise, registering by number even as well as naming the specimens is the best method, at least until you know your group well. The label should be quite secure from the possibility of obliteration or loss, and as it does not appear to be generally known, labels for spirit-preserved specimens may be written in lead pencil, and placed inside the container with the specimen, which indeed is the best plan; of course several kinds may be placed in the same container if the labels are so written that no mistake can arise.

"Regarding the data required, let me suggest in outline what is most desirable to give. For inland specimens—the colour and markings when alive, the altitude where found, and if numerous or otherwise; nature of habitat, such as if inhabiting running or stagnant water, and if fresh or salt, also if permanent or occasionally drying up. When of terrestrial habit, the nature of the locality, such as if hilly or flat, if open or bush-land, if damp or dry, if taken from the hill-side or at the bottom of a deep fern gully, or otherwise, also the watershed. If a parasite, the host from which the specimen was taken should be mentioned; also as much concerning the life-history and particulars of larval forms as possible, not forgetting to mention any morphological sexual characteristics.

"Do not mistake me, I am not saying that all this information is necessary, nor that collecting specimens otherwise is of no use. What I strongly affirm, however, is that sufficient trouble is generally not taken to accurately observe and make notes upon specimens. I do not wish to make light of the efforts this will require in the doing, but I feel assured that these efforts will be well repaid. In studying natural history objects one should examine them not alone to satisfy one's own curiosity, but in a definite and systematic manner; then and only then may he justly claim to be a scientific worker, and assuredly he will find that by this means he will accumulate a mass of accurate information that will afford himself benefit and make knowledge for others. Indeed, if only the effort is made, it will be schooling which will help in mental training.

"I am reminded here of some sound advice given by Professor L. C. Miall in an address on 'Life-History Studies of Animals.' He says:—'Perhaps no one ever carried through a serious bit of work without in some stage or other longing to drop it. There comes a time when the first impulse is spent, and difficulties appear which escape notice at first. Then most men lose hope. That is the time to show that we are a little better than most men. I remember as a young man drawing much comfort from the advice of a colleague, now an eminent chemist, to whom I had explained my difficulties and fears. All that he said was "Keep at it," and I found that nothing more was wanted.'

"Besides what has been already said about the collecting of specimens, it is, of course, necessary to use due care in preserving them in such a manner as is best suitable for laboratory examination. This requires special care in some groups, and sometimes the specimens are of no use unless killed when suitably narcotized. One should make sure if one is adopting right methods. A suitable little book, lately published by the British Museum authorities, called 'Handbook of Instructions for Collectors,' can be recommended. It deals shortly with all the leading

groups of animals and plants, and is published at about a shilling.

"I may mention by the way that as a general practice for preserving specimens in spirit it is not well to use the strong methylated spirit, but to dilute it with one part pure soft water to four parts of the spirit. This strength will be about 70 per cent. Care must be taken not to add too much bulk of fresh specimens to too small a quantity of spirit, so as to dilute it unduly, because the specimens will become macerated; the over-diluted spirit should be poured off from the specimens and fresh spirit added. Also, if they have to undergo rough transit the bottles should be loosely packed inside with a bunch of cotton wool, tow, or soft paper, to prevent the specimens being knocked against one another.

"As regards what groups most require systematically collecting and studying you have been well informed two years ago by a former president, whose judgment, in virtue of his experience, can be safely relied upon. I can but reiterate that our land and freshwater organisms particularly require working before the inroads of settlement and the spread of introduced forms dispossess the original dwellers. This assertion, however, does not mean to imply that anyone at present doing marine work should leave it in favour of the former, for unquestionably the latter is of importance.

"Whatever group of organisms you study, be sure not to neglect to observe the common forms. These are often the most important; they have at least shown, in virtue of their numbers, that they have been the most successful in the struggle for existence, and therefore possess dominant characters. It is also a good thing to collect thoroughly whatever group of organisms you are studying from at least one restricted locality, and compare them with collections from elsewhere. At any rate, consider your organisms from the point of view of locality and range; one often gets interesting reading from nature in this way. As only one instance, I may mention a little freshwater crustacean, called *Phreatoicus australis*, which was first found on the summit of Mt. Kosciusko; later it was recorded from Mt. Wellington; later still I identified it from Lake Petrach, a mountain lake in Tasmania; and again from material received from a member of the last Club excursion to Mt. Buffalo, collected from the top of the mountain. It therefore appears to be an inhabitant only of Alpine regions, and the reason why this should be so is raised in our minds. Of course considerable data are required before we can satisfactorily answer many questions that may arise in this way, but we have a better prospect of working to good purpose when we try to answer definite questions."

Mr. T. S. Hall, M.A., congratulated the president on his interesting address, and moved a hearty vote of thanks, which was seconded by Mr. C. M. Maplestone, and carried with acclamation. Mr. Sayce briefly responded.

OFFICE-BEARERS FOR 1904-5.

The following office-bearers were duly elected, being the only nominations received :—President, Mr. O. A. Sayce ; vice-presidents, Mr. F. G. A. Barnard, Mr. F. Wisewould ; hon. treasurer, Mr. G. Coghill ; hon. librarian, Mr. S. W. Fulton; hon. secretary, Mr. J. F. Haase ; hon. assistant secretary and assistant librarian, Mr. C. L. Barrett ; hon. editor, Mr. F. G. A. Barnard. On a ballot being taken, the following were elected as the committee :— Messrs. T. S. Hall, M.A., A. D. Hardy, G. A. Keartland, J. A. Kershaw, F.E.S., D. Le Souëf, C.M.Z.S.

The President alluded to the retirement of Mr. Kershaw from the post of hon. secretary after occupying that office for the last three years, and regretted that he had found it necessary to decline nomination for the position.

Mr. D. Best moved a vote of thanks to Mr. Kershaw for his untiring efforts on behalf of the Club during the three years he had held the secretaryship, and remarked that the great success of the Club had been mainly due to the excellent secretaries it had been fortunate in securing, and from Mr. Haase's work as hon. treasurer he felt no anxiety for the coming year.

Mr. H. T. Tisdall seconded the motion, and referred to the courteous manner in which Mr. Kershaw had carried out his duties, and which, combined with his position in the National Museum, had rendered him particularly fitted for such a post as hon. secretary of the Club.

Mr. Kershaw, in thanking the members for their hearty appreciation of his services, stated that he was very sorry to have to relinquish the work, which he found both congenial and interesting. He felt, however, that, owing to pressure of other duties, he could not devote the time that he considered really necessary to carry on the work of the Club as he thought it should be done. He expressed his appreciation of the cordial assistance he had received from time to time from the hon. editor, Mr. F. G. A. Barnard, and also from the hon. assistant secretary and librarian, Mr. C. L. Barrett, and stated that though retiring from the active duties of hon. secretary he did not intend to relinquish his interest in the work of the Club, which he would be glad to forward to the best of his ability.

A vote of thanks to the retiring office-bearers was moved by Mr. F. Pitcher and seconded by Mr. W. Scott, and was carried with acclamation. Mr. F. G. A. Barnard, who had filled one executive position or another for more than twenty years, briefly

responded on behalf of his fellow office-bearers, whom he said had all been animated with the desire to keep the Club to the front.

GENERAL BUSINESS.

Mr. J. A. Leach drew attention to the desirability of inducing a larger number of young people to join the Club, and gave notice of motion that, subject to the committee calling a special meeting for the purpose, on the night of the next ordinary meeting he would move that certain alterations be made in rule 4, as follows:—In rule 4, line 2, after "country" add "(*d*) associates." Instead of the present section (*d*), read—"(*d*) Associates shall be under the age of 20 and over the age of 16 years. They shall not be entitled to vote or to the Club's journal, and shall pay an annual subscription of five shillings. (*e*) Junior members shall be under the age of 16 years. They shall not be entitled to vote, or to the Club's journal, or to borrow books from the library, and shall pay an annual subscription of one shilling."

NATURAL HISTORY NOTES.

Mr. Barnard called attention to an early map of Victoria, evidently printed about 1860, exhibited by Mr. W. Scott, which was interesting, as it was very similar to the map in "Proeschel's Atlas," referred to in his paper, in the June *Naturalist*, on the journeys of the late Dr. Mueller. This map seems to be the only one which records all the names given by Dr. Mueller to prominent landmarks in the Alps, and amongst others shows Mt. Leichardt, now omitted from our maps.

Mr. H. T. Tisdall asked for information regarding the occurrence of the common pond plant Spirogyra. Mr. A. D. Hardy mentioned several localities in which he had found it during this season.

In reply to a question by the president, Mr. O. A. Sayce, regarding the prevalence of the destructive Cabbage Moth, *Lita solanella*, Mr. J. A. Kershaw, F.E.S., gave some details concerning its habits, &c.

Mr. T. S. Hall, M.A., referred to an ancient tapeworm, and said that it had recently been announced that the tapeworm, genus Linstowia, is confined to the marsupials and monotremes of Australia and to the marsupials of South America. Some rather peculiar conclusions may be inferred from this. It is almost certain that our marsupials and monotremes are derived from South America forms, and yet the families now found in the two regions are quite distinct. Hence it follows that the tapeworm invaded the marsupials before they were differentiated into the families of to-day. There is no direct way of estimating the geological age of such a soft-bodied creature as a tapeworm, for it leaves no fossil remains, and yet we have here clear evidence

that Linstowia is older than the marsupial genera, it is older than the families, and it seems probable even that it is older than the sub-orders Diprotodontia and Polyprotodontia, into which the marsupials are divided. It is likely then that the genus antedates tertiary times, and ranges back into the mesozoic period.

EXHIBITS.

By Mr. C. L. Barrett.—A nest of the common Ring-tailed Opossum, *Pseudochirus peregrinus*, taken recently at Black Rock.

By Mr. C. Coles.—A specimen of Bush Rat from Whittlesea.

By Mr. C. J. Gabriel.—Specimens of the following marine shells :—*Meretrix planatella* and *Crassatella kingicola*, from Western Port, Victoria ; and *Murex brassica*, *M. radix*, *M. bicolor*, and *M. regius*, from North America.

By Mr. J. F. Haase.—Microscopical sections of leaf and wood of *Eucalyptus amygdalina*.

By Mr. A. Mattingley.—A specimen of an Ophiuroid—*Ophiomyxa australis*—from Western Port, Victoria.

By Mr. W. Scott.—An early map of Victoria, date about 1860, showing Mt. Leichardt in Australian Alps.

After the usual conversazione the meeting terminated.

EXCURSION TO YARRA GLEN.

Only a small party left town by the early train on Easter Saturday, 2nd April, for Yarra Glen, distant some 30 miles, on the Healesville line. The locality was almost a new one for a Club excursion, and had been chosen for the good opportunities it afforded to the pond-life worker, it being the off season for almost all other branches. A reedy swamp close to the River Yarra was first visited, and the microscopists were soon at work. The shrubs along the river and its backwaters afforded shelter for numerous individuals of the Blue Wren, *Malurus cyaneus*, the Black and White Fantail, *Rhipidura tricolor*, the White-shafted Fantail, *R. albiscapa*, and the Little Tit, *Acanthiza nana*. Hundreds of the introduced Starlings, *Sternus vulgaris*, were feeding hereabouts on the marshy ground, rising in perfect clouds at our approach. The large eucalypts, acacias, &c., bordering the stream were almost destitute of insect life. Two species of frogs, *Hyla ewingii*, Dum. and Bibr., and *Pseudophryne semi-marmorata*, Lucas, were found concealed under the bark and amongst the tussocky grass. Leaving the pond-life workers here, the rest of the party recrossed the river and ascended the hills beyond the township. Numerous logs were turned over, and loose bark removed from the trees, but insects were scarce. The Coleoptera taken belonged principally to the families Carabidæ, Curculionidæ, and Elateridæ, among the latter being *Lacon*

pictipennis, Cand., *L. caliginosus*, Cand., and *Hapatesus jugularis*, Cand., var. *minor*, Cand. The only Lepidoptera noticed were *Chlenias banksiaria*, Le G., *Xanthorhoe vacuaria*, Gn., and *Ocystola hemisema*, Meyr., the latter being fairly common. The cockroaches, *Oniscoma castanea*, Brun., and *Panesthia lævicollis*, Sauss., were common, and assist to reduce the fallen timber. The only Planarian found was *Geoplana hoggi*, Dendy.

The botanical results of the day were not striking, but Miss K. Cowle has handed me the following list of plants and shrubs found in bloom :—*Loranthus pendulus* growing upon *Acacia dealbata*, *Centipeda cunninghami*, *Isotoma fluviatilis*, *Mazus pumilio*, *Tricoryne elatior*, *Hypoxis glabella*, *Lythrum hyssopifolia*, *Hypericum japonicum*, *Convolvulus sepium*, *Helichrysum ferrugineum*, *Brunella vulgaris*, *Cassinia aculeata*, *Viola hederacea*, *V. betonicifolia*, the ubiquitous *Goodenia ovata*, *Erythræa australis*, and *Bursaria spinosa*, with the orchids *Pterostylis obtusa* and *Eriochilus autumnalis*. Quantities of the graceful Maidenhair Fern, *Adiantum æthiopicum*, grew in the glens. Seed specimens of *Eucalyptus polyanthema*, Schauer, were obtained.

Mr. A. D. Hardy, who devoted himself to aquatic and subaquatic plants, reports that "the lagoons visited revealed a luxuriant growth of *Myriophyllum variifolium*, *Triglochin procera*, the rush-like *Heleocharis sphacelata*, and near the margin the sedge *Cyperus lucida*, the reed *Arundo phragmites*, with *Polygonum minus* and *P. strigosum*. Here and there *Ottelia ovalifolia* bearing fruit was noted, also, but not in bloom, *Ranunculus rivularis*. Of the lower forms of plant life, among the Algæ were noted species of Spirogyra, Zygnema, and Œdogonium, but in the absence of fruit or conjugation the determination of species would be unreliable ; while amongst the densely-growing Myriophyllum, *Volvox globator* occurred in great quantity in various stages of growth. In another lagoon, where there was a greater depth of water, a grass-like plant, probably *Claytonia australasica*, formed loose tangles just below the surface, and near the margin were found a few specimens of *Utricularia flexuosa*, submerged, but floating by means of the little vesicles or air-bladders interspersed among the linear segments of its leaves. In the absence of Myriophyllum, Volvox was scarce, but a very minute globular form of Algæ, probably *Stephanosphæra pluvialis*, was frequently met with, revolving rapidly as it moved onward. Of Desmidiaceæ the following genera were represented : —Arthrodesmus, Closterium, Cosmarium, Docidium, Euastrum, Didymoprium, Micrasterias, Penium, and Staurastrum ; while of Diatomaceæ living forms of Navicula, Pleurosigma, and Synedra were common. An alga, which I think was *Hydrianum*

heteromorphum, as it agreed very well with the descriptions of that species, instead of being attached as usually to a filamentous alga, and therefore an epiphyte, was here attached to one of the Entomostraca or Water-fleas (Daphnia, sp.), and was thus epizoic."

My co-leader, Mr. J. Shephard, reports as follows on the pond-life :—" After the main portion of the party left the banks of the river for the hills, two members remained behind and spent the day on the flats. The character of the pools is the same as those at Heidelberg with which the members of the Club are familiar, there being a number of lagoons, evidently old portions of the river channel. One of the first things noticed was the Rotifer *Stephanoceros eichornii*. Previously this beautiful form has only been obtained from the Botanical Gardens, Melbourne, and some doubt was felt as to its being merely an introduced form ; its discovery on this occasion may be regarded as deciding the point in favour of this species being indigenous to Victoria. Other Rotifers found were *Melicerta ringens*, *Lacinularia natans*, *Brachionus bakeri*, Asplanchna (sp.), and *Pedalion mirum*. This last-mentioned form may now be regarded as common in the valley of the Yarra. Another observation was made as to the prevalence of mosquito larvæ in permanent pools ; about a dozen empty pupa cases were noticed floating on the surface of the water in an area of about two square feet. This particular lagoon, we were informed by a local resident, does not dry up, and water boatmen, the alleged enemy of the larvæ in question, we observed in plenty, and the presence of fish was asserted by the anglers who were there."

Though the land party had on the whole a quiet day, still from the fine weather experienced, and the splendid views obtained from the tops of the hills, the excursion proved a most enjoyable one.—J. A. Kershaw.

Honours.—It is pleasing to record that natural science has been recognized by King Edward in awarding the " birthday honours " this year, and that the coveted distinction of C.M.G. has been bestowed upon Professor W. Baldwin Spencer, M.A., F.R.S., Melbourne University, in recognition of the valuable work he has done in biology, ethnology, &c., during his residence in Australia.

In recognition of his life-long work in Australian ornithology and oology, Mr. A. J. Campbell has received notification of his election as a Corresponding Member of the British Ornithologists' Union.

The Victorian Naturalist.

Vol. XXI.—No. 4. AUGUST 4, 1904. No. 248.

FIELD NATURALISTS' CLUB OF VICTORIA.

A special general meeting of the Club was held at the Royal Society's Hall on Monday evening, 11th July, 1904.

The president, Mr. O. A. Sayce, occupied the chair, and about 60 members were present.

ALTERATION TO RULE.

In accordance with notice given at the previous meeting, Mr. J. A. Leach moved—

"That in rule 4, line 2, after 'country' add '(*d*) associates' and '(*e*) junior members.'

"Delete section (*d*) and in its place put—

"(*d*) Associates shall be under the age of 20 and over the age of 16 years. They shall not be entitled to vote or to the Club's journal, and shall pay an annual subscription of five shillings.

"(*e*) Junior members shall be under the age of 16 years. They shall not be entitled to vote or to the Club's journal, or to borrow books from the library, and shall pay an annual subscription of one shilling."

Mr. Leach said that his main purpose in proposing the alteration in the rule was that, as so much attention is now being given to nature study in our schools, it would be advantageous to the children if they could be afforded greater facilities for carrying out their observations under the direction of experienced leaders, and he thought that if it were made possible for them to become members of the Club at a nominal expense, many would seize the opportunity to do so. Should the movement grow, as he hoped it would, the Club could then arrange special excursions for junior members under the guidance of members having special knowledge of the localities chosen, and who would doubtless be assisted by school teachers in maintaining order. Such outings would tend to cultivate habits of correct observation, increase in the children a love for rural things, and thus, perhaps, to some extent counteract the growing desire for city life now existing.

Mr. W. F. Gates, M.A., seconded the motion, and stated that he believed the movement would have the sympathy and support of Mr. F. Tate, the Director of Education.

A considerable amount of discussion followed. Mr. E. E. Barker, F.R.M.S., mentioned that a Students' Natural History Association had recently been formed, and if the motion was carried he would endeavour to bring them into the Club as junior members.

Mr. J. Shephard moved, as an amendment—"That a committee be appointed to go fully into the matter and bring up a more detailed scheme, and report at the next meeting."

On the question being put to the meeting the motion for the alteration of the rule was carried by the requisite majority.

The ordinary meeting was then held.

ELECTION OF MEMBERS.

On a ballot being taken, Messrs. F. H. Hayden, State school, Yarra Park, East Melbourne; A. Strahan, Lands Department, Melbourne; A. Symington, Education Department, Melbourne; and John Wilson, 153 Buckley-street, Footscray, were duly elected members of the Club.

GENERAL BUSINESS.

Mrs. M. Bage alluded to the honour recently conferred on one of the past presidents of the Club, and moved—"That the congratulations of the Club be forwarded to Professor W. Baldwin Spencer, C.M.G., M.A., F.R.S., on being created a Companion of the Order of St. Michael and St. George by His Majesty the King." Seconded by Mr. J. Shephard, and carried unanimously.

PAPERS.

1. By Mr. T. S. Hall, M.A., entitled "Notes on Some Victorian Echinoids."

The author gave some account of the references to Australian species in the bibliography of the group, and referred to the more notable collections made on Victorian shores. He was able to identify nine species, and gave their synonymy and references as a guide for future collectors.

Mr. A. Mattingley congratulated the author on his efforts to smooth out the complicated tangle into which the species of the genus Amblypneustes had got, and, although agreeing in the main with Mr. Hall's conclusions, he was not disposed to regard *A. formosus*, *A. griseus*, *A. ovum*, and *A. pallidus* as one species, his idea being that only *A. ovum* and *A. pallidus* should be regarded as identical. He further remarked that when dredging in Western Port, on a gravelly bottom, he had obtained the three forms, *A. formosus*, *A. ovum*, and *A. pallidus*, in one haul of the dredge.

Mr. F. Chapman, A.L.S., remarked on the value of the notes submitted by Mr. Hall, and concurred with him in the desirability of amalgamating the several recent species of Amblypneustes, since no two previous authors seem to have exactly agreed as to the separate standing of the recorded species, and, in the light of evidence afforded by a long series of specimens, a variable form like this, both as to shape and colour, was seen to be connected by the most inappreciable gradations. In illustration of the case, he called to mind the two species of tertiary Echinidæ described by Laube, from Southern Australia, which were identified from a large number of specimens by Professor Tate. Subsequently Professor

Tate sent a more limited collection of similar forms to Vienna, and these were dealt with by Bittner, who differentiated the series by making several new species. It was, however, impossible to follow the latter author in his specific determinations, and the specimens in the National Museum are now referred to the two species originally described by Laube, with a possible varietal form of Bittner's.

2. By Mr. E. E. Green, F.E.S., Government Entomologist, Ceylon (communicated by Mr. C. French, F.L.S.), entitled "Descriptions of Some New Victorian Coccidæ."

The author described five species of Coccidæ which had been collected on various native shrubs by Mr. C. French, F.L.S., in different parts of Victoria; and also gave a catalogue of thirty described Australasian species of the genus Eriococcus, showing their characteristic features.

The paper, being of a technical nature, was taken as read.

NATURAL HISTORY NOTES.

Mice.—Mr. A. E. Kitson mentioned a case in which a number of mice had invaded a beehive, and, having killed the bees, had comfortably established themselves within.

Dogs.—Mr. A. Mattingley read an extract from a country paper relating the case of a Newfoundland dog which had deliberately taken a terrier dog, which had annoyed it, into a dam, and held it under water until it was drowned.

Fibre Balls.—Mr. J. A. Kershaw, F.E.S., drew attention to his exhibit of some fibrous balls picked up on a South Australian beach, and asked if any member could offer any explanation of their origin?

Mr. F. Chapman, A.L.S., had submitted a portion of one to a hurried microscopical examination and found that it consisted chiefly of bast fibres and pieces of decayed leaves.

Mr. C. Coles stated that he had picked up similar balls on the beach at Carrum some years ago, and found them to consist of the same material throughout.

Cuckoo.—Mr. S. P. Townsend stated that twice during July, on the 2nd and 5th, he had observed a Fan-tailed Cuckoo, *Cacomantis flabelliformis*, in the Mornington Park. It was a silent bird, and might possibly be one that had remained in the district all the year, as it was yet early for visiting Cuckoos to arrive.

Giant Petrel.—Mr. S. P. Townsend also reported the capture, at Mornington, by a fisherman, of a Giant Petrel, *Ossifraga gigantea*, with a broken wing about a month previously. The bird had now become quite tame, and ate meat and fish greedily; this being the first Giant Petrel he had seen inside Port Phillip Heads, though he had occasionally observed them just outside.

EXHIBITS.

By Mr. E. A. Anderson.—Orthoptera (Locusts) from India.

By Mr. C. Coles.—Two species of Mantidæ from Charleville, Queensland; three aboriginal stone knives with resin handles, from N.W. Australia.

By Mr. C. French, jun.—Phasma (Walking Stick Insect), from Gippsland, showing remarkable protective mimicry; aboriginal stone tomahawks, aboriginal sharpening stones, all from Victoria; new Victorian scale insects, Coccids, in illustration of Mr. E. E. Green's paper; rare Victorian orchid, *Corysanthes unguiculata*, the dark and light coloured varieties, collected at Spring Vale, 10/7/04; photo. of Coast She Oak, *Casuarina quadrivalvis*, showing the scale, *Frenchia casuarinæ*, killing the tree.

By Mr. C. J. Gabriel.—Shells, including *Murex tenuissima*, *Voluta vexillum*, from Ceylon; *Zenophora exuta*, *Z. calculifera*, from Hong Kong; *Z. conchyliaphorus*, from West Indies; and *Z. solaris*, from China.

By Mr. J. A. Kershaw, F.E.S., for National Museum.—Four "fibre balls" from Middleton Beach, near Goolwa, mouth of Murray River, S. Aust.

By Mr. J. A. Leach.—Live specimens of *Daphnia carinata*, var. *magniceps*, and green Hydra.

By Mr. J. Shephard.—Under microscope—Rotifer, *Copeus labiatus*.

By Mr. S. P. Townsend.—Young specimen of *Diomedia chlororhyncha*, found on the beach at Mornington.

After the usual conversazione the meeting terminated.

A SUMMER IN SOUTH GIPPSLAND.

By J. C. Goudie.

(*Read before the Field Naturalists' Club of Victoria, 9th May*, 1904.)

It has often been said, and with a good deal of truth, that a change of scene and occupation is equivalent to a rest; and certainly to one who has for many years resided in the arid North-West of Victoria the prospect of a sojourn in Gippsland during the summer months is full of the charm of novelty and anticipation. Especially is this the case when one has a taste for the study of natural history, and thoughts of towering eucalypts, of fern-clad gullies where never-failing waters run, of the land of the Platypus and Lyre-bird, loom before his expectant vision.

I may here state that I was located a few miles to the south of Warragul, in the vicinity of Bear Creek, but I also collected over a strip of country, a few miles in width, lying between that town and Dandenong. As regards first impressions, the contrast between the level monotony and stunted vegation of the interior

and the hills and valleys and sky-scraping Blackbutts of Gippsland is, perhaps, the strongest. Then the beauty of the fern gullies, where tree-ferns, Lomarias, Polypodiums, and the delicate Gleichenias flourish luxuriantly, and Hazel, Musk, and Blackwood give strength and variety to the scene ; but it requires a botanist to do justice here, so I will pass on to the birds.

I was somewhat surprised at the small number, comparatively speaking, of species of birds to be seen in a day's walk, but this was more than compensated for by the element of novelty which pertained to most of those met with. One cannot help wondering, however, at this lack of variety, especially when we consider how eminently suited the country seems to the requirements of bird life.

Of the Accipitres, besides the pretty little Nankeen Kestrel, *Cerchneis cenchroides*, which was common, two others only—the Goshawk, *Astur approximans*, and the Collared Sparrow-hawk, *Accipiter cirrhocephalus*—were seen. The hawk tribe, as a rule, seem to avoid the heavily-timbered country, perhaps because their great powers of flight cannot here be effectively employed in procuring food.

In the cleared sections the birds which most frequently forced themselves on one's notice were the Great Brown Kingfisher, *Dacelo gigas*, and the White-backed Magpie, *Gymnorhina leuconota*. Interest was always maintained in watching their doings and noting the contrast between their respective vocal efforts. As the Crow is ubiquitous in the north, so in Gippsland the Great Brown Kingfisher is the ornithological presence. To a stranger its boisterous hilarity is quite infectious, and almost impels him to join in the chorus. Like the Magpie, it is not heard to the best advantage unless two or more are together ; then it tilts back its head and reserve is thrown to the winds.

In the quiet seclusion of the fern gullies a different class of birds was met with. Here the little White-fronted Sericornis, *S. frontalis*, would come creeping through the undergrowth like a mouse, prying into the darkest recesses, and pass within a foot of where the writer sat. A family of Orange-winged Sittellas, *S. chrysoptera*, would next appear, clinging in all manner of ridiculous postures to the trees in diligent, untiring search for insects. In this quest they were ably seconded by the White-throated Tree-creeper, *Climacteris leucophæa*. A sweet, long-drawn note, terminated by an abrupt "whack," proclamed the presence of the Coach-whip Bird, *Psophodes crepitans*. Often, however, this bird could only be located by a slight twittering, only heard by listening intently for it. The loud, thrilling call of the Lyre-bird, *Menura victoriæ*, echoing along the gully, always "galvanized" me into action, with a strong desire to see this grand bird in its native haunts. But, notwithstanding the greatest

caution exercised, I never succeeded in obtaining even a glimpse of one. A few of their "dancing mounds" were noticed. This habit of throwing together heaps of bark, leaves, and twigs suggests a touch of kinship between these birds and the Megapodidæ. I am indebted to Mr. F. Harvie, who acted as guide, for the pleasure of seeing a Lyre-bird's nest, snugly situated in a hollow burnt in the side of a large dead tree, some 7 or 8 feet from the ground, in very dense Hazel and Cotton-bush scrub. Climbing up to look into the nest, I was met "eye to eye" by a Tiger Snake coming out; needless to say, my retreat was more hasty than dignified, but a well-aimed blow from my companion's waddy settled the reptile before it reached the ground. I mention this incident to show the danger, in snake-infested districts, of feeling with the hand in any large nest before taking measures to wake up a possible unwelcome inmate. Satin Bower-birds, *Ptilonorhynchus violaceus*, were fairly numerous, frequenting the vicinity of fruit-gardens in the early mornings, and making free with the ripening fruit. All those seen were the greyish-green females or immature birds. In a patch of burnt scrub a small company of Ground-Wrens, *Hylacola cauta*, was met with; their specific name is well deserved, for they watch the intruder narrowly from some point of vantage where they can see all around; while a person remains in their vicinity this keen scrutiny is never relaxed, but at the same time they are not shy. This species appears, in the field, to differ but slightly from its northern congener, *H. pyrrhopgia*, both in appearance and behaviour.

Of Parrakeets, those most in evidence were the Rosella, *Platycercus eximius*, and the Crimson Parrakeet, *P. elegans*. The latter were for the most part in immature plumage, some showing traces of crimson on the under parts. Can any of our "bird-men" say when the full—that is, mature—plumage is assumed? At intervals a pair of Black Cockatoos, *C. funereus*, might be seen passing high overhead, uttering a sound not unlike the creaking of a rusty door-hinge. The steady, deliberate flight of these birds gives the impression that they are making a "bee line" for some place at least 100 miles distant.

On one occasion I saw a pair of birds in the scrub which I took to be the Olive Thickhead, *Pachycephala olivacea*, but cannot be certain of this, for though I subsequently visited the locality with the intention of procuring a specimen, I never saw them again.

Native Bears, *Phascolarctus cinereus*, were occasionally seen in the day-time, asleep in a fork of some tall White Gum tree. A loud snorting or grunting noise, usually heard about sunset, was attributed by local residents to these animals; it could be easily heard at a distance of a quarter of a mile. Wombats' holes are

common enough, but the animals themselves are seldom seen, even by those who have lived for years in the district. In the vicinity of the creeks snakes were numerous, chiefly of three deadly species —viz., the Tiger Snake, Black Snake, and the Copperhead, *Hoplocephalus superbus*. During harvest they are a constant source of danger to the men working in the paddocks, as they have a favourite trick of hiding in the stooks. It is a wonder that more people are not bitten by them. I heard of one man who pitched his tent in a paddock full of fallen timber and overgrown with bracken. In less than a fortnight he killed nine snakes in his tent. He then decided to shift.

Early one morning, whilst walking along the banks of a creek, I came on a specimen of the Giant Earthworm, *Megascolides australis*, lying dead on the grass; it had evidently been crawling about during the night, and been trodden on by the stock grazing near by. It was about 2 feet in length, and as thick as a man's forefinger, but probably when alive and extended it would have measured nearer 3 feet. An excellent account of this worm was given by Prof. Baldwin Spencer in the "Transactions of the Royal Society of Victoria" some years ago.

Wherever a bit of swampy land occurs hundreds of the erect cone-shaped entrances to the burrows of the Land Crab, *Engœus fossor*, may be seen; to dig one of these small crustaceans out is no mean task, the burrows appearing to be almost endless. The Land Planarians were numerous and of several species, some of them being very prettily striped. A student of this group should do well in Gippsland. Humid gullies, where the soil is deep and black, and with plenty of decaying logs about, are the places to look for them.

Entomology.—In this branch my attention was chiefly directed to the Coleoptera, which were both numerous and interesting. In point of individual numbers, five out of our sixty-eight Australian families were pre-eminent. These were, in order, Scarabæidæ, Elateridæ, Chrysomelidæ, Curculionidæ, and Tenebrionidæ. These five groups seemed to me to constitute the main feature of the order, though several other families were abundantly represented. The most profitable localities for the entomologist are to be found in that class of country which grows the Stringybark and Messmate, such as that along the railway skirting the northern edge of the great Koo-wee-rup Swamp. Here are large areas covered with a dense growth of Leptospermum and other shrubs, a pretty sight when in flower (in November), and a perfect insects' paradise. A few remarks on some of the insects noted will not, perhaps, be out of place.

Of the Carabidæ, less than a dozen species were met with, which surprised me, as I had expected to find this family in strong force. Very few of them were to be found under logs,

such places being almost exclusively tenanted by Wood-lice and Cockroaches, which were present in astounding numbers.

The Scarabæidæ are, without doubt, the most dominant group of beetles in Gippsland; of robust build, and voracious feeders, and with the eucalypts as their food plant, they appear eminently suited to hold the premier position. The species of the genus Anoplognathus seem to prefer the Stringybark or Messmate to other trees; in fact, I never saw a specimen in the Blackbutt country. The handsomely marked *Eupœcila australasiæ* was fairly common, as also was *Polystigma punctata*, a yellow, black-spotted beetle; a series of this latter species shows considerable variation in the shape and size of the markings. *Clithria eucnemis* was much rarer, and was taken on flowering Blackberry. The fine Cetonia, *Schizorrhina christyi*, was often seen, but was difficult to capture, owing to its rapid flight; this beetle seemed to have a liking for flying about haystacks, and was alluded to by residents as the "Harvest Beetle." The rare and handsome *Schizorrhina bestii* was diligently sought for, but without success; it is recorded from Nar Nar Goon, Launching Place, &c.

Buprestidæ were rather scarce, with the exception of three species—viz., *Stigmodera erythroptera*, *S. octomaculata*, and *S. bicincta*—the first two on Leptospermum, and the last on Blackberry; these could be taken by the handful. *S. andersoni* and *S. erythromelas* were a couple of prizes.

Amongst the Heteromera, the best represented families were Tenebrionidæ, Cistelidæ, Mordellidæ, and Œdemeridæ. The Cistelidæ were always in evidence wherever eucalypt or ti-tree blossom was to be found; many of the species are elegantly formed and very active beetles. *Atractus columbinus* is a lovely brassy-green insect. One specimen only of the rare *Mystes planatus* (Melandryidæ) was met with. This beetle, though small, and of sober colour, is regarded as a prize by collectors; it is not unlike an elater in shape.

The Curculionidæ of Gippsland would appear to be, so far, only partially worked up. During my short stay I found at least three new species, and the micros. were almost neglected. They need careful searching for, as many of the beetles will not shake off, but must be pulled from the branches. The beautiful green and black *Chrysolophus spectabilis* was often met with on Bursaria and wattles; it may be justly called the champion of Victorian weevils. Of the genus Syarbis, of special interest on account of its being without claws, one species was secured which has proved new to science.

Of the Longicornes, by far the commonest species was *Monohammus argentatus*. This silvery-tinted beetle hides by day amongst the branches of the Cotton-bush, and about sunset takes wing and flies about the clearings. *Phacodes obscurus*

breeds in the Blackwood, *Acacia melanoxylon*. *Trichomesia newmani* and the curious wasp-like *Hesthesis acutipennis* were found on blossoms.

Want of space prevents further details, but the appended list will, perhaps, be of use to workers and collectors. I am indebted to Mr. A. M. Lea, F.E.S., for many of the names.

Lepidoptera.—Four species of butterflies were at all times very plentiful; these were *Heteronympha merope*, *Xenica achanta*, *X. klugi*, and *Pyrameis kershawi*. *P. itea* was less common, while *Tisiphone* (*Epinephile*) *abeona* might be looked upon as one of the rarities. This fine butterfly seemed fond of slowly floating about in shady spots near the creeks. Several times I saw skippers fly past, but they travelled so swiftly that identification was out of the question.

The moths were very few and far between. One would have thought that a district so lavishly clothed with vegetation would produce moths *ad libitum*. Possibly in the autumn they may be more plentiful. *Scoliacma bicolor*, a red and black species, and *Asura lydia*, a yellow moth with black markings, were taken on eucalypts. *Darala acuta*, a greyish moth with a diagonal mark across the wings, was found sheltering in the Blackberry bushes. *Hydriomena subochraria*, a small yellowish species, was common in places; it has a jerky flight, resembling that of some butterflies. *Scipophaga patulella*, a beautiful pure white moth, was met with in swampy localities, resting on rushes. The handsome *Agarista lewini* was at home everywhere.

My first experience of the Great Green Cicada, *Cyclochila australasiæ*, will be long remembered. I had heard and read a good deal about its "vocal" powers, but was scarcely prepared for the reality. Somewhere near Dandenong I struck a patch of them in full blast, and, being rather enthusiastic about entomology, I quite enjoyed the terrible concert for a time. One rendering, however, would assuredly satisfy most people. Amongst all the host of green ones only one of the large black species, *Cicada mœrens*, was seen.

Of the Hemiptera, great numbers of the beautiful "Harlequin Fruit Bug," *Dindymus versicolor*, were met with almost everywhere, but especially where Blue or White Gum saplings abounded; they did not appear to trouble the fruit trees at all. In fact, it was remarkable how free from insect depredations the orchards were. In all that I saw no trace of the Codlin Moth could be found, and only at rare intervals were trees seen affected by the Woolly Aphis.

In the vast forest regions of Gippsland the many families of the Hymenoptera, Homoptera, Neuroptera, and Diptera afford an inexhaustible field for study and observation, and volumes might be written on their habits and life-histories. All that is wanted is

someone who will tackle them seriously, and who will make known the results of his researches to fellow-naturalists. The good work done by Mr. F. L. Billinghurst on Victorian Dragon-flies, and by Mr. E. E. Barker on the Bull-Ants, are admirable steps in the right direction.

List of Coleoptera Collected.

Carabidæ—
Helluo costatus, Bon.
Xanthophæa grandis, Chd.
Philophlæus eucalypti, Germ.
Stenolophus dingo, Cast.
Notonomus chalybeus, Dej.
,, gravis, Chd.
Hormochilus monochrous, Chd.
Pectinitarsis, sp.

Gyrinidæ—
Macrogyrus rivularis, Clk.

Staphylinidæ—
Quedius rubricollis, Fvl.
Creophilus erythrocephalus, Fab.
Xantholinus chloropterus, Er.

Silphidæ—
Ptomaphila lachrymosa, Schrieb.

Scaphididæ—
Scaphidium quadripustulatum, Oliv.

Histeridæ—
Saprinus lætus, Er.
,, cyaneus, Fabr.

Trogositidæ—
Leperina adusta, Pasc.

Cucujidæ—
Platisus integricollis, Reitter

Lucanidæ—
Lamprima rutilans, Er.
,, aurata, Latr.
Syndesus cornutus, Fabr.
Aulacocyclus edentulus, Macl.
Figulus regularis, Westw.

Scarabæidæ—
Onthophagus granulatus, Bohem.
Aphodius howitti, Hope
Phyllotocus assimilis, Macl.
,, bimaculatus, Er.
,, rufipennis, Bdv.
Diphucephala colaspidoides, Gyll.
Mæchidius macleayanus, Westw.
Scitala nigrolineata, Bdv.
,, pruinosa, Dalm.
Heteronyx jubata, Blackb.
Anoplognathus olivieri, Dalm.
Chiroplatys ascendens, Blackb.
Cryptodus paradoxus, Macl.
,, tasmanicus, Westw.
Eupœcila australasiæ, Don.
Polystigma punctata, Don.
Clithria eucnemis, Burm.
Chondropyga gulosa = christyi
Microvalgus, sp.

Buprestidæ—
Melobasis simplex, Germ.
Torresita cuprifera, Kirby.
Stigmodera andersoni, L. & G.
,, bella, Saund.
,, bicincta, Bdv.
,, burchelli, L. & G.
,, delectabilis, Hope.
,, erythromelas, Bdv.
,, erythroptera, Bdv.
,, macularia, Don.
,, octomaculata, Saund.
,, kerremansii.

Elateridæ—
Lacon caliginosus, Guer.
Monocrepidius erubescens, Cand.
Anilicus semiflavus, Germ.

RHIPIDOCERIDÆ—
Rhipidocera femoralis, Kirby.
MALACODERMIDÆ—
Metriorryhnchus erythropterus, Er.
Calochromus, sp.
Telephorus nobilitatus, Er.
Laius mastersi, Macl.
CLERIDÆ—
Natalis porcata, Fab.
Aulicus instabilis, Newm.
Eleale pulchra, Newm.
,, simplex, Newm.
Lemidia, sp.
Stigmatium, sp.
Scrobiger splendidus, Newm.
Pylus fatuus, Newm.
Cleromorpha novemguttatus, Westw.
Necrobia rufipes, De Geer
TENEBRIONIDÆ—
Nyctobates crenata, Bdv.
Menephilus cœrulescens, H. and R.
Meneristes australis, Pasc.
Lygestira simplex, Westw.
Lepispilus sulcicollis, Bdv.
Adelium, sp.
Apasis howitti, Pasc.
Chalcopterus iridicolor, Bless.
CISTELIDÆ—
Pseudocistela ovalis, Blackb.
Atractus columbinus, Bdv.
Chromomæa rufipennis
Tanychilus, sp.
Homotrysis microderes, Pasc.
MELANDRYIDÆ—
Mystes planatus, Champ.
LAGRIIDÆ—
Lagria tomentosa, Fab.
PYROCHROIDÆ—
Lemodes coccinea, Boh.
MORDELLIDÆ—
Mordella inornata, Lea
,, leucosticta, Germ.
,, communis, Waterh.
ŒDEMERIDÆ—
Sessinia atkinsoni, Waterh.
Copidita punctum, Macl.
Pseudolychus hæmorrhoidalis, Fab.
CURCULIONIDÆ—
Leptops tribulus, Fab.
Sclerorrhinus bubalus, Oliv.
Acantholophus gravicollis, Macl.
Cubicorryhnchus, sp.
Oxyops, sp.
Syarbis, sp.
Gonipterus, sp.
Aromagis echinata, Pasc.
Pelororrhinus margaritaceus, Er.
Rhinaria costata, Er.
,, transversa, Bdv.
Chrysolophus spectabilis, Fabr.
Orthorrhinus æthiops, Bdv.
Aoplocnemis, sp.
Gerynassa, sp.
Rhaciodes bicaudatus, Bdv.
,, granulifer, Chev.
Belus semipunctatus, Fabr.
Eurhynchus, sp.
Euops falcata, Guer.
Ecrizothis inæqualis, Bl.
,, sp.
Læmosaccus dapsilis, Pasc.
,, narinus, Pasc.
Neozeneudes, sp.
Poropterus, sp.
CERAMBYCIDÆ—
Cnemoplites australis, Er.
Iotherium metallicum, Newm.
Phacodes obscurus, Fab.
,, personatus, Er.
Phoracantha recurva, Newm.
,, fallax, Pasc.
,, semipunctata, Fab.
Callidiopis præcox, Er.
,, scutellaris, Fab.

Tessaromma undatum, Newm.
Rhagiomorpha concolor, Macl.
Tritocosmia, sp.
Stenoderus suturalis, Oliv.
,, concolor, Macl.
Trichomesia newmani, Pasc.
Hesthesis acutipennis, Pasc.
Eroschema poweri, Pasc.
Pempsamacra dispersa, Newm.
Ipomoria tillides, Pasc.
Amphirhœ decora, Newm.
Monohammus argentatus, Hope
Ancita australis, Bdv.

CHRYSOMELIDÆ—
Cadmus crucicollis, Bdv.
Prionopleura, sp.
Cryptocephalus erosus, Saund., var.
,, scabrosus, Oliv.
,, viridinitens, Chp.
Edusa, sp.
Colaspoides, sp.
Calomela curtisi, Kirby
,, sp.
Paropsis trimaculata, Chap.
,, nigerrima and several other species
Arsipoda, 2 sp.
Haltica pagana, Blackb.
Thallis, sp.

COCCINELLIDÆ—
Coccinella transversalis, Fab.
Leis conformis, Bdv.
Novius cardinalis, Muls.
Rhizobius, sp.

NOTES ON THE "NATIVE BREAD," *POLYPORUS MYLITTÆ.*

By Henry Thos. Tisdall.

(*Read before the Field Naturalists' Club of Victoria, 9th May*, 1904.)

At the last monthly meeting of the Field Naturalists' Club, I read a short note on the fungus usually known as "Native Bread," which excited some interest, and I was asked to expand it into a paper giving further details of this singular fungus.

A. De Barry, 1887, in his grand work on fungi, gives the following information about these plants:—"There are a large number of tuber-like compound fungus bodies, the real character of which is still doubtful; our ignorance of their structure or development makes it impossible to decide whether they are sclerotia or some other formation. Among these are *Pietra fungaga*, of S. Italy, which is formed of *Polyporus tuberaster* rolled up into solid masses with bits of soil, stones, and the like, and the tuberous fungoid bodies named Mylitta, which grow beneath the surface of the ground to the size of a fist or a head, and are known only in the sterile state."

It would be well here to notice what De Barry means by sclerotia. All fungi are formed either (1) of long, very minute tubes termed hyphæ, such as we see in any of the common moulds, where the hyphæ are matted together, forming a mycelium, (2) or these hyphæ may unite together into what are known as strands; these mycelial strands may be thick or thin,

and frequently branch, so that when we see them pushing their way beneath the surface of the ground they have the appearance of roots. But, besides being under the ground, the strands unite together into thick masses and form the stems and caps of mushrooms and the so-called toadstools. But there is a third structure found among fungi. In this case De Barry says :—" The name sclerotium has been given to certain thick tuber-like bodies formed on the primary filamentous mycelium, which proceeds from the germinating spore ; these, which are storehouses of reserve material, become detached from the mycelium when their development is complete, and usually remain dormant for a considerable time, and ultimately expend their reserve material in the production of shoots, which develop into sporophores."

As an instance of this we might notice a curious and well-known sclerotium termed Ergot (*Clavaceps purpurea*). The spores of this plant adhere to the seed of rye and other cereals. As the rye plant grows upward the spore sends out hyphæ, which enter into and grow upward through the stem, and when the flower of the rye is formed the hypha enters into the young ovary, where it receives all the food which the plant prepares for the young seed. The hypha does not elongate any more, but grows into a solid mass known as a sclerotium. In appearance the sclerotium or ergot is like a long black egg, somewhat pointed at both ends, and from ½ to ¾ of an inch in length. The ergot falls in the harvest and lies dormant in the ground all the winter. In spring, however, it becomes very much alive, and it gives out a number of shoots from its surface. Each of these shoots swells out at the top and forms a globular head which contains a great number of bags each filled with eight spores. These bags are termed asci, and all the fungi bearing asci are placed in a great division termed Ascomycetes.

Turning now to Cooke's " Handbook of Australian Fungi," under the head of Ascomyceteæ :—" Fruit consisting of sporidia, contained in asci springing from a naked or enclosed stratum of fructifying cells," and in this division he places, under the head of " Genera doubtful," " Genus 3. Mylitta.—Tuber hard, externally mealy, internally firm, veined or spotted, at length somewhat hollow. Fructification obscure ;" and, finally, he gives the species thus :—" *Mylitta australis.*—Globose, 7½ to 10 c.m. diam., firm, cortex unequal, blackish, and covered with warts ; gleba solid, yellowish, reticulated with whitish veins, seemingly alveolate. Spores unknown."

The only knowledge of *Mylitta australis* which we obtain from either De Barry (1887) or Cooke (1892) is that they may be of the same kind as the sclerotia of Ergot of Rye—that is, the Ascomyceteæ.

About the year 1884 I received a large sackful of *Mylitta*

australis from a gentleman living in the neighbourhood of Rosedale, Gippsland. They varied in size from a large apple to a large irregular mass measuring 24 or 30 inches round, very dark brown, and the surface rough, with dark warts. On cutting, the section appeared like boiled sago ; when fresh it was fairly soft, and I was induced to taste it, but found that it had no flavour and was very tough. I tried to cook it in various ways – boiled, fried, toasted—but still it remained tough and tasteless. I turned up Berkeley's "Cryptogamic Botany" (1857), and found "*Mylitta australis*, or the Native Bread of the Australians, is a useful article, and when dry in some conditions looks like hard, compacted lumps of sago." Again, at p. 288, he says:—"And Mylitta, which is sometimes several inches across, is abundant in some parts of Australia, where it is eaten by the natives. Fresh specimens have a sub-acid smell, and little taste ; but we have seen others of an extremely compact horny texture, resembling a mass of sago forcibly compressed into a solid ball."

In 1885, when I first consulted Mr. A. W. Howitt, who was then warden of the Gippsland goldfields, concerning the Mylitta as an article of food, I understood him to say that it was so used by the aboriginals. But either I must have misunderstood him, or he must have found reason to change his opinion, as he has since assured me that the natives never use it as an article of food, and that it has no nourishing properties whatever.

I examined carefully, by means of the microscope, not only the specimens sent from Rosedale, but quantities of other specimens obtained in Walhalla, Maffra, and other places, but never could get any spores or asci, or any other kind of reproductive organ. At last I gave them up for the time, and put them away into a kind of cellar which I had excavated in the side of the hill. The cellar had plenty of air, but was somewhat dark and damp. About two months afterwards I visited the cellar for something, and was astonished to find apparently fungoid parasitic growths on some of the Mylitta. I examined them carefully, and saw that they were belonging to the genus Polyporei.

The structure of the new fungus was undoubtedly mycelial strands, not sclerotia, and the reproductive organs were naked spores falling from the lower surface, which was pierced with holes, equalling the description of a Polyporus.

I must confess that at the time I did not understand that I had really solved the problem of the reproduction of Mylitta. But I was greatly interested in what I saw, and made coloured drawings of one of the specimens. I also placed some spores on slides for the microscope, and exhibited the whole at a meeting of the Field Naturalists' Club on 11th November, 1885 (*Victorian Naturalist*, vol. ii., pp. 94 and 109).

I think it was either Mr. Barnard or Mr. French, of our Club, who informed me some time ago that the Mylitta was pronounced to be a Polyporus by some European botanist, and I immediately thought of my drawings made so many years ago. I had mislaid them, and it was only last month that I discovered them at the Education Department.

Following up this accidental discovery, we can now prove by a few experiments—that is, by placing some freshly dug up specimens in a dark, damp, but airy place—whether they always produce the shoots resembling Polyporei.

We cannot help noticing how alike is the life-history of the Ergot of Rye and *Mylitta australis*.

They both form a sclerotium. They both lie on or in the ground for a long time, and under certain circumstances they both produce from their surface certain outgrowths, which swell into large heads; here they differ, for the head of the Ergot produces asci containing spores, whilst the head of the Mylitta produces naked spores on basidia.

In conclusion, I would like to ask some of our members to finally solve this interesting problem.

The Mylitta is common all through Gippsland and in the Dandenong Ranges. It is found under the ground, the depth varying from a few inches to several feet.

BIBLIOGRAPHY OF THE FUNGUS *POLYPORUS MYLITTÆ*, Cooke and Massee.

By D. M'Alpine.

At the May meeting of the Field Naturalists' Club, in connection with Mr. Tisdall's paper, I called attention to the fact that while Mr. R. T. Baker, F.L.S., in the "Proceedings of the Linnean Society of New South Wales," vol. xxvii., 1902, stated that only one specimen in fructification had been recorded, obtained from South Australia, there were really others. The "Native Bread" was first scientifically named by Berkeley, in 1839, *Mylitta australis*, but in the absence of fructification its real systematic position could not be determined, and, being underground, it was supposed to belong to the Truffle family.

The first undoubted notice of the fructification was by Mr. H. T. Tisdall, on 11th November, 1885, when he described before this Club (*Victorian Naturalist*, vol. ii., p. 109, January, 1886), specimens obtained in Gippsland which developed a regular stem and pileus, and, as he remarked, there was no doubt of their being veritable Polyporei. An accurate coloured drawing of the specimen still attests the accuracy of Mr. Tisdall's determination. The next notice of it I find is in *Grevillea* for December, 1892, where Dr. Cooke first describes it, and accurately names it *Polyporus mylittæ*, giving the

locality as South Australia. There are good grounds for calling in question the locality given, for, in the *Victorian Naturalist*, vol. ix., p. 144 (January, 1893), there is an extract from the *Gardeners' Chronicle*, in which Dr. Cooke announces the discovery of the fructification under the heading of "A Mystery Solved," and there is a footnote by the editor stating that Miss Campbell (now Mrs. Martin) had previously sent specimens to Dr. Cooke. Since Mr. Tisdall, in the paper previously referred to, also speaks of submitting his specimens to the same authority, there is every probability that the original specimens came from Victoria, and not from South Australia. Since everything connected with the history of such a purely Australian product as "Native Bread" is of interest to naturalists, I have brought forward the seemingly trivial matter of the first locality or source from which the long-sought-for fructification was obtained, in the hope that some members of the Club may settle the question. It is to the credit of the Field Naturalists' Club that before it was first solved the problem of the scientific position of the "Native Bread," and to Mr. Tisdall undoubtedly belongs the honor and credit of being the first person to determine it as a Polyporus and not a Truffle.

So few examples of the fructification are known that it may be worth while to record them up to date :—

1st.—Mr. H. T. Tisdall described and exhibited specimens from North Gippsland at this Club on 11th November, 1885.

2nd.—Dr. Cooke scientifically named it for the first time in *Grevillea* for December, 1892, from specimens sent from South Australia (?).

3rd.—Prof. Saccardo, in *Hedwigia* for March, 1893, named and described it independently of Dr. Cooke, based on specimens from Western Port, Victoria, forwarded by Prof. Spencer.

4th.—Mr. R. T. Baker, in the "Proceedings of the Linnean Society, N.S.W., for 1902," describes and gives excellent photographs of a specimen sent from Lithgow, N.S.W., but no spores were obtained.

5th.—Specimens exhibited by myself before this Club on 9th May, 1904, obtained through Miss Cowle from Tasmania in October, 1903. I also raised perfect specimens from slices of the "Bread" kept moist, and there was a profuse development of spores.

To complete the life-history of this most interesting fungus it only remains now to produce the "Native Bread" from spores sown under suitable conditions.

Honours.—In the reference to Mr. A. J. Campbell in the July *Naturalist*, the word "Corresponding" should read "Colonial." We understand that the number of members so designated is limited to ten.

The Victorian Naturalist.

Vol. XXI.—No. 5. SEPTEMBER 8, 1904. No. 249.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 8th August, 1904.

The president, Mr. O. A. Sayce, occupied the chair, and about 65 members and friends were present.

REPORTS.

A report of the Club excursion to the Zoological Gardens was given by Mr. J. Shephard, in the absence of the leader, Mr. D. Le Souëf, C.M.Z.S. A fair number of members were present, and a very enjoyable afternoon was spent in viewing the various animals and birds.

The hon. librarian reported the receipt of the following donations to the library:—"General System of Botany," by Le Maout and De Caisne, edited by J. D. Hooker, C.B., 2 vols. (1876), from Mr. S. W. Fulton: "Catalogue of the Described Coleoptera of Australia," by G. Masters (purchased); "Bulletin of the Geological Survey of Victoria," No. 12, with three maps, from the Department of Mines, Victoria; *Journal of Agriculture of Victoria*," vol. ii., part 7 (May, 1904), from the Department of Agriculture, Victoria; "Review of the Genus Eucalyptus," part 4, and "Forest Flora of New South Wales," part 8, by J. H. Maiden, F.L.S., Government Botanist, New South Wales, from the author; *Agricultural Gazette of New South Wales*, April and May, 1904, and Index to vol. xiv., from the Department of Mines and Agriculture, Sydney;" "Fisheries of New South Wales—First Annual Report (1902)," from the New South Wales Government; "Proceedings Linnean Society of New South Wales" (1903), part 4, from the society; "Proceedings Royal Society of Queensland," vol. xviii., from the society; *Nature Notes*, April and May, 1904, from the Selborne Society London; "Annual Report of the Smithsonian Institute, Washington, U.S.A.," for 1902, from the institute; "Proceedings Academy of Natural Sciences, Philadelphia," vol. lv., part 2 (1903), from the Academy; and *Wilson Bulletin*, March, 1904.

PAPERS.

1. By Mr. A. D. Hardy, entitled "The Fresh-water Algæ of Victoria."

In this paper, which was intended as an introductory one, the author referred to the apparent lack of interest manifested in the subject in Victoria, due, probably, to the scarcity of literature, more particularly as to local forms.

The life-histories of several species familiar to pond-life workers were described, and the sexual reproduction of *Hormiscia zonata* and the genera Spirogyra and Zygnema explained.

The paper was illustrated by a number of microscopical mounts and a fine series of beautifully-executed coloured drawings.

Mr. J. Shephard complimented the author on his paper, and expressed his satisfaction that a member had taken up this interesting group. From an economic point of view the subject was of importance. He mentioned an occurrence where, probably due to a favourable season, swarms of these minute plants had appeared in the water pipes, and there died, the result being that the water became impregnated with a very disagreeable odour.

Mr. C. French, jun., remarked that he, with several other members of the Club, had collected Fresh-water Algæ for the late Baron von Mueller, who had forwarded the material on to Dr. Otto Nordstedt, of Lund, Sweden. Dr. O. Nordstedt had since published the results in a work entitled "Australian Characeæ," and Part I. was in his possession, but whether other parts had been issued he was unable to say.

Mr. H. T. Tisdall mentioned that, in collecting Algæ, he had found that the best results were obtained by placing a piece of blotting or other paper under the leaves of a water plant, then gently raising it to the surface of the water, when the minute Algæ would be found adhering to the paper.

The president complimented the author on his paper, and hoped that he would continue his useful work. He was glad that Mr. Hardy had sent doubtful species to Europe for determination, as large quantities of material had been examined there by authorities on the group. Regarding the preservation of specimens, he had found Ripart and Petit's fluid an excellent medium, and gave the formula for it, which will be found later in this issue.

2. By Mr. A. Mattingley, entitled "Some Remarks on Queensland Fish."

The author, in an interesting paper, described some of the peculiar forms of fish abounding on the Barrier Reef, and said that about nine hundred marine and fresh-water species are known to inhabit Queensland waters, of which over three hundred are edible, many of these attaining to a very large size, and possessing excellent culinary qualities. He also referred to the Dugong and Beche-de-mer fisheries, the latter being an important item of trade with Eastern nations.

NATURAL HISTORY NOTES.

Fibre Balls.—Dr. Kaufmann, referring to the fibre balls exhibited by Mr. J. A. Kershaw, F.E.S., at last meeting, remarked

that they were made up of the fibres of a grass growing on the sand dunes near the sea coast, and that in Central Australia they are also very common.

FERN.—Mr. A. E. Kitson, F.G.S., drew attention to a variety of the fern *Lomaria discolor*, known as *bipinnatifida*, showing development from a form with entire pinnules to one in which the pinnules are deeply cleft or partite. When found, the tops only of some of the fronds showed the partite character, the lower pinnules being entire. These fronds are now dying or dead, but a new one appearing shows the partite character along the whole of the stem.

REED-LARKS.—Mr. G. A. Keartland drew attention to the skins of two Reed-Larks exhibited by him, one, *Calamanthus fuliginosus*, being from Waratah, Tasmania, where the original type specimen was procured. The others, shot near Melbourne, were recently described and named *C. albiloris* by Mr. A. J. North, in Part IV. of "Nests and Eggs of Australian Birds Found Breeding in Australia and Tasmania." Apart from the great difference in size, there appeared to be ample justification for specifically separating the birds.

EXHIBITS.

By Mr. P. C. Cole.—Boomerang, from N.W. Queensland.

By Mr. A. D. Hardy.—Various drawings and microscopic exhibits in illustration of paper.

By Mr. G. A. Keartland.—Skins of the Striated Reed-Lark, *Calamanthus fuliginosus*, and the White-lored Reed-Lark, *C. albiloris*; eggs of the Long-legged Tern, *Sterna anglica*, taken in New South Wales last season.

By Mr. A. E. Kitson.—Specimens of fern, *Lomaria discolor*, var. *bipinnatifida*, from Berry's Creek, between Mirboo North and Leongatha, South Gippsland.

By Mr. A. H. E. Mattingley.—Tusks of Dugong, *Halicore australis*, from North Queensland, in illustration of paper.

By Mr. H. T. Tisdall.—Coloured drawings of the Native Bread fungus, *Polyporus mylittæ*, and actual sections taken from specimens obtained in Gippsland in 1884.

EXCURSION TO CAMBERWELL.

A GEOLOGICAL excursion to Camberwell was made on 16th April, and was attended by over twenty members. The party examined the railway cuttings near the East Camberwell station, where red quartz sands and fine quartz conglomerates, not very distinctly bedded, were seen resting on the upturned edges of the bedrock of the district, which is of Silurian age, the top of the Silurian being between 230 and 220 feet above sea level. The valley to the eastward was then crossed, and on its opposite side,

in a gully crossing Riversdale-road, the same relationship of red sands to Silurian at about the same level was noted. On reaching the top of the hill at Highfield-road (270 feet) it was seen that we were standing on a plateau with a gentle slope to the south-west. The Malvern Town Hall, 2½ miles off in this direction, was visible, and is 200 feet above sea level. It was recalled that the country there was covered by the same red sands. More to the southward the plain about Caulfield, about 160 feet above the sea, could be seen across the valley of Gardiner's Creek, which on the line between the two places is about 60 feet above the sea. To the east the plateau is cut off by the broad, deep valley of Dandenong Creek and its tributaries, and a glimpse of the Yarra valley was obtained to the north. Far to the north-west and west lay the lava-covered Keilor Plains, which were visible across Melbourne, and which from sea level at Williamstown gradually rise as they sweep north, till at Sunbury they are about 700 feet above the sea at a distance of some 20 miles from the coast.

The result of our excursion was to have it brought clearly before our minds that to the east of Melbourne a mantle of red clays, sands, and gravels lies over the surface of the Silurian rocks which form the bed-rock of the district. The old surface of these ancient tilted and folded rocks is uneven, but has a general southerly slope. At Surrey Hills, near the reservoir, it rises to 420 feet. At Mentone, 12 miles south, its surface is about 560 feet below sea level. On the other hand, at St. Kilda it crops out on the beach, and rises to over 50 feet higher a little to the north.

About Beaumaris the red sands contain marine fossils which fix their relative age, and these beds, though the matter is in dispute, we call Kalimnan (? Miocene). No fossils have been found as far inland as we were, and, judging by the character of the beds, they are not marine, but represent material brought down by streams from the Dividing Range to the north before the Yarra dug its deep trench, which cuts off the plateau in that direction. This material was spread over the land. Speaking broadly, the freshwater beds may be regarded, I think, as of the same age as the marine ones at Beaumaris.

This sloping, sandy plain has been deeply cut into by streams, even by the intermittent ones, such as Gardiner's Creek and its tributaries, and by what in default of a more poetic name we must call the Hawthorn main drain.

In our previous excursion, a few weeks ago, to Keilor, we saw that red sands of a similar character, though of somewhat greater age, as the fossils show, underlay the lavas of the Keilor Plains. We can, then, look back to times, before this outpouring of molten rock, when country of a similar character lay all around the

present site of Melbourne. The sandy beds, of considerable depth, hold water like a sponge, and afford suitable soil, under a fair rainfall, for a thick growth of trees and scrub. Such a growth, in the memory of many of our members, occupied most of the country to the east of the Yarra. To the westward the lava plains are covered with a thin coat of soil, rich in plant food, but with a subsoil of dense bluestone, which neither holds water nor allows of drainage. It is a country rich in grass, but devoid of trees and scrub. The fauna depends on the flora for its existence, and rarely do we find so close together two such extensive and distinct classes of country as we do on the two sides of Melbourne. The differences in the plants and animals of the two areas are known, at any rate in part, to all. The tendency in the past has been to study the richer life of the eastern area, and to somewhat neglect the western.

In the far past, when conditions were similar on both sides of Melbourne, the same life—both plant and animal—was to be found at Sydenham and at Caulfield. Now the greatest contrast exists in every way, and we can see even from this sketch how far-reaching are the effects of geological changes. Not alone is this seen in the distribution of plant and animal, but we trace it in the scenery and in the growth of Melbourne's suburbs, for we prefer to build our houses on the sand, and not to found them on the rock.

In conclusion, I would like to suggest that an attempt should be made to compare critically the flora and fauna of the two classes of country that are here dealt with. We want comparisons of what lives on the basalt with what lives on the sands. But to do this properly we must keep out of those valleys which trench to the underlying rocks, and confine our attention strictly to the dwellers on the two geological formations. This is a problem which may be studied in many parts of Victoria, but here we can do it at our doors.—T. S. Hall.

DESCRIPTIONS OF SOME NEW VICTORIAN COCCIDÆ.

By E. E. Green, F.E.S., Government Entomologist, Ceylon.

(Communicated by C. French, F.L.S.)

(*Read before the Field Naturalists' Club of Victoria, 11th July*, 1904.)

Aspidiotus (Hemiberlesia) immaculatus, n. sp. (fig. 1).

Female.—Puparium snowy-white; the pellicles completely concealed—both above and below—by the white secretionary covering, but indicated by the presence of a raised disc above the first larval skin. Form strongly convex; the apex tilted over towards the anterior extremity. Diameter, 1.25 to 1.50 mm.

Male.—Puparium similar to that of female, but narrower. Long, 1 mm. ; broad, 0 50 mm.

Adult female broadly pyriform. Pygidium bluntly pointed. Pygidial lobes small and confused, almost concealed above by a chitinous outgrowth of the margin ; median pair ligulate, with truncate or slightly rounded extremity, separated by a space of about their own width ; first lateral lobes broader than median, closely followed by a stout marginal prominence simulating the outer lobule often present in species of Mytilaspis and Chionaspis; second lateral lobes represented by a blunt marginal prominence, beyond which the margin is somewhat serrate. Squames—between the lobes—rather densely chitinous. No circumgenital glands. Dorsal pores rather small and inconspicuous, in the usual linear series. Anal aperture moderately large, distant from margin by about three times its greater diameter. Long, 1.05 mm. ; broad, about 1 mm.

Habitat.—Shepparton, Victoria, Australia. On *Styphelia virgata.* (Coll. C. French, No. 18.)

(The above description has been drawn up from old and densely chitinous examples. It is probable that—in early adult examples—the pygidial lobes and squames would be more prominent and conspicuous.)

Aspidiotus (Tagionia) subfervens, n. sp. (fig. 2).

Female.—Puparium circular, strongly convex. Dull blackish brown, thickly dusted with greyish scurfy secretion. Pellicles fulvous, more or less obscured above by grey secretion. Below deep chocolate-brown ; pellicles fiery red. Diameter averaging 1.25 mm.

Male.—Puparium not observed.

Adult female almost circular. Pygidium rather acutely pointed. Median pygidial lobes large, prominent, convergent ; apex rounded, outer edge steeply sloped and notched in the middle. Lateral lobes represented only by small marginal prominences. Two pairs of large, stout claviform paraphyses on each side. No pectinate squames. Marginal spines moderately large. Anal orifice distant from margin by about 2½ times its greater diameter. No circumgenital glands. Dorsal pores few and inconspicuous. Long, 1 to 1.10 mm.

Habitat.—Victoria, Australia. On *Acacia*, sp. (Coll. C. French, No. 24B). Received also from Mr. J. Lidgett, on *Pomaderris*, sp. (Coll. J. Lidgett, No. 60.)

The pygidial characters are very similar to those of *A. perniciosus* ; but differ in the absence of pectinate squames, and in the relatively larger size of the paraphyses. The puparium of *subfervens* differs from that of *perniciosus* in its greater convexity, stouter texture, and colour of pellicles.

CHIONASPIS ANGUSTA, n. sp. (fig. 3).

Female.—Puparium elongate, narrow, somewhat resembling (in form) that of *Mytilaspis gloveri*. Colour white, more or less completely covered (in example under observation) by a reddish-brown superficial layer of inorganic matter that also covers the leaves of the plant. In other situations the puparia would probably be snowy-white. Pellicles fulvous. Long, 2 to 3 mm.; broad, about 0.75 mm.

Male.—Puparium snowy-white; feebly tricarinate. Pellicle orange-yellow. Long, 1.25 mm.

Adult female narrow in front, with straight sides, broadening to abdominal segments. Pygidium broadly rounded. Median lobes broad; not very prominent; united at base, widely divergent at extremity; slightly constricted in the middle; extremity truncate, smooth or feebly crenulate. First lateral lobes duplex, small; inner lobule largest, conical. Second lateral lobes obsolete. Singular spiniform squames at usual intervals. Spines inconspicuous. Anal orifice near base of pygidium. Circumgenital glands in five groups; median group 4 to 5, upper laterals 11 to 13, lower laterals 15 to 17. Dorsal pores large and conspicuous. Long, 1 mm.; greatest breadth, 0.40 mm.

Habitat.—Frankston, Victoria, Australia. On *Leptospermum lævigatum*. (Coll. C. French, jun., No. 33.)

CTENOCHITON SERRATUS, n. sp. (figs. 4–7).

Test of adult female oval. White or pale straw colour. Dorsum covered with polygonal glassy plates arranged symmetrically, in two series, on each side of a median line; a single elongate medial plate at anterior extremity; a marginal fringe of lanceolate plates, about 12 on each side. Long, 3.50 mm.

Test of male similar, but smaller and proportionately narrower. Hinder third occupied by a subcircular operculum, through which the adult insect makes its escape. Long, 2 mm.

Adult female with well-developed limbs. Antenna 6-jointed, 3rd longest, 3 and 4 sometimes confluent, occasionally an incomplete division in 6th. Plates of anal operculum triangular; outer edge a little longer than base, with a stout pine near apex; inner edge irregularly excised. Margin of body with a close series of short, stout conical-pointed spines. Stigmatic spines not noticeably larger than the others. Examples under observation not in sufficiently good preservation to permit of accurate measurement, but the length would be presumably a little less than that of the test.

Habitat.—Warrnambool, Victoria, Australia. On *Styphelia*, sp. (Coll. C. French, No. 34.)

Most nearly resembling *C. perforatus*, Mask., but more oval and differing from this (and apparently from all other described species) in the absence of a median dorsal series of plates on the test.

Eriococcus sordidus, n. sp. (figs. 8, 9).

Sac of adult female oblong oval. Colour and texture difficult to determine, every example being thickly encrusted with black fumagine fungus, as is also the surrounding surface of the bark. The inner coating of the sac is white. Long, about 3 mm.; broad, 1.50 mm.

Sac of male snowy-white, conspicuous against the dead black surroundings. Long, 1.50 mm.

Adult female oval. A marginal series of rather slender-pointed spines, broken into sets of three on the abdominal segments. A median dorsal series of paired spines—a single pair on each abdominal segment. A smaller spine on each segment about half-way between the median and marginal series. Both dorsal and ventral surfaces with small scattered spinnerets and fine hairs. Antenna moderately large and stout, 7-jointed; 2nd, 3rd, 4th, and 7th subequal, longest (3rd sometimes longer than the others); 5th and 6th subequal, shortest. Anal tubercles prominent, stout; terminal seta not twice length of tubercle; a longish stout-pointed spine at base on inner side; a slender spine at base on outer side; and two slender spines near apex—on ventral and dorsal surfaces respectively. Anal ring with 8 stout hairs, extending beyond the middle of the tubercles. Long, 1.25 to 1.75 mm.; broad, 0.60 to 1 mm.

Habitat.—Dandenong Ranges, Victoria, Australia. On *Helichrysum ferrugineum.* (Coll. G. French, jun., No. 25.)

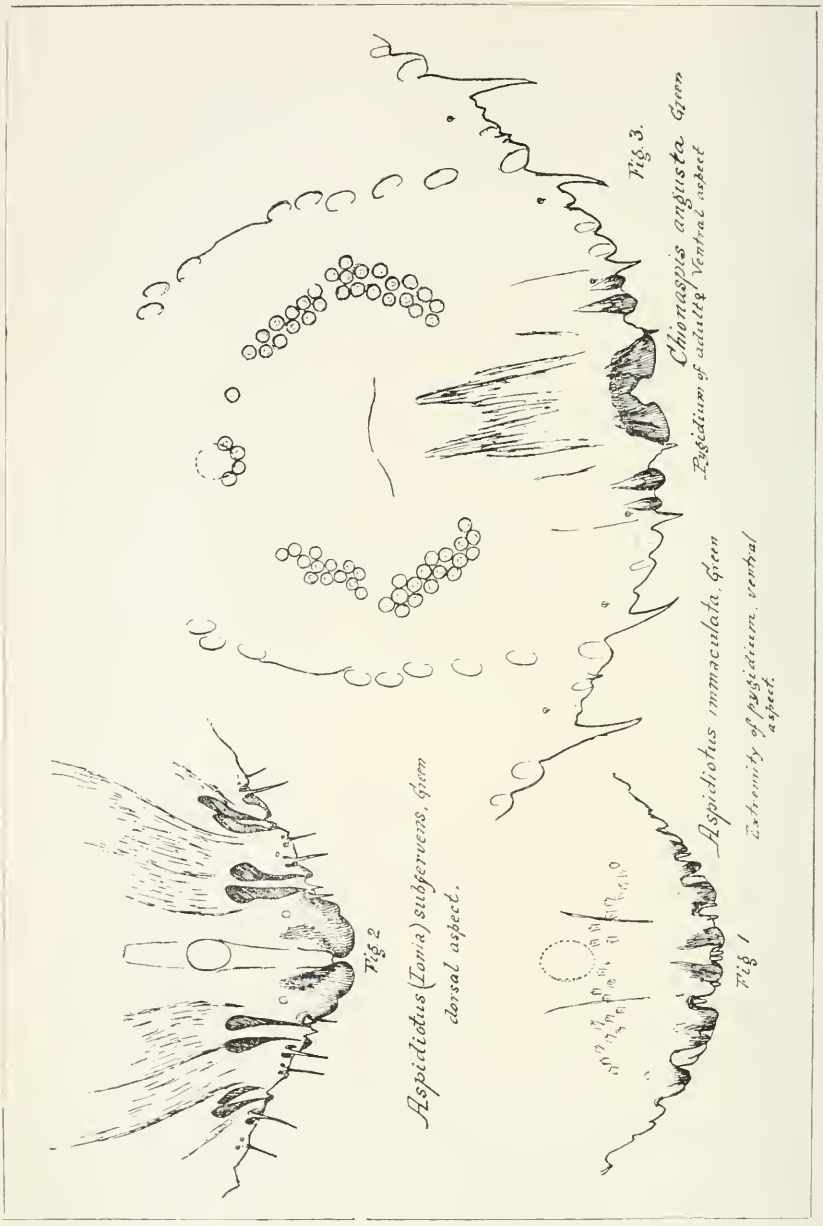
Said to be "a very destructive pest."

Differs from *danthoniæ*, Mask., in broader form, shorter marginal spines, and presence of median dorsal series. Near *leptospermi*, Mask., but differing in the single marginal fringe and 7-jointed antennæ.

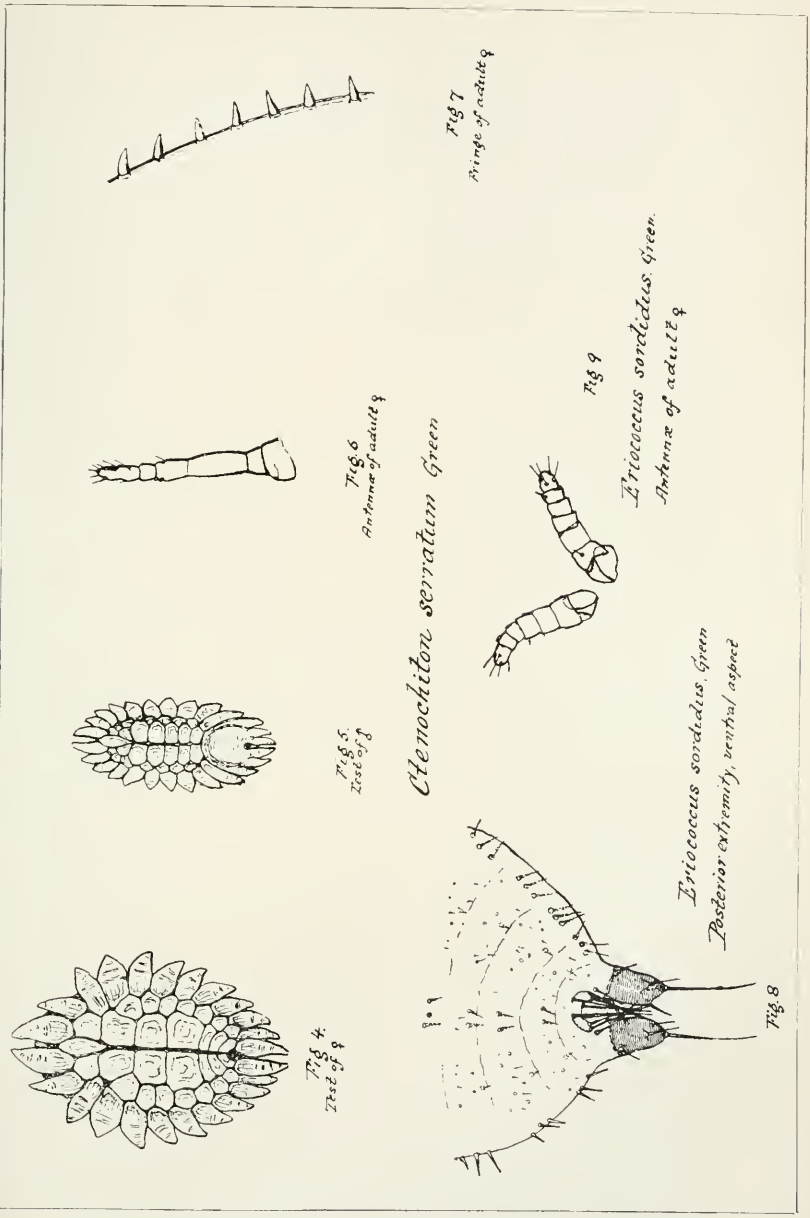
The accompanying catalogue of Australasian species of *Eriococcus*, showing the principal characters in parallel columns may be of assistance in discriminating between the closely similar forms. The characters are extracted from the published descriptions.

DESCRIPTION OF FIGURES.

1.—Aspidiotus immaculata, extremity of pygidium, ventral aspect.
2.—Aspidiotus subfervens, extremity of pygidium, dorsal aspect.
3.—Chionaspus angusta, extremity of pygidium, ventral aspect.
4.—Ctenochiton serratus, test of adult female, dorsal aspect.
5.— Do. test of male, dorsal aspect.
6.— Do. antenna of adult female.
7.— Do. marginal fringe of adult female.



NEW VICTORIAN COCCIDÆ.



NEW VICTORIAN COCCIDÆ.

Name.	Colour of Female Sac.	Colour of Male Sac.	Antenna, No. of joints.	Character of Spines.	Disposition of Spines.	Food Plant or Habitat.
ERIOCOCCUS –						
agonis, Full. ..	?	?	7	Inconspicuous	A few on dorsum; 2 on margin of each segment	Agonis flexuosa
apiomorphæ, Full. ..	White	White	7	Acuminate	Small on dorsum; marginal fringe larger, at regular intervals	In galls of Apiomorpha
araucariæ, Mask. ..	White	White	6	Conical, pointed	On margin only (1)	Araucaria
,, minor, Mask. ..	White	White	6	Conical, pointed	Marginal spines shorter than in type	Kunzea
buxi, v. australis ,, ..	White	White	6	None	Absent	Eucalyptus
confusus, Mask. ..	Grey	?	6	Slender, pointed	Numerous; most noticeable on median dorsal area	Eucalyptus
conspersus ,, ..	Yellow	White	6	None	Absent	Casuarina
coriaceus ,, ..	Yellow to dark orange	Yellow to orange	7	Slender	Numerous; scattered	Eucalyptus
cypræformis, Full. ..	Light brown	?	7	?	Numerous; scattered	Casuarina
danthoniæ, Mask. ..	White	White	7	Conical, strong	Marginal fringe; scattered on dorsum	Danthonia
elegans, Full. ..	?	?	6	Short, conical	? (2)	Casuarina
eucalypti, Mask. ..	Yellow to brown	Yellowish	7–8	Short, thick, conical	Scattered (3)	Eucalyptus, Bursaria, Banksia, Pittosporum
fagicorticis ,, ..	White	White	7	Conical	Strong marginal fringe; smaller and scattered on dorsum	Fagus
gurneyi, Full. ..	White?	?	8	Short, stout, conical	Innumerable; closely set (4)	Rhamnaceous plant
hakeæ ,, ..	White or buff	?	7	Conspicuous, conical	Many on dorsum, a few larger than others; 2 on margin of each segment longer, acuminate	Hakea
hoheriæ, Mask. ..	White	White	6	Small, conical	Numerous, especially on last 2 segments (5)	Hoheria
imperfectus, Full. ..	White	?	7	?	?	Melaleuca
leptospermi, Mask. ..	White or yellowish	White	6	Pointed	Margin with double row; double median longitudinal series (6)	Leptospermum
multispinus ,, ..	Yellow	Yellow	6	Conical, blunt	The largest in 6 longitudinal rows (7)	Rubus, Knightia
,, lævigatus, Mask.	Yellow	Yellow	6	Do. do.	Do. do. (8)	Acacia armata
pallidus, Mask. ..	Yellowish-white	?	6	Slender, conical	In transverse rows; not close (9)	Myoporum, Elæocarpus
paradoxus ,, ..	Dark red-brown	Reddish-yellow	Atrophied	None	Absent (10)	Pittosporum
,, simplex, Mask.	Do.	Do.	Do.	Do.	Do. (11)	Eucalyptus
phyllocladi, Mask. ..	Dark yellow	Dark yellow	6	Strong, conical, pointed	Marginal fringe	Phyllocladus
raithbyi ,, ..	Orange-yel.	Orange-yel	7	None	Absent	Fagus
simplex ,, ..	Yellow	White	7	Short, blunt, slender	Marginal fringe	Eucalyptus
,, dealbata, Mask. ..	White	White	7	Do.	Do.	Eucalyptus
sordidus, Green ..	White?	White	7	Slender, pointed	Marginal fringe (in threes on abdominal segments). Double median row	Helichrysum
spiniger, Mask. ..	White	White	6	Strong, blunt	Fringe, separated into groups by junctions of segments	Eucalyptus
tepperi ,, ..	White or yellowish	White or yellowish	6	Slender	In transverse rows. No marginal fringe (12)	Eucalyptus, Bursaria

OTHER CHARACTERS.—(1) (Ceylonese examples have a short ring-like basal joint to the antennæ, which might be considered as a seventh joint.—E.E.G.) (2) Sac incomplete. (3) Glassy filaments on sac. (4) Anal tubercles black. (5) Anal tubercles duplex. Feet atrophied. (6) Third joint of antenna subdivided in some examples. (7) Sac with spiniform processes. (8) Sac smooth. (9) Several varieties. Spines sometimes rare on abdominal segments. (10) Feet wanting. Large 8-shaped spinnerets. (11) Feet wanting. Simple circular spinnerets. (12) (Sac considerably smaller than that of *pallidus*, with which it otherwise closely agrees.—E.E.G.)

NOTES ON SOME VICTORIAN ECHINOIDS.

By T. S. Hall, M.A.

(*Read before the Field Naturalists' Club of Victoria, 11th July*, 1904.)

Most of the Echinoids found in our seas have long been known to science, but no one has attempted a list of the Victorian species, and it is difficult to say what forms occur and what do not. The museum of the Biological Department of the University has a certain amount of material, most of which was dredged about Port Phillip Heads by the late Mr. J. Bracebridge Wilson, M.A. It is, however, only a part of his gatherings, for the remainder, and I believe the larger part, was sent to England fourteen years ago to be identified, but the work has not yet been accomplished. The collections of Echinoids in the National Museum have not yet been found a permanent home, and are still stored in packing cases in the basement. I have, consequently, not been able to refer to them ; but, on the other hand, without the free access to literature in the Museum library that has been freely afforded me, I could have identified nothing with certainty.

Perhaps a few remarks on the literature of the group as a whole, and on its Australian occurrences, will be of use.

The "Revision of the Echini" by A. Agassiz, which contains full descriptions and fine figures of nearly all the recent species, is in the National Museum Library. The same author treated the *Challenger* gatherings, and in both works our forms are, of course, dealt with. Duncan's "Revision of the Genera and Great Groups of the Echinoidea" will be found in the *Journal of the Linnean Society*, London, vol. xxiii., 1891. In the same year the Australian Museum published a catalogue of the Echini by Dr. Ramsay. In 1889 Mr. T. Whitelegge's "List of the Invertebrate Fauna of Port Jackson" appeared in the *Journal of the Royal Society of New South Wales*. The Rev. J. E. Tenison Woods wrote two or three short papers in the early volumes of the Linnean Society of New South Wales. With these references it will be easy to find one's way to the others.

I have identified the following forms :—

1. Goniocidaris tubaria, Lamk.

The differences between this species and *G. geranioides*, Lamk., have not been very definitely expressed. Agassiz, in his Revision, says they are easily discriminated by the structure of the primary spines, the differences in the size of the genital plates and abactinal system. In his *Challenger* volume he says spines count for nothing in the Cidaridæ. It is not easy to get any definite statements by authorities on the size of the abactinal system and the genital plates ; in fact, authors are nebulous on the matter. M'Coy, in his "Prodromus," hazards the conjecture that the

differences are merely sexual, but is able to distinguish the two on the form of the test and spines and the size and position of the ovarian openings. The height of the test, however, is not specific, as specimens in our collection show, and, as Agassiz rejects the evidence of the spines, there remains only the size and position of the ovarian openings.

A study of the records of the distribution of the two species shows, I think, that the discrepancies in them are due to a forced attempt at species-making, and not to constant differences in the objects themselves. Agassiz, in the *Challenger* volume, records *G. geranioides* from East Indies, Australia, and Tasmania, and *G. tubaria* from Australia, Tasmania, and New South Wales (*sic*). He says, also, that a large number of specimens of *G. tubaria* were dredged outside Port Phillip Heads and off East Moncoeur Island, near Wilson's Promontory. *G. geranioides* does not appear in the *Challenger* lists. Ramsay says *G. geranioides* is not found in Port Jackson, while it is common on the south coast, Port Phillip being, I think, intended. Tenison Woods says it is found within the tropics, and is replaced in the south by *G. tubaria*. Agassiz and Desor record *G. geranioides* from Port Western, New Ireland, and New Holland (I suppose the New Ireland record is responsible for the "East Indies" of Agassiz). M'Coy says both species are common with us.

I am unable to see more than one species in the material I have examined.

Loc.—The best specimens I have seen were dredged about Port Phillip Heads by the late J. Bracebridge Wilson in 10–40 fathoms. Bottom shelly sand. It also occurs in Western Port (Gabriel). It is very rarely washed up on the beach.

2. Strongylocentrotus erythrogrammus, Val.

This is one of our commonest Urchins on a rocky bottom, and extends from tide mark to over 30 fathoms. We have no Victorian form that can be confused with it.

The species is found in Australia, Tasmania, New Caledonia, Samoa, and New Zealand. The genus is world-wide and outside Australia ranges back to the Miocene.

3. Microcyphus zigzag, L. Ag.

This species has much the build of the last one, but the presence of a zigzag bare area, usually coloured reddish-brown, on the median part of both ambulacra and interambulacra serves as one of several important distinguishing marks.

Our examples are all small. The species has a wide range: Japan, Philippines, Southern Australia, Tasmania. The *Challenger* dredged it off Port Phillip Heads in 38 fathoms, and off East Moncoeur Island in 40 fathoms, both on a shelly sand bottom. Wilson's collections came from the Heads, and a depth of about 10 or 20 fathoms.

4. Amblypneustes griseus, Blainv.

Agassiz seems to voice the general opinion when he says Amblypneustes is a very difficult genus, on account of its great variability. It is a Southern form only. Four Australian species are recognized by Agassiz in his Revision—namely, *A. formosus*, *griseus*, *ovum*, and *pallidus*. He is doubtful if *pallidus* is distinct from *formosus*. In the *Challenger* volume he records *formosus* alone of the four, and the only locality where it was obtained was East Moncoeur Island. Ramsay thinks *griseus* equals *formosus*, and that there are only two distinct species—*formosus* and *ovum*. Tenison Woods, again, thinks *pallidus* and *griseus* are but modifications, not of *formosus*, as Ramsay does, but of *ovum*. Duncan says *A. griseus* is a very erratic species. There is not much that is satisfying about these observations to help one in identification. The examples that I have examined are none of them identical with any of the species, and they vary in almost every point—shape, colour, number of tubercles on a plate and their arrangement; while the size and number of sutural pores varies on the same specimen. Still they all group round the *griseus* form, and I consequently apply that name to them. The evidence at present available seems to point to the existence of only one species, with, perhaps, varieties due to conditions of life or geographical position.

Loc.—Washed up very commonly on all our beaches. Dredged alive just outside Port Phillip Heads and in the South Channel; depth, 8–30 fathoms, by J. B. Wilson. The *Challenger* specimens identified as *A. formosus* came from East Moncoeur Island in about 40 fathoms.

5. Holopneustes porosissimus, L. Ag.

This usually dark-coloured Urchin seems to be not uncommon, though Tenison Woods, a keen collector, as late as 1880 had never seen a specimen of the genus on our coasts. In form the species closely resembles Amblypneustes, being nearly spherical, but the ambulacral pores, instead of being confined to a narrow band, spread widely over the ambulacra, which are broader than the interambulacra.

There seems to be the same difficulty about the species of this genus as there is about the last—at least, this is Ramsay's opinion. The examples I have seen from Western Port are undoubtedly the *H. porosissimus* of Agassiz's Revision.

Loc.—Thrown up in thousands at Shoreham, Western Port. Dredged, Port Phillip Heads (Wilson).

6. Echinocyamus, sp.

A small member of this genus, about 5 mm. in diameter, and very depressed, occurs profusely on the Portsea beach, and I

have found it along the coast near Torquay. It has been dredged by J. B. Wilson in about 6 fathoms, off Portsea. I am unable to identify the species.

7. EUPATAGUS VALENCIENNESII, L. Ag.

We have three examples in the collection, dredged by J. B. Wilson at Port Phillip Heads, probably in 10 to 30 fathoms. It was obtained by the *Challenger* off Sydney in 30 to 35 fathoms. Tenison Woods some years ago regarded it as only a North-east Australian form, but now we know it ranges much further south.

8. ECHINOCARDIUM AUSTRALE, Gray.

This is the commonest Urchin in Port Phillip and on the mud flats of Western Port. It varies a good deal in size, but its general characters are fairly constant. It ranges from Japan to New Zealand, and thence by southern Australia to Mozambique and Cape Colony. In depth it goes from a couple of fathoms down to 2,675 fathoms. Agassiz thinks it possible that it is identical with the European *E. cordatum*. If so its range is enormous. Other authorities do not agree with him. In the northern hemisphere the genus extends back to the Eocene. In Australia we do not know it as a fossil. The dried tests sometimes strew our beaches opposite mud flats in thousands.

9. LINTHIA AUSTRALIS, Gray.

I have seen several small examples of this species. The fascioles were clearly marked and traceable throughout. It has been dredged by Wilson in about 6 fathoms, and a dried test from Shoreham was given me by Mr. F. Chapman, A.L.S. It is recorded from Tasmania by the *Challenger*. Woods says it is liable to confusion with *Brissus carinatus*.

There seem to be a good many species which ought to be in this list and are not, and we must look to future collecting to increase it.

FLAMINGOS.—Though flamingos are birds which are comparatively common in zoological gardens, it seems that considerable uncertainty has existed as to their method of nesting, and it is only recently that the first nests of these birds have reached New York. These were obtained at the Bahamas, after considerable difficulty, by Prof. Frank M. Chapman, of the Department of Ornithology of the American Museum of Natural History. An account of his experiences, with illustrations of the "rookery" and a nest, is given in a recent number of the *Scientific American* (23/7/04). An article on the same subject appears in the *Windsor Magazine* for July, 1904. From these it seems that few persons have had the opportunity of studying the birds in their lagoon homes. In the classification of birds the Flamingo was

for many years placed in close proximity to the storks, probably on account of their long legs and necks, but recent investigations have shown that they really are closely allied to the ducks and geese. There are six or seven species, inhabiting the temperate zones of both the Old and New World. Perhaps the most curious feature in connection with Flamingos is their nest. Until so late as 1883 it was supposed that the nests were two or three feet high, and that the birds sat upon their single egg with the legs straddled on either side of them. This idea, however, was dissipated by Mr. Abel Chapman, who in that year visited the swamps along the Guadalquiver in Spain, and there fully investigated their habits. He reported them as being excessively shy, and great caution had to be exercised in approaching a flock when feeding in the shallow pools. The flocks numbered from two to five hundred individuals. At the least noise they were off, and a more beautiful sight than the simultaneous spreading of their hundreds of crimson wings, flashing against the sky like a gleam of rosy light, can scarcely be imagined. Prof. Chapman succeeded in reaching a large rookery in a lagoon in the interior of the Island of Andros (Bahamas). The locality was only a few inches above sea-level, and was characterized by wide stretches of shallow water bordered by red mangrove trees, with occasional bare bars of grey marl and outcrops of coraline rock, so eroded and waterworn as to make walking a great difficulty. Subsequent research showed that the locality was regularly frequented by the birds for breeding purposes, but that apparently a different spot was chosen each year. Eight groups of nests were found within a radius of a mile. The largest, placed on a mud-bar only an inch or two above the level of the surrounding water, was a hundred yards in length by about thirty in width, and an estimate based upon an actual count of a portion of the colony gave a total of two thousand nests for the three thousand square yards. An attempt was made to observe the birds engaged in the construction of their mud nests, but owing to their wariness this was impossible, but from those in process of building it was possible to gain some idea of their manner of construction. The nest may be described as a mud cone from nine to twelve or thirteen inches in height, in the slightly hollowed top of which a single white egg is laid. Doubtless the height of the nest is governed by the rise of the water, and being built wholly of mud, which is scooped up from about the base of the nest by the bird, it is necessary that the site chosen shall be near enough to water to insure an abundant supply of soft material. Such a site would, however, bring the nest within reach of the tide, or it might be flooded by heavy rains, consequently the birds must build their nests high enough to protect their contents from the water. The eggs are white, but showing

a blue tint under the surface if scraped away. They are long, oval, and have a thick shell, equalling in size that of the common goose. The task of getting the nests into the hold of the schooner was one of considerable difficulty. The largest secured measured eighteen inches in diameter at the bottom, thirteen inches at the top, and nine inches in height, weighing upwards of 100 lbs. Being a solid mass of mud, and dried only externally, it needed only a slight jar to break the strongest nest into fragments. However, six were safely got into the hold of the schooner. At Nassau they were treated with a solution of gum arabic, which hardened them, and, after being wrapped in plaster of paris bandages, were packed separately in large boxes, finally reaching New York in excellent condition.

Preserving Fluid for Microscopic Objects.—I would like to bring under the notice of microscopists a preserving medium known as Ripart and Petit's fluid, having the following composition :—Camphor water (not saturated), 75 parts ; distilled water, 75 parts ; glacial acetic acid, 1 part ; acetate of copper, 0.3 part ; chloride of copper, 0.3 part—which I have found extremely useful. To the recipe I have sometimes added formalin in the proportion of 1 per cent., or a trace of osmic acid at the time of using. Material may be mounted in this fluid on micro slides, or kept immersed in the fluid in small vials away from the light, and a little taken out for examination under the microscope when required. The form and cellular contents will be faithfully preserved, and the colour to a very considerable extent.—O. A. Sayce.

Oysters and Diatoms.—It has been observed that oysters grow much more slowly on some beds than on others—that in certain places they fail to fatten. These places were usually on overcrowded beds, and sometimes good results could be secured by transplanting or thinning out. Qualitative and quantitative study of the diatoms (which constitute the food of oysters) on beds where the oysters fattened well, and on other beds where they fattened poorly, showed that the number of diatoms per litre of water was very much greater in the former than in the latter. It was therefore believed that if the supply of diatoms could be increased on the unproductive beds the oysters on them would grow and fatten. Experiments along these lines were recently inaugurated at Lynnhaven, Va., under the immediate direction of Dr. H. F. Moore, of the Bureau of Fisheries. A small cove was selected where the bottom and the salinity of the water were favourable but diatoms were scarce. Commercial fertilizers of certain kinds were used to furnish food for the diatoms, and it was very soon found that the latter greatly increased in abundance, and lean oysters transferred to this cove fattened rapidly.—*Scientific American*, 16th July, 1904.

RECENT PUBLICATIONS.

Nests and Eggs of Birds found Breeding in Australia and Tasmania.—In the fourth part of this work, recently issued by the Trustees of the Australian Museum, Sydney, the author, Mr. A. J. North, C.M.Z.S., Ornithologist to the Museum, describes the nests and eggs of some eighty species of our smaller birds belonging to the Muscicapidæ, Turdidæ, Sylviidæ, and Timeliidæ. At the same time seventy-six species of eggs are figured. These, however, do not correspond with the birds and nests mentioned, as, on account of their reproduction by photographic processes, it is necessary for the eggs for each plate to be of a somewhat similar colouration. It may be mentioned that this part shows many changes in classification and in nomenclature, the latter both in the scientific and vernacular names, from that adopted in the A.A.A. List (1898)—thus the Maluri are called "Warblers" instead of "Wrens," the Acanthizæ are "Thorn-bills" instead of "Tits," and the Ephthianuræ are "Nuns" instead of "Chats," while the Pomatorhinus (Babbler) is now Pomatostomus (Chatterer). It seems a pity that some finality in naming cannot be arrived at even with our common birds. Four large plates of nests are given, which are excellent reproductions from photographs.

Report of Trustees of Public Library, Museums, and National Gallery for 1903.—In the portions of this report dealing with the National Museum, the hon. director, Prof. W. Baldwin Spencer, F.R.S., refers to the want of proper accommodation, both for the collections and the officers. However, since the date of the report, work has been resumed on the new wing, and it is hoped that portion of it will be available in a few months. The curator of the zoological collections, Mr. Jas. A. Kershaw, gives a detailed report of the work done during the year, mentioning the more important additions, such as the case of nearly two hundred specimens of humming-birds, though most of these had been many years in possession of the Museum. Among the list of donors of specimens it is pleasing to note the names of many members of the Field Naturalists' Club.

Journal of the West Australian Natural History Society.—The first number (May, 1904) of this new publication contains no report of the society's proceedings, the entire fifty-five pages being taken up by four papers on botanical subjects. Two of these, by Mr. W. V. Fitzgerald and Mr. C. R. P. Andrews, are devoted to recording additions to the Western Australian flora. These writers between them add no less than twenty-four new species of acacias to the already large number recorded for that State.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 12th September, 1904.

The president, Mr. O. A. Sayce, occupied the chair, and about 75 members and visitors were present.

REPORTS.

A brief report of the Club excursion to the Yarra, near Willsmere, Kew, on Saturday, 20th August, was given by the leader, Mr. F. G. A. Barnard, who stated that there was a good attendance of members, although the afternoon was showery and unpleasant. The object of the excursion was to see the Silver Wattles, *Acacia dealbata*, Link., so plentiful on the banks of the river there, in bloom. Many of the trees were found to be covered with quantities of their golden-coloured blossoms, presenting a glorious sight, and members were able to get some good specimens. Two or three members devoted their attention to the pond-life of the neighbouring lagoons, with fair results.

A report of the Club excursion to the Botanical Gardens on Saturday, 10th September was given by the leader, Mr. F. Pitcher, who said that, favoured by a beautiful afternoon, over 40 members and friends were present. The party was fortunate in seeing the Magnolias near the office in full bloom. A brief inspection was made of the seed collection and economic products, &c., in the museum. The shrubs, &c., in the Australian border were next visited, and then some time was spent in the system sheds. Many of the interesting specimens in the fern gully and the palmetum were pointed out, and a visit paid to the Latrobe memorial and adjacent rock work. The conservatory, containing many rare and choice plants, was next inspected, and afterwards the view from the reservoir mound was greatly admired.

At the conclusion of the ramble the members were invited by Mrs. Pitcher to afternoon tea in the rotunda.

The hon. secretary reported that the first of a series of practical evenings, devoted to structural botany, had been given by Mr. H. T. Tisdall on Wednesday evening, the 17th August. A fair number of members attended. The subject, *Vicia faba*, proved very interesting, and a profitable two hours were spent by those present. Commencing with the seed, Mr. Tisdall described the various parts, while the several kinds of cells and tissues necessary for the building up of the plant were lucidly explained.

The function of nutrition and respiration, the elaboration of cell-sap into plant food, was treated by the lecturer in his usual thorough manner. Numerous diagrams and blackboard illustrations, together with a number of microscopical sections, enabled the members to clearly follow the subject. Several microscopes were kindly lent by Messrs. W. Watson and Sons.

The hon. librarian reported the receipt of the following additions to the library:—"Animals of New Zealand," by Hutton and Drummond (purchased); "Annual Report Department of Mines, Victoria," 1903, from the Department; *Journal of Agriculture of Victoria*, vol. ii., part 8, July, 1904, from the Secretary for Agriculture; *Emu*, vol. iv., part 1, July, 1904, from the Australasian Ornithologists' Union; *Geelong Naturalist*, vol. i., part 2, from the Geelong Naturalists' Society; "Forest Flora of New South Wales," vol. i., parts 9 and 10, by J. H. Maiden, F.L.S., from the author; *Agricultural Gazette of New South Wales*, June and July, 1904, and "Annual Report Department of Mines, New South Wales, for 1903," from the Department of Mines and Agriculture; "Nests and Eggs of Birds Found Breeding in Australia and Tasmania," part 4, by A. J. North, C.M.Z.S., from the Trustees Australian Museum, Sydney; and *Nature Notes*, June, 1904, from the Selborne Society, London.

ELECTION OF MEMBERS.

On a ballot being taken, Dr. J. W. Dunbar Hooper, Collins-street, Melbourne, and Mr. A. Russell, Bourke-street, Melbourne, were elected as ordinary members; Messrs. Eric K. Larking, Alma-road, Caulfield and Francis E. Wilson, Wesley College, Prahran, as associate members; and the Misses Muriel Barnard, and W. Shephard, Methodist Ladies' College, Hawthorn, and Edith and Rita Sayce, Harcourt-street, Hawthorn, as junior members of the Club.

GENERAL BUSINESS.

Mr. F. Wisewould reported that at the request of the Committee he had interviewed the officers of the Lands Department with regard to the leasing in grazing blocks of the land reserved for a National Park at Wilson's Promontory. He found that it was probable that the land would be cut up into smaller blocks than shown on the plan, and suggested that joint action with the Royal Society, Ornithologists' Union, &c., be taken with the view of preventing the scheme being carried out.

Mr. T. S. Hall, M.A., said that at the request of the Royal Society he had written to the Department asking for action to be stayed for the present, and in reply the Minister had appointed the following Wednesday to receive a deputation on the matter. He trusted that as many as possible would endeavour to be

present to try and secure the permanent reservation of the land and the vesting of it in trustees.

It was resolved to join with the other societies, the President, Mr. T. S. Hall, and Mr. F. Wisewould being deputed to act on behalf of the Club and report at the next meeting.

PAPERS.

1. By Miss Freda Bage, entitled "Notes on Phosphorescence in Plants and Animals."

In an interesting paper the author briefly dealt with some of the various forms of luminous plants and animals, and pointed out the different groups in which phosphorescence is exhibited, and remarked that the phenomenon had been known since the times of Aristotle, and still excited the interest of scientists.

The paper was illustrated by a number of lantern slides and microscopic preparations, also by a collection of deep-sea fish from the National Museum, exhibited by Mr. J. A. Kershaw, F.E.S.

Mr. H. T. Tisdall remarked that for many years he had observed the luminosity of fungi in the mines at Walhalla, and so bright was the light emitted that he could read with ease pages from a book.

Mr. D. Le Souëf, C.M.Z.S., said that when in the Malay Peninsula he had noticed Fire-flies in thousands among the bushes at night, a peculiar feature being that they possessed the power of emitting and shutting off the light in unison; and during a trip off the coast of Java he had seen the sea so luminous at night that it was possible to read a newspaper on the deck of the steamer.

Mr. J. Shephard mentioned that one evening, while walking on Brighton Beach, his attention was drawn to the phosphorescence of the sand. On examination he found that it emanated from a number of ostracods. On taking a few home he was enabled to view them under the microscope by their own light.

The President congratulated the author on her excellent paper, and said that the subject opened up a new field to the members, and hoped that further contributions would follow.

In reply to Mr. Shephard, Miss Bage said that she had never noticed any freshwater plant or animal which gave out phosphorescence.

2. By Messrs. G. A. Waterhouse, B.Sc., F.E.S., and R. E. Turner, entitled "Notes on Hesperidæ Described by Mabille, and Reputed to be Australian."

Owing to the lateness of the hour, this paper was postponed until next meeting.

NATURAL HISTORY NOTES.

Indian Violets.—Mr. S. W. Fulton drew attention to his exhibit of specimens of the wild violet from the Pamirs, N.W.

India, mentioned so often by Mr. E. Knight in "Where Three Empires Meet." These were grown from roots forwarded to him through the post, packed inside potatoes scooped out, and all received had been grown successfully.

Fat-tailed Pouched Mouse.—Mr. G. A. Keartland reported the recent capture near Bulla of four specimens of this little marsupial, which had lived for some time in captivity.

Whales.—Mr. D. Le Souëf gave some information with reference to the movements of whales, contributed by Capt. Thompson, of the s.s. *Aramac.*

CONVERSAZIONE.

The President announced that Mrs. M. Bage had invited the members, after the inspection of the exhibits, to partake of light refreshments in the lower hall, in celebration of her twenty-first anniversary as a member of the Club. On adjournment a very pleasant half-hour was spent, during which Mrs. Bage was the recipient of many hearty congratulations.

EXHIBITS.

The following were the principal exhibits of the evening :—

By Miss F. Bage.—Spirit specimens: *Pennatula phosphorea, Pholos crispeta, Pyrasoma elegans.* Under microscope: *Pyrosoma elegans,* Thalassicolla. In illustration of paper.

By Mr. A. Coles.—Pair of Pratincole, *Stiltia isabella,* from North Queensland; Plumed Bronze-wing Pigeon, *Lophophaps plumifera,* from Mackinley, North Queensland.

By Mr. J. E. Dixon.—Twenty-eight species Coleoptera, collected recently, including *Carenum elongatum, Caladromus lacordairei, Bolboceras probocidium,* Chlænius, sp.; also curious flowers of the common Yellow Jonquil.

By Mr. C. French, jun.—Pitcher Plant, *Cephalotus follicularis,* Labill., from King George's Sound, W. Australia; remarkable Brachyscelis, sp. (galls), on Eucalyptus, sp., collected by G. E. Shepherd at Somerville, Victoria; clutch of three rare eggs of Blue-billed Duck, from Riverina, N.S.W.

By Mr. F. Pitcher, on behalf of the Director, Botanic Gardens, Melbourne.—Flowers of the following Acacias now blooming in the Gardens :—*Acacia acinacea, armata, crassiuscula, cultriformis, cyanophylla, jonesii, juniperina, longifolia, longifolia* var. *floribunda, longifolia* var. *sophora, lunata, macradenia, melanoxylon, montana, myrtifolia, oxycedrus, pravissima, prominens, pycnantha, saligna, spectabilis, stricta, vermiciflua,* and *verticillata.*

By Mr. C. J. Gabriel.—The following shells :—*Pecten subnodosus,* from North America; *P. purpuratus,* from Peru.

By Mr. G. A. Keartland.—Fat-tailed Pouched Mouse, *Sminthopsis crassicaudata,* from Bulla, Victoria.

By Mr. J. A. Kershaw, for National Museum.—A series of deep-sea fishes.

By Mr. A. E. Kitson.—(*a*) Specimen of Eucalyptus of doubtful variety, showing buds, flowers, and fruit. This is from Mt. Chaucer, Cape Nelson, near Portland, and is restricted to a small area. In general appearance the tree resembles the Mallee species *E. incrassata*, but the fruit, though about the same size, is not fluted. It is, in the opinion of Mr. Guilfoyle, perhaps a variety of *E. pilularis*. (*b*) Two small specimens of Native Bread, *Polyporus mylittæ*, from Tarwin River, South Gippsland.

By Mr. D. Le Souëf.—Pomarine Skua Gull, Great Skua, Richardson's Skua.

By Mr. G. E. Shepherd.—Clutch (two) eggs of Wonga Wonga Pigeon, New South Wales; clutch (three) eggs of White-headed Osprey, Western Australia.

THE FRESH-WATER ALGÆ OF VICTORIA.

By A. D. Hardy.

(*Read before the Field Naturalists' Club of Victoria, 8th August*, 1904.)

Algæ are thus defined by Cooke—"Cellular, flowerless plants, for the most part without any proper roots or mycelium, living, with rare exceptions, entirely in water, and imbibing nutriment by their whole surface from the medium in which they grow."

They may be roughly divided into two groups—the marine Algæ, commonly known as sea-weeds; and those inhabiting fresh water or moist places—and it is the latter group, and particularly the Victorian representatives, which I propose to deal with in a series of papers, to which this is intended to serve the purpose of an introduction.

The study of the fresh-water Algæ is restricted to microscopy, the plants being mostly very small and fragile. They have not the robust growth or variety of colour which is to be found in their marine cousins, the "sea-weeds," which, owing to their conspicuous beauty and comparatively easy preservation, have received much attention.

The largest of the fresh-water Algæ are probably the Characeæ, including the genera Chara and Nitella, species of Nitella several feet in length being found; while the other extreme is perhaps a species of Pleurococcus, which is so minute as to appear about the size of a pin's head when magnified 400 diameters. Between these extremes a great variety of forms exists—globular, disc-shaped, filamentous, &c.—but nearly all of a uniform green colour.

They are distributed all over the globe, wherever there is fresh water or moisture, from pole to pole, and from sea-level to mountain-top.

Some species are fixed, others are free-swimming. In lakes, lagoons, reservoirs, ponds, marshes, gutters, rivers, water-spouts, and old wheel ruts we may find them, as also on damp earth, tree trunks, moist walls, &c. The "Water Fleas," Simocephalus, Daphnia, &c., and other Entomostraca may often be seen carrying, in addition to busily-feeding Vorticellæ, small, bright-green, club-shaped bodies, which are unicellular Algæ.

A glass of rain-water, left covered with glass, but exposed to the sun's rays, rapidly developes a green coating of Algæ on the sides. Some species grow in hot springs, and others on snow-fields; while very strange habitats are recorded for some species, one having been found frequenting the hollow hairs of the Three-toed Sloth; while many filamentous forms have others of less growth attached to them, though not as parasites.

Before the commencement of the 18th century little was known of these plants, but during the 18th, and more particularly the 19th century, there appear in the records the names of workers too numerous to mention. In comparatively recent years the work of Hassall, Ralfs, and Cooke in England, and Wolle and Wood in America, devoted to the fresh-water Algæ of their respective countries, has done much to render the task of the British student less difficult. Evidence, also, of the important work being done by W. and G. S. West in England and elsewhere reaches us periodically in science journals. In New Zealand some work has been done, but I have not yet been able to obtain the details of recent investigations. Coming now to Australia, I find that Queensland leads, three of Mr. F. M. Bailey's bulletins descriptive of the "Queensland flora" having been devoted to the fresh-water Algæ. There, too, the difficulty of identification, in the absence of the necessary literature, seems to have been encountered, as the species have been sent to Europe, and determined by Professor Moebius, who has also named new species and new varieties of known species. In New South Wales Mr. J. H. Maiden has some preserved specimens, but there do not seem to be any other records of local work having been done. In Tasmania, South Australia, and Western Australia the work is almost untouched as regards local inquiry, though a number of species from South Australia, Tasmania, and Victoria are mentioned in the late Baron von Mueller's "Fragmenta Phytographiæ Australasiæ." In Victoria nothing has been done recently. In 1864 the late Mr. Henry Watts submitted a list of Confervaceæ and Desmidieæ to the Royal Society of Victoria. This list comprised Algæ collected at Warrnambool, Ballarat, Bacchus Marsh, and in the Yarra valley. About twenty years later he read a paper before this Club entitled "Some Recent Additions to Our Knowledge of Microscopic Natural History" (*Vict. Naturalist*, vol. iii. (1887), p. 133). In the latter portion of

this paper a few conspicuous or peculiar forms were described, and, at the end, a revised list of Algæ and Desmidieæ was added —a simple list, without reference to season, habitat, or size.

At various times at our Club meetings, in reports of excursions, &c., references have been made to the occurrence of *Volvox globator*, Desmids, Nitella, Spirogyra, Conferva, &c., in various localities, and, in looking through the Club's records for such references, I find the names of Messrs. C. A. Topp, M.A., J. Shephard, H. T. Tisdall, R. Bastow, D. McAlpine, W. and J. Stickland, F. Barnard, &c., as members who have saved the subject from obscurity in Victoria, and, since my own recent references to the cryptogamic botany of the Yan Yean Reservoir and the Yarra Glen lagoons, I have found that there are enough members of the Club interested to warrant the assumption that more precise work will be appreciated.

Regarding the position of the Algæ in the vegetable kingdom, if it be divided as in Kerner's "Natural History of Plants," we have four phyla, as follows :—

1. Myxothallophyta—Slime Fungi.
2. Thallophyta—Algæ and Fungi.
3. Archegoniatæ—Liverworts, Mosses, and Ferns (forms with archegonia fertilized by motile spermatozoids).
4. Phanerogamæ—Flowering Plants (fertilized by means of pollen tubes).

Selecting the Thallophyta, and dispensing with the class Fungi, except to refer later to the Lichen-Fungi, we have the remaining plants divided into four classes, as follows :—

I. Schizophyta { Cyanophyceæ—Blue-green Algæ. / Schizomycetes—Bacteria.

II. Dinoflagellata.

III. Bacillariales, including the Diatomaceæ.

IV. Gamophyceæ (inclusive of the important sub-class Chlorophyceæ—Green Algæ).

It is with the Schizophyta and Gamophyceæ that we shall have most to do, as the study of the Diatoms is too Herculean a task to be undertaken except to the exclusion of all else, and the Dinoflagellata (known as the Peridineæ from a zoological standpoint) may also be left aside without materially lessening the interest in our task. Indeed, we may bracket the Cyanophyceæ and Chlorophyceæ together as comprising most of the plants which will receive our attention.

Two considerations enter largely into the identification and classification of the fresh-water Algæ—viz., their colour and mode of reproduction.

With reference to the colour, it will be found by experiment that a large number of them (the Chlorophyceæ) contain the

green pigment chlorophyll, which is also present in the leaves, &c., of all the higher groups of plants. This can be proved by immersing some of them in absolute alcohol, when the Algæ will be bleached, and the spirit will become of a green colour, owing to the solubility of the contained chlorophyll in the alcohol. In one of the tubes exhibited this has been done, then oil has been added, which in its turn has abstracted the chlorophyll from the alcohol, leaving it of a yellow colour.

There are, however, many plants in the phylum Thallophyta which have no colour, as in some species of Fungi, and amongst the Algæ there are species which have colour, but no visible chlorophyll green. These have a bluish pigment diffused through their cells, and are known as the Cyanophyceæ. There is a tube amongst the exhibits showing this colour given off by some Oscillaria in water. Thus the blue-green Algæ more readily contaminate water, giving both colour and a musty smell to it. In other cases where chlorophyll is present it is masked by a reddish pigment, and the plants of this nature are sometimes grouped as the Rhodophyceæ. They include the genus Batrachospermum, which are so called from their resemblance to frog-spawn (*batrachys*, frog, and *sperma*, seed).

Glancing at the reproduction we find that the Chlorophyceæ, which are most numerous, have nucleated cells, and in many cases the sexual method of reproduction may be observed; but the Cyanophyceæ have no distinctly perceptible nucleus, though some observers have somewhat doubtfully recorded the finding of slight nucleoid appearances in the cells, and the reproduction of these plants appears to be asexual.

In unicellular forms, such as *Protococcus viridis* (which, by the way, has lately fallen under suspicion with other unicellular Algæ as being merely a phase in the life of another and filamentous genus), a simple division of the cell into two or four takes place, and the bodies so produced become active gonidia, produce cilia, and, on the rupture of the cell wall, escape as motile cells and swim freely about. After a time each cell comes to rest, loses its cilia, and puts on a firm cell wall, finally becoming like the original cell. Almost the same process occurs in *Hormiscia zonata*, a cell of which may resolve itself into an active ciliated body, which, on escaping, swims actively for a time and comes to rest. Then, losing the cilia, and attaching itself to some foreign object by its smaller anterior, and lately ciliated end, it elongates rapidly, and by transverse division becomes like the parent plant. The bodies which escape, and independently develop in this way, are called macrogonidia. But another cell in the original filament may have divided into many smaller bodies called microgonidia, the function of which is somewhat different from that of the asexual form just described. These smaller

bodies escape and swim by means of cilia, but fail to develop independently. Uniting in pairs however, they form a body which attaches itself, and develops into a plant of small growth, which in turn gives rise to other plants, similar in most respects to the parent. This is a sexual form of reproduction. Of the Zygnemaceæ the genera Spirogyra and Zygnema exhibit sexual reproduction. In some cases two cells of adjacent filaments bulge out their walls in processes which meet, and the common wall formed by the meeting of the processes dissolves, and there is formed a tube connecting the two cells. Through this tube one cell, which, on account of its active character, is considered the male, and called a gamete, flows through into the cell in the other filament. There the two cells fuse together their protoplasm and contained chromatophores, the process usually taking place in the dark, and occupying a considerable time, in one case which I watched, over three hours, but I believe that Mr. J. Shephard has found it, under other circumstances, to be completed in less than an hour. After fusion the newly-formed body puts on a firm membrane, and lies more or less loosely in the cell chamber. It is then called a zygote, or fertilized oospore. It turns from green to reddish-brown, and rests until conditions are favourable, when the cell wall bursts open at one end, and the contents emerge in the form of a club-shaped, delicate green body, which lengthens and transversely divides to form a filament of cells as in the parent. There are instances, however, of sexual elements which, disappointed at pairing time, make the best of their misfortune, and develop into new plants from the cell chambers in which they have been left behind. This may be found in *Hormiscia zonata*, as described by Cooke.

Although the species of many Algæ cannot be determined satisfactorily without the process of reproduction being known, still there are some having peculiarities of shape and disposition of chromatophores and pyrenoids which make the genus easily recognizable, examples being Spirogyra, with parietal spiral bands; Zygnema, with twin star-shaped bodies; and Mougeotia, with a single axile plate; and also many Desmids of conspicuous beauty and shape; while in the abrupt spheroidal swellings in the filaments of the Œdogoniaceæ, with the characteristic parallel transverse striæ of certain cells, the guide to the determination of the genus may be found, though the fruit may not be sufficiently matured to fix the species.

In the higher group, Characeæ, the genus Chara may, in the absence of fruit, be easily distinguished from Nitella by certain differences, which will be referred to later.

Many of the fresh-water Algæ exercise certain movements, both of the whole plant, as in some Desmids, Volvox, and species of the family Lyngbyæ, or of parts of the internal structure of the

plant, as in other Desmids, Chara, Nitella, &c. These may be watched with interest under the microscope, and the still uncertain causes of some of the latter class sought for by the student as an aid in the solution of problems affecting higher plants and possibly animals.

Reference has already been made to epiphytal and epizoic Algæ, and it may be mentioned that many unicellular forms are enslaved by species of Fungi which derive nourishment from them by enclosing them within a meshwork of tubes, allowing them to multiply by budding, in order to provide hosts for the young Fungi produced at the same time. This combination of Fungus and Algæ is familiarly known under the name of Lichen. Among the exhibits this evening a section may be seen where the Lichen thallus has been cut through, exposing the green Algal growth within the colourless meshwork of tubes.

Keeping in mind the delicate, perishable structure of these plants as a whole, one would not expect to find traces of them preserved in rocks, but there are representatives of at least two families known to paleophytologists. The gyroliths or spiral stones named by Lamarck, probably without his having been aware of their vegetable origin, and which are to-day collected in Europe, &c., and called Gyrogonites, are the hard pericarps of plants allied to the Chara and Nitella of the present time, which a comparison of the drawings exhibited of the oogonium of a living Chara, and that of the fossil *C. medicaginula* and *C. grepini* from the Paris basin, will show. The Diatoms, too, are found in large quantities, as the free-swimming forms of these plants exist in great numbers in salt and fresh water, and their structure is such as to render them almost indestructible. The Diatom has a shell or test, composed of silica, in two parts, one of which fits over the other like the lid of a pill-box. When the plants die these shells or frustules remain, and finally settle on the bottom of ocean or lake to form a white sediment. Kerner mentions a block of two cubic feet of Diatom-earth which is preserved in the Natural History branch of the British Museum, London. This block is composed entirely of Diatom shells (twenty-one species being represented), and is computed to contain over twelve billions of these minute forms. It is stated to be from the bed of a fresh-water lake in Australia. Perhaps geological members may be able to tell us more about it. Great beds of fossil Diatoms, otherwise infusorial earth, exist in North America and elsewhere in secondary, tertiary, and more recent formations ; one in Virginia, U.S.A., is said to be some miles in extent and forty feet deep. Among the exhibits may be seen some Diatom-earth which looks like white chalk. The white smudge on our fingers, if we handle it, consists of hundreds or thousands of the minute plant shells, which may be seen also

under the microscope, and there recognized as species of Navicula, &c. This Diatom-earth was given to me some years ago, when it was stated to be from near Bacchus Marsh, Victoria, but I have not been able to trace its precise locality.

The time at my disposal, and possibly the patience of members, will not permit of reference to polymorphism, alternation of generations, symbiosis, and other interesting matters, so I will conclude with the hope that in these somewhat disconnected preliminary notes the way has been paved for subsequent papers, in which I purpose dealing systematically with the fresh-water Algæ of Victoria.

In conclusion, I desire to acknowledge my indebtedness to Mr. C. A. Topp, M.A., I.S.O., for the loan of slides, and also to Mr. C. French, jun., and Mr. J. Gabriel for a number of slides from the collection of the late Mr. Henry Watts, one of the original founders of this Club.

Effect of Electric Light on Foliage.—Some twelve months ago I drew attention (*Vict. Nat.* xx., p. 87) to the influence of the electric light on vegetation, as evidenced by the leaves, still green, on some of the branches of one of the ornamental trees on the north side of Collins-street east, at the entrance to Alfred-place. This year the same tree has again a few leaves remaining on it, while all its neighbours are bare. The twigs bearing the leaves are in close proximity to the powerful arc light, which is no doubt the cause of their persistence throughout the winter. I noticed a similar case in Flinders-street, but this is now lost to observation through the annual pruning.—A. D. Hardy.

Fat-tailed Pouched Mouse (*Sminthopsis crassicaudata*), Gld.—On 30th July last, whilst Mr. H. W. Dixon was crossing a stubble paddock, near Bulla, his dog drew his attention to a hole in some loose soil beside a cart rut. On removing some of the earth he found four of these little marsupials, two of each sex, all of which he captured and carried home in his pocket. When placed in a box they soon became tame, and would eat meat or worms from his hand, but took no notice of grain or seed. A few days later Mr. Dixon heard a slight noise in the box, and on looking to ascertain the cause, saw three of the mice devouring their comrade. A fortnight later one of the males given to me proved a very attractive pet, and when given its liberty on the table would run back to its box on the least alarm. Unfortunately it disappeared, possibly inside the house cat.—G. A. Keartland.

Whales.—Capt. Thompson, of s.s. *Aramac*, states that Right Whales have come up from the Antarctic Seas, with their calves,

three months earlier than usual, which he attributes to the unusually cold season down south, and that ice has been seen 600 miles further north than is usually the case. The whales generally come up early in November, apparently to meet the current from the north, which brings a plentiful food supply. He has lately seen a whale as far north as Cape Moreton, and also a Sperm Whale inside the Barrier Reef, near Townsville.—D. Le Souef.

The Ibis: a Quarterly Journal of Ornithology.—The issue of this publication for July, 1904, contains a paper by Dr. E. Hartert, F.Z.S., on the birds collected by Mr. Robert Hall, C.M.Z.S., along the banks of the Lena River (Siberia) during the summer of 1903. About four hundred specimens, representative of eighty-two species, the finches predominating, were collected, all of which are now in the Hon. Walter Rothschild's museum at Tring, near London. The collection does not appear to contain anything of special interest, probably owing to the rapid nature of Mr. Hall's journey, and the few opportunities for collecting which presented themselves, but it is sufficient to considerably advance the knowledge of Siberian ornithology, especially as regards those birds frequenting the river banks.

"Journal of Agriculture of Victoria."—The September issue (vol. ii., part 9) of this publication is devoted to the annual reports of the Director of Agriculture, Mr. S. Williamson Wallace, and the heads of the different branches, several of whom furnish very interesting details of their work. Attention may be called to those by Mr. F. J. Howell, Ph.D., Mr. D. McAlpine, and Mr. C. French, F.L.S., as evidence of the work accomplished by the Department. Mr. A. W. Crowe, in his report on the forestry branch, emphasizes the urgent need of making our timber reserves a commercial asset.

Honour.—We are pleased to learn that the University of Cambridge has honoured Mr. A. W. Howitt, F.G.S., with the degree of D.Sc., in recognition of his anthropological studies.

Micro-Fungi. — Mr. D. McAlpine, Government Vegetable Pathologist, has contributed to a recent number of the *Annales Mycologici* an article entitled "Some Misconceptions Concerning the Uredospores of *Puccinia pruni*, Pers.," in which he brings evidence to prove that there are not two forms of uredospores found on the peach, plum, &c., as has been contended by some authorities.

Exchange—Rhopalocera.—Mr. T. S. Shepherd, Shipley, Yorkshire, England, is desirous of entering into correspondence with Australian collectors of Rhopalocera, with a view to exchange or purchase.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 10th October, 1904.

The president, Mr. O. A. Sayce, occupied the chair, and about 150 members and visitors were present.

REPORTS.

[Several reports are held over, on account of pressure on space. —Ed. *Vict. Nat.*]

ELECTION OF MEMBERS.

On a ballot being taken, Mr. and Mrs. E. L. Hayden, 36 Park-street, West Brunswick, and Mrs. J. C. Kaufmann, 21 Kooyong Koot-road, Hawthorn, were elected as ordinary members; Miss Jessie Nicholls, and Messrs. F. Schæfer, Gordon Wilson, J. Wilson, as associate members; and Sylvia Leach, Nell Hughes, T. M. Hall, A. S. Hall, Harold E. Kershaw, Leslie N. Kershaw, W. D. Chapman, Ernest Moore, A. O. Tymms, W. Keartland, Dorothy Haase, Janet French, Lily French, F. J. Kilgour, P. Cameron, S. Hansen, L. Hansen. From State School No. 1396, Brighton-street, Richmond—Frederick Williams, Claude Grehan, Arthur Langford, Frank Hooks, Joseph Winter, Stanley Lewis, Stanley Cassidy, John Campbell, Leslie Burrows, Clarence Robinson, Harold Smith, Leslie M'Nab, as junior members of the Club.

GENERAL BUSINESS.

Mr. A. J. Campbell said that he had been asked by Mr. C. French, jun., who was unable to be present, to suggest that some of the flowers from the exhibits of the evening be kept until next day, and then placed on the grave of the late Baron von Mueller. It was pointed out, however, that on previous occasions it had been found that the flowers were, after the night's exhibition, too withered for the purpose; nevertheless, exhibitors were asked to reserve some of their flowers for this object, and Messrs. C. French, jun., and C. Coles were appointed as a sub-committee to act in the matter.

The President reported as to the efforts made since last meeting towards securing the permanent reservation of Wilson's Promontory as a National Park. He congratulated the club on having initiated the idea, and said, from the enthusiasm evinced in the matter by the general public, he hoped that the presenta-

tion to the Premier of the resolutions passed at the public meeting would have the desired result.

PAPERS.

In order to enable members to devote as much time as possible to the exhibition of wild flowers, the following papers were taken as read :—

1. By Messrs. G. A. Waterhouse, B.Sc., F.E.S., and R. E. Turner, entitled "Notes on Hesperidæ Described by Mabille, and Reported to be Australian."

The authors enumerated a number of butterflies which had been recorded as from Australia, but of which the descriptions were so incomplete as to render their identification doubtful, while in some cases the locality given was totally wrong.

2. By Mr. D. Goudie, entitled "Notes on the Larvæ and Pupæ of Birchip Heterocera," part iv.

The author described the larva and pupa of the Geometer, *Thalaina angulosa*, Walker, which makes *Acacia hakeoides*, Cunn., its principal food-plant.

3. By Mr. C. Hedley, F.L.S., entitled "On the Change of Name of *Poroleda lanceolata*, Tate." Communicated by Mr. T. S. Hall, M.A.

The author stated that the name *Poroleda lanceolata* had been used both by Hutton and Tate for species from New Zealand and Victoria respectively, and, this having led to confusion, he had determined to rename the Victorian fossil *Poroleda tatei*.

NATURAL HISTORY NOTE.

Xerotes.—The hon. secretary read a natural history note from Mr. H. B. Williamson, of Hawkesdale, with reference to his exhibit of *Xerotes juncea*, F. v. M. This is the first time the male plant has been collected. The species was described from female plants found in South Australia, and was first recorded for Victoria by Mr. C. French, F.L.S., who found it near Border Town. The pupils of Mr. E. Waters, teacher, near Casterton, found the male plant last spring, but failed to find female plants. In September, Miss Thurman found both growing together at Vectis South, near Horsham.

EXHIBITS.

By Mr. G. A. Keartland.—Whip Snake, *Hoplocephalus flagellum*, alive ; caught at Sandringham excursion, 1st October, 1904.

By Mr. H. B. Williamson.—Dried specimens of *Xerotes juncea*, F. v. M., male and female plants, from N.-W. Victoria.

The exhibits of wild flowers are detailed in the following article.

EXHIBITION OF WILD FLOWERS.

Following the custom of past years, the exhibits at the October meeting of the Field Naturalists' Club consisted mainly of wild flowers, and, favoured by cool weather on the previous days, the members were able to make an excellent display. Exhibits were received from almost the extreme limits of the State, such as Dimboola and Bairnsdale, Hawkesdale and Mansfield, &c. A pleasing feature was the fine collections sent by the State schools at Emerald (Dandenong Ranges), Glenpatrick (Pyrenees), Grantville (Western Port), and Hawkesdale (S.W. Victoria).

Among the interested visitors were a number of teachers and their pupils, who availed themselves of the opportunity to take notes, and obtain correctly named specimens for future study. In order to show that a number of indigenous species are worthy of cultivation, Mr. W. R. Guilfoyle, F.L.S., Director of the Melbourne Botanical Gardens, forwarded a collection of 24 species grown in the Gardens.

The following are the names of the principal exhibitors, with some of their more prominent exhibits :—

By Mr. F. G. A. Barnard.—About 30 species from Braybrook and Deer Park, including *Dillwynia floribunda*, *Craspedia chrysantha*, *Podolepis acuminata*, *Swainsona lessertifolia*, *Veronica gracilis*, and *Diuris pedunculata*.

By Miss Cochrane.—About 50 species from Ringwood, including *Utricularia dichotoma*, *Polypompholyx tenella*, *Calochilus robertsoni*, *Caladenia deformis*, *C. suaveolens*, *Comesperma ericinum*, &c.

By Mr. A. G. Campbell.—About 40 species from the You Yangs, including *Prostanthera nivea*, *Eutaxia empetrifolia*, *Acacia pycnantha*, *A. implexa*, *A. decurrens*, *Senecio velleioides*, &c.

By Mr. G. Coghill.—About 120 species from Croydon, Dandenong Ranges, Emerald, Mansfield, and Bairnsdale, which were arranged in systematic order and were in excellent condition. They included *Hedycarya cunninghami* and *Candollea sobolifera*, from Croydon ; *Pittosporum bicolor*, *Eriostemon correifolius*, and *Epacris microphylla*, from Emerald ; *Pultenæa daphnoides*, *Acacia leprosa*, and *Coprosma hirtella*, from Dandenong Ranges ; *Acacia pravissima*, from Mansfield ; *Lasiopetalum ferrugineum*, *Pultenæa daphnoides*, *Kennedya rubicunda*, *Tecoma australis*, and *Pomaderris vaccinifolia*, from Bairnsdale, &c.

By Mr. S. W. Fulton.—About 35 species from Glenpatrick (Pyrenees), including *Grevillea alpina*, *Acacia pravissima*, *Gompholobium minus*, *Caladenia patersoni*, *Tetratheca ciliata* (very fine), &c. ; and about 40 species from Broadford, including

Grevillea rosmarinifolia, *Epacris impressa*, *Acacia acinacea*, *A. armata*, *Pterostylis curta*, &c.

By Mr. A. E. Kitson.—About 30 species from Branjee, near Euroa, including *Brachyloma daphnoides*, *Daviesia corymbosa*, *Gompholobium huegelii*, *Styphelia sonderi*, *Grevillea rosmarinifolia*, *Swainsona procumbens*, *Pimelea humilis*, &c.

By Miss M. Montgomery.—About 20 species from Foster, including *Pultenæa gunnii*, *Bauera rubioides*, *Tecoma australis*, *Acacia stricta*, *Melaleuca squarrosa*, &c.

By Mr. J. P. M'Lennan.—About 75 species from Emerald, including *Diplarrhena moræa*, *Acacia diffusa*, *A. myrtifolia*, *Pterostylis cucullata*, var. *alpina*, *P. pedunculata*, *Clematis aristata*, *Goodia lotifolia*, *Glycine clandestina*, *Coprosma billardieri*, *C. hirtella*, *Pittosporum bicolor*, *Iosopogon ceratophyllus*, *Dampiera stricta*, &c.

By Mr. J. T. Paul.—About 50 species from Grantville (Western Port), including *Pultenæa daphnoides*, *Styphelia ericoides*, *Tecoma australis*, *Acacia stricta*, *A. linearis*, *Indigofera australis*, &c.

By Mr. F. Pitcher, on behalf of Director of Melbourne Botanic Gardens.—24 species of plants grown at the Gardens, including *Bauera rubioides*, *Dillwynia cinerascens*, *Eriostemon myoporoides*, *Goodia lotifolia*, *Grevillea lavandulacea*, *G. oleoides*, var. *dimorpha*, *Indigofera australis*, *Prostanthera rotundifolia*, *Pultenæa villosa*, *Tetratheca ericifolia*, *Westringia rosmarinifolia*, *Zieria smithii*; also *Eucalyptus ficifolia* and *Acacia cyanophylla*, of Western Australia.

By Mr. F. M. Reader.—About 30 species from Dimboola, including many interesting species, amongst which were *Prostanthera coccinea*, *Halgania cyanea*, *H. lavandulacea*, *Aster exul*, *Eriostemon sediflorus*, *Acacia farinosa*, *A. calamifolia*, *Cassia eremophila*, *Lasiopetalum behrii*, *Loudonia behrii*, *Thomasia petalocalyx*, *Bœckea crassifolia*, *Westringia glabra*, *Mesembryanthemum æquilaterale*, *Santalum acuminatum*, *Cryptandra amara*, *Dillwynia hispida*, *Eucalyptus gracilis*, &c.

By Dr. Sutton, Messrs. Hardy and Weindorfer.—About 15 species from Gembrook, exhibited in large branches of each, including *Acacia diffusa*, *A. leprosa*, *A. verniciflua*, *Hakea nodosa*, *Pultenæa stricta*, *Styphelia ericoides*, *Dampiera stricta*, *Goodia lotifolia*, *Bauera rubioides*, *Hovea longifolia*, *Pimelea axiflora*, &c.

By Mr. H. B. Williamson.—18 species cultivated in the Hawkesdale State school garden, including *Lhotzkya genetylloides*, *Styphelia sonderi*, *S. ericoides*, *Grevillea oleoides*, *G. aquifolium*, *Pimelea linifolia*, *Kennedya rubicunda*, *Dianella longifolia*, *Thryptomene mitchelliana*, *Stypandra glauca*, &c.

NOTES ON PHOSPHORESCENCE IN PLANTS AND ANIMALS.

By Miss Freda Bage.

(*Read before the Field Naturalists' Club of Victoria, 12th Sept.*, 1904.)

In bringing before you this evening these notes on various forms of phosphorescent plants and animals, I do not claim to record anything new or original, but simply to put together some descriptions of a few forms which have already been well examined, and to point out others which have not yet been described in detail.

The subject has attracted attention from very ancient times. Aristotle, more than 300 years B.C., mentioned light proceeding from putrefying substances and from glow-worms; Pliny spoke of luminescence in the mouths of people who ate Pholas, the rock-boring shell-fish, and of such importance is this phenomenon that it is even said to have gained the first king of all Scotland his throne. Century after century naturalists and physicists have recorded cases of phosphorescence and have tried to account for them; but so great have been the difficulties, that to-day our chief interest in the subject lies in the fact that so many luminous animals remain to be observed, so many inquiries to be made as to the why and wherefore of their phosphorescence.

In the vegetable world instances of phosphorescence are perhaps not so generally known as those which occur among animals, yet many cases of the radiation of light from plants have been recorded.

Among flowering plants, sometimes the flowers themselves have been seen giving out light on dark, dry nights (29).* In 1762 the daughter of Linnæus saw light coming from some orange-coloured nasturtiums. Later, Professor Haggern, in Sweden, drew attention to the phosphorescence of some marigolds in July and August—*i.e.*, in summer. He carefully examined the flowers, and, satisfied that no animal organisms were present, attributed the phenomenon to the ejection of the pollen caused by the rupture of the anthers. A case which seems to be well authenticated is recorded by Fries as seen in the Botanic Garden at Upsal, in Sweden, during the summer of 1857. He first noticed three or four flowers among a group of poppies emitting little flashes of light, which showed at intervals for three-quarters of an hour. It was visible for some weeks at night-time, and was seen by 150 people before it finally ceased. Many other flowers have been recorded as phosphorescent—among others, several more varieties of nasturtiums, sunflowers, tuberose, and yellow lily. It may be noticed, though I have never seen any reason given for the fact, that nearly all plants regarded as phosphorescent have red or yellow flowers.

* The numbers refer to the bibliography at the end of the paper.

The light emitted by flowering plants is not, however, limited to the flowers themselves. Gardner records the phosphorescence of the sap of a Brazilian plant, *Euphorbia phosphorea*; and in a certain palm the rupture of the spathe or shield covering the flowers is accompanied by a noise and spark.

Perhaps the cases of vegetable phosphorescence best known to us are those shown by certain luminous fungi. Some of these—Rhizomorphæ—light up coal mines, and, in England, they occasionally show a light bright enough to read by. The best cases seem to be in the mines of Hesse, in North Germany, where fungi light up the air galleries, giving a beautiful moonlight effect. In Italy a mushroom, *Agaricus olearius*, grows at the foot of olive trees, and at night glows with a soft blue light.

In Australia these luminous fungi are well represented. In a paper read at Linnean Society N.S.W., in 1901, Mr. McAlpine (25) said that of twenty-one species of these determined with certainty up to that date, no less than five are confined to Australia, and fifteen known here. These are described by Dr. Cooke as shining with a pale greenish phosphorescent glow, and in all cases nearly the same story is told—that the light is strong enough for the hands on a watch to be seen. Drummond records some luminous fungi at Perth in 1842, where one species grew on a Banksia tree near the jetty, and another was seen inland growing tier upon tier up the trunk of a dead gum tree, glowing so brightly that he thought at first the tree had been set on fire by lightning.

Round the neighbourhood of Melbourne, especially on the coast about Frankston and Mornington, one species, *Pleurotus candescens*, is very common. It grows on the trunks of the tea-tree, or on the ground near its roots, and is seen especially about April and May. One specimen examined by Mr. McAlpine retained its phosphorescence for at least a week after being taken from the tree. In this case the luminosity is confined to the gills on the under surface of the fructification. Also a slight luminous patch is present at the base of the stem, but the light from this quickly disappears. Mr. A. J. Campbell found that the fungus distinctly fogged an ordinary photographic plate which had been exposed to its light for an hour.

I have not yet mentioned the lowest forms of plant life which have been found to possess phosphorescent properties. These are bacteria. Among all light-producing organisms our knowledge is now most exact in the case of these minute plants. Their simple unicellular structure can, thanks to modern microscopes, be studied with great exactness, and the circumstances under which the light production occurs noted.

When putrefying substances, such as wood, are luminous, as is sometimes the case, the light is caused by countless numbers of

bacteria. Cases of phosphorescence caused in some unknown manner are recorded, which we now know must have been due to bacteria—as, for example, the luminescence shown by meat when cooled. In 1672 Boyle mentions a luminous neck of veal which shone in more than twenty places, as decayed wood and putrefying fish do. According to Dr. Phipson the first distinct account is that given by Fabricio d'Acquapendente, Professor of Anatomy at Padua, in 1592. He states that three Roman youths residing at Padua bought a lamb and ate part of it on Easter Day. Several pieces of the remainder which they kept until the next day shone like so many candles in the dark. On examination of the meat d'Acquapendente found that both fat and lean parts shone, the softer parts most, but he could not give any reason for it.

Anecdotes such as these are very interesting just now, because phosphorescence in meat has been attracting the attention of our Melbourne butchers lately, owing to the unusual amount seen this year. Almost every butcher in Melbourne and the suburbs has had samples of glowing meat in his refrigerator, some observing only the bone glowing, while others say that the fat and lean are also luminous.

As far as I can ascertain no cultures have been actually taken from this meat, so that the variety of bacterium which infests the meat has not been identified.

Mr. J. E. Barnard (3), of the Jenner Institute of Preventive Medicine, has been working for the last few years on luminous or photogenic bacteria, his chief object being to determine as far as possible the cause of their luminosity and the conditions under which it occurs.

The natural habitat of these organisms seems to be almost exclusively sea water, and they are extremely widely spread, occurring both in the tropics and in cooler latitudes, in surface and deep water. In 1902 twenty-five varieties were stated to be photogenic, and of these Mr. Barnard has made most experiments with *Photobacterium phosphorescens*, the most widely distributed and best known of all photogenic bacteria. It occurs on the bodies of nearly all dead fish, and has a characteristic green phosphorescent light.

The light in all cases appears on the surface of the culture, which, if grown in darkness and kept from exposure to daylight, may remain phosphorescent for seven to eight weeks. Any outside source of light seems to decrease the luminosity of the bacteria.

Last year, at the meeting of the Academy of Science at Vienna (*Nature*, 14th May, 1903), Professor Molisch, of Prague, described the manufacture of his "bacterial lamp," which, on a dark night, would be visible at a distance of more than sixty

paces. The lamp was simply a culture of photogenic bacteria in a large glass flask, and as there is no heat about such an arrangement, it is suggested that it would be useful in powder magazines or in dangerous mines.

The most brilliant and most varied and interesting cases of phosphorescence are to be found among animals, and there seems hardly one of the larger groups which does not furnish some instances of it. We find animals, large or small, highly organized or simple, living on land or in water, apparently irrespective of relation in any other way, all resembling one another in the power of glowing in the dark. All the members of the same group of animals are not necessarily phosphorescent—indeed, this property seems to occur so irregularly in Nature that Darwin (11, p. 150) mentions luminous organs as being one of the "special difficulties of the theory of natural selection." "When the same organ is found in several members of the same class," he says, "especially if in members having very different habits of life, we may generally attribute its presence to inheritance from a common ancestor . . . . but this is far from the case here." This sentence was written about the electric organs of fish, but later he says :—"The luminous organs which occur in a few insects belonging to widely different families, and which are situated in different parts of the body, offer, under our present state of ignorance, a difficulty almost exactly parallel with that of electric organs."

As, then, phosphorescence occurs so widely, it would be impossible for me even to name all the animals which have this property, so I shall divide them into land and marine forms and try to touch on a few interesting types of each.

In the case of land animals, it seems to be among the smaller ones, such as earthworms and insects, that luminescence, except that caused by bacteria, is noticed.

Amongst the Oligochæta, or earthworms, several luminous species have been observed, the most noteworthy in Europe being *Photodrilus phosphoreus*, a small worm recorded by Giard in 1887. Giard says that the luminescence proceeds from glandular organs in the anterior part of the body. The large white New Zealand earthworm, *Octochætus multiporus*, was found by Professor Benham, of Dunedin, to discharge in the dark a brilliantly phosphorescent fluid from the dorsal pores. Another luminous earthworm may often be seen at night on garden paths round our suburbs, especially after rain. It is whitish in colour and about 1½ in. long. As well as glowing itself, it leaves often a phosphorescent track, which is most deceptive when one is trying to secure them.

Centipedes are very commonly seen to be phosphorescent in England, usually in the summer. In this case defence seems to

be one of the uses of the secretion, for, from various observations made at different times, the centipede is more than usually luminous when attacked. One case (*Nature*, January, 1902 (32)) was observed in the summer of 1897 in England. The centipede had evidently been attacked by about a dozen ants, and was seen ridding itself of its enemies by excreting a luminous material over them.

Now we come to the glow-worms and fire-flies, which are much brighter than any of the forms with which we have been dealing. The glow-worms (8) are so called on account of the worm-like form of the female, which is wingless and crawls about on the ground. The male is winged and has the luminous organs more restricted in area, and in consequence its light is not so bright. They are situated at the hinder end of the abdomen, at the very ends of the minute tracheal or air tubes, which branch in all directions over the body of the insect. Experiments show that the light is under the control of the nervous system, which regulates the supply of air in the tracheal tubes.

The fire-flies are more numerous in warmer climates, and are found nearly everywhere in the tropics. In this case also (31) it is the male which flies about, and is much more often found. In a great number of countries they are used for decorating and lighting purposes. Some friends who travelled in Japan a year or two ago told me that fire-flies there were sold in little cages, one, two, or three in a cage, according to the price paid. To give some idea of the light emitted by these beetles, they said that travelling once at night the second class railway carriages were not provided with lamps. The Japanese passengers, however, carried two or three fire-flies each, and the light given by these was quite sufficient to enable my friends to see the faces of all the people in the carriage.

One of the best known of the fire-flies is the so-called Mexican fire-fly, Pyrophorus, which is supposed to give a light quite strong enough to read by, from two oval patches on the thorax. Darwin describes immense numbers of these insects seen in a few days' journey from Rio Janeiro. Another South American beetle is Phengodes, which shows the curious larva-like form of the female with the luminous organs arranged at the sides of the body, one in each segment of the abdomen. The light in many cases is different in colour in the different species—green in the glow-worm and some fire-flies, blue in the Italian fire-fly, and purple in the lantern-fly, Fulgora, of America and China, which has luminous organs at the tips of its long proboscis.

One more instance of a luminous insect comes from New Zealand, this time belonging to the Diptera, or flies. The life-history of this was first observed by Mr. Hudson (19), of Wellington, and was complete as to facts, though he stated that

he could form no theories as to the use of the light. The larva of this insect was found suspended on a web hung across rocky niches on the banks of streams in dense forests. A number were found by Mr. Hudson in the Wellington Botanical Gardens, and were reared by him. In this larva there was a luminous organ situated at the posterior end, the shape of which could be changed by the animal, and the amount of light emitted seemed to be under its control. In 1886 he obtained a luminous pupa suspended in one of the webs, but the light given by this was much fainter than in the larva. In April, 1889, Mr. Hudson succeeded in obtaining the fly, and in August, 1890, he actually saw a fly standing on the pupa with part of its abdomen still within the pupa skin. When the fly finally emerged it gave out a very strong light from the abdomen, which brilliantly illuminated the box in which Mr. Hudson had placed it.

Let us now turn our attention to the perhaps more interesting cases of phosphorescence shown by animals in the sea. It need hardly be said that the examination of these animals is beset by many difficulties. In the case of the more minute organisms, even if one is provided with a microscope, the phosphorescent water probably contains so many forms that to be distinguished they must be seen by a strong light, and then, of course, it is impossible to tell which are and which are not luminous. Again, difficulty occurs in the case of large animals living in the sea, especially those from the abysmal depths, such as deep sea fish and crustaceans. These are extremely difficult to obtain, and when they have been dredged the conditions under which they are viewed are so altered as to make it well-nigh impossible to judge of their behaviour in the natural state.

The phosphorescence of the sea (27, "*Challenger* Narrative," vol. i.) attracted much attention about the beginning of the 18th century, and many explanations of it were attempted. In 1690 Tachard, a priest, explained the matter by stating that the waters of the ocean absorbed sunlight by day and gave it out again at night. Newton, 1730, considered that it was caused by the continual agitation of the waves. Some thought that it was due to a self-luminous substance, others to decayed material, while still others ventured the opinion that the phenomenon was produced in some unknown manner by living organisms, and this last suggestion, by discoveries made since, has been fully verified, whereas the other theories have one by one been disproved.

The lights seen at night from a ship at sea are chiefly due to animals which float and drift about on the surface of the ocean. "It is not," says Hickson (16), "as is very commonly supposed, only one or two different kinds of animals that are phosphorescent, but a vast number, belonging to many widely different families and of great variety of form and structure."

Amongst the Protozoa none is more highly phosphorescent than Noctiluca, whose very name has been given on account of this property. The organism is not spontaneously phosphorescent, but Professor Allman found that in certain definite spots in the protoplasm the light comes and goes when the animal is disturbed in any way. Another beautiful luminous protozoan is Thalassicolla, which is round in shape and somewhat larger than Noctiluca. A section shows the intra and extra capsular portions of the protoplasm, from the inner of which the light has been seen to come.

Most visitors to the seaside have seen phosphorescent zoophytes, which somewhat resemble sea-weeds, on the shore, and during my reading I came across an account of some exhibitions of these zoophytes in 1841 by Hassall (15), which, I think, is worth quoting. "Numerous friends can bear witness to the extraordinary brilliancy of phosphorescent light emitted by a great variety of species which I was in the habit of exhibiting to them. Once each week I received from the master of a trawling vessel on the Dublin coast a large hamper of zoophytes in a recent state. In the evening these were taken to a dark room and the spectators assembled. I then used to gather up with my hands as much of the contents of the hamper as I could manage, and tossing them about in all directions, thousands of little stars shone out brightly from the obscurity, exhibiting a spectacle which, to be appreciated, must be seen, and one which it has been the lot of but few persons as yet to have looked upon."

One of the most brilliantly phosphorescent of these forms is *Pennatula phosphorea*, one of the sea-pens, or cock's comb, as it is called. This is a colony consisting of numerous polypes imbedded in a common mass. Each polyp has been shown to possess eight luminous bands round the short alimentary canal, and when the colony is touched the light commences at the point irritated, and gradually spreads in both directions over the whole.

Among the polychæte worms, which for the most part live along the sea-shore in rock crevices, or burrow in the sand between tide marks, Professor Benham (6) singles out Chætopterus, a European form, as the "most eminently photogenic." The illustrations show the animal with its body curiously modified in shape, and also the appearance in the dark on stimulation. The body is almost entirely outlined by the light it gives—the so-called wings, the fans, tentacles, and hinder portion of the body are all so brilliantly lighted up that the light is quite good enough to read one's watch by. Many other members of this group are also phosphorescent—one of them, Polynoe, has phosphorescent "wings," which it frequently throws off, apparently to deceive its enemies.

Amongst the mollusca, one in particular is interesting as

having been observed and described by Pliny. This is Pholas, the rock-boring shell-fish, so called because it burrows into rocks. It has three different sets of organs which give out the light.

These are only a few of the many luminous forms of lower groups. Many of the smaller Crustacea, such as Copepods, are brilliantly phosphorescent, and some of the Echinoderms. There is even a pelagic species of rotifer which is luminous, this being interesting as one of the earliest luminous animals observed with the microscope.

Coming now to a higher group, we find an exceedingly beautiful and interesting form which is often seen floating in mid-ocean—Pyrosoma. This is a free-swimming colony of Tunicates, and is related to the sea-squirts found growing on rocks at the sea-shore. They are usually a few inches to a foot long, but are sometimes much larger. A giant colony was obtained on the *Challenger* voyage, and Professor Moseley (27) says of it:—"The most beautiful kind of phosphorescence is, however, that of the Ascidian colony Pyrosoma. This, when stimulated by a touch, a shake, or a swirl of the water, gives out a bright globe of bluish light which lasts for several seconds . . . . and then goes out suddenly. A giant Pyrosoma was caught by us in the deep sea trawl. It was like a great sac, with its walls of jelly about an inch in thickness. It was four feet long and ten inches in diameter. When a Pyrosoma is stimulated by having its surface touched the phosphorescent light breaks out just at the spot stimulated, and then spreads over the surface of the colony to the surrounding animals. I wrote my name with my finger on the surface of the giant Pyrosoma as it lay on deck, and my name came out in a few seconds in letters of fire."

The colony is composed of hundreds of animals imbedded in a common jelly-like mass. The light is given out from two distinct patches of cells in each individual, and Panceri (28), who first observed the right use of these cells, states that they are connected by muscular bands, which pass the stimulus on from one individual to another.

Comparatively little was known about animals living in the depths of the sea until ships specially fitted for dredging and for surveying the seas generally were sent out from Great Britain about the middle of last century. Of these the *Challenger* was the best fitted for the work, and had the most extended voyages, and our scientific knowledge of deep-sea life really dates from the sailing of that vessel from England in 1872.

In considering these forms we have to remember that the conditions in deep sea are very different from those of shallower water. No sunlight can penetrate below 500 fathoms, to take an extreme limit, and there is also an enormous pressure and a very low temperature. These strange conditions affect the animals

living in the depths in many ways, of which probably the most interesting is in enabling them to manufacture their own light.

Up to the present time very little work seems to have been done on the phosphorescent organs of the higher Crustacea. Sars (30), of course, who described the *Challenger* Crustacea, mentioned them, and Dr. Alcock (2), who was surgeon-naturalist on the *Investigator* for four years, observed them, and recorded their appearance. "On one occasion," he writes, "three large specimens of luminous Crustaceans were brought on board alive, one of which, Heterocarpus, was most brilliant, and both sexes of which poured out, apparently from the orifices of the green glands at base of the antennæ, copious clouds of a ghostly blue light, of sufficient intensity to illuminate a bucket of sea water, so that all its contents were visible in the clearest detail."

In some of the deep-sea Crustaceans the luminous apparatus takes the form of pale red spots with a central clear nucleus. The phosphorescence proceeds from the red pigment surrounding this nucleus. The body of the nucleus is very mobile, and is described as a true lens, acting as a condenser, and by this means the animal is enabled to produce a bright flash of light in a given direction.

In the case of the phosphorescence of fish more work has been done, and the researches of Von Lendenfeld (36), Günther (14), Professor Moseley (27), Sir Wyville Thomson (33), and many others enable us to understand, to some extent, the structure of the luminous organs and glands.

In the simplest cases we find that the mucous glands, to be seen in most fish, are especially strongly developed, and that their secretion is luminous. In such cases the fish must show a continuous phosphorescent glow on the head, or head and neck, where the mucous canals are most abundant. The light produced in this way is probably not under the control of the animal. Such a fish was obtained by Alcock in the Laccadive Sea—Aulastomorpha.

Other fish have definite organs, which may be present in every gradation of structure from a small luminous patch of skin on the head up to the complicated organs placed in the side of the body, which resemble "bull's-eye lanterns." Some fish have organs in addition to the luminous secretion, and these are not necessarily all of the same structure in the same fish. Photostomias shows a phosphorescent patch on the cheek, and the organs arranged in two rows on each side of the body.

In one fish, Astronesthes, described by Von Lendenfeld in the *Challenger* volume, there are small phosphorescent organs on the side of the head of a very simple structure, luminous patches near the top of the head, and both simple and compound organs as well; the former having glandular cells which secrete mucous material and are covered by a transparent patch of skin. Behind

the glandular cells are radial canals, backed by a thin layer of pigment which serves as a reflector. In the compound organ (3) there is not only the glandular secretion present, from which the light comes, but in addition two chambers with radial canals, and a lens-like body in front, all of which serve to intensify the light. This organ has a double surface, as it were, for the line of pigment, and therefore more surface for reflection.

One especially curious deep-sea fish was discovered by the *Challenger* off the coast of Brazil. This was *Ipnops murrayi*. No eyes are present, but in their place are two structures which Professor Moseley showed to have the power of producing light.

Sometimes the organs are arranged regularly along the lateral line, taking the place of the ordinary lateral line sense organs. This is seen in Odontostomus, which also has small organs on the head. In one species, which Alcock called Lamprogrammus, or "line of radiance," the scales are hollowed out and contain a greasy white substance, the oxidation of which appears to cause the light. Many writers have compared fish such as this one to miniature ships, with rows of port-holes lighted up, but we must remember that most of these really are miniature, as the fish are, for the most part, very small—about one and a half to twelve inches long.

Among the deep-sea fish we also have the anglers, just as among fish of shallow water. In these, however, instead of the lure which looks like an attractive morsel hanging in the water, we find a lantern. In Onirodes, which is only about 2 inches in length, there is a glandular luminous mass placed at the end of the modified first dorsal fin ray. This fish is blind, but its light attracts smaller fish, and so to obtain its food it simply has tc wait and hold its mouth open.

I think enough has now been said to show how exceedingly varied and numerous are the cases of phosphorescence in animate nature; but the questions which now arise are—What is the light due to? and what is its use in the economy of the organism? Many answers have been attempted to these questions in the past, but the man of science to-day is very wary in attributing a cause, no matter how he may speculate as to the possible uses to the animal. Without going into the many theories which have been suggested as to cause, the light is certainly always associated with oxidation, and in many cases probably with the oxidation of fats.

As to the possible uses of phosphorescence to the animal, Morgan (26) suggests that it is of *no* use, the phenomenon being, according to him, only a by-product of changes going on in the cells, and having no relation to outside conditions. This certainly seems to be the case with bacteria, but probably nowhere else.

Why should eyeless fish use light? With such forms it evidently is a bait to attract their prey. For others which have

large eyes the light must serve to illuminate the way, as in the case of glow-worms and some fish. With others, again, the object may be to terrify adversaries. In cases where animals are transparent in the day-time, presumably that they may be invisible to enemies, it seems to be most inconsistent for lights to be shown at night. Probably, however, the stinging powers of jelly-fish and other forms warn fish that phosphorescent creatures are not to be eaten carelessly, and in this case the phosphorescence is probably adopted by harmless forms as a protection.

These are only a few suggestions as to the uses of phosphorescence, collected from various sources ; but, as a whole, I think the theoretical part of the subject has been left, as almost too difficult to attack in the present state of our knowledge.

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Insects, part 2.
32. Thomas, Rose Haig—Luminous Centipede, *Nature*, Jan., 1902.
33. Thomson, Wyville—Depths of the Sea.
34. Tulasne—Sur la Phosphorescence des Champignons, Ann. des Sci. Nat., vol. ix., 1848.
35. Verwörn—General Physiology.
36. Von Lendenfeld—Deep-Sea Fishes, *Challenger* Rep., Appendix B.
37. Watasé—Physical Basis of Animal Phosphorescence, published with Biological Lectures delivered at Marine Biological Station, Wood's Holl.
38. Wielowiejski—Luminous Organ of Insects, Zool. Anzeig., vol. xii., 1889.

[The paper was illustrated by a series of lantern slides.—Ed. *Vict. Nat.*]

The Victorian Naturalist.

Vol. XXI.—No. 8. DECEMBER 8, 1904. No. 252.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 7th November, 1904.

Mr. F. Wisewould, one of the vice-presidents, occupied the chair, and about 40 members and visitors were present.

CORRESPONDENCE.

A letter was read from a resident in the Bright district, calling attention to the wholesale destruction of Lyre-birds taking place in his neighbourhood, and suggesting that the Club take some action in the matter.

It was decided that a copy of the letter be sent to the Minister of Public Works, who has the administration of the *Game Act*, and that the hon. secretary forward a letter to the public press on the subject.

REPORTS.

In the absence of the leader, Mr. J. A. Leach, a report of the excursion for juniors to the Kilby Lagoon, East Kew, on Saturday, 5th November, was given by Mr. T. S. Hall, M.A., who stated that the outing was a great success, over 90 juniors and others being present, though he would have liked to have seen a few more senior members at the excursion. During the afternoon several pools were visited, and instructive chats on the pond-life, botany, geology, and geography of the district given, in which the juniors showed great interest.

The hon. secretary reported that a practical evening for microscopic work was given by Mr. J. Shephard on Monday evening, 31st October, when some attention was devoted to the subject, "How to Find and Examine Rotifers." It was to be regretted, however, that the attendance was small, and barely repaid the demonstrator for the trouble he had taken in connection with the meeting.

The following reports were unavoidably held over from the last *Naturalist* :—

In the unavoidable absence of the leader, Mr. H. T. Tisdall, Mr. F. G. A. Barnard reported that the first excursion for junior members, held at Sandringham on Saturday, 1st October, had been an unqualified success. Over sixty boys and girls, the majority of whom were members or intending members of the Club, with about twenty members and friends, were present. On arrival at the heath ground, the leader asked the young students to each

dig up a specimen of the blue dwarf-squill, *Chamæscilla corymbosa*, F. v. M., when in simple language he explained the different parts and their functions. Afterwards the juniors dispersed over the heath, and brought to the leader or the seniors present, to have their questions answered, such objects of interest as they might have found. Finally, Mr. Tisdall gave a short practical demonstration of how to dry and preserve flowers.

A report of the excursion to Ringwood, on Saturday, 8th October, was furnished by the leader, Mr. C. French, jun., who said that there was a good attendance of members. The country towards Bayswater was visited, with very good results. Some fine plants of what was at one time regarded as a rare orchid, *Caladenia suaveolens*, were noted; also, *Diuris palustris*, and the lycopod, *Phylloglossum drummondii*. Among other plants seen were *Pultenæa gunnii*, *Acacia myrtifolia*, and *Utricularia dichotoma*, while of orchids thirteen species were seen during the afternoon. Specimens of the Copper-headed and White-lipped Snakes were seen. Both birds and insects were scarce, the season being somewhat backward.

The hon. secretary reported that the second practical evening on Structural Botany, by Mr. H. T. Tisdall, had been held on Monday evening, 26th September, when the flower and reproductive organs of the Broad Bean, *Vicia faba*, were studied. A very fine series of coloured drawings were shown and fully explained, and the members present then dissected and mounted the parts of the fresh flowers.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. D. Bird, Spring-street, Melbourne; Mrs. J. Booth and Mr. J. Booth, 25 Rathdown-street, Carlton Miss J. Greig, M.B., Brunswick-street Fitzroy; Miss Kiely, 98 River-street, South Yarra; Miss A. C. Parson and Mr. H. Parson, Kintore-street, Camberwell, were duly elected as ordinary members; Mr. Arthur Mansfield, Gordon-street, Mont Albert, as an associate; and Miss Preston, Masters Murray Jackson, Frank Nicholas, Reginald Sterry, W. T. Wilkinson; from State school 1183, Williamstown—Stanley Bradley, Reginald Bradley, George Cullen; from State school 1895—W. Bailye, V. Bull, Ben Cantor, W. Meare, F. Neilson, V. Sevior; from State school 112, Faraday-street, Carlton—L. Briggs, J. Colpoys, R. M'Dermott, H. Phillips, J. Smith, and L. Sullivan, as junior members.

GENERAL BUSINESS.

Mr. Clifford Coles reported that Mr. C. French, jun., and himself had, on the morning after the exhibition of wild flowers, attended at the hall, and taken such flowers as were suitable and arranged them on the grave of the late Baron von Mueller, in the St. Kilda Cemetery.

PAPERS READ.

1. By Mr. N. J. Caire, entitled "Notes on the Giant Trees of Victoria," communicated by Mr. F. G. A. Barnard.

The author, in an interesting paper, gave particulars as to the size and situation of some of the largest of the giant eucalypts of Victoria, and urged that some steps should be taken to protect the few remaining giants from destruction either by bush fires or by the hand of man. He estimated the age of these trees at from 1,500 to 1,800 years, and stated that further exploration would probably result in the discovery of other giants, especially in the valleys forming the head waters of the River Yarra. Attention was called to numerous patches of dead trees existing in parts of Gippsland, and suggestions made as to the cause.

The paper was illustrated by a fine series of lantern sides.

Mr. F. Pitcher complimented the author on his paper, saying that some action should be taken to arouse the interest of the public in our big trees, and pointed out that in the United States the big trees were regarded as a valuable asset, and an attraction to tourists.

Mr. C. French, F.L.S., referred to the patches of dead timber to be seen in our forests, and said that he had not been able to arrive at any conclusion regarding the cause. All the trees seemed to have perished about the same time, but whether from the effects of severe cold or the ravages of insect larvæ was impossible to say. He had found the White Gum singularly free from destruction by insects. He also stated that a magnificent forest of giant gums can be seen between the Upper Latrobe and Beenak, about five miles from Noojee and thirty from Neerim.

Mr. F. G. A. Barnard said that the statement that no records of our big trees exist was hardly correct, for in the chapter on *Eucalyptus amygdalina* in the late Baron von Mueller's "Eucalyptographia" a number of measurements of large trees are given, though some doubt has been since expressed as to the reliability of the figures given.

The Chairman remarked that a large area of dead trees exists in the Western Tiers, Tasmania, close to the Great Lake, at an altitude of about 3,000 feet. Driving along the road from Tunbridge, after passing through green forest country, one comes suddenly upon an area of probably 200 acres on which the whole of the original timber is dead, the only growth existing being clumps of small, stunted eucalypts here and there. Thousands of dead trees are lying all over this plain, while a large number are still standing, white, weird, and gaunt, the effect after leaving the living forest being most impressive. It is alleged by old residents that the trees were killed by a severe winter some fifty-five years ago.

2. By Rev. W. W. Watts, entitled "Some Mosses from near Melbourne," communicated by Mr. F. G. A. Barnard.

The author gave a list with remarks on about thirty species which he had collected, principally in the vicinity of Heyington railway station, Toorak, and which had been determined by Dr. Brotherus, who stated that three of them were new to science. He also gave the names of a small collection of mosses made by Mr. A. G. Campbell at King Island, Cataract Gorge (Launceston), and Dandenong Ranges.

3. By Mr. J. H. Maiden, F.L.S., entitled "Descriptions of two Victorian Eucalypts," communicated by Prof. W. Baldwin Spencer, F.R.S.

The author described as *Eucalyptus kitsoni* a small tree which had been observed by Mr. A. W. Howitt, F.G.S., near Foster, South Gippsland, and at Powlett Plains, Anderson's Inlet, by Mr. A. E. Kitson, F.G.S. He stated that this species had been labelled both *E. botryoides* and *E. gunnii* by Baron von Mueller, but was not identical with either, though it might possibly be a hybrid with the two species mentioned as parents.

The second species, which he named *E. neglecta*, is a small tree found in swampy places on the upper parts of the Livingstone Creek, in the Omeo district. This also may be a hybrid of *E. gunnii*, and has for its nearest affinities *E. kitsoni*, Maiden, and *E. aggregata*, Deane and Maiden.

EXHIBITS.

By Mr. F. G. A. Barnard.—Growing fern, *Lomaria alpina*, with fertile fronds, from Mount St. Bernard.

By Mr. C. French, jun.—Scale insect, *Aspidiotus fusca*, found on Loranthus, sp., near Murray River.

After the usual conversazione the meeting terminated.

THE LATE J G. LUEHMANN, F.L.S.

It is with deep regret we record the death, on 18th November, of Mr. J. G. Luehmann, F.L.S., Government Botanist and Curator of the National Herbarium, at the age of 61, after a comparatively brief illness, though he had been in indifferent health for some time. Mr. Luehmann was one of the "original" members of the Field Naturalists' Club, and served on the committee during the first two years of its existence (1880-1 and 1881-2), and again in 1897-8 and 1898-9, filling the position of a vice-president during the two following years, 1899-1900 and 1900-1. He was a native of Buxtende, near Hanover, in Germany, and came to Victoria in 1862, when he went to the Wood's Point district, then a flourishing mining centre, remaining there several years. In 1867, on the resignation of Mr. E. B. Heyne, secretary to the late Baron von Mueller, Mr. Luehmann was offered the position, which he accepted, and he remained connected with the Botanical Department until shortly before his

death. Mr. Luehmann was a man of good education and high intelligence. He displayed great interest in botany, and for many years made the preliminary identifications of specimens for Baron von Mueller, becoming an authority on the Eucalypts and Acacias. His great assistance was acknowleged by Baron von Mueller in the preface to the "Key to the System of Victorian Plants." In the early days of the Club, before the institution of the *Naturalist*, he contributed papers on the Eucalypts and Acacias. In 1896, on the death of Baron von Mueller, he was appointed Curator of the National Herbarium, and afterwards became Government Botanist. During late years he contributed several descriptions of plants to the Club's proceedings, in addition to a most interesting paper, "Observations on pre-Linnean Botanists" (*Vict. Nat.*, xv., p. 50), in which he called attention to the many valuable botanical works in the Herbarium Library. He was one of the earliest Victorian Fellows of the Linnean Society of London, and was greatly esteemed by his colleagues and acquaintances. He was twice married, and leaves a widow and young family. His funeral at the Melbourne Cemetery, on Saturday afternoon, the 19th November, was largely attended by his compatriots, with whom he was very popular, and by fellow-members of the Field Naturalists' Club.

NOTES ON HESPERIDÆ DESCRIBED BY MABILLE AND REPUTED TO BE AUSTRALIAN.

By G. A. Waterhouse, B.Sc., F.E.S., and R. E. Turner.

(*Read before Field Naturalists' Club of Victoria*, 10*th October*, 1904.)

M. P. Mabille has, during the last twenty-five years, published many incomplete descriptions of species of this family, most of which are simply supplied with the locality Australia, or even Australia (?). When a catalogue of the Rhopalocera of Australia was published last year by one of us, we did not know that these descriptions were available in Australia. We have lately obtained copies of them, and as a result are able to show that six species cannot be referred to Australia at all; three we can definitely sink as synonyms of older species, and four others we can sink, though with less certainty, thus relieving our lists of a number of worthless names. The remaining species appear to us to be so poorly described that we can hope for certainty only when fresh descriptions are given, if, indeed, the types are in existence to redescribe. As one sample of the worthless work of this author, we find that in the present year he describes a species from which the antennæ and palpi were missing, from Australia, with no more definite indication of locality.

Corone ismenoides, Pet. Nouv., ii., p. 205, 1878.—The late Mr.

L. de Nicéville wrote us that he had seen the type and that it was identical with *Pamphila ulama*, Butler, which is the female of *Erynnis sperthias*, Felder.

Pamphila rectivitta, Mab., Petit. Nouv., ii., p. 237, 1878, described from Celebes and Australia (?), is now given in Wystman's "Genera Insectorum, Hesperidæ" (p. 141), by Mabille as simply Celebes, and consequently leaves our lists.

Hesperilla eaclis, Mab., Contes Rendus Soc. Ent. Belg., vol. xxvii., 1883, p. lxiii., Australia (male, female), is a synonym of *Baracus vittatus*, Felder, a common hill species in Ceylon, and certainly not Australian.

Carystus vallio, *l.c.*, p. lx., New Holland.—The description agrees very well with the female of *Hesperilla doubledayi*, Felder, but, considering the genus used, and that no indication is given of size or sex, we can only sink the name, with some doubt.

Pamphila impar, *l.c.*, p. lxvi., one female from Australia or Oceania. The description is extremely vague and poor, and the locality is too doubtful for us to retain the name on our lists.

Hypoleucis indusiata, p. cxiii., *Pamphila nox*, p. clxviii., *Proteides leucopogon*, p. cxi., *op. cit.*, vol. xxxv., 1891, are all described from Victoria. These are African species, and the name Victoria refers to the old mission station of that name on the Cameroon coast.

Hesperilla atrax, *l.c.*, p. lxxxi., Australia.—This is undoubtedly the female *H. compacta*, Butl. (*scepticalis*, Rosenstock).

Hesperilla saxula, *l.c.*, p. lxxxi., Cooktown.—Mabille now gives the locality as Costa Rica! (See Wystman's "Genera Insectorum, Hesperidæ," p. 132).

Hesperilla melissa, *l.c.*, p. lxxxi. (male, female), Sydney.—The male is probably intended for male *H. compacta*, Butl., with which the description agrees very well as to the size and upper side, but we cannot feel any certainty about this identification.

Hesperilla satulla, *l.c.*, p. lxxxii. (female), Cooktown, is a synonym of *H. croceus*, Miskin.

Pamphila neocles, *l.c.*, p. clxxvii., Cooktown, we think we rightly identify as *Apaustus lascivia*, Rosenstock.

Pamphila sigida, *l.c.*, p. clxxvii., Australia, is almost certainly *Hesperilla fulgida*, Miskin.

Pamphila lagon, *l.c.*, p. clxxxii., Cooktown, we cannot recognize.

Tagiades australiensis, *l.c.*, p. lxxii., is identical with *T. gamelia*, Miskin, which we think doubtfully identical with *T. janetta*, Butler.

Toxidia thyrrhus, *l.c.*, p. lxxx., Cooktown.—Though a male is described, the description would do fairly well for the female of *H. bathrophora*, Meyrick and Lower. Mabille is careful to avoid any mention of the presence or otherwise of a discal stigma in this description, as well as in all others noticed in this paper.

NOTES ON THE LARVÆ AND PUPÆ OF BIRCHIP HETEROCERA.

Part IV.

By D. Goudie.

(*Read before Field Naturalists' Club of Victoria, 10th October*, 1904.)

It is now over a year since the last of these life-histories appeared in vol. xix. of the *Victorian Naturalist*. The severe drought of 1902 destroyed, for the time at least, all prospect of satisfactory entomological work in this district. No doubt it was due to the superabundance of "mallee rain," as the dust storms were called locally. They made the opening of a store box an operation fraught with peril for the contents, and had such a bad effect on entomology all round that I forbore this work till a more favourable time. I am pleased to say that what has already been published has proved interesting and useful to many, whose inquiries have induced me to go on with the work.

Thalaina angulosa, Walk. (Walker, Supp., p. 289; Meyrick, Proc. Linn. Soc. N.S.W., 1891, p. 655; Lower, *Vict. Nat.*, xi., p. 80.)

I have taken the larvæ of this fine geometer since 1898, but in April, 1899, the moths were fairly numerous, and in August and September of that year the larvæ were everywhere, feeding on the leaves of *Acacia hakeoides* and such shrubs. The moths were quite common next April, and were followed by hundreds of larvæ again in the spring. They were almost blotted out of existence, however, by the advent of a small black and yellow banded fly, which deposited its eggs in the caterpillars, the larvæ eating their way out of their hosts as soon as the latter entered the earth to pupate. I could not find a sign of moths or larvæ in 1902 and 1903, and only one this year so far. I have observed a similar occurrence in the case of a butterfly (*Delias aganippe*) and the previously described *Capusa senilis*. The former was quite plentiful here once, feeding on the leaves of the quandong, until the appearance of a parasite, which has apparently killed it out altogether, as I have not seen either larvæ or imago here for years.

The larvæ of *T. angulosa* differ but slightly from those of the other species of this genus. They are semi-loopers, and measure when full fed about 1¼ inches in length, and have at each side of the head on the next segment a small projection or horn, orange-red above and darker beneath. The head, which is invisible from above, is emerald-green in colour. Dorsal area green, thickly speckled with fine black spots. There is also a dark bluish rather broad dorsal stripe. Lateral line yellow, interrupted with orange-red. Ventral surface pale bluish green, sometimes with a few lighter longitudinal lines. Prolegs graduating to last

pair, which are the only ones perfectly developed—colour pale green, feet pale flesh colour.

Pupa.—Length, 5/8 of an inch. Enclosed in a frail web cocoon a couple of inches beneath the surface of the soil. Chestnut-brown in colour, with wing-cases emerald-green.

ON THE CHANGE OF NAME OF *POROLEDA LANCEOLATA*, TATE.

By C. Hedley, F.L.S.

(Communicated by T. S. Hall, M.A.)

(*Read before the Field Naturalists' Club of Victoria, 10th October*, 1904.)

The name of *Poroleda lanceolata* is involved in some confusion. Prof. Tate, in March, 1894, introduced (Proc. Roy. Soc. New South Wales, xxvii., p. 186, pl. xii., fig. 6) a new species, the type of a new genus, under this name, but in the previous September, Capt. Hutton had redescribed ("Macleay Memorial Volume," p. 86) his fossil under the same name.

Since *Poroleda lanceolata* is to-day in current use for both a New Zealand and an Australian shell, I propose to distinguish that which Tate figured and described from the Gellibrand River beds of Victoria as *Poroleda tatei.*

DESCRIPTIONS OF TWO VICTORIAN EUCALYPTS.

By J. H. Maiden, F.L.S., Government Botanist of N.S.W., and Director of the Botanic Gardens, Sydney.

(Communicated by Prof. W. B. Spencer, F.R.S.)

(*Read before the Field Naturalists' Club of Victoria, 7th Nov.*, 1904.)

Eucalyptus kitsoni, J. G. Luehmann, Herb.

This species-name has already found its way into literature, but the species has not been described, through the unfortunate illness of my friend Mr. J. G. Luehmann, F.L.S., Curator of the National Herbarium, Melbourne. One reference is in the *Victorian Naturalist*,* and the plant has also been distributed by Mr. Luehmann under the name above given.

A dwarf tree. "It usually does not grow higher than 4 feet to 5 feet, but at Foster it is found 18 to 20 feet in height" (A. W. Howitt).† Mr. Howitt informed me that it attained a height of 30 feet.

Bark.—"Smooth in texture and ashy-grey in colour, which becomes lighter in the upper branches" (A. W. Howitt, *op. cit.*)

* Vol. xvii., p. 81 (6th September, 1901).

† Trans. Roy. Soc. Vict., 1890, p. 101 (as *E. gunnii* (*b*)).

Juvenile Foliage.—The youngest specimens seen by me are oblong to broadly lanceolar in shape, sessile, or with a very short petiole, rounded at the apex, or terminating in a blunt point, symmetrical; texture coriaceous. The dimensions of some specimens are 3 x 1¾ inches and 5 x 2½ inches. Veins well marked, spreading, the intramarginal vein a considerable distance from the edges.

Mature Foliage.—When in a flowering state this tree has sometimes a few oblong leaves, but they vary in all degrees of width of lanceolar shape up to, say, 4 inches long by half an inch wide. Leaves on flowering twigs may be a little different from the juvenile foliage stage either as regards shape or position of intramarginal vein. Fully developed leaves have the intramarginal vein close to the edge, and are petiolar, with a petiole of an inch and more.

Buds with blunt conoid operculum when unripe, the calyx sessile on a broad (strap-shaped) peduncle. When near bursting the operculum is either perfectly hemispherical or with a slight umbo.

Flowers.—In a head of usually seven individual flowers, but they may be as few as three. Anthers two-celled and parallel.

Fruits.—Hemispherical to sub-cylindrical in shape, or more or less conoid by mutual pressure. Over ¼ inch in diameter. The rim truncate and well marked, the tips of the valves flush with the rim, or scarcely exceeding the rim. The fruit smooth or slightly angled. Valves in 3's, 4's, and 5's as seen.

Habitat.—"Dwarf eucalypt, Foster, Gippsland, Victoria; A. W. Howitt, 14th November, 1888" (label on specimens in Nat. Herb. Melb.; comm. J. G. Luehmann).

"Grows in poor, boggy country, in the low-lying tracts, but also occurs in the drier hills at Foster" (A. W. Howitt, *op. cit.*)

"All the undoubted samples of the species that I have yet seen on these (Powlett) plains are from burnt boles, though I believe some I saw nearer Cape Patterson are seedlings" (A. E. Kitson, 3rd February, 1903, in litt.) Foster is further to the east.

Species-name in honour of Albert Ernest Kitson, F.G.S., geological surveyor in the service of the Victorian Government, who has, at the instigation of Mr. Howitt, given much attention to this eucalypt.

The above simply deals with statements of fact. The following statements contain expressions of opinion that are my own:—

Affinities. — Mueller variously labelled this species *E. botryoides* and *E. gunnii*, and Howitt, quite reasonably, adopted the latter name, though with doubt.

(a.) E. botryoides, Sm. Let us compare *E. kitsoni* with Victorian-grown *botryoides.*

The juvenile foliage is smaller, much thinner, more acuminate, and has the venation more transverse, and the intramarginal vein closer to the edge in *E. botryoides*, while the mature foliage is certainly more transverse-veined. I have never seen the buds of *E. botryoides* so rounded as in *E. kitsoni*. The fruits of *E. botryoides* are more cylindrical, and the valves more sunk within the orifice. The bark of *E. botryoides* is fibrous scaly. I regret I have not been able to obtain a piece of timber.

(b.) E. gunnii, Hook., f.

It is the var. (*b*) of *E. gunnii* of Howitt (*op. cit.*), so Mr. Howitt informs me. *Loc. cit.* a description will be found.

The form of *E. gunnii* in view by Mueller and Howitt is doubtless that of var. *acervula*, Deane and Maiden (*E. acervula*, Hook., f.), so common in sour, swampy land in Southern Victoria. Var. *acervula* has the juvenile leaves more rounded and the opercula more conical. The fruits also are more top-shaped, and the rim broader than the rest of the calyx. The peduncles are not strap-shaped, while the buds, flowers, and fruits are pedicellate.

(*c.*) *E. dumosa*, var. *rhodophloia*, Benth. (*E. incrassata*, Labill., var.) It is certainly very near to the above, and perhaps identical with it. See B. Fl., iii., 230, and my "Critical Revision of the Genus Eucalyptus," Part iv., p. 98. I have drawings only of the Kew specimens examined by Bentham. They are from Phillips's Bluff, near Eyre's Relief, W.A., but, as compared with *E. kitsoni*, show some of the fruits slightly pedicellate, with, however, sessile buds. The peduncles are strap-shaped. The fruits are in 3's and 4's (those of *E. kitsoni* being in 3's, 4's, and 5's). The foliage appears to be identical as far as it goes.

But all the differences enumerated may not amount to much, and, considering the *E. kitsoni* and the *rhodophloia* specimens are from localities separated by thousands of miles, it would be extraordinary if they were precisely identical.

It seems to me that *E. kitsoni* is probably a hybrid. It appears to possess a strain of *E. gunnii*, and perhaps also of *E. botryoides*. If a hybrid, then *E. gunnii* is almost certainly one of the parents; the other is perhaps *E. botryoides*.

EUCALYPTUS NEGLECTA, sp. nov.

A tree of small size.

Bark.—"The bark is that of *E. gunnii*" (A. W. Howitt, in litt.)—*i.e.*, smooth and ribbony.

Juvenile Foliage.—Ovoid or oval, cordate at the base, and stem-clasping (sessile); pale green, of the same colour on both sides. I have leaves of this kind ⅞ and 1¼ inches broad. The leaves may remain sessile and of the same shape for a consider-

able period—*i.e.*, until they attain the texture of mature leaves and a diameter of nearly 3 inches.

Mature Foliage.—In dried specimens of a greasy lustre, broadly lanceolate to nearly orbicular. Sessile to petiolate, with a petiole of an inch or more. Base of leaf tapering into the petiole or cordate. Apex of leaf rounded or tapering to a blunt or even a sharp point. Margin often more or less crenulate, particularly in young leaves. Midrib very prominent, the lateral veins distant and roughly parallel, and making an angle of about 45° with the midrib. Twigs round to nearly quadrangular.

Buds.—Blunt, almost ovoid, and small; operculum tending to be slightly conical; glaucous.

Fruits.—Nearly hemispherical, small, say $\frac{3}{16}$-inch in diameter, rim prominent, tips of valves rather well exserted, valves four in my specimens. Fruits sessile on a short strap-shaped common peduncle, from three to eight or nine in a head, in the axils of the leaves.

Habitat.—It grows in swampy places in the upper parts of Livingstone Creek, near the Great Dividing Range, about 20 miles up the stream from Livingstone, usually called Omeo (A. W. Howitt, who collected the specimens, and from whom I received them).

Affinities.—The affinity of this species is closest to *E. kitsoni*, Luehmann, and *E. aggregata*, Deane and Maiden.

(*a*) From the former it differs in the juvenile leaves. There is a general resemblance in the mature foliage, but the leaves of *E. kitsoni* are narrower lanceolate, and more markedly veined. The buds are larger and more angular in *E. kitsoni*, while the fruits are considerably different.

With *E. aggregata* the affinity is less close, though one cannot resist the conviction that the relations of the three species are marked.

(*b*) In *E. aggregata* the juvenile foliage is narrower, more oval, and less, if at all, cordate at the base, the venation is more spreading, the buds are more slender, with narrower peduncles and longer (though not long) pedicels (often the fruits of *E. aggregata* are quite capitate), the twigs are less quadrangular, the fruits smaller, and have (apparently) a greater tendency to have the valves in threes.

To what extent hybridism is responsible for the origin of these three forms remains to be ascertained.

(*c*) *E. incrassata*, Labill., var. *conglobata.*

The resemblance of *E. neglecta* to the above variety is worthy of note; the resemblance of *E. kitsoni* to the variety is closer.

(*d*) *E. gunnii*, Hook., f.

This new species displays in bark, juvenile foliage, &c., con-

siderable resemblance to the above species, but the fruits are quite different. The general similarity is, however, so evident that, if hybridism be a factor in the evolution of the present species, the widely-diffused *E. gunnii* may well be supposed to have relationship with this new form.

A New Victorian Eucalyptus.—At the September meeting of the Field Naturalists' Club Mr. A. E. Kitson, F.G.S., exhibited specimens of an apparently new eucalyptus from the Portland district (*Vict. Nat.*, xxi., p. 81). These have since been submitted to Mr. J. H. Maiden, F.L.S., Government Botanist, New South Wales, who writes :—"Your eucalyptus is *E. diversifolia*, Bonpland, of which *E. santalifolia*, F. v. M., is a synonym. This record adds another species to the flora of Victoria, and the range of *E. diversifolia* is now sandy coast lands from Cape Nelson, Victoria, to Western Australia. It is probable other South Australian species of plants may be added to the flora of Victoria from this district."

Tenacity of Life as Exhibited in the Larvæ and Pupæ of the Common Salt-marsh Mosquito.—Some months since, at the instance of Dr. Gresswell, president of the Board of Health for Victoria, I undertook to collect and study the mosquitoes of Coode Island, Lower Yarra, and in this connection was fortunate enough to secure the co-operation of Mr J. A. Leach of the Biological School, University. Being desirous of testing the resisting powers of the larvæ and pupæ of these insects, a number of the former were placed in 90 % alcohol, in which they lived and swam for fifty-five minutes, the pupæ for twenty minutes longer! This is to me very little short of the miraculous, as, putting aside their singular method of breathing, one would have thought that such soft and frail creatures would have been effectually preserved in a few seconds. I was very pleased to be able to show these specimens, alive and moving, to Dr. T. Cherry, of the Agricultural Department, who chanced to call at my office. It would doubtless interest many readers of the *Naturalist* to know the reason of this partial immunity to such severe treatment.—C. French, Government Entomologist. 5th December, 1904.

The Great Barrier Reef.—Among the members of the scientific expedition which recently visited the Capricorn Group, off Gladstone, Queensland, under the leadership of Mr. C. Hedley, F.L.S., of the Australian Museum, Sydney, we notice the name of Mr. F. E. Grant, whose removal to Sydney deprived Victoria and the Field Naturalists' Club of an energetic worker in marine crustacea.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 12th December, 1904.

Mr. F. Wisewould, one of the vice-presidents, occupied the chair, and about 70 members and visitors were present.

REPORTS.

A report of the excursion to Warburton, from 12th to 14th November, was read by Mr. G. Coghill, one of the leaders, who said that the party had spent a very enjoyable outing. Attention was chiefly devoted to botany. A large number of plants in flower were collected, the most notable being *Oxylobium ellipticum* and *Eriostemon hillebrandi*, F. v. M., the last-named not having been previously recorded from the "S." district of the State. Insects were comparatively scarce, only the commoner kinds of butterflies and beetles being noted.

A report of the excursion to Cheltenham on Saturday, 19th November, was read by the leader, Mr. W. Stickland, who stated that so far as the pond-life section of the excursion was concerned the most notable find was a species of Protozoa quite new to local workers. This was a Phalanasterium, closely resembling *P. digitatum* of Stein, and is a wonderfully small animalcule, measuring from $\frac{1}{2500}$ to $\frac{1}{3000}$ inch. It occurred as social clusters consisting of many dichotomously branching tubes, at the ends of which the zooids are situated, each protruding a single long flagellum. Though belonging to the collared monads, its collar does not spread outwards, forming a funnel, as in other members of the group, but is constricted to the shape of a narrow truncated cone, from the centre of which the flagellum arises. Several fine desmids were taken, of which *Docidium nodosum* and *Penium nägelii* were the most prominent. The botanists of the party did very well, recording over thirty species worthy of note, among these being *Limnanthemum exaltatum*, *Viminaria denudata*, *Gompholobium huegelii*, *Pimelea curviflora*, *Diuris maculata*, and *Microtis porrifolia*.

A report of the excursion to Emerald on Saturday, 26th November, was given by Mr. G. Coghill, who stated that Mr J. P. M'Lennan had acted as co-leader of the party, being well acquainted with the flora of the district. A very large number of plants were found, either in bloom or just over, among which might be mentioned *Eriostemon correifolius*, *Gompholobium huegelii*, *Sphærolobium vimineum*, *Pultenæa villosa*, *Bossiæa*

prostrata, *Acacia armata*, *Hakea sericea*, *Utricularia dichotoma*, *Epacris microphylla*, *Sprengelia incarnata*, *Gastrodia sesamoides*, *Caladenia congesta*, *Diplarrhena moræa*, &c. Among the Coleoptera taken were *Stigmodera kirbyi*, *S. cruentata*, *Trichomesia newmani*, the rare *Aphenope serricata*, and about twenty other species well known in similar country.

In the absence of the leader, Mr. J. Shephard, the hon. secretary reported that the third excursion for juniors to Brighton Beach on Saturday, 3rd December, had been well attended. The leader, in a clear and interesting way, briefly explained the habits of some of the more common forms of life found on the sea-shore. The afternoon was rather warm, and many of the juniors availed themselves of the opportunity to have a paddle, and soon filled the bottles they had brought with a varied assortment of marine life for observation at home.

The hon. librarian reported the receipt of the following donations to the library since September :—"Birds of the Lena River," by Robert Hall, C.M.Z.S. (reprinted from *Ibis*), from the author ; "Proceedings Royal Society of Victoria," vol. xvii., new series, part 1, from the Society ; *Emu*, iv., part 2, October, 1904, from the Australasian Ornithologists' Union ; "Bulletin Geological Survey of Victoria," 1904, No. 13, from the Department of Mines, Victoria ; "Report of Trustees Public Library, &c., Victoria," for 1903, from the Trustees ; *Journal of Agriculture of Victoria*, vol. ii., 9, 10, September–November, 1904, and "Bulletin Department of Agriculture," Nos. 16, 17, 18, from the Department ; "Official Guide and Plan, National Park, New South Wales," from the Chairman of Trustees ; "Proceedings Linnean Society of New South Wales," 1904, vol. xxix., parts 1, 2, 3, from the Society ; "Forest Flora of New South Wales," by J. H. Maiden, F.L.S., Government Botanist, vols. i., Index, and ii., parts 1 and 2, from the author ; "Revision of Genus Eucalyptus," by J. H. Maiden, F.L.S., part 5, from the author ; *Agricultural Gazette of New South Wales*, August, September, October, and November, 1904, from the Department of Mines and Agriculture, Sydney ; "Year-Book of Western Australia," 1900–3, from the W.A. Government ; "Journal of the Western Australian Natural History Society," vol. i., No. 1, May, 1904, from the Society : "Proceedings New Zealand Institute," vol. xxxvi., 1903, from the Institute ; "Bulletin New York Botanical Garden, vol. iii., Nos. 9 and 10, from the Director ; "Minnesota Botanical Studies," part 3, October, 1904, from the Director ; "Action of Snake Venom," and "Contributions to Stellar Statistics," from the Carnegie Institute, U.S.A. ; *Nature Notes*, July, August, September, October, and November, 1904, from the Selborne Society, London ; and *Nature Study*,

August and September, 1904, from the publisher, C. Mosley, Lockwood, England.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Jennings, 21 Tivoli-place, South Yarra, and Mr. R. Craig, State School, South Yarra, were elected as ordinary members; Mr. R. Macgregor Gillespie, "Toolang," St. Kilda-road, Melbourne, and Mr. Charles Oke, 56 Chaucer-road, St. Kilda, as associates; and Miss E. Jennings, Masters J. Ham, S. G. Johnston, G. Mackay; from State school, Surrey Hills—J. Billing, R. Billing, N. Browne, E. Firth, W. Hooke, L. Tassell, R. Stephenson, R. Sparkman, W. Robins, M. M'Phee; from State school No. 1895—E. Barby, H. Duncan; from State school, Glenferrie—N. Elminger; from State school, Hawthorn —A. Holmes; and from State school, Camberwell—C. J. Mann and J. Spencer, as junior members of the Club.

GENERAL BUSINESS.

Several members expressed their very great regret at the death of Mr. J. G. Luehmann, F.L.S., Government Botanist, recorded in the last *Naturalist*, and the hon. secretary was directed to convey to the widow and family the deep sympathy of the Club in their bereavement.

Mr. G. A. Keartland said that he was pleased to notice that several successful prosecutions under the *Game Act* had recently taken place, and commented upon the apparent ignorance of the general public regarding the dates of the opening and closing of the seasons.

Attention was called to the exhibition of a fine series of water-colour paintings of Australian and tropical flowers, by Mrs. Ellis Rowan, and a resolution was carried that the efforts of Professor Baldwin Spencer and others to retain the collection in the State have the support of the Club.

The Chairman stated that he had represented the Club on the deputation which recently waited upon the Minister of Lands regarding the permanent reservation of Wilson's Promontory as a National Park, and though no promise was made it had since been announced that the Government had decided to permanently reserve the greater portion of the Promontory, but the terms of the reservation had not yet been published.

PAPERS READ.

1. By Mr. G. A. Keartland, entitled "Notes on the Red-winged Lory, *Ptistes erythropterus*, Gmelin."

The author gave an interesting account of the mating and nesting of a pair of these beautiful parrots, which he had received when young from Queensland. He also gave some observations

of the birds made during his visit to the Kimberley District, N.W. Australia. He exhibited several skins from New South Wales, Queensland, and West Kimberley, showing slight variation, and remarked that Gould had separated the north-western birds from the eastern as two species under the names of *P. coccineopterus* and *P. erythropterus*. With this he did not agree, as the differences in plumage were trivial, and due, he considered, simply to age. The British Museum authorities now regarded them as the same species under the name of *P. erythropterus*.

Mr. D. Le Souëf, C.M.Z.S., remarked that all Mr. Keartland's specimens were *P. erythropterus*, and not the smaller variety named *P. coccineopterus* by Gould, and so far he had only seen specimens of *P. coccineopterus* from the north-western portions of Australia, and even there both varieties seemed to be found. He had several skins of the latter bird pass through his hands, but none were as large as *P. erythropterus*.

Mr. A. Coles contended that one of the specimens exhibited, a young bird labelled "male," was of the opposite sex, the red webs on the inner side of the tail feathers being a certain indication of the female sex, as in Barraband's Parrakeet.

Mr. Keartland said that he was quite certain of the correctness of his label, from the fact that he had killed a whole brood of young Ptistes at one shot, and all had the red on the tail, and also that young Barraband's Parrakeets of both sexes were similiarly marked.

2. By Mr. H. H. Baker, entitled "Notes on the Maintenance of Equilibrium and Symmetry in Eucalyptus and Other Trees."

The author said that his attention had been called to the question by noticing several trees which had lost their branches on one side by storm, and which had made an effort to restore their equilibrium by putting out fresh branches on the denuded side. He then entered into the effect of the bending of the branches and stems of trees on the free flow of the sap, and consequently upon their growth.

Mr. D. Le Souëf, C.M.Z.S., remarked that he had noticed that at the Zoological Gardens the *Pinus insignis* trees had the strongest branches away from the north-west, and had developed longer roots on the other side to counteract the increased weight.

The chairman said that the paper opened up an interesting question, and he would like to know whether trees on the sea-shore and other such exposed situations, where branches could not be thrown out, owing to prevailing winds, and where the upper part of the tree was sometimes at right angles to the main stem, threw out additional roots to make up for their inability to equalize matters above ground.

NATURAL HISTORY NOTES.

NESTING OF WATERFOWL IN RIVERINA.— Mr. D. Le Souëf, C.M.Z.S., said that during a recent visit to the Murray swamps he had found the nesting of all the waterfowl late compared with last year. On the 1st of November last year hundreds of the Nankeen Herons were nesting, while this year, though a fair number were in the neighbourhood, hardly any were nesting. The Egrets were sitting, but no young were yet hatched, while the White Ibis were only just commencing to construct their nests, and where probably a fortnight later there would be many thousands of birds we saw only a few hundreds. It would be interesting to know whether members have noticed the same thing elsewhere this season.

ZOOLOGICAL GARDENS.—Mr. D. Le Souëf, C.M.Z.S., stated that at the Zoological Gardens this year clutches of the Squatter or Partridge Bronze-wing Pigeon, the White-bellied Plumed-Pigeon, and the Stubble Quail had been hatched and reared.

BEE-EATER.—Mr. A. Coles drew attention to his exhibit of a pair of Bee-eaters, *Merops ornatus*, which was shot at Ascot Vale, and remarked that the occurrence of these handsome birds so far south was unusual.

SNAKE-LIZARD.—Mr. A. Mattingley drew attention to an exhibit on the table of a live specimen of a Snake-Lizard from New South Wales, the legs of which, having become atrophied, were not readily discernible.

EXHIBITS.

By Mr. M. Bell.—Native bread, made by the natives of New Greenwich from dried Bread-fruit.

By Mr. A. Coles.—Bee-eater, *Merops ornatus*, male and female, shot at Ascot Vale.

By Miss K. Cowle.—Dried specimens of *Eriostemon hillebrandi*, F. v. M., from the Goat Mountain, Grampians, and same species from Warburton. Not recorded before from "S." Victoria.

By Mr. A. D. Hardy.—Flowers of Satin Box, *Eriostemon squameus*; also Native Bread, *Polyporus mylittæ*, and other plants, from Beech Forest.

By Miss M'Haffie.—White-velvet or Lambswool Plant, *Lachnostachys verbascifolia* (Verbenaceæ), from Murchison, Western Australia.

By Mr. G. A. Keartland.—Skins of Red-winged Lory, *Ptistes erythropterus*, in illustration of paper.

By Mr. L. K. M'Nab.—Seven spear-heads, from Kimberley; also orchids and flowers from Perth, Western Australia.

By Mr. A. Mattingley.—Birds in the flesh from Tuggerah Lakes, New South Wales, viz. :—*Malurus lamberti*, *M. cyaneus*, *Zonœginthus oculatus*, and *Eurystomus australis*.

After the usual conversazione the meeting terminated.

NOTES ON THE GIANT TREES OF VICTORIA.

By N. J. Caire.

(Communicated by F. G. A. Barnard.)

(*Read before the Field Naturalists' Club of Victoria, 7th Nov.*, 1904.)

The giant trees of Victoria are found in limited numbers on the Great Dividing Range and its spurs, and in the South Gippsland ranges. It need hardly be stated that, while our giant trees represent two or three distinct species, all are members of the great genus eucalyptus, the characteristic timber tree of the Australian continent.

In the study of a giant tree two points have to be considered—viz., girth and height. To be a giant in girth it should measure, with a tightly-drawn tape, not less than 40 feet in circumference at 5 feet from the ground, while to be regarded as a giant in height it should raise its trunk and topmost branches at least 250 feet above the soil. Few of our giant trees combine these two qualifications.

The conditions under which they grow vary very much. Thus quality of soil, amount of shelter, exposure to sunlight, and accessibility of moisture from river or creek each have their influence. Certain combinations will produce the giant in girth, while from another set of conditions will arise the giant in height, without great girth. That there are thousands of trees in our forests measuring 20 to 30 feet in girth goes without saying, probably of great age, but, wanting favourable conditions, have come to maturity more slowly, and will probably die their natural death at those dimensions, or perhaps become a prey to the borer insect, like the many thousands of white spectres still standing in our forests. Thus the giant trees of Victoria are comparatively few in number, and occur mostly in the southern portions of the State.

Unfortunately, fire has greatly reduced their numbers, even in recent years. Thus we have lost "Big Ben," the parent of the Black Spur forest, a splendid specimen of *E. amygdalina*, with a solid trunk, without a sign of decay, 57 feet in girth. Poor "Ben" was unprotected, and was caught in the great bush-fires of 1902, and killed. He probably was a sapling when the people of England were semi-barbaric. He sent his gigantic roots down into mother earth to enable him to withstand the shocks of wind and storm century after century, whilst nation after nation has risen, held its sway for a time, has conquered or been subdued.

Some guide as to the age of trees of such a size may be gathered from the fact that one was felled in order to cut a section for use as an exhibit at the Paris Exhibition of 1878. From the centre to the bark there appeared a series of rings or band-like markings,

which when counted numbered over 1,200. Supposing one of these markings to have been formed each year, then this tree was at least 1,200 years old.

Recently, in conversation with an American expert, who was employed by his Government to obtain information generally on the giant trees of America and elsewhere, I found that his idea of their age agreed with that I had formed.

In California there are some giant trees, belonging to the Sequoia family, varying from 70 to 120 feet in girth. Only about eighteen of them were now left. They are carefully protected, and are to be allowed to live their natural life until they die and decay away. Experts who have studied them have come to the conclusion that they are fully 1,800 years old. In Victoria the giant trees are regarded as so much firewood, and little is known regarding them.

Nearly all the Victorian giant trees which have come under my notice have the tops broken off, with signs of decayed timber coming down. Once decay sets in through old age, shrinkage seems to follow. We have an instance of this in "Uncle Sam" on the Blacks' Spur beyond Fernshaw. Some thirty-five years ago this tree measured 40 feet in girth at 6 feet from the ground, when I measured it some ten years ago it was only 36 feet. Its height, taken with a theodolite, was 250 feet, with a broken top, and very much decayed. My impression is that at the age of from 1,200 to 1,500 years, decay and skrinkage set in.

Let me now give some particulars of trees we have known. The first to attract public attention was a Blackbutt, *E. pilularis*, which I named "Uncle Sam," on the Black Spur, and which, in consequence of being close to the road traversed every day by Cobb and Co.'s coaches, soon became an object of public interest. This tree was 40 feeth in girth and 250 feet high, with a broken top.

Another blackbutt, "Big Ben," I discovered, and also named, is situated about a mile and a half from "Uncle Sam," and measured 57 feet in girth and over 250 feet high. The tree which was felled for the purposes of the Paris Exhibition stood on a hill to the south of "Big Ben," and was christened "Billy Barlow" by the splitter who found it. The flat butt of "Billy," about 20 feet in diameter, is all that now remains to mark the place where once he stood defying the storms of centuries.

At "Tommy's Bend," about seven miles beyond Marysville, there is still to be seen the ashy shell of what was once a very big tree, supposed to have been about 60 feet in girth. A few miles beyond, at Cumberland Creek, we have the two newly discovered giants. These are situated in sheltered valleys at an altitude of about 2,600 feet. One of them, a White Manna Gum, *E. viminalis*, measures 58 feet in girth at 6 feet from the ground.

The other, a Mountain Ash, *E. stuartiana*, is 70 feet in girth at 4 feet from the ground. The height of these is only about 150 to 180 feet in each case, the top having been blown off through decay setting in. Probably if either of these were felled it would show from 1,500 to 2,000 rings in its butt, thus indicating very great age. I have been informed that in the early days finer trees than these were found in the ranges nearer Wood's Point, but no definite records seem to exist.

In the Dandenong Ranges, at Sassafras Gully, some very fine trees up to a little over 40 feet in girth existed, but all have been destroyed by fires, or by the village settlers in clearing their allotments.

Some very large trees have existed in the Warburton district, especially one, in the hollow shell of which four or five mounted horsemen could stand abreast. Following the ranges round to Gilderoy, and on to Beenak, here and there large trees were to be found. At Spicer's, Mount Myrtalia, Gilderoy, there is a hollow tree in which ten or twelve visitors can sit round a table for afternoon tea.

Beyond Beenak, along the ranges at Noojee and Neerim, many fine specimens existed. The "Neerim Giant," measured by a Government surveyor, was 48 feet in girth and 325 feet high, with the top broken off. This fine specimen has gone, like many others, through neglect, and has been reduced to ashes. About a mile from this I found a tree, since known as Barker's "Duke," which measured 40 feet in girth. Thence further along the ranges towards Mount Baw Baw other giant specimens have been known on private property, but no records have been made of them.

If we cross over to the South Gippsland Ranges we will find the same class of country, the same quality of soil, and the same conditions existing. At Yarragon, and thence across to Mirboo, some fine specimens once existed, but have now mostly been destroyed. "Hercules," at Wynstay, near Yarragon, was a monster, growing in red volcanic soil, but came to its end by fire; its hollow trunk measured nearly 30 feet in diameter. The forests here were noted for their tall trees. The tallest yet heard of was at Childers, and was felled for the local saw-mills, and many thousands of palings were split from its trunk, which was of no great girth, but measured 300 feet to the first branch, beyond which was a head of 50 feet of foliage.

Turning to the Otway Peninsula, we find "Old Joe," at Lorne—a good solid trunk, without spurs, 40 feet in girth, and over 200 feet high. Others existed at Apollo Bay, a little further south, and at Beech Forest, more to the west, but no records have been made of them, and probably, in the general destruction, they have now passed out of existence.

On the Geological Survey Quarter-sheet, 3 N.E., issued in 1865, which includes the Plenty Ranges, there is marked on the western slopes of Mount Disappointment the position of a tree having a circumference of 46 feet 8 inches at 2 feet from the ground.

From these notes it will be seen that the giant trees now existing are few and far between, and in consequence of the little interest taken in them, either by the Government or private individuals, in the course of another half-century they will have ceased to be. The constant recurrence of drought and bush fires will surely overtake the few that remain with us, and our grand and great grandchildren will only hear of the great plants whose seeds were sown in the ground probably about the commencement of the Christian era, or they may perhaps see a photograph of one handed down by those interested in them; but the great giants themselves, the parents of our forests, will have passed away, unless some interest is awakened in the meantime, and an effort made to conserve and protect some of the finest specimens.

In many cases hollow giant trees have been made use of as temporary shelters by the selectors on whose land they happened to be until more suitable structures could be erected. In some instances they have been permanently retained for use. Thus, one at Neerim was turned into a three-storied dwelling; the topmost flat was used as a bedroom, the middle flat as a sitting room, whilst the basement served as a kitchen and diningroom. At Yarrawonga an old couple made use of a hollow Red Gum, *E. rostrata*, as a dwelling-place for more than twelve years whilst depending upon fishing for a livelihood. At Kerrisdale, in the Yea district, a hollow giant Red Gum has afforded welcome shelter to many a sundowner, or swagman, for years past. They have been utilized as storehouses, as stables for horses, bullocks, and calves, and also as pig-styes. A very large tree once existed at M'Donald's Track, South Gippsland, in which a teamster was known to stable his team of 12 bullocks. Felled across a creek from bank to bank they have been used as bridges, in one case which came under my notice saving a walk of four miles out of seven which would have been necessary had it not been for this mode of crossing. Others have been turned into look-outs, as for instance the two specimens at the Hermitage, Blacks' Spur, which are ascended by means of permanent staircases to 60 or 70 feet above the ground.

It is not improbable that in the past history of Victoria even larger trees than those mentioned have existed, but have by some means or other been destroyed. The selector, usually a rough and ready man, with but little poetry or sentiment in his otherwise sturdy character, is blind as to the origin or history of these great

plants, his one desire being to see his land cleared and grass growing for the sustenance of his stock. No doubt old age has told its tale on many of the great trees, but the firebrand has proved the more easy and expeditious method for their destruction.

Another enemy to the giant tree must also be mentioned, by which their destruction is accomplished, though in a slower way. In many of our Victorian forests vast patches of white trees can be seen, giving at a distance the impression that the hill or country in question is covered with snow. Travellers to Marysville, when descending the further side of the Blacks' Spur, can see on the eastern slopes of Mount Juliet white patches and stripes near the summits of the ridges. These are vast patches of eucalyptus trees, white as spectres, all dead without having been rung or yet bearing any sign of having been charred by fire. For a time it was conjectured that falls of snow, followed by frost, were responsible for the death of the trees. More recent opinions have ascribed the cause to the depredations of insect larvæ, most probably some species of borer beetle.

So far as I know no official investigation has been made into the question, and what has been stated is merely conjecture. In the South Gippsland mountains great strips of forest are thus made bare, and are discernible as white stripes on the hills. Many years ago I deemed this of sufficient importance to secure negatives for future reference. As far as my observations went, these dead areas ran in long narrow strips having an east and west direction. My opinion is that some cause existed sufficient to destroy the trees long before they arrived at maturity. The natural death of eucalyptus trees can be seen everywhere in our forests. All the great giant trees are far advanced in their natural course of life, all with the tops broken off, and the tumbling branches giving us positive evidence of the decay existing above. Smaller trees by the roadside afford the same evidence. We see their topmost branches wither downwards, clearly showing that the tree has no longer power to force its sap to the highest branches, and death is the natural consequence.

For years the State has maintained a Forest Department, several Chief Conservators of Forests have held office, nurseries have been established, and after all this great expenditure our efforts at forest conservation have been pronounced a failure by the press. The public has been told officially that we have no giant trees, and the cause of the destruction of thousands of great gum trees in our forests has never been investigated; in fact, the general public is entirely ignorant that such wholesale destruction of our forests is slowly, but surely, taking place.

In the very early history of Victoria reports were circulated of the existence of large trees in the mountain ranges; but that

these trees were the oldest inhabitants of the land seems never to have occurred either to public or private individual. They seem to have been regarded merely as profitable sources for the firewood dealers. The final touch in the matter of officially ignoring the giant trees of Victoria was given during the last International Exhibition in Melbourne, when the representative of the United States requested the Government to guide him to one of the forests, so that he might see a specimen of our giant trees. He was officially informed by one of our Executive Ministers that we had no giant trees, and therefore it was of no use to conduct him to any of the forests.

In America the existence of such trees has been made a profitable asset to the country, in being held out as an incentive to tourists to visit them. Here we have had an equally valuable asset, but for the sake of the few hundred pounds which might be necessary to clear sufficient space around the well-known ones to protect them from the ravages of bush fires, or to offer as rewards for the discovery of fresh examples, this grand asset has almost slipped away from us. Want of means can be no excuse, for nearly one million of money was spent on the Exhibition referred to—with what result !

The question arises—Is it yet possible to revive an interest in our few remaining giants? I think it would be still possible to gather much information, for purposes of record, before the few remaining giants finally pass away. If an association of persons interested were to meet periodically, and by correspondence or visits to the forests get together such information as may be procurable, it might then be published, either officially or privately. To allow this generation to pass away, and with it much of the knowledge of these giants, of whose age and history we know so little, would be a disgrace to a people priding themselves on the advanced state of their civilization. Without doubt in future years scientific men in all parts of the world, when studying the varied aspects of plant-life, will come across references to the giant trees which once existed in Victoria, and will send to our grandchildren, or may be our great grandchildren, for authentic records of the same. Finding they can get no satisfactory information, they will naturally conclude that the so-called giant trees existed only in our imagination, and originated in the early days from stories told us by the aboriginals.

Geologists might possibly be able to tell us something of the causes which have led to the production of such magnificent examples of the vegetable world. Possibly one or two facts which have come under my notice may be of help in this direction. The altitude above sea-level at which they grow has now been pretty well determined. Near the coast we find them, as a rule, at from 300 to 600 feet above sea-level, especially in the Gipps-

land mountains. As we proceed inland to the Great Dividing Range the altitude increases. Thus "Big Ben" stands at about 1,000 to 1,200 feet, while the recently-discovered giants beyond Marysville are found at about 2,600 feet. Perhaps early geological history has something to do with the question. If we travel by the Gippsland railway we go, as it were, along a great valley, between the Baw Baw mountains on the one hand and the South Gippsland mountains on the other. If we stop at Beaconsfield, at a mile from the station, on the first rise of the hill, we come to a deposit of white sand, of considerable area. Eighteen feet down and we are not at the bottom of it. Higher up the hill, towards Upper Beaconsfield, a similar formation is found. If we go to Pakenham station, seven miles further, and walk a few miles towards the Gembrook hills, we find another similar deposit of pure sand, suggesting that the ocean once washed the shores of these spurs of our Gippsland mountains; but I am unaware whether a similar formation exists on the opposite side of the valley, along the spurs of the South Gippsland ranges.

In placing the foregoing information before the Field Naturalists' Club I must be permitted to state that, while making our giant trees a favourite study, I did not do so as a botanist, as I have but a superficial knowledge of that branch of science. It is my profession as a photographer which has continually brought me into close contact with them, and, being of an inquiring and observant temperament, I have gradually been led to make a study of them. If the few facts I have now stated be the means of awkening official and public interest in them, and lead to the collecting and recording of information for the benefit of future generations, then I will consider myself well repaid in the interest that has been aroused.

WILSON'S PROMONTORY AS A NATIONAL PARK.

The proposal to reserve Wilson's Promontory as a National Park has now been before the public for a period of nearly twenty years. I can find no record as to who originated the scheme, but tradition in the Club ascribes to Mr. J. B. Gregory the credit of bringing it forward, and of long and strenuously advocating the cause. In the second volume of the *Victorian Naturalist* will be found an account of a trip made to the Promontory at Christmas, 1884. The party consisted of Mr. Gregory, Mr. A. H. S. Lucas, and Mr. Robinson. They went from the Trafalgar railway station to the lighthouse. Probably the idea of the reservation then arose in their minds. The almost complete isolation of the locality, with its dense fern gullies and occasional well-wooded hills, would

appeal to them as well fitting it to the purpose in view, while the beauty of the scenery was such as to appeal to all as being worthy of a people's park.

Meanwhile, other influences were at work with a view of cutting up the area in question. On 8th July, 1887, Mrs. Gordon-Baillie waited on the Minister for Lands, Mr. J. L. Dow, and endeavoured to secure a grant of 45,000 acres of land, near the Promontory, for the settlement of some Skye crofters. It was intended, she said, to settle 1,000 of them on freehold allotments, their chief industry to be fishing. The question was discussed in the press (see, for instance, the *Argus* of 9th, 11th, 12th, and 13th July). On 16th July a long letter appeared by Mr. J. L. Purves, in which he gave an interesting description of the district, or more especially of the coast line and parts adjacent. He advocated the reservation of township sites on the various bays, but did not appear to think the country of much value except for sightseers and for fishermen to spread their nets. By the regulations then existing no facilities were given for the alienation of small blocks.

The result of this endeavour of Mrs. Gordon-Baillie's was apparently to urge Mr. Gregory to do something definite, and he moved that a deputation wait on the Minister (*Vict. Nat.*, iv., p. 66, 8th August, 1887). This deputation saw Mr. Dow in February of the following year, and was attended by members of our Club, and of the Royal Society, the Royal Geographical Society, and the Academy of Arts.

A brief note in the *Naturalist* (vol. iv., p. 197) says that the proposal was favourably received, "and there was every probability that the greater part of the peninsula would be reserved." Nothing, however, was done, and in May, 1890, the Club again approached Mr. Dow. The *Naturalist* (vii., p. 16) says that the Minister was thoroughly in accord with the object the deputation had in view, and he promised that "the remainder"—whatever that was—"would be permanently reserved for State purposes," and "suitable regulations would be prepared by the Lands Department and submitted to the Club for its approval." It was then thought that everything was satisfactory. The maps prepared some time afterwards showed that the site was reserved for a National Park, and the *Game Act* specially forbade the killing of any native animals, excepts snakes, on the reserve (*Government Gazette*, 4/11/98).

Since that time the land has been held under three separate grazing rights, and a comparatively small number of cattle have been run on it. In September last it was brought under the notice of the Club's committee that a further encroachment was contemplated, and the land was to be cut up into 1,000-

acre grazing blocks. Mr. F. G. A. Barnard laid the matter before the general meeting of the Club, and Mr. F. Wisewould, the other of our vice-presidents, brought it under the notice of the Royal Society Council. As secretary of the latter body, I was instructed to write to the Minister, the Hon. J. Murray, and request him to stay his hand till we could arrange a deputation. The Club meanwhile appointed the president (Mr. Sayce), Mr. Wisewould, and myself to act on its behalf. Events moved quickly, and I received what, through delay in receiving the Minister's letter, amounted to two days' notice of his willingness to receive a deputation. There was no time to meet to draw up a statement of our requests, but still several leading men were seen, and we managed to get representatives of the Club, the Royal Society, the Royal Geographical Society, and the Ornithologists' Union to promise to attend.

Meanwhile it was necessary to find out exactly how matters lay. With the assistance of Mr. A. D. Hardy, a member of our committee and an officer of the Lands Department, it was discovered that we had been living in a fool's paradise. There was no permanent reservation, which would have meant the necessity of an Act of Parliament before the land could be applied to any other purpose. Instead of this we found that not till 1898 had a still later Minister of Lands, Mr. R. W. Best, reserved the land, and then only as a temporary reserve for the site of a National Park (see *Government Gazette* for 8/7/98, p. 2,690). A reserve under these conditions, as the Club has repeatedly found by sad experience, is practically of no value. It is under the absolute control of the Ministry, and may be alienated at will.

Our deputation was duly made, and was a representative one. It was introduced by our fellow-member, the Hon. Frank Madden, Speaker of the House. He earnestly supported our claim. Professor Baldwin Spencer, as president of the Royal Society, gave the details, and several other gentlemen spoke. The Minister said he had already thrown the leases open, but would lay the matter before the Cabinet. This he did, with the result that the subdivison was cancelled, and for this respite we owe him our warm thanks.

Still it was felt that matters should be further advanced, and that at once. There was no need for any delay, and Professor Spencer and myself, as representatives already appointed by the Royal Society and the Club, thought that a public meeting should be called. A letter to the press by the Professor roused interest in the matter, and offers of support were received on all sides. A strong committee met at the Town Hall and the meeting was decided on, Professor Spencer being appointed secretary of the movement.

The public meeting was held on 7th October, in the large hall of the Athenæum, and was well reported by the papers of the following day. It was a decided success. The Lieutenant-Governor, Sir John Madden, presided. Professor Baldwin Spencer stated why the meeting was called, and what we had made up our minds to get. The chief resolution, stating that we desired the area to be proclaimed a National Park, and to have it vested in trustees as a heritage of the people for ever, was proposed by the most fitting man in the community, Mr. E. G. Fitz Gibbon, who for more than fifty years has fought the battle of the people's parks. His was a stirring speech. He was supported by Dr. Carty Salmon, who represented the A.N.A., by Rev. Dr. Bevan, and Hon. Frank Madden.

The Hon. Frank Stuart proposed the names of a large committee, representing all the scientific societies, and comprising as well the names of many influential men, to lay the resolution before the Premier, Mr. Bent, and the Minister of Lands, Mr. Murray. During the evening a fine series of lantern slides by Dr. F. Bird and Mr. A. G. Fryett, illustrating the Promontory, as well as a few showing the New South Wales National Park and the United States National Park, were shown by the Club's honorary lanternist, Mr. J. Searle.

Here for the moment the matter rests, but, judging by the enthusiasm of the meeting and the wide support the movement is receiving, there seem to be good grounds for feeling confident of our ultimate success.—T. S. Hall.

Addendum.—After some delay the committee was notified that the deputation would be received by the Minister of Lands, the Hon. J. Murray, on 7th December. The deputation was a large and influential one, comprising representatives of the Field Naturalists' Club, the Royal Society, the Ornithologists' Union, the Royal Geographical Society, the Zoological and Acclimatization Society, the Victorian Anglers' Association, the Australian Natives' Association, the Trustees of the Public Library and the Exhibition Building, besides several leading public men. The Hon. Frank Madden, Professor Spencer, the Hon. Frank Stuart, and others spoke. The Minister said that before giving a decision he would visit the locality, and invited some of those interested to accompany him. However, a few days afterwards it was announced in the press that the Cabinet had decided to permanently reserve the Promontory, but owing to the holidays we are not yet aware under what conditions this has been done. Nothing short of permanent reservation under trustees should satisfy us, and if a sufficiently strong public feeling be worked up in favour of this we shall get it, but there is danger in letting the matter drop.—T.S.H. 3rd January, 1905.

Where the Pelican Builds.—Mr. G. W. Rutherford, of Boorooma station, *viâ* Brewarrina, N.S.W., writes as follows :—"I have often heard some doubt expressed as to whether Pelicans make their nests and hatch their young in New South Wales, and have always been under the impression that they did not do so. I find I am mistaken, as at the present time (November, 1904) on this run, at a spot where the Narran River empties into the Narran Lake, there are a great number of nests—in fact, a regular 'rookery,' covering about three acres, in which the eggs are in all stages. Many eggs are already hatched, and the young birds very much in evidence. The eggs are about the size and colour of a goose egg. Heaps of dead fish are strewn about the ground, which have been carried to the nests by the old birds."—*Australasian.*

Native Bread.—Under the title of "Native or Blackfellows' Bread," Mr. D. M'Alpine contributes to the *Agricultural Journal of Victoria* for November, 1904, an exhaustive article on the fungus *Polyporus mylittæ*, C. and M., known as "Native Bread," which is particularly well illustrated. It is just seventy years years since the first account of this fungus was written by J. Backhouse in an article descriptive of the roots and other indigenous esculents of Van Diemen's Land. He remarks that its taste somewhat resembles boiled rice, but that like the heart of the tree-fern and the root of the native potato—the orchid *Gastrodia sesamoides*—cookery produces little change in it. It has been doubted whether the fungus was ever used as food by the aboriginals. However, definite evidence is given by two gentlemen who had charge of aboriginal stations for many years that it was so used, but apparently, beyond creating a feeling of fulness, it could not have been very satisfying, for Mr. J. H. Maiden, F.L.S., Government Botanist of New South Wales, who tested the substance in a variety of ways, says that it does not contain nitrogen in any form, and is practically unalterable in water or reagents. When cut into pieces and placed in liquid no swelling takes place, the cut edges lose none of their sharpness, nor does the substance soften. When boiled in a dilute alkaline solution, only a small proportion of pectic acid is dissolved, and this is thrown down when the solution is rendered acid. It is immaterial whether it is eaten raw or cooked, as hot or cold water are equally ineffective in acting upon it. It can therefore be of only infinitesimal value as a source of food. He considers the native bread to consist mainly of a modification of cellulose, most probably fungin.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 16th January, 1905.

The president, Mr. O. A. Sayce, occupied the chair, and about 75 members and visitors were present.

REPORTS.

A report of the excursion to Beaumaris on Saturday, 17th December, was given by the leader, Mr. O. A. Sayce, who remarked that comparatively little was known even of the common forms of life inhabiting Port Phillip Bay. He pointed out that Beaumaris offered excellent opportunities to the student of marine life, and said that the afternoon had been mainly devoted to elementary remarks on some of the specimens met with.

A detailed account of the extended excursion to Apollo Bay, Otway Peninsula, from Saturday, 24th December, to 2nd January, was given by Mr. A. D. Hardy, one of the leaders. The report dealt generally with the main features of the district, and was illustrated with a fine series of about forty lantern slides, which gave a graphic representation of the magnificent forest scenery met with. A large number of dried and mounted plants, together with other specimens, were exhibited in illustration of the report.

The Chairman congratulated the members of the party on the results of the trip, and the excellence of the botanical exhibits.

The hon. librarian reported the receipt of the following donations to the library :—"Memoirs of the Geological Survey of Victoria," vol. i., part 3, from the Department of Mines, Melbourne; "Records of the Geological Survey of New South Wales," vol. iii., part 4, from Department of Mines, Sydney; *Agricultural Gazette of New South Wales*, January, 1905, from the Secretary for Agriculture, Sydney; *Geelong Naturalist*, vol. i., No. 3, from Geelong Field Naturalists' Club; *Nature Notes*, December, 1904, from the Selborne Society, London.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. H. W. Jeffrey, 21 Nicholson-street, Abbotsford, and Mr. Chas. Preston, 44 Albert-street, Kew, were elected as ordinary members; Mr. David H. Wilcox, Ivanhoe, as an associate; and Misses A. Bage, J. Bage, H. Wilson, Masters G. Preston and S. G. Johnson; also, from State school 2901, Moonee Ponds, Ethel Birkenhead, Ettie Edwards, Muriel Evans, Jessie Ison, H. Basford, V. Faulke, and J. Sweatman as junior members of the Club.

GENERAL BUSINESS.

Mr. F. Wisewould drew attention to a map of Wilson's Promontory, showing the most likely spots suitable for the introduction and maintenance of native animals and birds, and remarked that residents of the surrounding districts regarded the locality as quite unfitted for a national park, owing to the barren nature of a great part of the area.

The Chairman mentioned that two members of the Club, Miss Freda Bage and Mr. J. A. Leach, had qualified for the degree of Bachelor of Science at the recent examinations of the Melbourne University.

PAPER READ.

By Messrs. C. L. Barrett and E. B. Nicholls, entitled "Bird Notes from Olinda Vale."

The authors recorded a very interesting series of field notes made during visits to the valley of the Olinda Creek, between Lilydale and the Dandenong Ranges. Forty-nine species of birds were under observation from time to time, of which thirty-five were found nesting.

Several interesting notes on the habits of the cuckoo, and the markings of young birds, were made, and the paper was illustrated by about fifty very fine photographs.

Mr. G. A. Keartland complimented the authors upon the paper, and said that very little information regarding young birds and the progress they make are known, even of the commoner birds. The work done by the authors deserved the highest praise, whilst the photographs exhibited were both unique and extremely interesting.

Mr. D. Le Souëf, C.M.Z.S., also remarked upon the good work done by the authors, and specially referred to the photographs exhibited showing the young of the Superb Warbler, *Malurus superbus*, being ejected from its nest by a newly-hatched Narrow-billed Bronze Cuckoo, *Chalcococcyx basalis*.

Mr. A. Mattingley mentioned that he had often wondered whether the young cuckoo acted from reason or instinct in throwing its companions out of the nest.

In reply Mr. D. Le Souëf said that instinct probably moved the bird, and that cuckoos in all parts of the world possessed the same habit.

The chairman congratulated the authors upon their excellent paper, and trusted that others of a similar nature would be brought before the Club.

Owing to the lateness of the hour, Mr. F. M. Reader's paper, entitled "Notes on the Cruciferous Plant, *Geococcus pusillus*," was held over until the following meeting.

NATURAL HISTORY NOTES.

Large Snakes.—Mr. A. Mattingley referred to his exhibit of a large snake skin, and asked for information as to the largest

known snakes, quoting from Baron Nery's "Land of the Amazons" that the Sucurijú, *Boa scytale*, a water snake of that region, is known to attain a length of sixty feet.

Mr. D. Le. Souëf said that collectors from Europe had made special trips to localities where large snakes are known, to secure specimens for exhibition purposes, and it had been stated on reliable authority that no snake is known to exceed a maximum length of thirty-five feet.

Mr. J. A. Kershaw, F.E.S., said that he did not think that snakes of the size mentioned by Mr. Mattingley existed.

A New Shell.—Mr. R. A. Bastow called attention to his exhibit of a specimen of the shell *Amussium pleuronectes*, L., which had been dredged off Steep Point, the most westerly point of Australia, by Mr. W. Farquhar, of Claremont, W.A. This is the first record of its occurrence in Australian waters, the specimens in collections being generally of Japanese origin. It has been recorded, however, for Station 5, Boydong Cays, Torres Straits, by Melville and Steneden, in the *Journal of the Linnean Society of London* for 1899.

EXHIBITS.

By Mr. C. L. Barrett.—Specimens of a species of fly the larvæ of which infest the nestlings of the Spotted Pardalote, *Pardalotus punctatus*.

By Mr. R. A. Bastow.—Shell, *Amussium pleuronectes*, L., from Steep Point, W.A., first Australian locality recorded; *Chiton calliozona*, Pilsbry, found alive in a *Voluta mamilla* in 15 fathoms, associated with a Hermit Crab, not previously recorded from Victoria.

By Miss K. Cowle.—Botanical specimens collected during Otway Forest excursion, including *Drosera binata* (flowers), *Billiardiera longiflora* (flowers and fruit), *Gastrodia sesamoides*, and *Caladenia congesta*; also the mosses *Trichocalea tormentilla* and *Tridontium*, sp.

By Miss S. Cochrane.—Wild flowers from Tasmania.

By Mr. C. French, jun.—Longicorn beetle, *Uracanthus acuta*, a new pest attacking fruit trees in Victoria. Also, on behalf of Mr. Charles Walter, dried specimens of plants collected in the Victorian Alps, December 1904—*Helichrysum dealbatum*, Lab., previously recorded only from E. Victoria and Tasmania; *Pultenæa flexilis*, F. v. M., previously recorded only from E. Victoria and New South Wales; and *Pultenæa ternata*, F. v. M.

By Mr. C. J. Gabriel.—Rare Victorian shells, *Modiola arborescens* and *M. victoriæ*, from Western Port Bay; also *Pecten septemradiatus* and *P islandicus*, from Norway; *P. hastatus*, from North America; and *P. tranquebaricus*, from Penang.

By Mr. A. D. Hardy.—Botanical specimens collected during Otway Forest excursion—viz., flowers and fruit of economic

trees, including Native Olive, *Notelæa ligustrina*, Vent.; Satin Box, *Eriostemon squameus*, Lab.; Cheesewood, *Pittosporum bicolor*, Hook., &c., with corresponding timber specimens lent by Forests Branch, Department of Agriculture; thirty species of ferns, including *Cyathea cunninghami*, J. Hook., *Aspidium hispidum*, Swartz, *Asplenium flaccidum*, and *Pteris arguta* (*tremula*), Aiton, &c., and the moss *Dawsonia superba* (new locality); also, an incrustation of gypsum from a dark cave at Point Patten, impregnated with the alga *Pleurococcus vulgaris*.

By Mr. G. A. Keartland.—Barraband's Parrakeet, *Polytelis barrabandi*, a young male, aged eight months, showing the red on the inner webs of the tail feathers.

By Mr. C. P. Kinane.—50 photographs, in illustration of Messrs. C. L. Barrett and E. B. Nicholls's paper.

By Mr. A. Mattingley.—Skin of snake from Borneo. The snake measured, in the flesh, 33 feet in length; the skin, owing to sun-drying and tanning, is now 26½ feet long.

By Mr. J. Newell, jun.—Beads worn by natives at Broome, W.A.; also eggs of Australian tree-lizard.

By Mr. E. B. Nicholls.—Specimen of Pigmy Flying-mouse, *Acrobates pygmæus*, captured at Olinda Creek, South Wandin; also a White-lipped Snake from Cunninghame.

By Mr. F. Pitcher, on behalf of Director Melbourne Botanic Gardens.—Blooms of *Eucalyptus ficifolia* (various shades), *E. calophylla*, *E. calophylla*, var. *rosea*, *Acacia elata*, *Sterculia acerifolia* (Flame Tree), and *Melaleuca genistifolia*, all Australian trees, now flowering profusely in the Gardens.

By Mr. E. O. Thiele.—Geological specimens from Mt. Wellington, North Gippsland—Graptolites, striated boulder from a palæozoic conglomerate, chromite, serpentine, &c.

After the usual conversazione the meeting terminated.

EXCURSION TO WARBURTON.

Warburton, situated on the Yarra, nearly fifty miles from Melbourne, offers many attractions to the field naturalist, and it was with pleasurable anticipations that a party of six left town by the early train on Saturday, 12th November, to spend the greater part of three days in that sylvan district. The journey, as far as Lilydale, is rapidly losing its bush-like appearance, and consequently its charm for the naturalist, but the next few miles, during which the train climbs the hills approaching Olinda Vale station, offer many opportunites to the botanist to note various shrubs, &c., in bloom. Here in many places *Grevillea alpina* made a goodly show, while *Leptospermum scoparium* and *Daviesia latifolia* added variety to the scene. Passing through the lower country about Wandin, the last remaining blossoms of the Acacias

and Pultenæas were seen. Further on, at Woori Yallock, fine specimens of the Black Wattle, *Acacia mollissima*, were just bursting into the fullest glory of their flowering period. Some pools here seemed to offer great possibilites to the pond-life worker. Launching Place, the scene of two recent outings of the Club, gave us our first glimpse of the Yarra, and hereabouts *Leptospermum lanigerum* was greatly in evidence. Traversing the flat country towards West Warburton quantities of *L. scoparium* were seen, which on a favourable day should afford the beetle-hunter all he desired. Another turn and we almost traverse the bank of the Yarra, the main road only intervening, and in a few minutes we reach our destination. Accommodation having been bespoken at the Alpine Retreat Hotel, we wended our way thither and disposed of our baggage, &c. After lunch we started off along the only road of the district, which follows alongside the Yarra, at times less than a stone's throw from the stream, sometimes more distant. The vegetation of the Four-Mile Creek at its junction with the Yarra attracted us, and among other specimens secured here were *Lyonsia straminea* (almost in flower), *Pultenæa muelleri*, and *Hedycarya cunninghami* (the Native Mulberry), whilst *Clematis aristata* festooned the shrubs in great luxuriance with its sprays of creamy-white flowers At Pheasant Creek the flowers of the Sassafras, *Atherosperma moschata*, were added. Further on the road rounded the end of a spur, which a few days before must have presented a glorious sight, from the quantities of Pultenæa blooms just over. Many pretty views of mountain and river are obtained along the road, while its sides are bordered by such flowers as *Goodenia ovata*, *Billardiera scandens*, *Platylobium formosum* (very fine), *Asterotricha ledifolia*, *Aster stellulatus*, and *Senecio vagus*. Some very fine gum trees alongside the road attracted our attention, and near by the Oak Fern, *Pteris incisa*, grew in great luxuriance. Our lepidopterian made many attempts to secure the fine Mountain Brown Butterflies, *Epinephile abeona*, which flitted tantalizingly about, and finally succeeded. After crossing the end of another spur we came upon some swampy country, where the sweet-smelling *Melaleuca squarrosa* was plentiful. Postman's Creek, and finally Big Pat's Creek, about three miles from Warburton, is reached. Here the ladies rest awhile in the shade of the overhanging trees, while two of the gentlemen wander on for another mile in the hope of securing something more notable. Near the East Warburton State School specimens of the rarer Star Fern, *Gleichenia dicarpa*, are collected, while *Bauera rubioides* decks the roadside. There being no other road, the same route had to be followed on the return journey, during which a few more specimens are added. A young gum sapling was remarked here covered with scale-insects busily secreting a substance having all the appearance

and flavour of manna, as ordinarily picked up on the ground under the large White Gums. A few fine bushes of *Pimelea ligustrina* grow alongside the road near the township. By the evening train two additional gentlemen arrived to join our party.

Having made some preliminary inquiries, it was decided to devote Sunday to a visit to the Cascades, near the head of the Four-Mile Creek, to which Mr. Purdey, jun., kindly offered to act as guide. Before breakfast a scramble in a gully close to the township revealed a promising spot for the Monday. Two friends at the hotel having decided to share in our adventures for the day, we made a party of ten, four being ladies. Our road lay through "Lala," where we picked up our guide, then, crossing the Four-Mile Creek on the Old Warburton road, we headed up a steep spur for about a mile, when, coming to a disused water race, cut years ago for mining purposes, and following a contour line along the hillside, we turned eastwards, and were soon in a thick tangle of shrubs and tree ferns. In the ditch alongside us were numerous smaller ferns, such as *Gleichenia flabellata*, *Lomaria lanceolata*, *L. fluviatilis*, &c. Following along this path, crossing one or two smaller streams, we again came to the Four-Mile Creek. Here we must have been about 1,000 feet above Warburton, or some 1,500 feet above sea level. Leaving the track, such as it was, we now commenced a scramble almost up the bed of the creek, which descends the hillside at a grade of about 1 in 1, amidst a luxuriant growth of tree and other ferns. In about a mile, and perhaps a thousand feet higher, our guide said we had come to the best part of the Cascades, and finding almost the only spot where it was possible to camp, left us to our own devices for the rest of the day. The billy was boiled and lunch disposed of. Then, leaving the ladies to explore the immediate vicinity of the camp, the gentlemen decided to climb higher, and, if possible, reach the crest of the range. It was hard work scrambling in the gully amidst such a wealth of tree ferns, but we got some glorious glimpses of giant ferns, and also of giant trees, for growing on the hillside were some of the straightest and most symmetrical trees it has been our lot to see, while many of them must have been from ten to twelve feet in diameter, and of great height. However, the climb did not yield many specimens, a few Mountain Brown Butterflies being almost the only representatives of entomology, and the vegetation, with the exception of *Oxylobium ellipticum*, was of the usual fern-gully type. Having nearly reached the summit, which must be over 3,000 feet above sea level, we decided to return, and on account of the steepness were back at the camp in less than no time. Here afternoon tea was disposed of, and as the weather looked threatening—in fact, as billows of mist were rolling over a distant ridge into a neighbouring valley—we deemed it time to pack up and make a start for home. Close

by grew a fine tree of *Persoonia arborea* (in fruit), also *Pittosporum bicolor*. A few ferns, such as *Lomaria fluviatilis*, *Polypodium decompositum*, having been added to our collection, we worked our way down to the water-race, where several more ferns were secured for home cultivation. Before leaving the race a bush of the white-flowered variety of *Eriostemon hillebrandi* was observed. After a scramble down the hillside, the hotel was reached again about 7 p.m., none the worse for the trip, but rather tired after our six-mile walk and climb, which, from a collector's point of view, was hardly worth the exertion entailed.

Monday morning promised to be hot, so we determined to work up Scotchman's and Backstairs Creeks towards Old Warburton. These valleys afford visitors to Warburton an excellent picture of bush scenery with comparatively little trouble, for a well-made pathway is cut along the hill sides, from which numerous pretty glimpses of tree ferns, Musk, Hazel, Native Laburnum, Privet-leaved Pimelea, Dogwood, and other shrubs, some in bloom, others just over, are obtained. A pretty little labiate growing here was *Teucrium corymbosum*. At the head of the creek the country opens out, and one can return down another track to the township, but we decided to follow the old road towards West Warburton, and though we had a long, hot walk of nearly three miles from that township back to the hotel, still the two miles and a half from Old Warburton down to the main road was all that could be desired from a botanist's point of view. The road is cut along the side of a ridge sloping down to Yankee Jim's Creek, the scene of much sluicing in the early days, but now having its opposite side scarred with a timber tram. The valley itself is a delightful picture of shrubbery, &c. On our left the hillside was gay with flowers, here the deep yellow *Pultenæa muelleri*, there the orange-red of *Eutaxia empetrifolia*, brilliant in the extreme, or the delicate pink or deep magenta of *Tetratheca ciliata*. *Pultenæa daphnoides* was over, but *Sphærolobium vimineum* was very fine and abundant. As we descended, the bright blue orchid, *Thelymitra aristata*, was fairly common, and finally we reached a tract of country which, from its vegetation, put one in mind of the heath ground at Sandringham. Here *Dillwynia floribunda* was very brilliant, *Bœckea diffusa*, *Eucalyptus gunnii*, the beautiful blue *Dianella cærulea*, *Patersonia glauca*, and others were added to our list. We then turned homewards along the road, and found it hot and dusty after the wooded hillsides. After lunch two ardent explorers made the final trip of the outing, across the river to the falls on the Yithan Creek, close to which may be seen large bushes or trees of *Correa lawrenciana*, *Coprosma billardieri*, &c., also *Asplenium umbrosum* and other ferns; but during the last twelve months much of the vegetation here has been destroyed by the operations of a sawmill and its attendant settlement. As the Yithan rises

in Mount Juliet, and has a long southerly course, we would suggest that on a future excursion it would be worth while giving a whole day to the exploration of its valley. Again, a little earlier in the season a botanist would do well on the hills between Old and West Warburton. Altogether over one hundred species of plants were noticed in bloom during the three days.

The entomological results of the excursion are not very striking. Two members devoted considerable attention to lepidoptera, but their list is not a formidable one. Of butterflies *Epinephile abeona*, *Pyrameis kershawi*, *P. itea*, and *Hesperilla donnysa* were the only species captured, though *Papilio macleayanus* was seen near the head of Four-Mile Creek. Among moths the only species taken were *Porthesia obsoleta*, *Spilosoma curvata*, *Agarista lewinii*, and an unnamed species of Darala taken at a lamp at night. It is difficult to account for the paucity of specimens in such an apparently favourable locality, and it can only be attributed to some seasonal effect. With regard to beetles, though *Leptospermum scoparium* was in bloom in great profusion, the absence of a coleopterist may account for the small number of species secured. Among those collected may be mentioned a rather large specimen of *Cisseis leucosticta*, Kirby, and examples of *Macroues capito*, Pasc., and *Crepidomenus filiformis*, Cand.; but the district is one which should, if well worked, yield a fair reward to the coleopterist.

The weather during the three days was all that could be desired, and the party returned to town sincerely hoping that it would not be the last Club visit to that part of the Yarra basin.—F. G. A. Barnard; G. Coghill.

SOME MELBOURNE MOSSES.

By Rev. W. Walter Watts.

(Communicated by Mr. F. G. A. Barnard.)

(*Read before Field Naturalists' Club of Victoria, 7th Nov.*, 1904.)

When spending a week or two in Melbourne, in September, 1902, I took the opportunity of collecting some mosses and hepatics, mostly within a short distance of Heyington railway station, which is situated close to the banks of the River Yarra, about four miles east of the City.

The species of mosses which were unfamiliar to me I submitted to Dr. Brotherus, of Helsingfors, who states that four are new to science. These he provisionally names *Barbula glaucula*, *Funaria* (*Entosthodon*) *bullata*, *F. perpusilla*, and *Pottia subphyscomitrioides*, and will describe them fully at an early date.

As my list contains several interesting records, it is possible that it may be of service to fellow-workers in your city, and I therefore avail myself of this opportunity to present it for consideration.

For convenience of reference I have arranged the species in alphabetical order.

Acaulon sullivani, C. M. Shady bank of Yarra, Heyington. First found by the late Mr. D. Sullivan, and apparently widely distributed, as it is common in New South Wales.

Astomum cylindricum, Tayl. Bank of railway, &c., Heyington.

Barbula acrophylla, C. M. Heyington-place, Toorak. The only previous record apparently is the original record of Mr. Sullivan—viz., Moyston.

B. calycina, Schwgr. Heyington station.

B. chlorotricha, Broth. et Geh. Damp banks of Yarra, Heyington. This species was described from specimens collected at Tilba, N.S.W., by Mr. F. M. Reader. I found it on the banks of the Nepean, as well as of the Yarra, in each case associated with *Bartramia strictifolia*.

B. glaucula, Broth., sp. nov., in sched. (30/4/04). In drain, roadside, Heyington-place, Toorak.

B. torquata, Tayl. Bank of Yarra, Heyington.

Bartramia strictifolia, Broth. et Geh. Bank of Yarra, Heyington.

Bryum argenteum, L. Heyington.

B. pachytheca, C. M. Heyington.

Campylopus clavatus, R. Br. Near Heyington station.

Eccremidium pulchellum, H. f. W. Heyington, near station; fairly plentiful. This find is interesting, the only records I know of previously being the original "Swan R., W. Austr.," and a doubtful one of Mr. Whitelegge's in New South Wales.

Fissidens elamellosus, Hpe. et C. M. Railway bank, &c., Heyington. The banks of the Yarra yielded the late Baron von Mueller's original find. Dr. Brotherus has recently returned me this species among material collected by me near Young, N.S.W., and by Mr. Bäuerlen in the Cobar district.

F. macrodus, Hpe. Near Heyington station, on bank of Yarra, &c.

F. vittatus, H. f. W. By roadside, Heyington.

Funaria (*Entosthodon*) *apophysata*, Tayl. Heyington.

F. bullata, Broth., sp. nov. (30/4/04). On hard ground, top of railway embankment, Heyington.

F. perpusilla, Broth., sp. nov. (30/4/04). *Ibid.*

Hypnum tenuifolium, Hedw. Heyington.

Pleuridium gracilentum, Mitt. Heyington, several places. This appears to be the first record for Victoria. Previous localities, Western Australia and Tasmania.

P. tenellum, Mitt. Near railway station, Heyington. The only previous record I know of is the original locality of Archer, in Tasmania.

Pottia brevicaulis, Tayl. Footpath, "Avonhurst," St. Kilda-road, Melbourne.

P. subphyscomitrioides, Broth., sp. nov. (30/4/04). *Ibid.*, and at several spots near Heyington station.

Racopilum convolutaceum, C. M. Heyington.

Tortula atrovirens (Sm.), Lindb. Heyington; frequent.

T. muralis (L.), Hedw. Heyington-place, Toorak.

T. vesiculosa, C. M. On trees, "Avonhurst," St. Kilda-road, and Irving-road, Toorak. Originally found by Mr. Sullivan at Mt. Ararat and Mr. J. Stirling in the Alps, and apparently not recorded since.

Stereodon cupressiformis, L. Heyington.

Triquetrella papillata (H. f. W.), C. M. Heyington.

Weisia flavipes, H. f. W. Heyington, bank of Yarra.

In addition to these mosses, I have the following hepatics to record, determined by M. Stephani, of Leipzig:—

Fossombronia papillata, Steph. On ground, Heyington, near station.

F. wattsiana, Steph., sp. nov. (Dec., 1903). On ground in paddock near Heyington station.

I also take the opportunity of recording the results of small collections of mosses forwarded to me by Mr. A. G. Campbell, from the Dandenong Ranges, Victoria; King Island, Bass Straits; and Cataract Gorge, near Launceston, Tasmania. All collected in November, 1902.

From the Dandenong Ranges he sends *Pogonatum australasicum*, Hampe et C. M.; *Ditrichum affine*, C. M.; *Bryum pyrothecium*, Hampe; and *B. leptothecium*, Taylor.

The collection from King Island seems to show that that island is not rich in species, for in addition to the inevitable *Campylopus introflexus*, Hedw.. *Funaria hygrometrica*, L., and *Ceratodon purpureus*, Brid., the only species included are *Bryum pyrothecium*, Hampe, and *Barbula calycina*, Schwgr.

The Cataract Gorge, Launceston, specimens are *Bryum pyrothecium*, Hampe; *Polytrichum juniperinum*, Willd.; *Rhacomitrium heterostichum*, Hedw.; *Grimmia trichophylla*, Grev.; and *Ceratodon purpureus*, Brid.

NOTE ON RED-WINGED LORY, *PTISTES ERYTHROPTERUS*, Gmelin.

By G. A. Keartland.

(*Read before the Field Naturalists' Club of Victoria*, 12*th Dec.*, 1904.)

About twelve months ago a friend, Mrs. Chas. Clarke, of Mary Vale Station, Queensland, kindly presented me with a pair of beautiful Red-winged Lorys. They were young and very

tame, and early in October last showed signs of breeding. Whenever the male secured a choice morsel of thistle or any other dainty he ate as much as he could, and then, after displaying many marks of affection, proceeded to feed his mate in the same manner that a pigeon would its young, until he had emptied his crop into hers. The hen bird made repeated examinations of the hollow log in which other parrots had previously bred, but it did not seem to meet with her approval, However, on 30th October I noticed her sitting on the floor of the cage, under the log, and soon afterwards an egg was lying there. I put a box about 6 inches square just where the egg was, first putting some earth and sawdust into it to give it weight and form a nest. I placed the egg in the centre of the nest, and she immediately sat on it, turning round and round many times. On the 31st she laid another egg on the floor, which I put with the other. As the box was evidently too small, I broke away one side to within an inch of the bottom. The next two eggs were laid on the 2nd and 3rd November in the nest, and the female commenced to sit. The male now behaved in a most eccentric manner. Whenever he saw anyone approaching with choice food he would fly backwards and forwards from the perch to the nest many times, occasionally making a playful peck at his mate. After eating the food he at once flew on to the side of the nest and fed her. The female was only seen to leave the nest three times in fourteen days. The male never sat. This I believe to be very characteristic of many of our parrots. Whenever I have disturbed one from its nest in the bush, it has invariably been the female. Whilst the hen birds are sitting the males form flocks by themselves, and, as occasion requires, repair to the nest to feed the female. After my bird had been sitting a fortnight two of the eggs were unfortunately broken, both of which contained birds. The remaining two were not fertile.

Whilst writing the above I thought it would be interesting to exhibit a few skins of these birds from West Kimberley, Queensland, and New South Wales, for the sake of comparison, as Gould separated the north-western from those obtained on the eastern side of the continent into two species. To the former he gave the name of *Ptistes coccineopterus*, and to the latter *P. erythropterus*.

In this, I believe, he is mistaken. He mentioned several trivial variations in plumage and size, but one has only to keep a pair of birds from anywhere along the eastern or northern parts of Australia in captivity for a few months, and all the changes alluded to may be noticed. When the feathers are new the colours are bright, but as they become old they fade and lose much of their former brilliancy. With regard to the size, I cannot find any difference except what age will account for. I

am therefore glad to see that the British Museum authorities have now abolished the name of *P. coccineopterus*. What strengthens this view, in addition to the specimens exhibited, is the fact that at several of our bird shows I have seen a number of these parrots, in full plumage, from various places, extending from eastern New South Wales to Derby in the north-west, and could not detect the slightest difference.

Another statement Gould makes is that they are naturally shy and wary, and seldom become tame or familiar in captivity. This is the reverse of my experience. I never saw one in captivity that was not tame. In a letter from Mrs. Clarke, who sent me my birds, that lady states that she liberated a pair of Red-wing Parrots in her garden. They stayed near the house, and reared four young ones in a neighbouring hollow tree. They came to the verandah regularly to be fed, and, when the young ones could fly, the whole family (adults and young) often came walking down the hall like pet chickens.

The only nest I ever saw was within forty yards of Mr. Blyth's residence, near the Fitzroy River, West Kimberley, where, in addition to the folks about the house, several men were almost daily drafting cattle or horses at the stock-yards close by, amidst cracking of stockwhips and other noises. These parrots are always found near water. I had no difficulty in shooting as many as I required, as they permitted me to approach within twenty yards of them whilst they were feeding on the small black native figs. In the stomachs of those shot grass seed and figs were the only food found.

Starlings and Thrushes.—In view of the controversy at present being carried on in the daily press as to the habits of these birds, the following paragraph from *Nature-Study* for November, 1904, is *apropos*:—"Birds and the Fruit of the Mountain Ash.—There has this year been a very heavy crop of 'wiggin berries,' as the fruit of the Mountain Ash is called, their bright red colour presenting a pretty appearance amidst the setting of dark green foliage. So conspicuous are the berries that their quick disappearance must have been apparent even to the most casual observer. Birds—starlings and thrushes in the main—are responsible for this, which, considering the exceptionally mild and open weather we have experienced for some weeks past, is somewhat remarkable. One usually looks upon such wild fruits as provender in severe weather, but this year they have been appropriated early, and one wonders what the birds will do when the severe weather does come.—Charles Mosley, Lockwood, Yorks."

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 13th February, 1905.

The president, Mr. O. A. Sayce, occupied the chair, and about 80 members and visitors were present.

REPORTS.

A report of the junior excursion to the Zoological Gardens on Saturday 4th February, was read by the hon. secretary, in the abscence of the leader, Mr. Robt. Hall. Some thirty-five juniors attended, and a very pleasant afternoon was spent in viewing the various animals and birds in the Gardens.

A report of the excursion held at Belgrave, Dandenong Ranges, from Saturday, 28th, to Monday. 30th January, was read by the leader, Mr. J. F. Haase. Unfortunately, the outing was spoilt by rain, and very little collecting could be done. However, the locality was regarded as a suitable one, and a hope was expressed that it would not be the last excursion to the district.

The hon. librarian reported the receipt of the following donations to the library :—*Journal of Agriculture of Victoria*, vol. iii., part 1, January, 1905, from Department of Agriculture, Melbourne; "Records of Geological Survey of Victoria," No. 14, from Department of Mines, Melbourne; *The Emu*, vol. iv., part 3, January, 1905, from the Australian Ornithologists' Union; "Proceedings Linnean Society of New South Wales," vol. xxix., part 3, 1904, from the Society; "Proceedings Royal Society of South Australia," vol. xxviii., 1904, from the Society; and *Nature Notes*, January, 1905, from the Selborne Society, London.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. Alex. C. Mackay, J.P., Apollo Bay, and Mr. C. Grace, Skene's Creek, Apollo Bay, were elected as ordinary members; Guy Sloggatt and Mervyn Stephen as junior members of the Club.

GENERAL BUSINESS.

Mr. F. G. A. Barnard inquired if anything further was known with regard to the proposed purchase by the Government of Mrs. Ellis Rowan's paintings of Australian wild flowers.

Mr. A. D. Hardy stated that the matter was held over until

the return of the Premier from Hobart, and it was thought probable that the object would have the support of the Cabinet.

Mr. G. A. Keartland drew attention to the efforts that were being made in various parts of the State to have the opening day for quail-shooting altered to 1st March, and suggested that the Club take immediate action in the matter. After some discussion, it was resolved that the hon. secretary write to the Minister of Lands and the press, protesting against any alteration to the *Game Act.*

PAPERS READ.

1. By Mr. F. M. Reader, F.R.H.S., entitled "Notes on *Geococcus pusillus*, J. Drummond."

The author stated that he had recently had opportunities of watching the growth of this plant, and found that in favourable localities it produced well-defined stems, and though ripening the majority of its fruit underground, still sufficient are ripened above ground to provide for dispersal by the agency of animals, or transportation by wind or water.

2. By Mr. E. E. Green, Government Entomologist, Ceylon, entitled "New Victorian Coccidæ." Communicated by Mr. F. G. A. Barnard.

The author described six new species and varieties of Scale-insects collected by Mr. Jas. Lidgett in the Mryniong district.

3. By Mr. O. A. Sayce, entitled "Description of a Common Shore Crustacean."

The author gave a detailed description of the Isopod, *Ligia australiensis*, so far only briefly described from broken specimens from New South Wales. Examination of specimens from Tasmania, Victoria, and South Australia showed no fundamental morphological differences, and were referable to the same species. It was also compared with the New Zealand and European species, and peculiar differences pointed out. The paper was illustrated by a drawing showing the outline of the body and various parts of the appendages.

4. By Mr. F. Chapman, A.L.S., "On some Fossil Casts in Tertiary Ironstone from Stawell, figured by M'Coy."

The author dealt with the validity or otherwise of four fossils figured and very briefly alluded to by the late Sir F. M'Coy in the "Progress Report of the Geological Survey of Victoria," No. II., 1874. He had compared these fossil casts, in the National Museum collection, with the published figures and descriptions, and had arrived at the following conclusions:— *Lepralia stawellensis* having been founded on the cast of the zoarium, it is better to let this name drop altogether from our lists, since it is impossible to correctly identify a specimen in this condition; only a probable guess at the affinities of the species with known and better-preserved forms can be made.

Nucula marthæ is probably one of the Ledæ subsequently described by Tate, but the identification here is also doubtful, owing to the bad preservation of the fossil and an indifferent drawing, so that this name also should lapse. *Tellina krausei.*—This bivalve is clearly identifiable with Tate's *Semele krauseana*, and its name stands therefore as *Semele krausei*, M'Coy, sp. *Ditrupa wormbetiensis.*—This annelide species also stands, it being identifiable with the better-preserved specimens found in considerable quantities in the limestone of Wormbete Creek, Barwon Valley.

Mr. A. E. Kitson said he was pleased that Mr. Chapman had revised the naming of these casts of marine fossils from Stawell, pointing out the importance of the occurrence, and stated that some marine shells, determined by Mr. J. Dennant as of Miocene age, had been obtained from a well on the Walmer Estate, near Horsham, north-west from Stawell.

NATURAL HISTORY NOTES.

A New Victorian Butterfly.—Mr. Geo. Lyell contributed a note recording the butterfly *Ogyris genoveva*, Hew., at Dimboola, where the larva was found feeding on the mistletoe.

Mr. J. F. Haase congratulated Mr. Geo. Lyell on his addition of another butterfly to our Victorian list, and remarked that the habit of hiding under bark and in crevices was common to the larvæ of the genus Ogyris. He had taken many larvæ and pupæ of *O. olane* and *O. abrota* in such situations, but had not heard of any Victorian butterflies being taken from beneath the surface of the ground, as was the case with the specimens obtained by Mr. Lyell.

Tape-worms in Birds.—Mr. E. B. Nicholls drew attention to an exhibit by him of several Tape-worms taken from the Night Heron, *Nycticorax caledonicus*. The worms were found in both young and adult birds.

Mr. G. A. Keartland stated that whilst skinning a Boobook Owl he noticed enormous numbers of Thread-worms between the skin and the skull.

Mr. A. E. Kitson mentioned that in skinning a kangaroo thousands of little white worms were to be seen between the skin and the flesh. He also related an experience that, whilst skinning a Tiger Snake, he cut open the intestine, and withdrew a Tape-worm fully two feet in length.

Aboriginal Canoe.—Mr. A. Mattingley made a few remarks upon his exhibit of a canoe from Hinchinbrook Island, North Queensland. The canoe was obtained by a lady some fifteen years ago from the sole surviving native of that island. The exhibit was interesting, inasmuch that, so far as is known, there are only two specimens in existence, the other being in the

Sydney Museum. He intended to present it to the Ethnological Museum, Public Library, Melbourne.

Rare Beetle.—Mr. F. G. A. Barnard drew attention to an exhibit by him of a pair of beetles, *Trichaulax* (*Schizorrhina*) *philipsi*, Schreib., recently taken in a building at Kew. He considered the beetle rare, and said that the male had been captured about the middle of January, while the female had been taken in the same building (a bank) a fortnight later.

Mr. J. A. Kershaw, F.E.S., mentioned that the beetle was extremely rare, and that he had captured his last specimens some years ago in a private garden in the University Grounds.

EXHIBITS.

By Mr. F. G. A. Barnard.—Pair of beetles, *Trichaulax* (*Schizorrhina*) *philipsi*, recently taken at Kew.

By Mr. A. Coles.—Small crocodile from Leichardt River, Queensland.

By Miss S. W. L. Cochrane.—Large mussel shell from Sorrento.

By Miss K. Cowle.—The epiphytal orchid, *Sarcochilus parviflorus*, Lindley, from Sassafras Creek, 30th January, 1905.

By Mr. C. French, jun., on behalf of Mr. C. Walter.—Dried specimen of the composite, *Senecio cunninghami*, collected by exhibitor at Little River, February, 1905. New for South Victoria. Previously recorded from north-west and south-west only. Plants exhibited last month were also collected by exhibitor.

By Mr. G. Lyell.—In illustration of note, butterflies, male and female of *Ogyris genoveva*, Hew., first record for Victoria; larvæ and pupæ taken at Dimboola, and bred at Gisborne.

By Messrs. E. B. Nicholls and Jno. Knight.—Bird-skins from Rubicon River, Thornton:—White Ibis, *Ibis molucca*, Dollar-bird, *Eurystomus australis*, Night-Heron, *Nycticorax caledonicus*, Goshawk, *Astur approximans*, Black-throated Grebe, *Podicipes novæ-hollandiæ*, also Coleoptera from stomach of Dollar-bird, and Tape-worms from Night-Heron.

By Mr. A. E. Kitson.—The following specimens from New South Wales:—Fossil fish and plants, impure coal; soft, bluish-grey mudstone and micaceous shale, both containing fragments of plants from the Jurassic beds near Cockabutta Mountain, Talbragar River; coal and torbanite (kerosene shale), some examples showing Glossopteris, from Glenowlan and Torbane, Capertree Valley; aboriginal axes, hammers, and shell-breakers from middens on raised beaches at Woy Woy, near Gosford.

By Mr. A. H. E. Mattingley.—Canoe of the Hinchinbrook Islanders, North Queensland.

By Mr. F. M. Reader.—*Geococcus pusillus*, in illustration of paper.

By Mr. G. E. Shepherd.—Egg of Jardine's Campephaga, collected at Somerville.

By Master F. Shepherd.—Nest and eggs of Emu-Wren (rare), collected at Somerville.

By Mr. O. A. Sayce.—Amphipods collected at Belgrave excursion :—Terrestrial species—*Talitrus sylvaticus* and *Talitrus*, sp., so far undescribed. Freshwater species—*Atyloids gabrieli*, *Gammauis australis*, *G. haasei* ; also marine Isopod, *Ligia australiensis*, in illustration of paper.

After the usual conversazione the meeting terminated.

EXCURSION TO THE OTWAY FOREST.

When this excursion was first planned it was intended to make the township of Beech Forest the centre for various short trips, but a preliminary scamper over the ground in November made it evident that better results might be expected if the eastern fringe of the forest at Apollo Bay were substituted, and where in addition the party would have the advantage of the sea-shore, with its various forms of life.

The results of the outing were satisfactory, especially from a botanical point of view. In zoology, the list of birds seen forms an interesting and useful record. Under my co-leader, Mr. G. Coghill, several members were indefatigable in their search for new or interesting forms of shore life, but the results are not commensurate with the energy displayed. Geology was to some extent neglected, but in view of the fact that the Department of Mines has recently published an extensive report, with map, by Mr. V. Stirling, one of the field geologists of the department, it is hardly likely that the party could have added anything new in that branch of science. From the nature of the locality the botanists had undoubtedly the best opportunities, and their efforts resulted in the collection of about 150 species of phanerogams in bloom, with 30 species of ferns, and at least a dozen mosses.

The party, numbering eight, including ladies, left town by the 6.30 a.m. south-western train on Saturday, 24th December, travelling as far as Birregurra (183 miles), where the branch line to Forrest was taken for another 20 miles. Here a special coach was waiting to convey the excursionists to their destination, 25 miles further. The road follows a spur dividing the head waters of the Gellibrand River from the west branch of the Barwon, gradually ascending from about 550 feet above sea level till it reaches, at the half-way house at Mt. Sabine, an elevation of 1,940 feet. It then descends to Skene's Creek, and skirts the coast line as far as Krambruk, the township of the Apollo Bay district. Our destination was "Milford House,"

a boarding-house managed by Miss Cawood, situated about a mile before reaching Krambruk. This we made our head-quarters, being conveniently situated for excursions either towards the forest or along the shore, and we had no cause to regret our choice, for every attention was paid to the party during our time there. The house itself was somewhat remarkable, having been added to so often that the original design was quite hidden, and the materials used in the additions had frequently been recovered from wrecks which had occurred on the adjacent coast.

Our operations extended along the shore from the Parker River, south-west of Krambruk, north-easterly to Point Patten, including an examination of the sand hummocks and the limited area of the flat land in the vicinity; the exploration of an aboriginal midden at Point Bunbury; the grass-tree and heathy country in the valley of the Barrum-Barrum River; and excursions to the various creeks, nine of which enter the sea in about as many miles; and a forest excursion, kindly arranged by Mr. Alex. Mackay, J.P., and the Apollo Bay Sawmilling Co., who placed some timber trucks and a team of stout horses at our disposal. The coal seams at Wild Dog and Coal Creeks were also visited.

The isolated patch of mountainous country known as the Otway Ranges can be approached in three ways—either by our first intended plan, *viâ* the narrow-gauge railway from Colac to Beech Forest, by the route we adopted, or by steamer from Melbourne to Krambruk *viâ* Lorne. The district greatly resembles parts of Gippsland, but with certain faunal and floral differences, which will be noted later on.

The backbone of the Otway Peninsula is a range running approximately north-east and south-west, and from it numerous spurs are thrown out, which in many cases extend to the sea shore, and frequently end in abrupt vertical cliffs, leaving but little flat land between the hills and the coast. From the mouth of the Wild Dog Creek northwards to Cape Patten the coast is practically rockbound, but in the other direction two fair beaches exist, at Apollo Bay and Mount's Bay, separated by the rocky projection of Point Bunbury. Backing the beaches are sand dunes grassed with spinifex, interspersed with numerous bushes of *Correa alba*, *Styphelia richea*, and *Myoporum insulare* (Boobialla). In the absence of sandy beaches there are flat rock platforms, which often extend from the vertical face of the sea-beaten cliffs some seven or eight chains out to sea. These platforms are dry and exposed at low water, but as the tide returns are covered with foaming breakers. At one place between Wild Dog Creek and Stony Creek the platform shows a fault, in which, according to Mr. Stirling's measurements, the lines of the dislocated strata show a displacement of twenty feet.

At another spot further along a considerable stretch of the rock platform can be utilized for vehicular traffic in the hands of a careful driver, and so save the heavy pulling on the soft sandy road on top of the cliffs. The one fairly extensive flat piece of land in the district covers an area of about 100 acres, and extends back from Point Bunbury along the Barrum-Barrum River.

Unfortunately for the naturalist, large areas of the main range and the principal spurs have been devastated by fire, and thus denuded of much of the original timber trees, which have been replaced by a dense growth of young trees and scrub where not kept down by artificial means. The numerous creek gorges are, however, often well filled with vegetation of various kinds, in which the Valley Tree Fern, *Dicksonia billardieri*, predominates. Such are the steep gullies of Carisbrook, Nettle or Sugar-loaf, Whalebone, Smythe's, Flatbottom, Browne's, Petticoat, Skene's, Stony, Wild Dog, and Cawood's, taking them in their order from north-east to south-west. Further south are the valleys of the Barrum-Barrum and Elliott Rivers and Blanket Creek, which are more open.

At Cape Patten, where a spur from a lateral ridge ends abruptly at the shore line in a perpendicular cliff, there are two interesting points. One, locally known as the "Blowhole," is a fault or crevice in the rock platform, some thirty feet wide, which precludes further progress along the shore at the foot of the cliffs, here about 130 feet in height. The sea at times rushes in here with great force and deluges the face of the cliff above. The other is a cave, situated in the rocky extremity of the Cape, and reached only by keeping above the cliff, and then descending on the further side of the "Blowhole." The entrance, only a few feet in width, is about twenty-five feet high. Just inside is a vertical rock-face some ten feet high which almost bars the way, but on this being surmounted the visitor finds himself in a dark chamber about fifty feet high. The walls are damp, but not wet, and on striking a light the sandstone was seen to be coated with a bluish-green coloured substance hard to the touch. On knocking off a portion of this it was found to be a mineral incrustation about an eighth of an inch in thickness. Some specimens were submitted to Mr. F. Chapman, A.L.S., on our return to town, who reports that it is "a whitish incrustation of earthy gypsum (really finely crystalline) superficially impregnated with alga cells, some of which show subdivision into four daughter cells. The alga imparts a vivid green colour to the incrustation, making it appear at first sight as of a mineral nature." The alga we have since determined as a species of Pleurococcus. Here we thus have an instance of a plant growing in almost total darkness, and as since removal the alga has continued to grow,

the species seems to be one which can adapt itself either to bright light or darkness.

The rocky projection of Point Bunbury is also interesting, inasmuch as it shelters Apollo Bay from the force of the currents from the south-west, the effect of which can be seen at various places along the coast in the outlets of the various streams, which nearly all have a north-easterly trend, sometimes running parallel to the sandy beach for many chains at only a few yards distance. Point Bunbury also bears a ridge of sand hummocks, beneath which, on the ferruginous sandstone, are the remains of an aboriginal camp. This, on examination, yielded many skinning flakes of quartzite, &c., and chipped stones, together with mollusc shells, often in groups of species. We did not succeed in unearthing any tomahawks, though these have been found here, as well as at Point Franklin and Cape Otway, further south.

Regarding the timber trees of the district, where bush fires have not carried all before them, fine specimens of Blue Gum, *Eucalyptus globulus*, Messmate, *E. obliqua*, Blackbutt, *E. pilularis*, and White Gum, *E. gunnii*, exist, the first-named being the predominant species. The Beech Forest, so named from the magnificent growth of the native Myrtle or Beech, *Fagus cunninghami*, extends from about four miles west of Apollo Bay over a considerable area, and must not be confounded with "Beech Forest," the terminus of the narrow gauge line from Colac, which is some miles to the northward, on the summit of the main divide. The Blue Gums here are unsurpassed in Victoria, and almost equal those of Tasmania. The straight, clean boles of this gum run up with scarcely decreasing girth for the greater part of their height. In many cases I measured 125 feet to the first branch, while a number of fairly large, but not monster, specimens gave an average height of 225 feet, their girth at a few feet above the ground averaging twenty-four feet. These results were obtained by means of clinometer, Chesterman's tape, and mathematical calculation, and may be taken as being as nearly correct as possible. As showing the value of the timber here, a measured acre, selected at random, was found to contain some thirty trees, five of which equalled the dimensions mentioned, the others being of diminishing sizes, all clean, straight, and sound, showing that with judicious cutting the State possesses in this forest a very valuable asset. However, the danger from fire is very great. The selectors on the edge of the forest are in the habit of cutting the undergrowth of hazel, dogwood, &c., which, when dry, and the wind favourable, is set on fire, with probably appalling results to the forest.

Probably the finest growth of Beech trees is to be found in the cool, shady valley of the upper portion of the Elliott River, where

they surpass in height and girth the Blackwoods, *Acacia melanoxylon*, which at a distance they resemble, especially when the Blackwoods are flowering and the Beeches are resplendent with the golden-coloured young leaves at the tips of their otherwise dark-green branches. Many were seen from 125 to 150 feet high, with a stem diameter of three to four feet, though an exceptionally fine tree will reach 200 feet, with a girth of twelve to fifteen feet.

It is somewhat remarkable that the Sassafras, *Atherosperma moschatum*, appears to be entirely missing from the Otway Forest, and with it the Lyre-bird, *Menura superba*, and the little crustacean *Talitrus sylvaticus*, its principal food, as also the Wombat and the Echidna, or Porcupine. These associated absences are striking, and bear out a bushman's statement that one never finds the Lyre-bird where there is no Sassafras and "Lyre-bird's Shrimp."

By way of compensation, however, we have the rare tree fern, *Cyathea medullaris*, which grows in limited quantities in the deep gullies, interspersed with the common Valley Tree Fern, *Dicksonia billardieri*, but never ventures up the slopes like the Hill Tree Fern, *Alsophila australis*. In the upper Elliott Valley the Dicksonias acquire great dimensions of stem, some measured with a tape at 3 feet from the ground yielding diameters of 3, 3 feet 6 inches, and 4 feet respectively. On their trunks grew the finest of filmy ferns, specimens of *Hymenophyllum nitens* and *H. javanicum*, taken at random and exhibited to-night, measuring 15 and 11 inches in length respectively. These two ferns, with the fan-leaved hepatic *Symphogyna flabellata*, and other filmy mosses, often completely covered many of the large tree fern trunks with a beautiful green coat.

The damp recesses of the Otway Forest are ideal homes for ferns, and several other species besides the filmy ferns were found growing on the trunks of the tree ferns. Of course the climbing polypody, *Polypodium pustulatum*, sometimes called the Victorian Stag-horn, was abundant, while the smaller *Polypodium australe*, *Aspidium capense*, the bulb-bearing spleenwort, *Asplenium bulbiferum*, and the rarer Willow Fern, *A. flaccidum*, helped to vary the drapery of the large tree fern trunks.

Some of the ferns cover considerable areas in which one species predominates; thus *Lomaria capense*, var. *procera*, covered acres, and the fertile frond five and a half feet long and twelve inches wide exhibited to-night will give some idea of the growth of this species in a favourable locality. Close by the Cyatheas, and in the shadiest part of the forest, was found the rare fern *Aspidium hispidum*, yielding fronds thirty inches long by eleven wide—an unusual size for this species. The Lomarias, *L. fluviatilis*

and *lanceolata*, were plentiful, but *L. patersoni* was not seen, though considerable search was made for it. *Pteris comans* and *P. incisa* were also plentiful, but *P. arguta* (*tremula*) was not met with.

In scrambling through the forest two plants offered us considerable resistance, the Native Nettle, *Urtica incisa*, and the Wire Grass, *Ehrharta juncea*. Intermingled with, and closely resembling, the nettle, grew the inoffensive *Australina pusilla*, evidently, conscious of its weakness, associating with its more offensive neighbour for protection.

Among the trees and shrubs characteristic of the forest must be mentioned the Wild Olive, *Notelæa ligustrina*, Vent. (Jasmineæ), which has here its principal habitat in Victoria. A specimen measured fifty feet in height, with a stem of eighteen feet to the first branch, and a girth of eight feet. At a distance this tree might be mistaken for a small Blackwood. It grows on the ridges as well as in the valleys, and has a hard, close-grained, dark-coloured wood, locally known as "Plum-wood," presumably on account of the colour. Fruit specimens only were obtainable. Residents say that the fruits are white, red, or blue on separate trees, but all that we saw were very dark, almost black. Seedlings are very numerous, and form a large part of the scrub.

Another somewhat local shrub or tree is the Satin Box, *Eriostemon squameus*. This grows in similar localities to the Olive, but seems to prefer the slopes and ridges. We saw no large specimens of this tree, but logs were pointed out to us which measured thirty feet in length, with a diameter of twelve to eighteen inches. The wood is very durable, and surveyors' pegs, in the ground for twenty years, were practically as sound as when first used. It is reputed to resist the ravages of the white ant. The smaller bushes were bearing fruit abundantly. The unpleasant smell which arises from the bruised foliage has earned for it the name of Stinking Box in some parts of the district.

Many fine specimens of the Blackwood, *Acacia melanoxylon*, were seen. This tree prefers the deep shady valleys, and specimens of over 100 feet were not uncommon. Three cut logs lying by the mill tram track measured 32, 36, and 40 feet in length by rather more than two feet in diameter.

The Cheesewood, *Pittosporum bicolor*, with fruit capsules bursting and exposing conspicuous masses of sticky red seeds, was frequently seen, generally growing from an old fern stem. The Native Musk, *Aster argophyllus*, grows to a large size—one stem measured thirty inches in diameter. The wood when cut and polished greatly resembles bird's-eye maple.

The Forests Branch of the Department of Agriculture has

kindly lent me, for exibition to-night, specimens of most of the forest trees I have mentioned.

Other trees and shrubs met with were the Native Hemp, *Plagianthus pulchellus*, the Native Mulberry, *Hedycarya cunninghami*, *Lomatia fraseri*, and *L. ilicifolia*. Here and there through the forest are belts and patches of heathy country, in which the Grass-tree, *Xanthorrhœa australis*, is a prominent feature, and along with it the Prickly Tea-tree, *Leptospermum scoparium*, and the Yellow Bottle-brush Tea-tree, *Melaleuca squarrosa*. In the shelter of these grew such plants as the Lycopod, *Selaginella uliginosa*, the Forked-leaved Sundew, *Drosera binata*, the Blue Iris, *Pattersonia glauca*, Stunted Honeysuckles, *Banksia marginata*, *Bauera rubioides*, *Epacris impressa*, &c. On the undulating country bordering the forest *Helichrysum ferrugineum* (Snapwood) was very plentiful, and perhaps the commonest shrub in the district; also the Currajongs, *Pimelea axiflora* and *P. ligustrina*, *Aster myrsinoides*, var. *erubescens*, the orchids *Dipodium punctatum*, *Gastrodia sesamoides*, and *Caladenia congesta*. The Fire-weed, *Senecio dryadeus*, was very plentiful, and quite filled the place occupied by *Goodenia ovata* in other parts of the State. Associated with it were *Senecio odoratus*, *S. bedfordii* (Blanket-wood), and *S. velleyoides*. *Aster stellulatus* and the Supplejack, *Clematis aristata* (the latter with stems over an inch in diameter), *Correa lawrenciana*, *Acacia suaveolens*, and *A. verticillata* were frequently met with.

The party left Krambruk by coach at 6 a.m. on Monday, 2nd January, and reached Melbourne, after a somewhat tiring journey, about 8 p.m., well pleased with their holiday. The total cost per head was under £4, which, considering the distance and inaccessibility of the spot, must be considered very moderate.

Our thanks are due to Messrs. A. Mackay, J.P., C. Grace, and J. Marriner, residents of the district, for assistance during our rambles, and to Miss Cawood for studying our comfort while at Milford House.

The insects collected, together with the crustaceans, &c., also the stone chippings, shells, &c., from the aboriginal kitchen midden, have been presented to the National Museum in the name of the Club.

I am indebted to Miss M'Haffie for notes on the principal birds seen, to Mr. J. A. Kershaw, F.E.S., for the identification of the zoological specimens, other than the birds, in the collection of which Miss L. Cowle, Messrs. J. A. Leach, B.Sc., G. Coghill, and J. Tuckett greatly assisted; and to Miss K. Cowle, Mr. G. Coghill, and Mr. L. K. M'Nab for help in the botanical collections. Specimens which were unfamiliar to us were submitted to Mr. C. Walter for identification, while Mr. R. A. Bastow has kindly

named some of the mosses. A fuller list of the Otway Forest plants will be found in the census compiled by Mr. G. H. Adcock, F.L.S., and published in the *Geelong Naturalist*, vol. v., No. 1 (October, 1895).

A. D. Hardy.

Ornithology.—In the following notes I have briefly mentioned the principal birds seen during the excursion :—

Sea birds were fairly plentiful along the coast, both Pacific and Silver Gulls, the Little Tern, *Sterna nereis*, Storm Petrels, *Pelagodroma marina*, Gannets, *Sula serrator*, and three species of Cormorants being noted.

Hæmatopus unicolor, Black Oyster-catcher.—Some of these were observed on the rocks at low tide.

Ægialitis cucullata, Hooded Dottrel.—Fairly plentiful about the seashore.

Chenopis atrata, Black Swan.—This splendid bird occurs in the swamps and back waters of the rivers. One pair seen had a cygnet with them which was still clothed in grey down.

Anas superciliosa, Black Duck.—Only saw two of this species.

Porphyrio melanonotus, Bald-Coot.—Seen occasionally in the inland swamps.

Notophoyx novæ-hollandiæ, White-fronted Heron.—One of these graceful birds, commonly called the Blue Crane, was to be seen any morning or evening feeding in a small creek near the house.

Calyptorhynchus funereus, Black Cockatoo.—These occur in flocks, and many of the tall forest gums are a witness to their presence, as the ground beneath was strewn with shreds of bark torn from the tree by these cockatoos' strong bills in their search for grubs.

Callocephalon galeatum, Gang-Gang Cockatoo.—Seen in the high lands where the timber was thickest.

Cacatua galerita, Sulphur-crested Cockatoo.—Several flocks were noted.

Polytelis barrabandi, Green-Leek Parrakeet.—Only observed one solitary specimen.

Aprosmictus cyanopygius, King Parrot.—Fairly numerous throughout the forest, and very destructive in garden and orchard.

Platycercus elegans, Pennant Parrakeet.—Very common everywhere amongst the low eucalyptus trees and dogwood.

Platycercus eximius, Rosella.—Both heard and seen very frequently.

Collyriocincla harmonica, Grey Shrike-Thrush.—Very often met with through the moist gullies, and where the scrub was dense.

Negative by C. P. KINANE.

RUFOUS-BREASTED THICKHEAD.—FEMALE AND YOUNG.

Negative by C. P. KINANE.

BRONZE CUCKOO (16 DAYS OLD) BEING FED BY FOSTER-PARENT.

Negative by C. P. KINANE.

SPOTTED PARDALOTES (4 WEEKS OLD).

Negative by C. P. KINANE.

SUPERB WARBLER BEING EJECTED FROM NEST BY NARROW-BILLED BRONZE CUCKOO.

Geocichla lunulata, Mountain Thrush.—Frequently observed hopping along the ground amongst the undergrowth in its search for insects.

Grallina picata, Magpie-Lark.—Generally seen in pairs or more about the river flats.

Corone australis, Raven.—Only noted in the flat and lightly-timbered country.

Strepera cuneicaudata, Grey Crow-Shrike.—The loud, harsh note of these birds was often heard, and there were usually four or five of them together.

Gymnorhina leuconota, White-backed Magpie.—Not particularly abundant.

Cracticus destructor, Butcher-bird.—Only saw about two pairs.

Eopsaltria australis, Yellow-breasted Robin.—Heard them frequently in any of the wooded gullies and even close to the seashore.

Pachycephala gutturalis, White-throated Thickhead.—Fairly common where there was any thick timber.

Climacteris leucophæa, White-throated Tree-creeper.—Saw one specimen only.

Dacelo gigas, Brown Kingfisher.—Very numerous, being heard and seen throughout the district.

Halcyon sanctus, Sacred Kingfisher.—Only seen once or twice in the tall gums.

Acanthochæra carunculata, Red Wattle-bird. This variety and also the Brush Wattle-bird were observed.

Ptilotis leucotis, White-eared Honey-eater.—These were seen amongst the low flowering shrubs, and were shy of approach.

Philemon corniculatus, Leatherhead.—Reported, but did not see one myself. There were other Honey-eaters also, but they needed closer inspection to describe.

Rhipidura tricolor, Black and White Fantail.—Not as numerous as the White-shafted, which could be seen flitting about in every patch of scrub. Observed a pair of Brown Flycatchers, *Micræca fascinans*.

Malurus cyaneus, Blue Wren.—Very common everywhere, especially amongst the bracken and low scrub.

Petræca leggii, Scarlet-breasted Robin.—Plenty to be seen anywhere along the road.

Petræca rosea, Rose-breasted Robin.—Saw one specimen only, hopping about in a musk tree.

Acrocephalus australis, Reed-Warbler.—These were frequenting every bunch of rushes and sedges about the river and swamps.

Ptilonorhynchus violaceus, Satin Bower-bird.—These were reported to be very numerous in parts, doing much damage to both orchard and garden.

Acanthiza pusilla, Brown Tit, and *Acanthiza chrysorrhoa*, Yellow-rumped Tit, were both numerous where there was timber.

Ephthianura albifrons, White-fronted Chat.—Noted two or three of these in the grass-tree country.

Pardalotus punctatus, Spotted Pardalote.—Saw several about the roadside.

Artamus sordidus, Wood-Swallow.—A few here and there were noted in the dead gums.

Anthus australis, Ground-Lark.—Very common. I saw them even on the beach searching for insects amongst the dry seaweed.

Sericornis osculans (?), Scrub-Wren.—Seen in one of the gullies, where a nest was also found.

Hirundo neoxena, Swallow.—Many nests were noted on the face of the rocks, both in the creeks and on the seashore. The young were just fledged.

Petrochelidon nigricans, Tree-Martin.—Observed along the road occasionally.

Uroaëtus audax, Wedge-tailed Eagle.—From all accounts these birds are said to be fairly numerous. A farmer on the Wild Dog Creek showed us the wings of a pair he had shot, which measured 6 ft. 9 in. and 6 ft. 10 in. respectively, from tip to tip.

Pandion leucocephalus, Fish-Hawk.—Only saw one of this species, but was shown the spot on the summit of a rocky bluff or headland where a pair nested this season.

Accipiter cirrhocephalus, Sparrow-Hawk.—Seen occasionally soaring over the flats ; also the Swamp-Hawk, *Circus gouldi*.

Cerchneis cenchroides, Nankeen Kestrel.—Very numerous everywhere. Generally seen singly.

Falco lunulatus, Little Falcon.—Saw one solitary specimen.

Ninox boobook, Boobook Owl.—Only one was observed.

Zonœginthus bellus, Fire-tailed Finch.—Seen in flocks, and several nests were found, some containing eggs.

Ægintha temporalis, Waxbill.—Flocks of these were also noted.

Starlings were beyond enumerating, as there must have been thousands of them in one flock. Mostly about the flat meadow lands or dead timber. Several flocks of Goldfinches were seen along the roadside.

A. F. W. McHaffie.

Entomology, &c.—The insects, &c., collected during the excursion do not contain any species of importance, and have been identified as follows :—

Insects.

Coleoptera.

Notonomus chalybeus, Dej.
Chlænioidius prolixus, Erich.
Rhytisternus liopleurus, Chaud.
Diaphoromerus mæstus, Dej.?
Ceneus chalybeipennis, Chaud.
Ptomaphila lachrymosa, Sch.
Scaphidium quadripustulatum, Oliv.
Ceratognathus niger, Westw.
Saulostomus villosus, Waterh.
Cheiropolus mælius, Erich.?
Heteronyx piceus, Blanch.
Monocrepidius punctatostriatus, Cand.
M. alpicola, Blkb.
Hapatesus hirtus, Cand.
Metriorhynchus rufipennis, Fabr.
M. eremita, Blkb.
Calochromus cucullatus, Blkb.
Lemodes coccinea, Boh.
Pseudolychus hæmopterus, Gn.
Œdemera dorsalis, Klug
Lagria grandis, Gyll.
Adelium similatum, Germ.
Seirotrana crenicallis, Pasc.
Meneristes australis, Bdv.
Æthosus westwoodi, Pasc.
Poropterus succosus, Bohem.
Disterna lugubris, Pasc.
Stenoderus suturalis, Oliv.
Pentacosmia scoparia, Newm.
Epithora dorsalis, Macl.

Lepidoptera.

Darala repleta, Walk.

Neuroptera.

Hemianax papuensis, Burm.
Synthemis brevistyla, Selys.
Lestes analis, Ramb.
Ischnura heterosticta, Burm.
Diplax melanapsis, Selys.?
Telephlebia godefroyi, Selys.
Eusthenia spectabilis, Westw.

Hemiptera.

Dindymus versicolor.

Homoptera.

Pauropsalta mneme, Walk.

Land Shells.

Paraphanta atramentaria
Vitrina verreauxi
Rhytida capillacea.

Crustacea.

Phreatoicopsis terricola, Spencer and Hall.

Land Planarians.

Geoplana munda, Fletch. and Ham.
G. quinquelineata, Fletch. and Ham.
G. mediolineata, Fletch. and Ham. Dendy's three-lined variety, in which the broad lateral lines are continuous from end to end
G. sugdeni, Dendy?
G., sp.

J. A. Kershaw.

Botany.—The following list contains the names of the principal plants collected or seen during the excursion, with indications showing whether in bloom or in fruit :—

* = bloom ; † = fruit.

Dicotyledoneæ—

*Clematis aristata
*Ranunculus lappaceus
*R. aquatilis
*R. rivularis
*Hibbertia densiflora
*H. stricta
†Hedycarya cunninghami
†Cassytha, sp.
*†Cakile maritima
*Viola hederacea
†Pittosporum bicolor
*Bursaria spinosa
*†Billardiera longiflora
*B. scandens
*Drosera binata
*Comesperma volubile
*C. ericinum
*Zieria smithii
*†Eriostemon squameus
*Correa alba
C. lawrenciana
*Pelargonium australe
*†Erodium cygnorum
†Plagianthus pulchellus
Poranthera microphylla
*Amperea spartioides
*Beyeria viscosa
*Australina pusilla
*†Parietaria debilis
*Urtica incisa
Fagus cunninghami
*†Casuarina quadrivalvis
*†C. suberosa
†Dodonea viscosa
*Stackhousia linarifolia
*Polycarpon tetraphyllum
*Rhagodia billardieri
Salicornia arbuscula
Suaeda maritima
*Mesembrianthemum æquilaterale
*Polygonum minus
*Muehlenbeckia adpressa
*Sphærolobium vimineum
*Daviesia ulicina
*Pultenæa daphnoides
*P. stricta
*P. Muelleri
*Dillwynia ericifolia
†Platylobium obtusangulum
*Bossiæa cordigera
†Goodia lotifolia
†Indigofera australis
*Swainsona lessertifolia
*†Acacia verticillata
*A. vermiciflua
†A. suaveolens
*†A. myrtifolia
†A. melanoxylon
†A. decurrens
†A. dealbata
†A. stricta
†Rubus parvifolius
†Acæna sanguisorbæ
*Bauera rubioides
*Epilobium tetragonum
*Haloragis teucrioides
*Leptospermum scoparium
*Melaleuca squarrosa
†Eucalyptus globulus
†E. amygdalina (var. regnans)
†E. obliqua
†E. macrorrhyncha
*E. gunnii
E. pilularis
†Pomaderris apetala
*Cryptandra hookeri
*Panax sambucifolius
*Hydrocotyle candollei
*Apium prostratum
Exocarpos cupressiformis
Loranthus pendulus

*Isopogon ceratophyllus
Lomatia fraseri
L. ilicifolia
*Banksia marginata
*†Pimelea ligustrina
†P. axiflora
†P., sp.?
*Coprosma hirtella
†C. billardieri
*Sambucus gaudichaudiana
*Brachycome graminea
*B. diversifolia
*Aster argophyllus
*A. stellulatus
†A. ramulosus
*A. axillaris
*A. myrsinoides (var. erubescens)
*Gnaphalium japonicum
*G. luteo-album
*Leptorrhynchus squamatus
*Helichrysum apiculatum
*H. ferrugineum
*H. cinereum
*Cassinia aculeata
*Senecio velleyoides
*S. dryadeus
*S. odoratus
*S. bedfordii
*Microseris forsteri
*Lobelia anceps
*Isotoma fluviatilis
*Wahlenbergia gracilis
*Candollea serrulata
*Brunonia australis
*Scævola microcarpa
*Goodenia ovata
*G. geniculata
*Erythræa australis
*Samolus repens
†Notelæa ligustrina
†Alyxia buxifolia
Lyonsia straminea
*Convolvulus marginatus
*Solanum vescum
*Gratiola peruviana
*Veronica derwentia
*Mentha australis
*Brunella vulgaris
*Prostanthera lasiantha
†P. melissifolia
†Myoporum insulare
†Styphelia scoparia
†S. lanceolata
†S. richei
†S. humifusa
*Epacris impressa
*Sprengelia incarnata.

MONOCOTYLEDONEÆ—

†Dipodium punctatum
*Gastrodia sesamoides
Chiloglottis gunnii
*Caladenia congesta
*Microtis porrifolia
*Patersonia glauca
*Dianella revoluta
*Xerotes thunbergii
*X. brownii
*X. longifolia
*Xanthorrhœa australis
Lemna minor
†Triglochin procera
*Juncus communis
*J. planifolius
*Cyperus lucidus
*Carex paniculata
*Lepidosperma gladiatum
*Cladium glomeratum
†Anthistiria ciliata
†Ehrharta junceæ
*Spinifex hirsutus
*Stipa, sp.
*Poa, sp.
*Arundo phragmites.

ACOTYLEDONEÆ—

Azolla filiculoides
Selaginella uliginosa.

Ferns.

With the exceptions of *Trichomanes venosum* and *Cyathea medullaris* all the ferns were found in fruit.

Trichomanes venosum
Hymenophyllum nitens
H. javanicum
Gleichenia circinata
G. flabellata
Osmunda barbara
Cyathea medullaris
Alsophila australis
Dicksonia billardiera
Davallia dicksonioides
D. dubia
Lindsaya linearis
Adiantum æthiopicum
Pteris aquilina
P. incisa
P. comans
Lomaria discolor
L. lanceolata
L. fluviatilis
L. capensis (var. procera)
Blechnum cartilagineum
Asplenium flabellifolium
A. bulbiferum
A. flaccidum
A. umbrosum
Aspidium aculeatum
A. capense
A. decompositum
A. hispidum
Polypodium australe
P. pustulatum

Mosses and Hepatics.

Ptychomnion aciculare
Meteorum molle
Porotrichum (Isothecium) spininervis
Cyathophorum pennatum
Bryum bimum
Marchantia tabularis
Trichocolea tomentella
Podomitrium phyllanthus
Dawsonia superba

Also representatives of the genera Sphagnum, Polytrichum, Trichostomum, Camptylopus, Bartramia, and Tridontium. Some of these were collected in the valley of the Aire River a few weeks previously, during a preliminary visit to the district.

A. D. Hardy.

BIRD NOTES FROM OLINDA VALE.

By C. L. Barrett and E. B. Nicholls.

(*Read before the Field Naturalists' Club of Victoria, 16th January*, 1905.)

The following are a few field notes in connection with the photographs exhibited here to-night by Mr. C. P. Kinane. The whole series, with one or two exceptions, were taken in the valley of the Olinda Creek, about three miles south-east of Lilydale. Weekly visits were made to the district during the past few months. Forty-nine species of birds were noted (thirty-five nesting), and photographs of the nests, eggs, or young of many of these obtained. Our attention was mainly devoted to a few of the commoner kinds, no attempt being made at a complete record of species, hence the comparative meagreness of our list.

On the heavily-timbered mountain slopes, the Butcher-bird, *Cracticus destructor*, was found building high up in the slender boughs of the Stringybark, *Eucalyptus obliqua*. The young birds fly well on leaving the nest. One in captivity, now about ten weeks old, whistles splendidly, mimicking the notes and tunes of a Rosella perfectly. In feeding it often tries to wedge small pieces of meat between the bars of the cage, and failing this, places them on some sharp nail points projecting from the wall.

A few Orioles, *Oriolus viridis*, were encountered amongst the tall eucalypts. The only nest taken was suspended in a Peppermint Gum, *E. amygdalina*, about thirty-five feet from the ground.

In November the loosely-built nests of the Wood-Swallow, *Artamus sordidus*, were fairly numerous in the smaller gums; more rarely the Red Wattle-bird, *Acanthochæra carunculata*, was found building, whilst in the hollows of many trees the Brown Kingfisher, *Dacelo gigas*, the Sacred Kingfisher, *Halcyon sanctus*, and the Rosella, *Platycercus eximius*, were rearing their broods.

Occasionally we startled a few Bronze-winged Pigeons, *Phaps chalcoptera*, from the vicinity of a Native Cherry (Exocarpus), or beside a fallen log found the two eggs of the Spotted Ground-bird, *Cinclosoma punctatum*, though the bird itself was seldom seen. Frequenting the open grassy spaces of the valley, such species as the Stubble Quail, *Coturnix pectoralis*, the Ground Lark, *Anthus australis*, and the little Grass-Warbler, *Cisticola exilis*, are not uncommon, and small flocks of the Red-browed Finch, *Ægintha temporalis*, flit continually about the bushes, nesting in the Tea-tree scrub, *Melaleuca ericifolia*.

Three species of Acanthizæ—viz, the Brown Tit, *A. pusilla*, the Striated Tit, *A. lineata*, and the Yellow-rumped Tit, *A. chrysorrhoa*—breed here in considerable numbers, their dome-shaped nests being suspended from bracken fronds or in small shrubs and saplings. The Superb Warbler, *Malurus superbus*, is an equally abundant species; but probably the commonest bird in the district is the Yellow-breasted Shrike-Robin, *Eopsaltria australis*, considerably more than one hundred nests being seen, mostly built low down in Hazel or Tea-tree, but one pair had selected the horizontal bough of a eucalypt, fully forty feet high, on which to build.

Five species of fly-catchers were met with. The small cobweb-covered nests of the White-shafted Fantail, *Rhipidura albiscapa*, are very plentiful, and many pairs of the Black and White Fantail, *R. tricolor*, built on branches overhanging the water. The Rufous Fantail, *R. rufifrons*, is a much scarcer bird, only one nest being found. The Restless Flycatcher, *Sisura inquieta*, and the Brown Flycatcher, *Micræca fascinans*, are comparatively common, though their nests are difficult to discover.

The Yellow-faced Honey-eater, *Ptilotis chrysops*, the White-plumed Honey-eater, *P. penicillata*, and the Silver-eye, *Zosterops cœrulescens*, suspend their nests from slender branchlets of Musk or Hazel overhanging the stream, and in the low tangled undergrowth the White-bearded Honey-eater, *Meliornis novæ-hollandiæ*, rears its young. Many nests of the White-throated Thickhead, *Pachycephala gutturalis*, and the Rufous-breasted Thickhead, *P. rufiventris*, were found in the Tea-tree (Melaleuca) and Hazel thickets, the former being the commoner species. To procure the photograph of the Rufous-breasted Thickhead and young we were obliged to carefully screen the camera with boughs, while the operator lay concealed at some distance, and worked the shutter by means of a length of rubber tubing. The parent birds were very suspicious, the young were also restless, and it was only after several hours' patient waiting that a successful negative resulted. The Grey Shrike-Thrush, *Collyriocincla harmonica*, breeds in the hollow stumps along the course of the creek. The Mountain Thrush, *Geocichla lunulata*, prefers a Musk tree or Blackwood in the dense, humid gullies, where it builds a large and beautiful nest of fine shreds of bark, covered externally with long strands of brilliant green moss. One nest we saw had been built on the remains of two former ones.

The nesting burrows of several pairs of the Spotted Pardalote, *Pardalotus punctatus*, were excavated in the sloping banks of the creek. The usual complement of eggs is four, but on opening up one of the tunnels we found five nestlings. Three of these were dead, being half-eaten by the larvæ of some species of dipterous fly of the genus Calliphora. A few pupæ were secured for future observation, and have since hatched out. The flies are exhibited to-night. The young Pardalotes early assume the beautiful spotted plumage of the adult bird, as is well shown in our photograph of a brood about four weeks old.

Four species of cuckoo are abundant in the Olinda Valley. The Pallid Cuckoo, *Cuculus pallidus*, often deposits its salmon-tinted egg in the open nest of the Yellow-faced Honey-eater, *P. chrysops*. The Fan-tailed Cuckoo, *Cacomantis flabelliformis*, the Bronze Cuckoo, *Chalcococcyx plagosus*, and the Narrow-billed Bronze Cuckoo, *C. basalis*, select the domed nests of the Superb Warbler, *Malurus superbus*, and the various species of Acanthiza.

The Bronze Cuckoo, *C. plagosus*, shows a preference for the nest of the Brown Tit, *A. pusilla*, and we made some observations on the nestlings while securing a series of pictures. Considerable difficulty was experienced in obtaining a photograph of the young Bronze Cuckoo being fed by the foster-parent, as the cuckoo had just ventured from the nest, and was intent on exploring its

surroundings; it was also very eager to be fed, and whenever the little Acanthiza returned with food, would immediately flutter in her direction, and consequently get out of focus. The photograph exhibited represents a whole morning's work When ten days old the young cuckoo has the bronze-green plumage of the back well developed, but no horizontal bars across the breast. These appear later, and on the sixteenth day are well marked, as shown in our photograph. The foster parents were feeding the young bird mainly on the greenish-coloured larvæ of a geometer moth. The adult cuckoo devours large numbers of the peculiar green larvæ of the Cup Moth (Pelora). Has this food any influence in determining the colouration of the egg? Pycraft, writing of the English Cuckoo, mentions ("Story of Bird Life," page 164) "that the resemblance between the egg of the cuckoo and that of the foster-parent selected is attributed to the influence of the food during the nesting period of each particular cuckoo," and goes on to state "that the soundness of this conclusion has yet to be tested."

It would be interesting to learn if the diet of the Narrow-billed Bronze Cuckoo, *C. basalis*, corresponds in any way to that of the Bronze Cuckoo. The Cup Moth (Pelora) has also another enemy in the White-throated Tree-creeper, *Climacteris leucophæa*. This bird, whilst working up and around the trunks of the Eucalypts, easily finds the oval whitish cocoons in the chinks in the bark, and must destroy large numbers of the pupæ.

One of the photographs exhibited shows a nestling of the Superb Warbler, *M. superbus*, being ejected from its nest by a newly-hatched Narrow-billed Bronze Cuckoo, *C. basalis*. When discovered, the nest contained two young birds. The cuckoo, blind, featherless, and apparently not more than a day old, struggling till it got beneath its victim, gradually lifted it to the edge of the nest, resting at intervals, all the while balancing the resisting nestling in the hollow situated between the wings immediately at the back of the neck. Slowly and relentlessly it pushed the unfortunate wren over the side. The photograph shows the position of the birds at this stage. The young wren was replaced in the nest half a dozen times, but always with a like result, until the cuckoo was thoroughly exhausted.

The dense thickets of Hazel (Pomaderris) and Tea-tree (Melaleuca) are the favourite haunt of the Coachwhip-bird, *Psophodes crepitans*, and we had several nests under observation. The female seems to do all the feeding of the young. She is often absent from the nest for a period of fifteen minutes, or even longer, one that was timed making five visits in two hours. The young Coachwhip-bird leaves the nest long before it can fly; clinging to the dense tangle of wire-like grass in which the nest is built, it easily lowers itself to the ground. At four weeks its legs

and feet are almost as large and powerful as those of the adult bird, and it runs, or, more correctly speaking, hops through the scrub at a great pace. At this stage the wings are comparatively small and it has practically no tail. The crest, however, is well developed, but the whitish patches on the cheeks and throat of the parent bird have not yet appeared. Writing of this species North states ("Nest and Eggs of Birds, Australia and Tasmania," vol. i., page 337) that the female always responds immediately to the call of the male ; such, however, was not our experience, as we constantly heard the curious notes of the male bird without the response of his mate. Once a particular bird called twenty-four times, and only in five instances did the female reply.

In conclusion, a note on the Starling may be of interest at the present time. The birds are here in great numbers, and are very wary and shy ; so much so that it is impossible to get within gunshot unless a flock comes to the orchard for fruit. Last year one of the settlers had eighteen cases of cherries from twenty trees ; this year he collected about 2 lbs. from the same trees. While away on a Sunday afternoon's fishing excursion, the starlings swooped down and cleared his orchard. Undoubtedly they eat cherries in this district, but, so far, have not attacked the raspberries.

A NEW RECORD IN VICTORIAN BUTTERFLIES. *OGYRIS GENOVEVA*, Hew.

Ogyris genoveva is rightly looked upon as the largest and showiest of its brilliant genus, and is therefore the finest of all the Lycænidæ ("Blues") of Australia. Ten years ago it was only known from Duaringa, Central Queensland, having there been bred by the late Mr. Geo. Barnard. Since that time it has been bred in Townsville and Brisbane, and quite recently in Sydney. Now I have to record it from our own State.

In November, 1903, Mr. P. Frichot, of Dimboola, sent me two freshly caught specimens of *O. idmo*. The following season I determined, with his help, to search for the larvæ and pupæ. Doing so we found instead those of *O. genoveva*, and bred from them, in Gisborne, the butterflies exhibited here this evening.

The larvæ feed on *Loranthus pendulus*, the mistletoe frequented by *O. olane* and *O. abrota*. In this instance the loranthus was growing upon the small Mallee eucalypts. The most noticeable peculiarity is their place of concealment. Feeding by night, during the daylight they shelter, and afterwards pupate, below the surface of the ground, at the foot of the tree on which their food-plant grows. Scratching away the leaves and earth at the foot of the tree we found them in crevices of the bark, two and three inches below the surface. As usual with the most of the genus,

they are attended by ants—a large black and tan species—and the presence of these ants at the spot mentioned is the best indication of the whereabouts of the larvæ and pupæ.

As showing the care with which the ants attend them, the following notes by Mr. Frichot will be of interest:—Placing a larva on the ground, a couple of feet from the trunk, the ants quickly found it, and dragged it back to its cover at a much faster rate than it could have travelled by itself. In prising off a hard bit of bark a larvæ was damaged and thrown aside, but next day it was found in its original crevice, having been carried back to the tree by the ants during the night. Note.—This damaged larva, though dead when found the second day, had not been devoured by the ants. Two pupæ, overlooked the first day, but evidently raked out with the rubbish from the foot of the tree, were also found, carried back, and placed under cover.

Data.—Pupæ taken near Dimboola on 7th and 9th November, 1904, emerged in Gisborne on 12th November (male), 30th November (female), 3rd December (male), and 4th December (female).

I hope our success in adding a new butterfly to our Victorian list will lead to more interest in the butterflies of the Mallee districts. Mr. D. Goudie tells me he once captured at Birchip a damaged butterfly of this species, but did not record it.—Geo. Lyell. Gisborne, 13th February, 1905.

DESCRIPTION OF THE NEST AND EGGS OF THE VARIED HONEY-EATER, *PTILOTIS VERSICOLOR*, Gould.

By Alfred J. North, C.M.Z.S., Ornithologist, Australian Museum, Sydney.

Mr. Albert F. Smith has forwarded me for examination and description, a nest and set of two eggs of the Varied Honey-eater taken by him on "Franklin" * Island, off the coast of North-eastern Queensland, on the 16th October, 1904; also the two parent birds, shot at the nest.

The nest is an open cup-shaped structure, rather scantily formed of fibrous rootlets, held together with plant-down intermingled with spiders' webs and egg-bags of spiders, the inside being sparingly lined with pale brown fibre, and at the bottom with a small quantity of silky-white plant-down. Externally it measures three inches and three-quarters in diameter by two inches and a quarter in depth, the inner cup measuring three inches in diameter by one inch and a half in depth. It was built in a shrub, and is firmly attached by the rim on one side to a thin leafy branch, two leaves also being worked on to the outer portion of the opposite side, where Mr. Smith informs me it was

* Frankland Island in the Admiralty chart.

fastened to two upright twigs, at a height of seven feet from the ground.

The eggs, which are in an advanced stage of incubation, are two in number, oval in form, somewhat pointed at the smaller end, the shell being close-grained, smooth and lustrous. They are of a uniform fleshy-buff colour, with a slightly richer shade on the larger end, where on one specimen, with the aid of a lens, a few very minute darker dots may be seen. Length—(A) 0.96 x 0.7 inches; (B) 0.94 x 0.68 inches.

It will be seen from the description that the eggs of *Ptilotis versicolor* are indistinguishable in colour from those of its close ally, *Ptilotis sonora.*

Similar eggs taken by Mr. E. M. Cornwall, of Cairns, have recently been described as the eggs of *Ptilotis fasciogularis*, Gould.

The late Mr. H. E. Hill.—We regret to have to record the death of Mr. H. E. Hill, at Kalgoorlie, W.A., on 28th February. Mr. Hill for some years acted as one of the honorary curators of the Gordon College Museum, Geelong, and its arrangement is in great part due to his energy. He was for some time editor of the *Geelong Naturalist*, and later on of the *Wombat.* He was a keen ornithologist, and contributed several notes to the *Emu*, as well as to the journals mentioned. At the time of his death he was Secretary and Mathematical Lecturer at the Kalgoorlie School of Mines.

Wild Duck and Young in Cellar.—My attention was recently attracted by a paragraph in the *Albury Banner* reporting the finding of a wild duck with ten ducklings in the bottle cellar of a vineyard, and asking the question as to whether the ducklings were hatched in the cellar. On inquiry, I found that it was a Black Duck, *Anas superciliosa*, which had been found. Most of our ducks and teal rear their young in hollow trees, often far from water, and then convey or lead them to the water, though sometimes the Black Duck will carry its brood one by one right to the water. In this case it is probable the ducklings were being led to the water, when, taking alarm at something, they sought shelter in some hole which led to the cellar, and from which they were afterwards unable to escape.—G. A Keartland. Preston, 14th January, 1905.

The Brontosaurus. — After considerable work a skeleton of this giant pre-historic lizard has recently been set up in the American Museum of Natural History in New York. It came from near the celebrated Bone Cabin Quarry, Wyoming, U.S.A. Some idea of the size of this creature can be gained from the measurement of the femur of the hind leg, which is 5 feet 10½ inches. The skeleton required little restoration, and has a total length of 66 feet.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 13th March, 1905.

The president, Mr. O. A. Sayce, occupied the chair, and about 85 members and visitors were present.

REPORTS.

A report of the excursion to Willsmere, Kew, on Saturday, 25th February, was read by the leader, Mr. W. Stickland, who stated that the excursion was well attended, but the pools were not in the best of condition for pond life work. Only the ordinary rotifers were found, but two somewhat unusual Protozoa were noted —viz., *Distigma proteus*, Kent, and *Difflugia acuminata*, Ehr. As usual in autumn at Willsmere, Desmids were numerous, and among them was *Calocylindrus turgidus*, which seems to be very abundant everywhere this year, while a few filaments of that extremely pretty species, *Onychonema nordstedtiana*, were observed. A few botanical specimens of no great interest were also collected.

A report of the excursion to the Burnley quarry on Saturday, 11th March, was read by the leader, Mr. F. M. Chapman, A.L.S., who reported a good attendance and an enjoyable afternoon. A number of interesting minerals were obtained from cavities in in the basalt, and portions of a tree trunk found under 90 feet of basalt were secured by the members.

A report of the excursion for juniors to Fisherman's Bend, Port Melbourne, on Saturday, 1st March, was given by the leader, Mr. T. S. Hall, M.A., who reported a very large attendance, over one hundred being present, including about forty-five pupils from the recently established Continuation School. The afternoon was devoted principally to the examination of some of the common objects of natural history usually to be found on the Port Melbourne beach, which afforded material for short chats to the young students.

The hon. librarian reported the receipt of the following donations to the library:—"The Tasmanian Flora," by L. Rodway (purchased); "Proceedings Royal Society of Victoria," vol. xvii., part 2, 1905, from the Society; "Journal of Royal Geographical Society of Australasia (Victorian Branch) for 1904," from the Society; "Australian Museum, Sydney, Annual Report, 1904," from the Trustees; *Agricultural Gazette*, N.S.W., vol. xvi., part 3, March, 1905, from the Secretary for Agriculture, Sydney; "Forest Flora of New South Wales," vol. ii., part 4, by J. H.

Maiden, F.L.S., Government Botanist, from the author; "Memoirs of the New South Wales Naturalists' Club, No. 2—Fishes of New South Wales," from the Club; "Western Australian Year-Book," 1902–4, from the W.A. Government; *Nature Notes*, February, 1905, from the Selborne Society, London; *Nature Study*, January, February, 1905, from the publisher.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. C. W. Thonger, 103 Drummond-street, Carlton, and Mr. J. W. Blackburn, Toorak-road, Toorak, were duly elected as ordinary members of the Club.

GENERAL BUSINESS.

Mr. G. A. Keartland said that since the last meeting the Club had been asked to join in a deputation to the Minister of Public Works, as administrator of the *Game Act*, to protest against any alteration in the close season for quail. The deputation was a large one, and, besides representatives of the Club, Ornithologists' Union, &c., included about twenty sportsmen, who were unanimous in supporting the arguments brought forward by the members of the Club in opposition to any change being made in the opening date, and though it was to be regretted that the decision of the Minister went to some extent against the deputation, he felt hopeful that before the next season the Club's efforts would be recognized, and the division of the State into two districts be found a mistake.

Mr. A. D. Hardy mentioned that the boundary line as given in the daily press was misleading, and had resulted in much confusion and uncertainty, and called attention to a map of Victoria exhibited by him, showing the correct boundary line, as authorized by the Minister.

PAPERS READ.

1. By Mr. J. T. Jutson, entitled "Notes on the Volcanic History of Mount Shadwell, Victoria," with an Appendix on the Rocks and minerals, by F. Chapman, A.L.S.

The author dealt with the newer volcanic rocks shown in two quarries on the flanks of Mount Shadwell, near Mortlake. The facts observed point to two distinct periods of eruption, from the fact that the lower red beds are much decomposed, whilst the overlying black basalt is practically fresh. The author concludes that a considerable space of time ensued between the consolidation of the lower and the outpouring of the upper lavas. The high inclination of some of the rocks indicates a disturbance of the beds, probably at the time of the later eruption.

Mr. F. Chapman, A.L.S., furnished some notes on the minerals and rocks collected by Mr. Jutson.

Mr. A. H. Mattingley inquired if the authors had any idea of the probable date of the eruption of the Mount, and the age of

the beds, as the aboriginals had a tradition relating to the time of the outburst.

Mr. A. E. Kitson, F.G.S., also discussed the paper.

Mr. Jutson, in reply, stated that he had not formed any definite conclusions as to the probable age of the beds. With regard to the aboriginal tradition, he mentioned that Mount Shadwell looks much older than the craters of Mount Noorat, respecting which there are no traditions.

2. By Mr. A. E. Kitson, F.G.S., entitled "Tramps through Benambra to Mount Kosciusko."

The author described two trips he had made to Mt. Kosciusko —the first in 1895, with one companion, from Tallangatta through Corryong, Gehi Valley to Groggin, thence to Kosciusko *viâ* Monaro Gap, returning the same way; the second, in 1896, with two companions, from Tallangatta through Cravensville, Dark River, Gibbo River, Benambra Creek, and Bremba River to Groggin, thence to Kosciusko *viâ* Monaro Gap, returning the same way to Groggin, thence along the Indi River, on the Victorian side, to Corryong, and back to Tallangatta through Berringama and Koetong. The general geological and scenic features were specially dealt with, and some botanical and natural history notes mentioned. In all some 52 lantern views of scenery and maps were shown.

Mr. D. Le Souëf, C.M.Z.S., complimented the author upon the paper and the excellent views shown. He inquired if any "Bogong" Crows were noticed during the trip?

Mr. Kitson, in reply, remarked that he had noticed Crows at very high altitudes, but what species they were he was unable to say.

NATURAL HISTORY NOTES.

Mr. A. E. Kitson, F.G.S., called attention to an exhibit by him of the fern *Lomaria discolor*, var. *bipinnatifida*, from Barry's Creek, near Mirboo North, South Gippsland.

The specimen, in showing development from a form with entire pinnules, is different from the one in which the pinnules were deeply cleft or partite, which was exhibited at the August meeting of the Club. The present specimen, which a month ago showed entire pinnules only, has now three new fronds, two of which show the partite character exclusively, and the third almost quite so. All the fronds developed by the former specimen since it was exhibited possess the partite character entirely.

Mr. Kitson also read a newspaper cutting relating to the pursuit of a "Laughing Jackass" by a hawk. The bird sought refuge within the walls of an hotel, and, in its extremity, dived through the upper pane of one of the commercial room windows, and then, after making several ineffectual efforts to pass through

a large mirror over the fireplace, regained the street by "taking a header" through another closed window.

Mr. A. E. Kitson, F.G.S., remarked that he did not agree with the statement in the report of the Otway Forest excursion in the last *Naturalist* that the absence of the Lyre-birds in the Otway Forest was a sign of the absence of Sassafras trees in the Forest. In South Gippsland he had seen many of the birds in country that was quite destitute of Sassafras trees, and could not believe that the two were necessarily associated.

EXHIBITS.

By Mr. F. Chapman, A.L.S.—Section of minerals and rocks from Mt. Shadwell, in illustration of Mr. Jutson's paper; sections of basalt and lantern slides relating to the excursion to Burnley quarries.

By Master W. D. Chapman.—Specimens of Aragonite and Vivianite in basalt vesicles from Burnley, collected on recent excursion.

By Mr. C. French, jun.—Galls of Brachyscelis destroyed by Gang-Gang Cockatoos.

By Mr. C. J. Gabriel.—Shell, *Melongena patula*, from North America.

By Mr. A. D. Hardy.—Sketch map showing division of the State into east and west districts in connection with the close season for quail; on behalf of Lands Department, plan of subdivision of Acclimatisation Society's Reserve at Gembrook, showing a reserve of about 60 acres in the north-west corner, and a strip along each side of Cockatoo Creek, for recreation purposes.

By Mr. A. Mattingley.—Stuffed specimen of the rare Spotted Crake, *Porzana fluminea*, from Barmah, Victoria.

By Mr. F. M. Reader.—Dried plants—*Hibiscus trionum*, L., new for Victoria; grass, *Lepturus incurvatus*, Trin., new for N.W. of Victoria; *Avellina michelii*, Savi., an introduced grass, new for Victoria; and *Ipomœa niemanni*, F. M. Reader, n. sp., from the Northern Territory, South Australia.

By Miss Turner.—Pod of Cassia, sp., from Thursday Island.

By Mr. S. M. Ware.—*Heliomystis electrica* and *Papilio macleayanus*, collected at Mt. Tonnebuang, between Healesville and Warburton.

After the usual conversazione the meeting terminated.

NATURE STUDY.—The Geelong Field Naturalists' Club has inaugurated the first Nature Study Exhibition to be held in the Commonwealth. It will be opened in the Gordon Technical College on Easter Monday, 24th April. An extensive prize schedule, embracing some sixty classes, has been issued, and entries should be made *at once* with the hon. secretary, Mr. A. B. F. Wilson, 45 Little Malop-street, Geelong.

EXCURSION TO BURNLEY.

The excursion to Messrs. Willis Brothers' quarry at Burnley, on Saturday, 11th March, was attended by eighteen members and visitors. On the road to the quarry a halt was made on the high ground by the engine shed to draw attention to the physical features of the surrounding country, the distribution of the newer basalt, its direction of flow, and the nature of the lava. The remarks were illustrated by a section taken across country from south to north, passing through Richmond. The changes which have taken place since the basalt was first poured out over this spot are considerable, for the old river bed and swamps now lie about 35 feet below the present bed of the Yarra. This depression may have been a direct consequence of the inflowing of the lava stream, which is here piled up to the great thickness of 90 feet. Resting on a floor of river silt, the basalt at this locality appears to show at least two distinct periods of eruption, marked by differences in the structure of the basalt, both in its megascopic and microscopic aspects. In contact with the silt at the quarry base, the basalt is vesicular, which fact is probably connected with the presence of moisture at the time of contact in the area covered by the lava. This vesicular structure is lost after the first foot or two, when the basalt assumes the dense character of a typical bluestone. There is something like an average thickness of 50 feet of rocks of this nature, followed by about 40 feet of easily decomposing basalt showing spheroidal or bomboidal weathering to the top of the quarry. These two beds are irregularly separated by thin and intermittent layers of an ochreous rock, which, on closer examination, has proved to be a finely granular calcareous deposit similar to certain travertin tufas met with elsewhere, which are of lacustrine origin; the calcareous grains each contain a ferruginous nucleus, and they are bound together by crystalline calcite. The descent to the floor of the quarry was made by the nearest path, which proved precipitously steep, and ended in an expeditious reunion at the foot. The party assembled in the N.E. end of the quarry. On the N.E., E., and S. sides the quarry face shows a radial arrangement of slender and somewhat irregular columns, probably induced by the infilling of a valley with sloping sides, since it seems a general rule, as Lyell points out, that the columnar structure is developed at right angles to the cooling surface. On the other hand, Scrope held the view that this radial arrangement is merely due to clots or masses of lava cooled unequally in relation to the surrounding material.

In two places tree stumps were found here, under the basalt and embedded in the silt, in the east and north-west corners of the quarry. A portion of one of these trunks, which microscopic examination shows to belong to the Coast or Drooping She-oak, *Casuarina stricta* or *quadrivalvis*, was fortunately found by the

members, who secured specimens of the wood ; this by the way, shows no greater alteration than a piece of Irish bog-oak, although it has been in actual contact with the lava. On a former visit the writer found a gnarled stump enclosing a piece of basalt within a hollow on the side of the stem.

The few hammers available were then speedily brought into use, and the quarry resounded from the energetic blows of the members searching for minerals. They were rewarded by finding some interesting and often choice specimens of mammillated, radial, and stalactitic Aragonite and Ferrocalcite, which in their setting of blue Vivianite in the vesicles presented an extremely pretty appearance. The structure of the basalt from the two principal flows seen in the quarry was explained for the members by means of sections under the microscope provided for the purpose.

On the party emerging from the quarry by an easier path at the south end, a stack of short but very perfect columns was examined, which form a causeway between two water-filled quarry-holes. The ball and socket joints of these columns forcibly reminded some of the members who had visited Ireland of those at the Giant's Causeway.

The minerals seen in this quarry during the afternoon were the following:—Calcite, Aragonite, Ferrocalcite, Magnesite, Vivianite, Limonite, Copperas, and Marcasite. The occurrence of Vivianite, which is almost exclusively confined to the vesicular layer at the bottom of the basalt flow, may be the result of the liberation of phosphoric acid or phosphate of ammonia from the decomposing animal matter usually met with in similar silty and peaty deposits, such as would have existed here.

Although this seems to be the first visit of the Club to the Burnley quarry, its many points of interest, both scenic and scientific, together with its accessibility to town, should make it a more frequent resort for those interested in the study of geology.

Note on the Microscopic Structure of the Basalt in Messrs. Willis's Quarry.

Sample 1.—A compact bluestone, which rings under the hammer ; from the lower part of the quarry. This is a fresh Olivine Basalt, with holocrystalline and pilotaxitic structure (completely crystalline and with fluidal structure in the ground-mass). The base consists of a closely felted mass of slender plagioclase crystals with a general parallel arrangement. The felspar laths are often strongly bent. The interstices between the groups of felspar laths are filled in with granular purplish Augite crystals ; sometimes these crystals, however, are idiomorphic. Magnetite is freely scattered throughout, the crystals often showing parallel grouping, sometimes arranged in the line

of flow, and sometimes cutting across transversely. The phenocrysts, or larger crystals, in this rock are Olivine and Labradorite. The Olivine is the ferriferous variety, and shows a tendency to develop a clean brachy-diagonal cleavage. There are no traces of decomposition in the Olivine, but minute crystals of Specular Iron (Hæmatite) occur as inclusions. Some of the Olivine crystals scattered through the ground-mass are much smaller, and may represent a second crop of the mineral. The phenocryst of Labradorite contains a nuclear mass of included impurities.

Sample 2.—A vesicular Basalt, having a ground-mass similar to the above, but masked by the ferruginous decomposition products of the Olivine and Magnetite. The phenocrysts of Olivine are very much fractured and cleaved, and are generally in an advanced state of alteration. Some of the less altered Olivines show something akin to Chrysotile structure, the fibres starting from a cleavage surface, and frequently situated at the centre of the crystal. On account of the high percentage of iron in its composition the decomposition product of the Olivine is largely limonitic.—Fredk. Chapman.

NOTES ON THE MAINTENANCE OF EQUILIBRIUM AND SYMMETRY IN TREES.

By H. H. Baker.

(*Read before the Field Naturalists' Club of Victoria, 12th Dec.*, 1904.)

My attention was directed to this subject by noticing in the case of several trees which had been denuded of branches by storm, and were thus thrown out of balance, that an effort was apparently made on their part to put forth new branches upon the side where the loss had occurred, with the intention of restoring the equilibrium necessary for vigorous growth. The idea presented itself that certain natural causes would probably account for the action of the trees, and I venture to submit the following as an explanation of what has occurred in these and in similar cases.

One of the most familiar facts in connection with trees is the symmetry and balance which are displayed in their growth, and that, almost without exception, provision has been made to preserve the equilibrium of the plant, so that the centre of gravity is to be found, under normal circumstances, somewhere near a vertical line drawn through the spot from which the centre of the main stem issues from the ground. This can be accounted for largely by the regular manner in which the branches are developed in the axils of the leaves on the young stems. But as the plant advances in age many of these promising shoots disappear, being torn off by storm, withered by want of light or water, or eaten back by insects.

The regular habit of the plant would alone be insufficient to prevent a branch from growing abnormally in one direction, thereby endangering the stability of the whole tree.

It will also have been noticed in thickly-wooded districts that the trees grow specially tall and straight, the lower part being often as free from branches or leaves as a telegraph pole. Here the only light received comes vertically, and light being a necessity to the plant, only the topmost shoots have found sufficient light for their existence. If, however, a tree in a position not so crowded as to prevent free access of sunlight to all its parts has its regular habit interfered with so that branches disappear from the places where they would normally grow, what is the process which enables it to regain its lost symmetry?

On looking at almost any tree taken at random, it will be found that where a new shoot issues from a stem or branch of a few years' growth, it proceeds from a portion of the wood which is curved, and the new shoot appears on the outer or convex side of the bend. A rough sketch of a tree will at once illustrate the point. A drawing which showed branches proceeding from the inward part of a bend on the parent stem would be at once pronounced untrue to nature, but where the branches proceed from the outer side of the curve the appearance is seen to be quite normal.

It appears, then, that usually before a new shoot arises upon an old stem or branch such stem has a tendency to bend in the opposite direction to that in which the new shoot is to grow. Such a bend will be due to the force of gravitation, and more particularly to the fact that one part of the plant is being developed more quickly than another, causing it to bend over to that side which carries the greatest weight. The new shoot grows out in the opposite direction, and so the equilibrium is restored.

As to the process by which this is effected, it will be seen that when a branch is bent, the part upon the outer or convex side of the bend will have its individual fibres in a state of tension, the fibres offering less resistance to an outgrowth than on the inner or concave side of the bend where the substance would be more dense and compact and unlikely to yield to any internal force which might otherwise be capable of producing a shoot. It is, then, upon the convex side of the bend that the new shoot appears, and while the parent stem remains bent everything is favourable to the flow of sap and consequent growth of the new branch. If, however, the new shoot should become so strong and heavy as to counterbalance the weight of its parent, the latter would become less bent, the opening in its fibres towards the new branch would become more contracted, the flow of sap somewhat less free, and the progress of the offspring would thus be kept within proper limits.

The bending of the stem by too vigorous a growth in one direction therefore tends to operate in two ways—first to cause new growths to appear on the side opposite to that in which the parent stem is bent and to cause a free flow of sap in that direction, and secondly to prevent new growths from appearing on the side which has already become too strong and heavy, and to restrict the growth of the branches on that side by partially constricting the vessels which convey the various juices to them.

CONTRIBUTIONS TO THE FLORA OF VICTORIA. No. XIII.

By F. M. Reader, F.R.H.S.

(*Read before the Field Naturalists' Club of Victoria, 13th Feb.*, 1905.)

Notes on Geococcus pusillus, J. Drummond.

Recently I have had opportunities of examining and watching the growth of a number of specimens of the cruciferous plant, *Geococcus pusillus*, Drummond, and find that in a depauperated state only it produces no stems. When nourished it is provided with distinct, but short, prostrate or ascending tufted stems and branches, and in the centre of these tufts are several flowers. Shortly below the apex of the stems the leaves arise, which a little higher up are clustered, and in these clusters flowers again emanate ; in more luxuriant plants from this point arise branches with leaves again at the top and flowers in the centre, and in this manner the plant may spread out to a certain extent.

The leaves are different from those of *Sisymbrium cardaminoides*, F. v. M. The lobes at first are obliquely-deltoid, or some narrower ; later on some of them are provided with a tooth, or shortly incised, and generally are of a more uniform size and shape. The ultimate lobes are confluent, or three-lobed, or the ultimate lobe is free and usually of an oblong or oval shape.

The flowers are minute, about ½ line long, with thick peduncles, which soon recurve ; the sepals concave and broader than the petals, with the whitish margin narrowly membranous ; the petals shorter, as long as, or somewhat longer than, the sepals, in outline oblong or oval, slightly tapering downwards ; the filaments comparatively broad and tapering upward, and the style is sessile, broad and entire.

The pod is from oblong-linear to oblong and elliptical and bilobed at the base, and valves are prominently 1-nerved ; seeds few, and arranged in two rather distinct series, oblong, without a margin, and with long funicles ; cotyledons incumbent ; the radicle is facing the sides of the cotyledons.

Although the longer stamens by their length are adapted to autogamy, and the flowers inconspicuous, they are not truly

cleistogamous; they soon open out and offer opportunities to external agencies for the purpose of cross-pollination.

The manner of growth of this plant is much like other plants that ripen their fruits underground, and their number is not large. Of these the best-known examples are *Arachis hypogœa* (the well known Pea-nut), *Voandzeia subterranea* (Bomba Ground-nut or Earth-pea), *Morisia hypogœa*, *Trifolium subterraneum*, *Cardamine chenopodifolia*, *Linaria cymbaria*, *Vicia amphicarpa*, *Phrynium micans*, &c., and *Geococcus pusillus* also should now be placed among these.

In the case of *Viola sepincola*, as related by Kerner and Oliver, "the open flowers are adapted to cross-pollination through the agency of bees; should no cross take place, and no fruits be produced from the open flowers which bloom above the ground, cleistogamous flowers, hidden underground, develop and bring forth a number of fertile seeds, as a result of the autogamy which invariably takes place within their closed envelopes. This plant also may be taken as a type of those plants in which most of the fruits ripen underground."

Like other plants of this class, *Geococcus pusillus* has some of the fruits ripening above ground, hence their seeds become adapted to being carried any distance through the agency of animals, or by means of aqueous or aërial currents.

Hitherto this interesting species has been regarded as synonymous with *Sisymbrium cardaminoides*, F. v. M., in a stemless state, but this view must now be relinquished, and the plant looked upon as distinct from that species.

NOTES ON THE FOSSIL CASTS IN TERTIARY IRONSTONE FROM STAWELL, FIGURED BY M'COY.

By F. Chapman, A.L.S., F.R.M.S., National Museum.

(*Read before Field Naturalists' Club of Victoria*, 13*th Feb.*, 1904.)

In the "Progress Report, No. II., of the Geological Survey of Victoria (1874)," p. 22, Prof. M'Coy figured four species of fossils, represented by casts in Tertiary ironstone, from Poverty Hill, 5 miles north of Stawell. The label attached to the rock-specimen, which is in the geological collection of the National Museum, gives the additional information that it was found 18 feet below the surface, and 23 feet above the "gold-drift." The specimen was collected by Norman Taylor of the Victorian Geological Survey.

Since the time when M'Coy named these fossils, the majority of our Tertiary invertebrates has been described by various specialists; and as figures of new forms based on casts are not always very satisfactory for the purpose of subsequent identification, it may be in the interest of scientific workers to re-examine

these particular specimens and their evidence, in the light of our present knowledge.

The fossils figured in the "Progress Report, Geol. Surv. Vict., No. II.," p. 22, are :—

Lepralia stawellensis, M'Coy. (Fig. 1.)
Nucula marthæ, M'Coy. (Fig. 2.)
Tellina krausei, M'Coy. (Fig. 3.)
Ditrupa wormbetiensis, M'Coy. (Fig. 4.)

A repetition of M'Coy's original notes on these fossils will be found in the "Schedule of Reports on Fossil Specimens" (No. 3.160), in the "Progress Report, No. IV.," p. 155.

Casts of other fossils, chiefly bivalves, occur on the same slab, some of which resemble *Meretrix eburnea*, Tate sp.

Remarks on the Fossils.

Lepralia stawellensis, M'Coy.

There is no descriptive information accompanying the figure of this species.

The fossil cast (of which fig. 1 is probably an attempted restoration) is that of a foliaceous *Lepralia*, with zoœcia arranged in linear series. The surface of the zoœcium is moderately convex to nearly flat, and does not show the decidedly barrel-shaped form seen in fig. 1. I have compared this cast on the ironstone block with actual Tertiary specimens of *Lepralia* in the Macgillivray and Maplestone collections in the National Museum, and also with those authors' published descriptions. The ironstone cast seems to agree in all its details, so far as they are preserved, with *Lepralia quadrata*, Macgillivray sp. Another form which bears a somewhat close comparison is *L. quadratipunctata*, Maplestone. It is, however, impossible to do more than indicate its affinities. To attempt the identification of fossil polyzoa by their casts is extremely risky from a scientific standpoint. Mr. C. M. Maplestone has been kind enough to examine this fossil cast, and agrees with me in the conclusion that the species *L. stawellensis* is not valid, since it was based on insufficient material.

Nucula marthæ, M'Coy.

Respecting this fossil, M'Coy remarks that it is "an extinct species common in the Oligocene Tertiary beds between Mount Eliza and Mount Martha."

The figured specimen is an internal cast, and consequently the surface-sculpture of the shell is not seen. Fig. 2 of the woodcut in the "Progress Report" appears to be a restoration of this cast, based on a fossil shell very like the *Leda apiculata* of Tate, a species which occurs commonly in the Balcombian series of Mornington and Muddy Creek.

In outline the cast, which for comparative purposes is not very perfect, is, by its elongated and compressed shape, nearer the

shell referred to above, rather than to *Leda vagans*, Tate, as Professor Tate believed.*

The data afforded by the figure of the cast and the restoration of *N. marthæ* are insufficient for the purpose of identification; but even if we considered the claim of the figured shell to be valid as representing the true outline, the drawing shows too coarse a concentric lineation for a close comparison to be made with *L. apiculata*, and therefore we should not be justified in displacing Tate's species for that given by M'Coy.

Tellina krausei, M'Coy.

This fossil is clearly identifiable with Tate's *Semele krauseana*, both in contour and in the visible traces of the growth-lines. When Tate described his specimens of *Semele krauseana* he was aware of their probable identity with M'Coy's species, for he remarks † in his description of this shell (p. 170):—

"Professor M'Coy, in Report Geol. Surv., Victoria, No. 2, figures on p. 22, under the name of *Tellina krausei*, the impression of a Tellina-like shell obtained near Stawell, and states that the species is common in the Tertiary beds at Schnapper Point. It may possibly be *Semele krauseana*, with which it agrees in shape, but doubtfully so, as the drawing indicates an ornamentation of thick concentric ridges, unless, however, it be faulty in this particular. The figure is unaccompanied by description."

Since both species were dedicated to the same man, it will require little change to effect the needed correction.

With regard to the figure given in the "Progress Report," Tate was correct in his surmise that the concentric ridges were the result of faulty drawing; and, further, it may be stated that the figure on p. 22 is about two-thirds the natural size, although this is not indicated.

Ditrupa wormbetiensis, M'Coy.

This fossil is somewhat common in the ironstone from Stawell, and there can be no doubt whatever as to the identity of this little annelide, which I have compared with the original examples from Wormbete Creek, in the Barwon valley, in the National Museum collection.

The species enumerated by M'Coy from Stawell may therefore stand as follows:—

(1.) *Lepralia stawellensis*, M'Coy = *Lepralia* sp. cf. *quadrata*, Macgill., sp.

(2.) *Nucula marthæ*, M'Coy = *Leda* (?) *apiculata*, Tate.

(3.) *Tellina krausei*, M'Coy, should read *Semele krausei*, M'Coy sp. (synonym *S. krauseana*, Tate).

(4.) *Ditrupa wormbetiensis*, M'Coy.

* *See* Trans. Roy. Soc. S. Australia, vol. viii., 1886, p. 132. (The *Leda lucida*, T. Woods sp., under which Tate's remarks are made, was subsequently changed to *L. vagans*, the earlier name having been preoccupied.)

† Trans. Roy. Soc. S. Australia, vol. ix., 1887, p. 169, pl. xvi., figs. 18 *a*, *b*.

THE

Field Naturalists' Club of Victoria.

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