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THE

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OF THE

Field Naturalists' Club of Victoria.

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MAY, 1918, TO APRIL, 1919.

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 11, in note—For "entomological" read "ethnological."

Page 20, line 21—For "Rose-breasted Cockatoos" read "King Parrots."

The Victorian Naturalist.

Vol. XXXV.—No. 1. MAY 9, 1918. No. 413.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 8th April, 1918.

The president, Mr. F. Pitcher, occupied the chair, and about fifty members and visitors were present.

CORRESPONDENCE.

From Mr. F. P. Dodd, Sydney, intimating that he would shortly have on view in Melbourne an extensive collection of Queensland and New Guinea insects, principally butterflies, together with some large photographs of scenery.

REPORTS.

A report of the excursion to Korkuperrimul Creek (Bacchus Marsh) on Saturday, 23rd March, was given by the leader, Mr. R. E. Luher, B.A., who reported a fair attendance of members. The excursion was devoted to geology and physiography, and the members had been successful in securing some of the characteristic fossils of the district, and, notwithstanding the somewhat warm day, had been greatly interested in the extensive views obtained from several points on the walk.

A report of the excursion to Lake Corangamite and the Colac district at Easter was given by the leaders, Messrs. J. Shephard and J. Searle. The former gave a general account of the outing, which he said had been very successful, and referred to the rotifers obtained, while Mr. Searle gave some account of the micro-crustaceans collected. Further notes were given by Mr. A. D. Hardy, F.L.S., on the algæ met with, and Mr. F. G. A. Barnard on the salt industry connected with Lake Beeac.

ELECTION OF MEMBER.

On a ballot being taken, Miss E. Perry, High School, Geelong, was duly elected a country member of the Club.

REMARKS ON EXHIBITS.

Mr. J. Shephard made some remarks on a probable new species of Pedalion from Lake Corangamite, where it existed in large numbers.

Mr. F. Chapman, A.L.S., referred to some specimens of a Springtail (Collembola) which appeared recently in countless numbers after a storm. The insects, however, appeared to differ in some respects from the recognized species.

Mr. F. G. A. Barnard called attention to his exhibit of a globular, water-worn granite pebble extracted from the glacial till during the Korkuperrimul Creek excursion, which, he understood, was somewhat unusual in shape, and expressed his intention of presenting the specimen to the National Museum.

PAPER READ.

By Mr. J. W. Audas, F.L.S., entitled "The Characteristic Vegetation of the Yarram District."

The author dealt with the results of a botanical collecting trip in the Yarram (South Gippsland) district last October, when he was successful in finding a number of interesting plants in bloom, including *Kennedya rubicunda, Prostanthera rotundifolia, Fieldia australis,* &c. He added some notes about the early history of the district, which included the one-time busy port, Port Albert.

The chairman said that the author was to be congratulated on the results of his trip, which indicated a good wild-flower district.

Mr. C. Daley, B.A., said that the reason of the original Port Albert being abandoned was that, it being on Crown lands, the occupiers were called upon to pay a yearly license fee, and rather than do this they abandoned the site and bought freehold land at the site of the present Port Albert.

NATURAL HISTORY NOTE.

Mr. J. L. Robertson, M.A., said that he had been given the description of a strange fish, measuring over eleven feet long, which had recently been washed up on the Elwood beach. He hoped to have further details to place before the next meeting.

Mr. J. A. Kershaw, F.E.S., said that from the description given he was unable to connect it with any known species.

EXHIBITS.

By Mr. F. G. A. Barnard.—Round water-worn pebble of granite, weighing 1¼ lbs., extracted from the glacial till at Korkuperrimul Creek, Bacchus Marsh; fossiliferous rocks from same locality, obtained at recent excursion; also specimens of rocks, volcanic ash, cinders, &c., from Colac district; alga, *Entomorpha intestinalis,* and shells, *Cociella striatula,* as thrown up on shore of Lake Corangamite; foliage and fruit of *Eucalyptus Behriana,* F. v. M., Bull Mallee, from Anthony's Cutting, near Bacchus Marsh.

By Mr. F. Chapman, A.L.S.—Victorian Springtails, Lipura, (?) sp., collected at Balwyn in garden drain after a storm, in illustration of note.

By Mr. A. D. Hardy, F.L.S.—*Cladophora flavescens,* a fresh-

water alga from Lake Colac; *Entomorpha intestinalis*, an alga from Lake Corangamite.

By Mr. R. E. Luher, B.A.—Fossil leaf impressions of *Laurus werribeensis*, M'Coy, and *Cinnamomum polymorphoides*, M'Coy, in Cainozoic ironstone, Korkuperrimul Creek, Bacchus Marsh; fossil frond impressions of *Gangamopteris spatulata*, M'Coy, and Tæniopteris, sp., from Permo-Carboniferous beds of Bald Hill, Bacchus Marsh; also glaciated stones, all collected at excursion on 23rd March, 1918.

By Mr. F. Pitcher.—Flowering branches of *Acacia discolor*, Willd., Sunshine Wattle, from Melbourne Botanic Gardens.

By Mr. P. R. H. St. John, on behalf of Director of Melbourne Botanic Gardens.—Flowering branches of *Hoheria populnea*, A. Cunn., "Hohere," N.O. Malvaceæ, native of New Zealand, grown at Melbourne Botanic Gardens.

By Mr. J. Searle.—Micro-crustacea under microscope, collected during Corangamite excursion, Easter, 1918; also salt from Lake Beeac.

By Mr. J. Shephard.—Plankton gatherings from Lakes Colac and Corangamite; rotifer, Pedalion, sp. (under microscope), from Lake Corangamite; map of parts visited, compiled by Mr. A. D. Hardy, F.L.S., and photographs in illustration of excursion report.

By Miss A. H. Skinner.—Flowers of *Banksia serrata*.

By Mr. H. B. Williamson.—Robust specimen of *Hymenanthera Banksii*, F. v. M., Tree Violet, with photograph of bush, illustrating the tendency of plants to arm themselves as a defence against grazing animals.

After the usual conversazione the meeting terminated.

Shower of Fish.—In the *Argus* "Nature Notes" of 26th ult., Mr. J. V. Mack, of Berrybank, Lismore, confirms a statement made in a previous issue as to a shower of fish during a rain storm near Cressy. Mr. Mack says:—"In 1879 one of my men was collecting odd fence-posts in that district, and came home with his pockets filled with the ordinary creek minnows, about three inches in length. He told me he had tilted the dray during an awful storm, and afterwards found the fish. I rode out in the afternoon, and saw that the storm area was only about 100 yards wide and half a mile long. The crab-holes were then half-full of water, while the rest of the plain was quite dry. There were thousands of minnows in the pools, and no other surface water of any kind within three miles." This statement seems to be a clear confirmation of the belief that frogs, fish, &c., can be transported from place to place by the action of wind and rain in the form of a so-called waterspout; in this case minnows were plentiful in streams, at no great distance, running into Lake Corangamite.

EXCURSION TO BERWICK QUARRY.

THE wet forenoon of Saturday, 23rd February, doubtless prevented several members from taking this trip. Early in the afternoon, however, the clouds disappeared, and a delightful afternoon was the result. The party proceeded straight to the quarry, where it was found that the exposure worked by the members of the Club on their visit in April, 1916 (*Vict. Nat.*, xxxiii., p. 4), was covered with *débris*, which had to be cleared away before any specimens could be obtained. The exposure consists of a small vertical face of fluviatile clays underlying the Older Basalt. The actual bed of the old stream was not visible, owing to the amount of water in the well which has been sunk through the clays. We were greatly indebted to Messrs. A. H. Blake and J. L. Robertson for their exertions in removing the *débris* and so enabling us to split many fine specimens out of the material, including a legume—the first evidence of the Leguminosæ in these beds. The species collected include Tristanites angustifolia, Deane, T. Muelleri, Deane, Lomatia perspicua, D., L. Bosistooides, D., Eucalyptus Kitsoni, D., L. Hermani, D., L. Houtmanni, D., L. Mitchelli, Ettinghausen, Atherosperma Berwickense, D., Fagus, *cf.* Luehmanni, D., Aristotelia, sp., Mollinedia, sp., Pittosporum, sp., and a legume, (?) Acacia, sp. The species of Pittosporum is not the same as that obtained from the leaf-beds at Mornington. Eight of these species were obtained during the Club visit in 1916. Later in the afternoon the party proceeded to the summit of One-Tree Hill, and studied the physiography of the wide area observable from that vantage point. I desire to place on record the Club's indebtedness to Mr. Wilson for his courtesy in permitting the members to visit the quarry and open up the leaf-beds.—R. A. KEBLE.

THE AUSTRALIAN FOREST LEAGUE.—The fourth annual meeting of the Victorian Branch was held at the Melbourne Town Hall on the 29th ult., when an encouraging report of the progress made during 1917 was given. On the conclusion of the formal business, the retiring president, Prof. A. J. Ewart, D.Sc., Government Botanist, gave an address, the keynote of which was the approaching timber famine in Victoria as well as in other Australian States, which he considered not more than thirty years off. He urged that no further settlement be allowed on land bearing timber of any value. The Hon. F. Clarke, M.L.C., Minister of Lands, who occupied the chair, said that he recognized the truth of Prof. Ewart's remarks, but it must be shown that timber-growing was a payable proposition. An interesting discussion followed on the points raised. Mr. W. Russell Grimwade was elected president for the ensuing year.

EXCURSION TO KORKUPERRIMUL CREEK (BACCHUS MARSH).

QUITE a large party, including several ladies, met at Spencer-street station on Saturday, 23rd March, in order to take the 7.40 a.m. train to Bacchus Marsh. During the train journey the immense level plains of Newer Basalt over which we passed, and the almost circular hollow in which the town of Bacchus Marsh has been built, were duly noted and commented upon. The weather was ideal, and as the party walked through Maddingley Park towards the township, and afterwards along the Ballan road, the sunshine, tempered by a slight breeze, enhanced the outlook and rendered the outing decidedly pleasant. The early part of the excursion was along the route of an excursion taken some two years ago by University students under Professor Skeats. At a suitable point a halt was called, and the geological history of the district, with the resulting physiography, studied. The dark, densely-wooded hills in the distant north-west were pointed out as the bedrock of the district, being composed of shales and mudstones of Ordovician age, and of the Castlemaine horizon. In striking contrast were the nearer treeless slopes of Bald Hill, the material of which was deposited in Permo-Carboniferous times. The bedrock, during the great Devonian earth movements, had probably been folded, faulted, and pierced by igneous dykes, followed afterwards by a long period of erosion. Next, in the Permo-Carboniferous period, an immense ice-sheet moved northwards over the area from a hypothetical point in the Antarctic, and deposited the argillaceous sediment of Bald Hill. Turning more to the west were the sloping yet steeper hills of Older Basalt. In Mesozoic and Cainozoic times the district had probably remained a land area, and the great volcanic activity which followed was shown by the immense thickness of the floor as indicated by the hillsides. This outpouring disturbed the drainage system of the area, and a huge fresh-water lake was created, on the banks of which grew trees similar to the cinnamons and laurels now growing in Queensland and New South Wales. After this lacustrine period the Newer Basalt flows connected with renewed volcanic activity of Pliocene age once more overwhelmed the area, filling up the old streams. Thus, where we stood in the road-cutting we could see the old river sands and gravels exposed, whilst as far as the eye could see —east, south, and west—were the Newer Basalt plains, with their steep edges towards the Bacchus Marsh basin. Then further changes took place. A big fault-scarp occurred in the Ordovician series, which was visible along the eastern slopes of Bald Hill, and extended a considerable distance either way.

The formation of this scarp diverted the Werribee and Lerderderg Rivers, and in the process of cutting through this impediment to its course the Werribee River formed the famous gorge, the entrance to which was just visible to the south-west. The union of the two rivers gradually formed an alluvial flat, now very many acres in extent, and known throughout Victoria for its wonderful fertility, the soil in many places being upwards of twenty feet in depth. The party then proceeded towards the Korkuperrimul Creek, which, flowing from the north to the Werribee River, crosses the Ballan road just beyond the junction of the road to Bald Hill. Here, on the side of the road before reaching the bridge, an ironstone outcrop occurs, in which may be found leaf impressions of two trees which at one time grew in the neighbourhood. On splitting some of the pieces of stone, fairly good specimens of *Cinnamomum polymorphoides*, M'Coy, and *Laurus werribeensis*, M'Coy, were obtained. We then proceeded northwards, and on the slope of Bald Hill inspected the upper beds of Permo-Carboniferous origin which are there exposed in a ravine. Although fossils were obtained here on the previous excursion, time prevented the party seeking for them on this occasion. Further north, in a somewhat damp depression, a number of fine mushrooms were gathered, some of which measured six and eight inches across. A little further north an intrusive dyke was pointed out, from which some large orthoclase felspar crystals were obtained. It was now time for lunch, so, obtaining water from a neighbouring farm-house, we selected a shady spot near a big red gum, and boiled the billy. The pools marking the course of the creek teemed with animal life and algæ, but unfortunately the microscopists of the party had not brought their collecting apparatus. Feasting and resting over, we resumed our walk up the stream, such as it was, and at a bend inspected a cave-like hole hollowed out of the glacial till. One of the party took a fancy to a rounded pebble partly exposed in the face, and succeeded in extracting it without much damage. It proved to be a water-worn granite stone deposited in its recent position many thousands of years ago; now it is to rest in the National Museum collection as a somewhat unique specimen, the included stones in the glacial till being generally angular. The fault line between the Permo-Carboniferous beds and the Older Basalt was seen at several points along the creek. The hills composed of Older Basalt were also more closely inspected, when the different terraces marking succeeding layers or flows of lava were seen to stand out prominently at places, making an imposing sight, and seemed to indicate that the Older Basalt had here a thickness of nearly 1,000 feet. Further along the course of the creek some monchiquite dykes were pointed

out. We then climbed the slopes of Bald Hill, on the way obtaining a fine view of the meanders of the stream, and in one of its tributaries noting some large boulders, which had been deposited by glacial action, exposed in the cut-down bank. The Bald Hill freestone quarries were then visited, and some of the rejected blocks of stone split open in search of impressions of the ferns *Gangamopteris spatulata*, M'Coy, and *G. angustifolia*, M'Coy, nice specimens of which were found. This freestone was glacially deposited, and has a binding of argillaceous cement. It was used in the construction of the Chief Secretary's office, Melbourne, but has not stood the city atmosphere well; however, in sheltered positions it wears better. Some of the party then walked to the summit of the hill, where a temporary trigonometrical station has recently been erected, probably in connection with the military survey of the State. From this flat, dome-shaped height a fine panoramic view was obtained, mellowed by the waning daylight. To the south the You Yangs and the nearer Brisbane Range were visible; in the west, over the Pentland Hills, were Mounts Egerton and Steiglitz; to the north-west the wooded summit of Mount Blackwood stood out prominently in front of the hills of the Dividing Range, while nearer at hand were the Lerderderg Ranges; to the north, between Mounts Bullengarook and Gisborne, could be seen Macedon and the Camel's Hump; to the east, in the foreground, was the Bacchus Marsh basin, with the basaltic plains beyond, on which stood numerous points of eruption, Mount Kororoit or Misery being the most prominent. Returning to the quarry, a pause was made to watch the Adelaide express laboriously climb the incline from Rowsley towards Ingliston—part of the big fault-scarp already referred to—and then the return walk to the township was commenced. It was almost dark by the time the town was reached, when all were ready for tea, which was partaken of in the park by moonlight. Leaving by train about 9 p.m., Melbourne was reached in due course, all agreeing that a most enjoyable and instructive day had been spent.—R. E. Luher.

Household Pests.—In the *Journal of Agriculture, Victoria*, for April, Mr. C. French, jun., Government Entomologist, gives some account of the depredations which may be caused to the timbers of houses, furniture, &c., by the Furniture Beetle and the Pin-hole Borer, two insects which have unfortunately become very common in recent years. Bamboo furniture is especially subject to their attacks, and should be watched. He gives some hints as to the precautions to be taken to secure immunity from attacks, and means to be adopted when the trouble is present.

WHAT IS NARDOO.

BY SIR BALDWIN SPENCER, K.C.M.G., F.R.S., D.Sc.

(*Read before the Field Naturalists' Club of Victoria, 11th Feb.*, 1918.)

IN the *Victorian Naturalist* of January, 1915 (vol. xxxi., p. 133), there appeared a short but interesting article by Mr. E. H. Lees under the above title. In this communication Mr. Lees very briefly discussed the subject of "Nardoo" from two different points of view—(1) what actually is nardoo; is it a name applied to one single plant or product of the same, or is it a name applied to the products of several plants that are, or were, used as foods by the aboriginals; and (2) is the nardoo, so often referred to in connection with the Burke and Wills Expedition as forming the staple food of the explorers during their last days on Cooper's Creek, the sporocarp of a species of Marsilea, or did they give the name to and subsist not only on this but on seeds of grasses and leguminous plants to which they applied the same name.*

The matter is one of considerable interest both from a natural history, an ethnological, and, as connected with the Burke and Wills Expedition, an historical point of view. As one who has seen and gathered nardoo where it grows in profusion, has had long and intimate intercourse with the natives, watching them grinding and pounding the various "seeds" that they use as food, and, above all, in regard to this special question, has frequently discussed with the late Dr. Howitt this and other matters connected with the Burke and Wills Expedition, it has seemed to me to be of some interest and importance to arrive at a definite decision as to what is nardoo. In the endeavour to do this I have made as complete an examination as possible of all the available evidence, including the accounts of the expedition as published in book form, and in the 'daily Melbourne papers for 1861, 1862, and 1863, the Report of the Parliamentary Commission in 1861–2, the records of the term nardoo as dealt with in scientific journals, ethnological and botanical works, and more especially the manuscript journals and papers referring to the expedition, which for many years have been preserved in the Melbourne Public Library. It would occupy far too much space to record the mass of evidence derived from these original sources, but I have selected what appears to me to be of primary and sufficient importance to decide the question, which I propose to deal with under the two heads already indicated.

* Mr. Lees, in his article, mentions the fact that there have been many specific names applied to various forms of Marsilea in Australia. It is now recognized that, though there may be local varieties, there is only one species, which retains the name of *Marsilea quadrifolia*.

(1) *What is Nardoo.*

In the *Australasian* of 12th February, 1910, Mr. E. J. Welch, under the title of "The Explorer—Dietary Experiences," referred to nardoo. Mr. Welch was a member of the Howitt contingent relief party, and, on being communicated with, he distinctly asserted, in the *Victorian Naturalist*, the identity of nardoo with the plant Marsilea.* In reply to this Mr. Lees says †:—"According to Mr. Welch, and, in fact, to every writer on the subject, it is identified with Marsilea, or with some other specific plant. I maintain that this is not so. Nardoo is not a plant at all; it is a food obtained from several plants."

Experience in Central and Northern Australia, whilst living amongst various tribes, has enabled me to gain some insight into native matters. In the first place, one has to be very careful in regard to words such as "nardoo." A white man living for a time in one locality hears a native name applied to some special object. When he travels on to another place he carries this name with him, and, as likely as not, applies it to some other thing to which, either in general appearance or in regard to its use, it is apparently similar, and the native, wishing to please the white man, adopts the new name, with the result that confusion arises in consequence of the same name being applied to two different objects. Or, again, a name that is applied originally in one special tribe to one special object may become widely used for the latter, because it is carried on from tribe to tribe by white men, or even by natives working for them, as the country is opened up or settlement extends.

The name nardoo, nardu, gnardu, or ardoo is a case in point. The word belongs to the language of the Yantruwanta tribe, in the Lake Eyre district; but, thanks to white men, it has been widely spread over Central Australia, and for many years past has been used by native tribes to whom it was quite unknown before the advent of the former. So, again, the same is true of the word "munyeru," used in connection with the seeds of species of Claytonia and of cakes made from them by natives in many parts of Central Australia. At Alice Springs, for example, the real native name is "ingwitchika," but the name "munyeru" has been adopted from the white men, and is, or was, almost universally used.

It may be noted also that mistakes are liable to arise because, if a native be asked by a white man a question, such as "Is this nardoo?" and he thinks that the answer "Yes" will please the former, he will as likely as not return what is the wrong answer, just because of his anxiety to please.

* *Vict. Nat.*, May, 1910, vol. xxvii., p. 16.
† *Vict. Nat.*, January, 1915, vol. xxxi., p. 135.

Many scores of times I have watched the natives of various tribes, from the Urabunna, in the south, on the west side of Lake Eyre, right across the continent to the Kakadu, on the Alligator River, in the Northern Territory, grinding and pounding the various seeds that they use for food. In addition to grass seeds, they use those of various species of Acacia, "shelling" them when they are fresh and green, just as we "shell" peas, and eating them in large quantities, either raw or after warming them in hot ashes. When dry and hard they are pounded and made into cakes, to which the name nardoo is certainly not applied in the Urabunna or the Arunta tribes —the latter inhabiting the country from the Macumba River to the south of Charlotte Waters and away to the north of the Macdonnell Ranges in the centre. In regard to these two tribes I am speaking after having made careful investigations, and, as I know from Dr. Howitt, the same is, or was when he knew them well, equally true of the Dieri and Yantruwanta tribes of the Lake Eyre district. On the other hand, it is important to note that, as indicated later, the natives have a special name for each form of plant food. In the far north, for example, cakes are made from the seeds of the water-lily, but the name nardoo is never applied to them; they are called either "worki" or "porijilili" by the Kakadu natives.

Mr. Lees writes, in regard to his experiences, that on one occasion when returning from "a western exploration trip in the neighbourhood of Giles's 'ever-flowing Ferdinand' . . . we faced the return journey of six days with barely sufficient stores to last two days. On the second day we struck water, and, notwithstanding the commissariat shortage, we had to spell the camels for a day. During this time our camp black (a Macumba River native) collected a supply of leguminous seed, from which we made nardoo." Again, in regard to his experiences near Charlotte Waters, Mr. Lees writes:—"On one such expedition I was accompanied by Mr. Gillen, and we have partaken of leguminous nardoo in aboriginal restaurants, where at that time English was unspoken and the white man little known." One cannot help thinking that the term nardoo was mistakenly applied by the white man in all good faith to the leguminous cakes, or, if by the natives, simply because they knew that nardoo was a name well known to the former.

I have spent very many months with my late friend and colleague, Mr. Gillen, working amongst the aboriginals. Over many a camp-fire between Lake Eyre, in the south, and Borroloola, on the Gulf of Carpentaria, we have discussed most things connected with the natives, but he never suggested and we never found any evidence to show that the word nardoo

was used in connection with anything except Marsilea, its fruit, and the cakes made from this.

The above are the only two references that I can find in numerous accounts of nardoo written by those who have had actual experience amongst the natives, in which it is suggested that the name is given to the product of any plant except Marsilea, and even here the evidence can only be described as very vague and most unconvincing. When Mr. Lees says "We made nardoo" and "We have partaken of leguminous nardoo," one naturally wants to know what exactly is his authority for calling it by this name. The Arunta tribe, in whose country Mr. Lees was travelling when he was accompanied by Mr. Gillen, does not (except possibly in its most southern part, where it is in contact with the Urabunna) use the sporocarps of Marsilea as a food, and the word "nardoo," except as a borrowed word, does not exist in its language.

So far as my experience goes, every plant, the leaves, stems, roots, or seeds of which are used for food, has its own special name. Nardoo, munyeru, parakilia, tjainda, itata, erlipinna, ingwitchika, tiritipaua, kurangula, kudnagertikati, katnungara, are a few of those known to me by personal experience, but each of these names is applied to one and only one plant and its product.

So far as I can find out, also, every investigator who has made a special study of the natives and has had first-hand experience in the field is in complete agreement on this point. Dr. Roth,* for example, gives *pappa* as the "generic" name for all seed-foods in the language of the Pitta-pitta tribe in Queensland, but, in addition, he records the native names of many individual food plants, and, without any exception, each such name applies to one plant only. Amongst many different forms he mentions "the hard-shelled seed of the 'nardoo' (Marsilea), easily and speedily collected from the plant when growing in marshy swamps."

So, again, Gason,† in his account of the "Manners and Customs of the Dieri Tribe," gives the names of various seeds, &c., describing nardoo as "ardoo." He writes:—"In a dry season they subsist mainly on ardoo, but in a good season, with plenty of rain, they have an ample supply of seeds, which they grind or pound, make into small cakes, and bake in the ashes." He thus very clearly distinguishes between ardoo and other vegetable foods.

In Brough Smyth's "Aborigines of Victoria," when speaking

* Roth, "Entomological Studies Amongst the Natives of N.W. Central Queensland," 1897, p. 92.

† "The Native Tribes of South Australia," Adelaide, 1897, pp. 259, 288.

of the Cooper Creek tribe, Dr. Howitt says * :—"Nardoo is well known. It may be called their stand-by when food is scarce. In many places miles of the clay flats are thickly sprinkled with the dry seeds. Seeds are generally called 'Bowar,' of which Portulac, the Manyoura 'bowar,' is the most prized."

At a much later date, in "Folk Lore," Miss Mary E. B. Howitt † published "Some Native Legends from Central Australia." These were selected from a large number collected by the Rev. Otto Siebert. In a note on one of these, Miss Howitt says :—"Nardoo forms a staple article of food with these tribes, and has been well known to the natives since the unfortunate explorers Burke and Wills tried unsuccessfully to live on it, when Wills wrote in his diary that it was 'not unpleasant starvation.' Some of the seed actually collected by them, and afterwards found by Mr. A. W. Howitt's rescue party, is before me now. The so-called seeds are spore-cases of a species of Marsilea, a genus common to many parts of Australia."

It is important to note that Dr. Howitt states that "bowar" is a term applied to seeds in general. The Rev. Otto Siebert, in charge of the Aboriginal Mission Station at Kopperamana, on the Barcoo, says that "Paua is food made from the seeds of various plants. It is collected, cleansed, and stored away in pits, which are closed by a cover made of rushes and smeared on each side with clay to hold them together. . . Nardoo is not ground, but pounded to a fine powder and made into a kind of cake."

Dr. Howitt's name "bowar" is clearly the equivalent of "paua," and both of these are general terms applied to plant food, of which nardoo is clearly only one kind.

(2) *What was the Nardoo of the Burke and Wills Expedition.*

There can, fortunately, be no doubt in regard to this. It is made absolutely certain by reference to the original sources of information previously indicated.

The earliest reference to nardoo, though under a name spelt somewhat differently, occurs in the diary of Dr. Herman Beckler.‡ After Burke had broken up his party at Menindie, and was proceeding northwards to Cooper's Creek, despatches arrived for him from Melbourne. Two men—Lyons and Macpherson—attempted, without success, owing to the dry season, to follow him up. Beckler succeeded in rescuing them on their

* "Aborigines of Victoria." Appendix, vol. ii., p. 302.

† "Folk Lore," vol. xiii., 1902.

‡ Diary of Herman Beckler's journey to relieve Lyons and Macpherson, from 21st December, 1860, to 5th January, 1861.—MS.

return journey to Menindie. Writing on 27th December, 1860, he says :—" At about 6½ o'clock a.m. we met with numerous tracks of the natives. . . All at once Peter called out, 'Hye! hye!' and sure enough there was Macpherson at a short distance from us, apparently searching for something on the ground. . . Lyons was at the camp engaged in baking cakes when we came up to him. The seeds of which they prepared a warn (?) meal, and out of that either cakes or porridge, is not properly a seed, but the sporangium and the spores of a small plant, the leaves of which are very like clover. It is, I believe, a Marsileana, and everywhere to be met with where water stagnates for a time. . . The plant which saved Macpherson and Lyons's lives is called by the natives Gnadunnea." It is important to note that this is clearly distinguished from other seeds, &c., used for food, because Dr. Beckler adds :—" Here I may as well say that the Portulac * abounds . . . and just now . . . it begins to blossom. They (the natives) call it 'dungerow,' and they use the seeds in the same way as the sporangiums of the Marsileaceous plant to make flour."

In Wills's journal we read (I am quoting from his manuscript) —" Camp No. 9, Thursday, 7th May, 1861.—On our arrival at the camp they (the natives) led us to a spot to camp on, and soon afterwards brought a lot of fish and bread, which they call nardoo." Later on, whilst still at the same camp, he says :—" Mr. Burke and King employed in jerking the camel's flesh, whilst I went out to look for the nardoo seed for making bread. In this I was unsuccessful, not being able to find a single tree of it in the neighbourhood of the camp. I, however, tried boiling the large kind of bean which the blacks call padla." This may be taken as evidence that leguminous seeds were not called nardoo by the natives.

Whilst still at the same camp, Wills writes :—" On approaching the foot of the first sand-hill King caught sight in the flat of some nardoo seeds, and we soon found that the flat was covered with them." Lastly, at a later date, Thursday, 20th June, 1861, he writes :—" I cannot understand this nardoo at all—it certainly will not agree with me in any form. We are now reduced to it alone, and we manage to consume from four to five pounds per day between us. It appears to be quite indigestible, and cannot possibly be sufficiently nutritious to sustain life by itself."

In John King's narrative † he says :—" We had not gone far before we came on a flat, where I saw a plant growing that

* *Claytonia balonnensis* and other species.

† Report of the Commission (Appendix L.) presented to Parliament, Victoria, 1861–2.

I took to be clover, and, on looking closer, saw the seed, and called out that I had found 'the nardoo'; they were very glad when I found it."

It may be noted also that the explorers, in addition to the bean called padla, already referred to, were well acquainted with at all events one other vegetable food quite distinct from nardoo, as will be seen by the following questions put to and answered by the survivor King when giving evidence before the Parliamentary Commission :—

"No. 899. And about that time the provisions began to get short ?—Very short.

"No. 900. And the allowance was on a very small scale to match ?—On a very small scale; our principal ration was the portulac.

"No. 901. Which is a kind of vegetable ?—Yes, a kind of vegetable.

"No. 902. A leafy vegetable ?—Very leafy.

"No. 921. How did you cook the vegetable ?—Boiled it."

Dr. Howitt is perfectly clear on the matter. In his journal,* on 2nd September, Camp 20, he writes :—"On some of the flats I observed quantities of the plant growing from the seeds of which the natives make their bread. It appears to choose a loose, blistered, clayey soil, subject to be flooded, such as is generally found in polygonum ground. The leaves resemble clover, but with a silvery down, which is also found on the seeds when fresh; these grow on short stems springing from the roots, and are flat and rather oval. In places where the plant has died down, these seeds quite cover the ground; they are gathered by the native women, and, after being cleaned from the sand, are pounded between two stones and baked as cakes."

The above evidence at first hand from Dr. Beckler, Wills, King, and Dr. Howitt is surely conclusive, and, moreover, as I write this I have in front of me, amongst the records of the expedition, two little packets, described as nardoo, and both containing a few sporocarps of *Marsilea quadrifolia*. One contains nardoo actually brought down by King from Cooper's Creek; the other † is accompanied by a copy of a note made by Dr. Howitt, as follows :—"Nardoo collected by Burke and Wills and King at Cooper's Creek, found by A. W. Howitt at their camp."

* "Diary of Burke and Wills, Howitt's Journal and Despatches, King's Narrative, &c.," Melbourne, published at the *Age* office, 1861.

† I am indebted to Miss Mary E. B. Howitt for this. Miss Howitt writes :—"I have a small quantity of the actual seeds found in a little heap, as gathered by one of the fated party, somewhere near the remains of one of them."

To sum up the evidence in regard generally to nardoo, it may be said that—

(1) Nardoo or gnardu is the native name in the Yantruwanta tribe for the plant *Marsilea quadrifolia* and the food product derived from it.

(2) The name nardoo is applied to this plant and its product only. There is no real evidence of its ever having been applied by the natives to any other plant or its product.

(3) The nardoo referred to in connection with the Burke and Wills Expedition is the plant *Marsilea quadrifolia,* its sporocarps, and the product derived from these, on which the survivor King lived until he was rescued by Dr. Howitt at Cooper's Creek in 1861.

THE BLUE-TONGUED LIZARD.—A friend, Mr. G. A. Heumann, of Sydney, who has kept Blue-tongued Lizards in captivity for years, was fortunate not long ago in seeing some young born. He says within an hour and a half the female dropped seventeen young. Supporting the front part of the body on the ground, she raised her back legs and body above the ground, and dropped the young at short intervals. These were encased in an oval-shaped skin bag, the tail being bent along the body towards the head. After a few moments the young lizard pushed its head out of the bag, halted, evidently to take its first breath and a view of the world, and then wriggled right out. The skin bag being attached to the abdomen, the young made short work of getting rid of it by eating it; this was their first feed. Still many of them were not satisfied, and at once ate three or four meal-worms in addition. Then they walked straight away under cover, and took not the slightest notice of the mother, or she of them. On several occasions young Blue-tongued Lizards have been born in the Melbourne Zoo, but fewer in number at a time. Mr. Heumann's interesting account agrees with what I have seen here.—D. LE SOUËF, Parkville.

RAINING SPRINGTAILS.—On the morning after the storm of Saturday, 2nd March, 1918, my attention was arrested by a black deposit in the tile gutters at the side of the garden path at my house at Balwyn. At first sight it looked like menaccanite or iron-sand; but, probing it with the finger, it yielded, and not only yielded, but began to jump in all directions. An examination with a lens showed it to be composed of myriads of tiny insects, measuring about .7 mm. in length, since found to be related to the order Collembola, Lubbock, of which *Lipura* is a well-known genus. Mr. F. Spry informs me that

this particular species is unknown to him, and is probably new. There being no lack of specimens, I collected a tubeful, some of which are in the National Museum collection. To gain an idea of their excessive abundance, the cubic contents of one patch (out of three or four within a length of ten yards of gutter) worked out at one million and twenty-five thousand individuals. The morning was dull, but after the sun came out for a few hours there was a marked stampede of the little insects, probably to the bases of the grass tufts, from whence they seem to have been washed, the expanse of grass being only a few inches above the level of the gutter. This particular form is shaped like an elongated wood-louse, with three pairs of thoracic legs, six body segments, a pair of short, unequally-segmented antennæ, and two short, stout appendages near the hinder extremity, used for jumping. No sucking disc was visible on the under side of the body. The feet are terminated by a sharp, curved claw. The last abdominal segment carries either a pair of elongate, triangular cerci surrounded by long, curved bristles, or a pair of sharp, backward-curving claws. Scattered bristles are seen covering the general surface of the body and appendages, and these seem to serve in an efficient way to entrap air so that in flood waters the insects float calmly on the surface buoyed up by a silvery film. To a palæontologist this little creature is of especial interest, as it shows many features of an archaic type, which, so to speak, have been borrowed from more than one extinct group of arthropods. Such are the terminal joints of the antennæ, which end in pad-like structures suggestive of the swimming paddles of the sixth pair of feet in the extinct water-scorpions, *Eurypterus*, and probably used for the same purpose. The specimens somewhat resemble *Lipura ambulans*, Linn., but differ in having a tapering rather than broadly-rounded extremity to the abdomen. Lubbock, however, states that in the family Lipuridæ there is no saltatory appendage and the body is cylindrical, so that it is probable that the present form represents an entirely new group of family rank. Mr. F. G. A. Barnard has drawn my attention to the determination of one of our Collembolas by Lubbock (now Lord Avebury) from specimens sent to him by the late Mr. H. Watts (*Vict. Nat.*, vol. iii., 1887, p. 135) as a *Degeeria*, but the present form is not of that genus, which has a cylindrical body, club-shaped hairs, long saltatory appendages, and fairly long antennæ. — F. Chapman, Balwyn.

Erratum.—In vol. xxxiv., page 123, line 14, for *Thrasymene* read *Trachymene*.

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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 May, 1918.

The president, Mr. F. Pitcher, occupied the chair, and about sixty members and visitors were present.

The president introduced to the meeting Miss D. Philpott, a member who had volunteered to take shorthand notes of the proceedings by means of the stenotype machine.

A report of the excursion to Altona Bay on Saturday, 13th April, was given by the leader, Mr. E. S. Anthony, who stated that there had been a good attendance of members. A visit was first made to the aboriginal shell-mounds, usually known as kitchen middens, situated near the shore-line to the east of the station. An examination of these revealed quantities of broken shells of mollusca of kinds still common in the locality. Several of the mounds showed signs of fire having been used in preparing the feasts, and some fragments of the bones of birds were also noted. Some pieces of ochre used by the aboriginals for decorative purposes were also obtained. Returning to the western side of the jetty and traversing the hollows between the sand-dunes, search was made for further signs of the former inhabitants of the place. Here members were rewarded by finding numbers of quartzite flakes of various shapes and sizes, also some of the cores from which the flakes had been struck. These flakes were the primitive instruments which the aboriginals used for cutting, preparing animal skins, &c. The botany of the district is not remarkable, but a number of introduced plants seem to thrive there, about which Mr. H. B. Williamson would say a few words. Mr. Williamson remarked that the most interesting of the endemic plants were the useful sand-binding grasses, *Spinifex hirsutus*, Hairy Spinifex, and *Cynodon dactylon*, Couch-Grass. The Rosy Stork's-bill, *Pelargonium Rodneyanum*, was blooming in many places. The principal introduced plants were *Solanum Sodomæum*, Apple of Sodom, *Glaucium luteum*, Horned Poppy, *Atriplex patula*, Common Arache, and *Silene cucubatus*, Bladder Campion; the latter, though a troublesome weed in some places, was showing a mass of thick roots, holding the sandy soil together and preventing erosion.

A report of the excursion to Wattle Park, Riversdale, on Saturday, 27th April, was given by the leader, Mr. F. G. A. Barnard, who said that the excursion had been well attended. The afternoon proved very enjoyable, though the park is not

a prolific hunting-ground. A visit was first paid to the wattle plantation formed last June, where it was gratifying to see that nearly every tree was doing well. Some had made fine growth, while *Acacia retinodes* and *A. discolor* could each boast of a few flowers. Rambling through the wooded portion of the park towards the eastern boundary, few plants were seen in bloom, *Styphelia* (*Astroloma*) *humifusa* being perhaps the most uncommon. Diligent search was made for the little orchid *Eriochilus autumnalis*, so abundant on the previous visit in March of last year, but not one could be seen. A few birds of the commoner kinds were seen or heard, and, in addition, some quail were disturbed by our presence, and quickly made for cover. Members who devoted themselves to microscopic life were successful in finding a fair variety of aquatic objects in a small creek in the south-eastern corner of the park. Another object collected was the larva of the syrphid fly, *Microdon daveyi*, which, although not an uncommon insect, is interesting from the fact that it selects the nests of ants under the bark of trees as the place in which to live and pupate. Little is known of the reasons for this way of living, or whether its presence is of any benefit to the ants, or the ants to it. Among some fungi collected a polyporus was found to be infested with some minute insects, apparently of the springtail group (Collembola).

A report of the excursion to the Burnley Quarries on Saturday, 11th May, was given by the leader of the pond-life section, Mr. J. Stickland, who said that most of the excursionists had followed Dr. Pritchard, and devoted themselves to geology. The recent rain had somewhat interfered with the pools in the quarries; still, a number of interesting forms were met with, among which were some fine colonies of the infusorian, *Zoothamnium* (?) *dichotomum*. In the absence of Dr. Pritchard, Mr. A. L. Scott said that the geologists, after the general character of the basalt flow in which the quarries are situated had been explained, crossed the river by the Heyington bridge, where the principal features of Silurian formation were pointed out. The time, however, proved to be too short, and Dr. Pritchard offered to repeat the excursion on a date to be arranged.

[An extra excursion to Heyington, under Dr. Pritchard, has been arranged for Saturday, 15th June.]

ELECTION OF MEMBERS.

On a ballot being taken, Mr. Percy H. Bond, Scotch College, Hawthorn, was duly elected an ordinary member; and Messrs. Walter Mann, Rockmount, Narracan, and Thos. Smith Savige, Narracan East, as country members of the Club.

GENERAL BUSINESS.

Nominations were made for office-bearers for 1918–19, and Messrs. F. Keep and F. Wisewould were elected to audit the accounts for the current year.

REMARKS ON EXHIBITS.

Dr. Sutton called attention to his exhibit of the fruits of *Eucalyptus pyriformis*, one of the largest fruits of the genus, collected by Mr. H. Deane, M.I.C.E., near the track of the East-West railway in South Australia.

Mr. F. Pitcher called attention to his exhibit of flowering branches of *Alyxia ruscifolia*, R. Br., Ruscus-leaved Brushland Box, a native of New South Wales and Queensland, a useful garden shrub, having pleasing foliage and bright berries; also to *Plectranthus parviflorus*, Willd., Small Cockspur Flower, a Victorian plant, useful as a trailer for hanging baskets, &c.

PAPER READ.

By Professor Sir Baldwin Spencer, K.C.M.G., F.R.S., D.Sc., entitled "Notes on Certain Kitchen Middens on Wilson's Promontory."

The author said that great interest is attached to the kitchen middens, or shell-heaps of the aboriginals, the investigation of which helps to throw light on the life and customs of the former inhabitants of our State. During a recent visit to the National Park he had taken the opportunity to make a thorough examination of a number of shell-mounds which had been laid bare by some heavy gales, and exhibited a large collection of marine shells, flint and bone implements, &c., as the result. Portions of a human skeleton had also been collected, but he did not consider it any proof of the existence of cannibalism among the natives at any time, as it was the custom in some parts to bury the dead in old shell-mounds or "ovens," as they are termed in the northern districts. A number of stone implements were also exhibited, which must have been brought from considerable distances, as no stones of similar kinds are to be found within many miles of the Promontory.

In the discussion which followed, the president, Messrs. Keep, Daley, Keble, Anthony, Keartland, and Chapman took part.

Mr. G. A. Keartland said that the natives carry articles of use to them for vast distances. He had found a large marine shell at a native well in North-West Australia, four hundred miles from the sea. At one place he knew of there were several drayloads of fresh-water mussel shells, showing that the natives had used the place for many years.

Professor Spencer said that, with regard to the question of cannibalism, the Australian aboriginals could not be accused of cannibalism as usually understood. They did sometimes eat human flesh, but it was purely in a ceremonial way.

Owing to the lateness of the hour, the paper by Mr. T. Steel, F.L.S., "Tracks of the Garden Snail," was postponed until next meeting.

NATURAL HISTORY NOTES.

Mr. J. Searle said that he had kept several of the larvæ of the flies referred to in the Wattle Park report, along with ants, until they turned into the perfect insect, but he had been unable to determine anything as to their food. Mr. F. Spry said that similar flies are found in different parts of the world, but their life-histories are as yet unknown. He had tried on several occasions to discover what the larvæ live on, but without success.

Mr. F. Keep read an extract from the *Scientific Australian*, stating that a kangaroo had kept up a pace of forty miles per hour for at least two miles against a motor-car.

Mr. G. A. Keartland said that recently large numbers of Rose-breasted Cockatoos had visited the Preston district, where they had not been seen for years.

Mr. F. G. A. Barnard said that he had seen a few days before a female "Imperial White" butterfly, *Delias harpalyce*, Don., flying at Kew. This, he thought, was an unusual occurrence for May, but Mr. F. Spry said it had also been recorded as having been seen in June.

EXHIBITS.

By Mr. J. W. Audas, F.L.S.—Thirty species of flowering plants collected at Yarram, South Gippsland, October, 1917, including *Boronia anemonifolia, Cyathodes acerosa, Pultenæa paleacea, P. juniperina, Choretrum laterifolium, Helichrysum bracteatum, H. rosmarinifolium, Acacia Howittii, Leptocarpos Brownii, L. tenax, Caustis pentandra, Epacris lanuginosa, Scævola hispida*, and *Gompholobium latifolium*. These should have been recorded for the April meeting, having been exhibited then in illustration of paper on plants of Yarram district.

By Mr. F. G. A. Barnard.—Growing fern, *Asplenium flaccidum*, collected at Wilson's Promontory, December, 1914.

By Mr. C. Daley, F.L.S.—Stibnite, antimony ore from Costerfield, Victoria, and Numeaite, nickel ore, from New Caledonia.

By Miss A. Fuller.—Papuan butterflies.

By Mr. J. A. Kershaw, F.E.S.—Large specimen of marine shell, *Voluta mammilla*, found on beach, National Park, Wilson's Promontory, by Mr. W. J. Cripps.

By Mr. F. Pitcher.—Flowering specimens of *Acacia discolor*, Willd., Sunshine Wattle, Victoria, New South Wales, and Tasmania; *Alyxia ruscifolia*, R. Br., Ruscus-leaved Brushland Box, New South Wales and Queensland; *Hakea cristata*, R. Br., Crested Hakea, Western Australia; *H. verrucosa*, F. v. M., Warty-fruited Hakea, Western Australia; and *Plectranthus parviflorus*, Willd., Small Cockspur Flower, Victoria, New South Wales, and Queensland, from Melbourne Botanic Gardens.

By Miss Rollo. — Mineralogical specimens from Trans-Continental Railway, including manganese, barytes, oxide of copper, carbonate of copper, and crude salt; also bean of African tree, *Afzelia africana*.

By Mr. A. L. Scott. — Granite under microscope—(*a*) in ordinary light, (*b*) between crossed nicols.

By Sir Baldwin Spencer, K.C.M.G.—Portions of aboriginal skeleton, two bone awls, and collection of marine shells, flint, and other stone implements, from aboriginal kitchen middens, Wilson's Promontory; photographs of middens, and of the middens or "native ovens," near Koondrook, Murray River.

By Mr. J. Searle.—Salpa, a pelagic tunicate, showing alternation of generations.

By Mr. P. R. H. St. John.—Herbarium specimens, in bloom, of *Patersonia glabrata*, R. Br. (Iridaceæ), Victoria, New South Wales, and Queensland; *Mitrasacme montana*, J. Hooker (Loganiaceæ), Victoria and Tasmania, collected by exhibitor at foot of Mount Riddell, Healesville, 5th May, 1918; also specimen of *Panax sambucifolius* with variegated foliage, collected by exhibitor at Warburton, 20th April, 1918; sample of crude oil of *Eucalyptus Sieberiana*, Silver-top Gum, Victoria and New South Wales, prepared at the Botanic Gardens laboratory by exhibitor from tree cultivated in the Gardens.

By Mr. H. Whitmore.—Ladybirds, *Orcus australasiæ*, hibernating under bark of wattle tree; specimen of Thorn Apple, *Datura stramonium*, an introduced noxious plant, common at East Malvern.

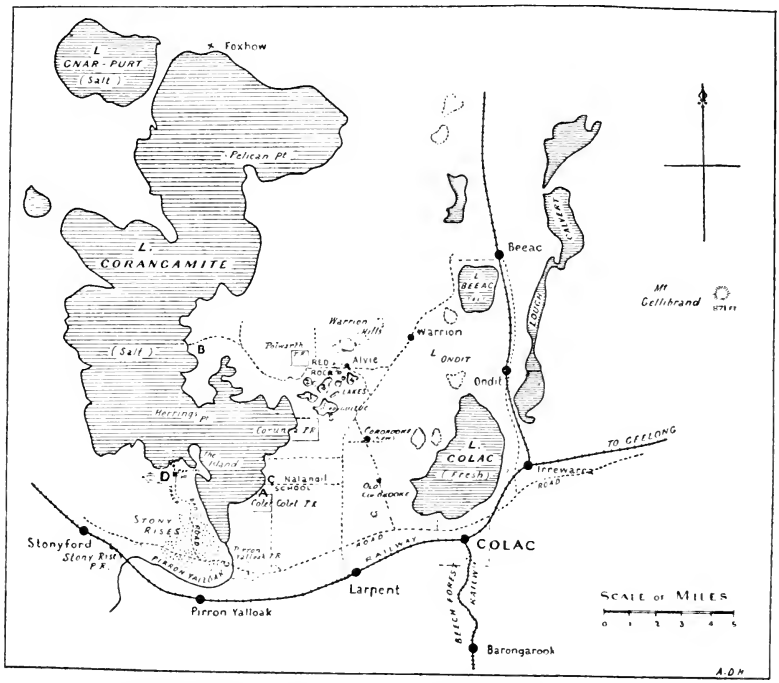
By Mr. H. B. Williamson.—Dried specimens of the introduced plants, *Glaucium luteum*, Scop., Horned Poppy, and *Atriplex patula*, Common Arache, from Altona Bay.

After the usual conversazione the meeting terminated.

THE GREAT WAR.—Another of our members, Mr. C. C. Brittlebank, Vegetable Pathologist, Department of Agriculture, Victoria, has suffered bereavement by the death of his only son, Private Cyril C. Brittlebank. He had seen over three years' service in the Field Ambulance Brigade, and his death in hospital in France has just been reported.

EXCURSION TO LAKE CORANGAMITE AND DISTRICT.

This excursion took place at Easter, and covered from 28th March to 2nd April. Accommodation being unobtainable nearer, quarters were taken up at Colac, about ten miles from the lake. The party consisted of Messrs. Searle, Shephard, Barnard, Eaton, and Hardy, four arriving on Thursday night and the remaining one on Friday. Next morning collecting was commenced at Lake Colac. The water in this lake is fresh, and covers an area of 10½ square miles. Boats are readily procurable, and the party engaged in securing plankton



Lakes near Red Rock.—1, L. Gnalinegurk; 2, Twin Lakes; 3, L. Werowra; 4, L. Coragulac; 5, L. Purdiguluc.

by means of a tow-net. The weather was very fine, and the surface perfectly smooth. Micro-fauna was abundant, and a floating alga, recognized by Mr. Hardy as a species of Botryococcus, was also present in great quantity. This separated out very well when formalin was applied to the gathering, as the animals sank to the bottom while this representative of the flora rose to the surface. It was noticeable that furthest from the shore Entomostraca (chiefly Copepoda) predominated,

while closer in more species of Rotifera occurred. Among the Rotifera was the well-known species *Triarthra longiseta*; an Anuræa frequently observed from other localities but probably unnamed; a Brachionus (unidentifiable) was also in plenty. It will be difficult to say whether this latter form is new, as this genus comprises many species, which in some cases are very variable. This form, however, was quite unknown to any of the party. A very interesting and pleasant morning was spent here. In the afternoon a journey was made to the well-known Stony Rises, of which much has been said in the past that need not be repeated now.* One of the aims was to find out the means of access to Lake Corangamite at some point where a boat was available. In the Rises it was disappointing to find all the hollows dry; evidently the summer had been drier in this district than about Melbourne. A chance meeting with a resident gave information of a good road to Corangamite, and, pursuing it, a point was reached on the southern shore (A on map). This lake is given in the "Victorian Year-Book" as covering an area of 90 square miles, and is of very indented outline, about 18 miles long by 6 miles wide. At this position the shore is a basaltic floor sloping very gradually into the water. The soil covering the basalt is washed away, but deposits of rather fine sand occur in the hollows. The univalve shell *Cociella striatula* occurs, and there are considerable accumulations here and there. As only stick-nets could be used, wading was resorted to in order to get out as far as possible. Examination on the spot of the gathering revealed the presence of a very interesting rotifer, a species of Pedalion, occurring in great numbers. Returning to Colac, the party was added to by the arrival of Mr. Searle, and a very interesting evening was spent examining the material obtained by means of the microscopes the party was provided with. On Saturday, as no information had come to hand regarding a boat on Lake Corangamite, it was determined to visit Coragulac Hill and the adjacent hill known as the "Red Rock." This has been made a picnic resort, and the shire council has provided facilities for visitors in the shape of roads, paths, water supply, and on the summit of Coragulac, 768 feet above sea-level, a cast-iron dial giving the direction and distances of the land-marks all round the horizon. The view here is scenically very fine and of great interest, as affording a view of the distribution of the lake system. Corangamite extends to the very limit of the horizon, while close below is Coragulac, covering 90 acres. There are also surrounding the eminence Lakes Werowra, Purdiguluc, Gnalinegurk, two known as the "Twin Lakes,"

*Searle and Shephard, "Visit to the Lakes near Camperdown and Colac," *Vict. Nat.*, October, 1915 (vol. xxxii., p. 87).

the "Blue Lake," and several smaller unnamed. The name "Red Rock," which is applied locally to the whole district, evidently arises from the pile of weathered volcanic rock capping one end of the ridge of which Coragulac Hill is a part. This ridge partly encircles the small lake known as the "Blue Lake." The appearance of several of these small lakes is suggestive of volcanic craters filled with water. Four of these crater-lakes were visited and worked with stick-nets. This involved some hard climbing on the part of at least one member of the party, as the depressions are of considerable depth, and ridges occur between each of the lakes. Coragulac was found to contain a Copepod, and, in great numbers, a rotifer of the genus Brachionus, which was, for a members of this genus, of large dimensions, and may also prove new. The small "Blue Lake" was practically monopolized by two species of rotifers —one occurring in immense numbers, a Brachionus closely resembling *B. mulleri*, a form often found in brackish water; the other, not so plentiful, being a Pedalion, differing from the Pedalion of Corangamite. After spending some hours at the spot a move was made beyond Alvie, and, keeping on an excellent road, the shore of Corangamite was reached at a point (B on map) about five miles north from the place visited the day before. Plying stick-nets, it was soon found that here also Pedalion was the predominant form. On returning another interesting evening was spent in looking over the day's results. The following morning a visit was paid to the hills on the south of Colac, just reaching the fringe of the forest country stretching down to the Otway district. Here the botanist of the party put in some tree-climbing in order to reach the flowers of the eucalypts. Later in the day a start was made for Lake Beeac, which lies about twelve miles to the north. This is a salt-water lake, and it was with interest that preparations were made to examine the water in search of its inhabitants. The apparently prosperous town of Beeac is hard by the shore, and a good road nearly encircles the lake. The first point approached showed a very smooth and flat expanse of whitish mud, with apparently water in the distance. Leaving the shore the mud became rather soft, but, undeterred, one member of the party removed his boots and attempted to reach the water, but the foothold became too treacherous, and he had to return without reducing the apparent distance of the water. Looking towards the north end, the lake appeared to have a higher bank, with the water in contact. Over to the west a number of white mounds were visible, which also seemed near the water. On reaching these shores the mud flats were found to extend just as far as at the first position, and it was with reluctance concluded that water was entirely absent from

the surface, and that mirage was accountable for the illusory appearance which for a time duped even the experienced members of the party. This lake—or, rather, lake-bed—covers 2⅓ square miles, and is nearly circular in outline. The white mounds proved to be heaps of salt, apparently scraped off the surface of the mud flat as it became firm enough to bear man and horse. Disappointed in the search for aquatic life here, a line was taken to return through Cororooke, passing the hamlet of Warrion on the way. Here the outlook westward is very picturesque, the Warrion Hills, Little Warrion, and Coragulac Hill rising boldly from the plain. So as not to return without some collecting, a call was made on the way home at another point (C on map) on the shore of Corangamite, and the same forms as before were obtained at a position between those already worked. During the evening communication was fortunately established with Mr. H. V. Vaughan, of "Te Aro," Larpent, who owns a boat on the west shore of Corangamite, and this gentleman kindly agreed to the party using it. On Monday morning Mr. Barnard was obliged to return to town, to the regret of the remainder, who proceeded by the Camperdown road, calling on the way at Mr. Vaughan's for instructions as to the exact locality of the boat. In the "Rises" a turn was made to the right along a very rugged track for about four miles, reaching a farm, to the owner of which we carried a letter of introduction. The position is on the west shore of Corangamite (D on map), near a peninsula which connects a hill, jutting out into the lake and known as "The Island," with the mainland. Some searching was necessary to locate the boat in a sandy bay near "Swan Point," at the mouth of a good stream of fresh water flowing into the lake. This position was very interesting. The springs feeding the stream come out underneath piles of basalt, and in a few hundred yards combine to give quite a considerable flow. Low ridges of weathered basalt run down to the lake, and lines of detached points mark the continuation of the ridges into the water. A flock of Black Swans added to the interest of the scene. These masses of low, rough, basaltic hillocks and ridges extend to a considerable distance on each side of Corangamite, and occur in detached areas throughout the whole district traversed. The shore here shelves very gradually, and the boat had to be pushed out about a hundred yards before it floated. The four occupants were soon fully employed in rowing, baling, and plying the tow-nets. The value of the tow-net for collecting plankton was well exemplified, as, besides the rotifer Pedalion, great quantities of Copepoda were found at the first cast. Indeed, had the party returned with only the product of netting from the shore there would have been liability of a very wrong

conclusion in regard to the relative prevalence of the different forms. About an hour's work sufficed to fill the receptacles provided, and the party returned to the shore. Before leaving the botanist collected on the marshy land near the springs, securing a number of aquatic plants. On Tuesday morning another visit was made to Lake Colac. The weather was unfavourable, the water being rough, but material was secured in the hope of bringing it while still living to Melbourne, but this was not a success, as all the more delicate animals had disappeared when examined on arrival. The return to town was made in the afternoon, and the members separated with the feeling of having spent a profitable time. The accompanying map of the locality, kindly drawn by Mr. Hardy, shows the tracks taken during the excursion. The appended reports do not represent the full results of the collecting, as further work is necessary to deal with the material gathered, and it is very probable that several new species will be established.

Crustacea.—By J. Searle.

Between Red Rock, Coragulac Hill, and Lake Corangamite there is a group of small lakes of a very interesting character. Some are strongly mineralized, while others adjoining them are fresh. They are formed at the bottom of steep declivities, and their investigation proved extremely strenuous, as one had to be continually climbing the steep hills, varying from fifty to two hundred feet in height, and then clambering down the other side to another lakelet. The micro-fauna of the lakes was as various as the lakes themselves. At the foot of Coragulac Hill are three lakes, known locally as "The Basins." The lake on the eastern side of the hill is Lake Coragulac, and its water is fresh enough for domestic purposes. On the western side is Lake Werowra, or the Red Lake, as it is known locally; its water is brick-red in colour, thick, and "soupy." This is caused by an alga of the Anabœna or Nostoc group, consisting of short, beaded filaments. Animal life appeared to be totally absent from this lake, though in a small pool formed by a fresh-water spring a few feet from the lake a few water-beetles were captured, and, floating on the surface of the water, the pupal skins of a species of Chironomous were noted. In Lake Werowra, a few feet from the eastern shore, is a pile of scoriaceous rocks forming an islet. On these rocks were growing lichens of the most brilliant colours. The third lakelet has no official name, but is known as the Blue Lake. It is perfectly circular, and the local name of "The Basin" fits it exactly. Hand-netting proved that it was densely crowded with rotifers of two or three species and a few small worms, not yet identified, that wriggled along the surface skin of the water; no other

organisms were found in it. In the depression over the ridge to the south of the Basin the water had dried up. Samples of the mud from its bed were secured for "hatching" purposes at home. Further south is the largest of this group of small lakes—Lake Purdiguluc. It appears to be very shallow, and the effect of the dry spell was marked by the shrinking of its surface, leaving stretches of mud-flats along its shores. The fauna of this lake consisted of a Copepod, *Boeckella symmetrica*, and a few rotifers, the muddy shores making collecting very difficult. To the west of Purdiguluc is Lake Gnalinegurk, and, though the distance separating the two is not great, it is of considerable height and steepness, and, after the climbing already undertaken, I did not feel physically fit to negotiate it when I remembered I was a mile and a half in direct line from the lunch camp, and between it and me were a number of ridges to be crossed, with a final climb of two hundred feet over Coragulac Hill; so reluctantly I retraced my steps. The general impression formed of these lakes was that, though their waters contained great numbers of specimens, the number of species was small. A visit to the lakes in early spring might furnish a greater number of species.

The most interesting of the lakes was the one to which the excursion owed its origin—Lake Corangamite—for in its waters was taken a Copepod which will be the type of a new genus, of which there are probably two species. The specimens captured near the shore were slightly smaller, and on the fourth thoracic segment, on the dorsal side, the females have a short projection. Those taken with the tow-net half a mile or so from the shore were deeper in colour, slightly larger in size, and the females did not possess the dorsal spine already alluded to. It is proposed, provisionally, to call this genus Heterotemora, and a full description, with figures, will be furnished in due course. Another interesting "find" in this lake was an Isopod, certainly undescribed for Victoria, and probably new to science. Its capture was the result of inductive reasoning. Along the lake shore and in the shallow water Dottrel were observed. As the netting operations captured nothing larger than Copepoda, and the algæ on the rocks sheltered Ostracoda and the little univalve mollusc *Cociella striatula*, curiosity was aroused as to what the Dottrel found to eat. Selecting a rock on the shore where one could kneel without getting unduly wet, the muddy bottom of the lake was scrutinized for any appearance of living creatures. Finally our patience was rewarded by observing a movement just under the surface of the fine silt, and the quick insertion of the fingers resulted in the capture of an Isopod. Twenty minutes' close search was rewarded by the capture of eight or

ten specimens. When next there is an opportunity of visiting this lake apparatus will be taken for the special investigation of this class of animal life, and perhaps further new species may be secured.

On a previous visit to this lake the Brine Shrimp, *Parartemia zietziana*, was found in great numbers on the rocky shore on the eastern side of the lake. Not a vestige of these was observed on this occasion, though it was only a few weeks earlier in the year than the occasion on which they were found.

The Entomostraca of Lake Colac did not differ from that described on a former visit, though they were not nearly so numerous as on that occasion. On this visit, *Hymenosoma lacustris*, the Fresh-water Crab, was taken.

The following is a list of species as far as observed :—

Cladocera—
  Moina australiensis
  Pseudomoina lemnæ
Copepoda—
  Boeckella symmetrica
  ,, oblonga
  ,, asymmetrica
  Heterotemora, gen. et sp. nov.
  Cyclops albidus
  ,, serrulatus
  Harpactocoida, sp.
Ostrocoda—
  Three species, not yet determined.
Isopoda—
  Probably new.
Brachyura—
  Hymenosoma lacustris
Mollusca—
  Cociella striatula
  At some distance from the shore of Lake Corangamite shells of a species of Limnæa were found embedded in the soil.
Insecta—
  A few water beetles, not yet identified.

Botany.—By A. D. Hardy, F.L.S.

1.—En Route.—The indigenous flora, especially the trees of the volcanic plains between Melbourne and Colac, having for the greater part vanished, the botanist may reach the lake area almost with as little diversion as the microscopist in search of microzoa. Suffice it to say that, beyond a few Yellow Gums, *Eucalyptus leucoxylon*, near Lara, and Red Gums, *E. rostrata*, and Swamp Gums, *E. ovata*, between Geelong and Colac, the only plant of arboreous habit is the Drooping Sheoke, *Casuarina stricta*, a remnant of much that grew on rising ground and rocky hillocks. The sheokes have been cut out for firewood and for fodder in drought time for stock ; the gums, too, have been heavily "pruned" for stock feeding, and cut out for fencing and firewood. (Here I may mention that I have seen well-fed cows in a good grass paddock rush up to and greedily devour the leaves and twigs of a large branch of *E. ovata* that had suddenly crashed to the ground.) In the Stony Rises—a weird area of tumbled basalt—the exclusive gum-tree is the Manna Gum, *E. viminalis*, and this is supported by small Blackwoods, *Acacia melanoxylon*, and Native Cherry or Ballart, *Exocarpos cupressiformis*, with a ground cover of common bracken and "Prickly Moses," *Acacia verticillata*, &c.

2.—The Lakes.—Aquatic botany is better studied earlier in the year than Easter, but only folk of a leisured class can fit their excursions always to appropriate seasons. In respect of material to be gathered, the zoologists were more fortunate than the botanists in the excursion from a seasonal point of view. The lake flora was collected from several places, and has not been exhaustively examined, yet enough has been gathered and specifically determined to give a good idea of the algological condition of the two lakes at the date of our visit, so that the outstanding features of the lakes Colac and Corangamite may be stated as follows :—

Lake Colac.—Fresh or slightly brackish water, containing a floral plankton and a few attached species. No visible waterweeds, excepting a solitary plant of the introduced dock, Rumex, sp.

(*a*) Plankton consisting almost exclusively of *Botryococcus Braunii*, but with an occasional *Closterium cynthea*, and with a few species of diatoms present.

(*b*) Attached Algæ. — The only conspicuous growth was *Cladophora flavescens*, which was attached to jetties, posts, unused boats, &c., and to the aforesaid dock. The Cladophora bore sparingly sterile filaments of a species of Œdogonium, and less of Bulbochæta, and also *Hydrianum heteromorphum* and *Chamæsiphon incrustans*, the latter being seen occasionally also on Copepoda. Oscillatoria, sp., was associated with the Cladophora, but only isolated filaments were found. The smooth mud bottom of the lake was barren.

Lake Corangamite. — This is a salt lake with a marine atmosphere—the large expanse of salt water, the rock-bound coast with shelly beaches, and littoral ulvaceous fringe of characteristically smelling "seaweed" contrasting well with the smaller, less exposed, and fresh-water Colac ; more so when, as at irregular periods, such weeds as *Heleocharis sphacelata*, *Triglochin procera*, &c., make their appearance in the latter.

(*a*) Plankton plants absent.

(*b*) The littoral alga flora consisted almost exclusively of *Enteromorpha Ralfsii*, Harv., and this almost encircled the lake with a high level mark of dry and white bleached felt, which covered the basaltic rocks and rendered walking on them with bare feet a matter of comfort. At the water's edge, and for a considerable distance "seawards" along the gently sloping bottom, this weed formed flocculent masses, sometimes waving upwards from the rock base, or floating in large gas-borne masses that made wading difficult. The only associated alga was *Oscillatoria* (*littoralis* ?), in isolated filaments.

(*c*) Shore Macrophytes and Algæ.—On the western side of

the lake, where fresh water from the springs makes marshy ground and enters the lake by soakage and shallow surface film almost without current, holes made by hooves of cattle, &c., contained water covered with *Azolla filiculoides* and *Lemna minor*. Other plants of the vicinity were *Isoetes fluviatilis*, *Nasturtium officinale*, *Cotula* (*coronopifolia* ?), Cyperus, sp. ?, the introduced flat-weed, *Hypochæris radicata*, and *Triglochin striata*. Among or attached to some of these were sterile filaments of Spirogyra, Zygnema, Mougeotia, Œdogonium, *Volvox globator*, *Closterium Ehrenbergii*, *Closterium cynthea*, several species of Navicula, and *Arcella vulgaris*, &c. On the eastern side of Corangamite the shelly beaches overlying basalt extend inland, interspersed with *Salicornia australis*, &c., which lead on to the dry-land grasses. Among the rocks, and within reach of salt spray, *Senecio lautus* and thistles grew sparingly with *Chenopodium album*, and the flat-weed was plentiful beyond high-water mark.

The results of the excursion are on the whole very satisfactory, and it is hoped that further investigations will be carried out before long at a different season of the year. Intending visitors to the Red Rock district can obtain at the Tourist Bureau a large scale map of the locality, which will be more serviceable than the small sketch map herewith.—J. SHEPHARD.

TWO SNAKES NEW TO VICTORIA,

WITH A LIST OF THE VICTORIAN SPECIES.

BY J. A. KERSHAW, F.E.S., Curator of the National Museum, Melbourne.

(*Read before the Field Naturalists' Club of Victoria*, 14*th Jan.*, 1918.)

TWO species of snakes not previously recorded from Victoria have been recently added to the National Museum collection, both of which were captured in the Mallee, in the north-western portion of the State.

These I have been able to identify as *Rhynchelaps australis*, Krefft, and *Denisonia nigrostriata*, Krefft. The former was described from specimens obtained in the neighbourhood of Port Curtis, Queensland, and on the Clarence River, northern New South Wales, and the latter has been recorded from Rockhampton, Queensland.

RHYNCHELAPS AUSTRALIS, Krefft.

This is a small species measuring 11 inches long, of a bright red colour, with a series of narrow cross-bands of whitish, black-edged scales, extending half round the body. These bands, of which there are 55 altogether, each occupy one row

of scales, except on the neck, where they are broader and cover four rows of scales, and towards the tail, where they occasionally embrace two rows. On the head is a broad dark brown band extending from the anterior edge of the frontal to the posterior edge of the parietals, and spreading on either side to the upper edge of the labials, enclosing the eyes. On the hind neck is a similar, though broader, band, the scales on the posterior half of which are white-centred.

The single example was taken at Speed, west of Lake Tyrrell, and forwarded to the Museum by Mr. Donald Macdonald.

DENISONIA NIGROSTRIATA, Krefft.

This is of a yellowish-white colour, the scales of the sides narrowly edged with grey, and a similarly coloured vertebral line extends from the neck to the tip of the tail. The head is grey above, the upper lip and lower parts white.

A single specimen, measuring 13¼ inches, was taken at Ouyen, North-Western Victoria, by Mr. A. S. Kenyon, and a second specimen, from South Australia, is in the Museum collection.

The total number of snakes recorded from Victoria, including the Typhlopidæ (Blind Snakes) and excluding two doubtful Victorian species—viz., *Dendrophis punctatus* and *Denisonia signata* (recorded by Mr. D. Le Souëf in vol. i., 1884, p. 86, of this journal)—is now twenty-six. Of these, *Denisonia nigrescens*, Krefft, recorded for the first time in Victoria in the *Vict. Nat.*, vol. xxv. (1908), p. 91, has since been taken at Cunninghame and Bruthen, in Eastern Gippsland, and at least four specimens of the Yellow-bellied Sea-Snake, *Hydrus platurus*, Linn., are known to have been taken in Victorian waters.

In view of the additions and changes in nomenclature of our Victorian snakes which have been made since the list published in the first volume of the *Naturalist* was compiled, I take the opportunity of adding a complete list of the Victorian species :—

FAMILY TYPHLOPIDÆ.

Typhlops proximus, Waite.
T. polygrammicus, Schleg.
T. unguirostris, Peters.
T. ligatus, Peters.
T. pinguis, Waite.
T. broomi, Blgr.
T. wiedii, Peters.
T. bituberculatus, Peters.
T. australis, Gray.

FAMILY BOIDÆ.

Python spilotes, Lacep., Carpet Snake.

FAMILY COLUBRIDÆ.

Sub-family HYDROPHIINÆ.

Hydrus platurus, Linn., Yellow-bellied Sea-Snake.

Sub-family ELAPINÆ.

Diemenia textilis, Dum. and Bibr., Brown Snake.
syn. *D. superciliosa*, Fischer.
Furina bicucullata, M'Coy.
D. nuchalis, Gthr., Shield-fronted Brown Snake.
syn. *D. aspidorhyncha*, M'Coy.
Pseudechis porphyriacus, Shaw, Black Snake.
P. cupreus, Blgr.
syn. *P. australis*, Krefft.
P. microlepidotus, M'Coy, Small-scaled Brown Snake.
Denisonia superba, Gthr., Copper-headed Snake.
D. nigrescens, Gthr., Black-headed Snake.
D. gouldii, Gray, Gould's Snake.
D. coronoides, Gthr., White-lipped Snake.
D. flagellum, M'Coy, Little Whip Snake.
D. nigrostriata, Krefft.
Notechis scutatus, Blgr., Tiger Snake.
syn. *Hoplocephalus curtus*, Schl.
Acanthophis antarcticus, Shaw, Death Adder.
Furina occipitalis, Dum. and Bibr., Black and White Ringed Snake.
Rhynchelaps australis, Krefft.

[While the foregoing paper was in the printer's hands I received from Mr. E. R. Waite, Director of the South Australian Museum, Adelaide, a copy of his article, "A Review of the Australian Blind Snakes," which constitutes the first part of the *Records of the South Australian Museum*, vol. i., No. 1, 1918 (issued 24th May, 1918). During the preparation of this contribution Mr. Waite examined all the specimens of Australian Typhlopidæ in the National Museum collection, and I am therefore enabled to include a complete list of the Victorian species.—J. A. K.]

DISTINCTION FOR A MEMBER.—Members will be pleased to learn that one of their number, Mr. Albert Ernest Kitson, C.B.E., F.G.S., F.R.G.S., director of the Geological Survey Department, Gold Coast (West Africa), has recently had conferred upon him the distinction of Commander of the British Empire (C.B.E.) Beginning as a clerk in the Victorian Mines Department, Mr. Kitson qualified himself for scientific investigations, ultimately becoming the senior field geologist on the Geological Survey of Victoria. In 1906, on the recommendation of Prof. J. W. Gregory, F.R.S,, D.Sc., a former director of the Survey, Mr. Kitson was appointed to the mineral survey of Southern Nigeria.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The thirty-eighth annual meeting was held at the Royal Society's Hall on Monday evening, 10th June, 1918.

The president, Mr. F. Pitcher, occupied the chair, and about one hundred members and visitors were present.

The chairman, in welcoming the members and visitors, said that, in view of it being the annual meeting, and as he was on the eve of retiring from the presidency, he would take the opportunity of saying a few words about the aims and objects of the Club, which, he considered, was accomplishing valuable work in many branches of natural science. The importance of the society might be gathered from the fact that it included within its membership His Excellency the Governor-General, University professors, heads of Government scientific departments, the curators of the National Museum, Botanic Gardens, and Zoological Gardens, as well as heads of educational establishments, &c. The value of the monthly meetings, the wild-flower exhibitions, the excursions, and its monthly journal were strongly emphasized as means for nature students to acquire special knowledge of the various branches of natural history, and he therefore appealed to any present of similar tastes to become members of the society. He had the pleasure also of announcing that His Excellency the Governor-General, Sir Ronald Munro Ferguson, G.C.M.G., would be present later in the evening to unveil the Club's honour roll.

CORRESPONDENCE.

From Mr. A. J. B. Haldane, secretary of the Medicinal Plants Board of Victoria, asking the Club's assistance in procuring supplies of indigenous plants reputed to be of medicinal value, for investigation. It was proposed to deal first with *Clematis microphylla* and *Daviesia latifolia*.

The hon. secretary stated that the best method of helping in the matter is under consideration by the committee, who would be glad to have offers of assistance from members knowing of considerable quantities of the plants named.

REPORTS.

A report of the visit to the National Museum on Saturday, 25th May, was given by the leader, Mr. F. Chapman, A.L.S., who said that a good party of members had attended, and a couple of hours or so were spent in examining the palæontological department, where a number of interesting Australian fossils

had been pointed out, and some time given to discussing their occurrence in the various geological formations.

A report of the excursion from Evelyn to Montrose, on the King's Birthday, Monday, 3rd June, was given by the leader, Mr. G. Coghill, who reported a good attendance. The day turned out very fine, and an enjoyable ramble resulted. The Native Heath, *Epacris impressa*, in white and various shades of red, was found to be blooming freely, and many bunches were gathered for home decoration. Not many other plants were in bloom, while no plants of the Broad-leaved Bitter Pea, *Daviesia latifolia*, were met with. It had been intended to procure, if possible, a large quantity of this plant as material for chemical experiments to be made regarding its medicinal value.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. C. E. Cole, Tooronga-road, Caulfield; Mr. Hugh Hughes, off Glenhuntly-road, Elsternwick; and Mr. F. P. Morris, 54 Millswyn-street, South Yarra, were duly elected ordinary members; Mr. James Firth, Beech Forest, and Mr. A. W. Grainger, West Warburton, as country members; and Mr. Malcolm Howlett, 34 Chapman-street, North Melbourne, and Mr. David Oldmeadow, 171 Park-street, Parkville, as associate members of the Club.

ANNUAL REPORT.

The hon. secretary, Mr. E. S. Anthony, read the thirty-eighth annual report for the year 1917–18, which was as follows:—

"To the Members of the Field Naturalists' Club of Victoria.

"Ladies and Gentlemen,—Your committee have pleasure in presenting for your consideration the thirty-eighth annual report, giving a general survey of the Club's activities for the year ended 30th April.

"It is gratifying to find that, notwithstanding the distracting influences of the Great War, the Club has, throughout another twelve months, maintained its operations and work; its ability to carry on being due to the continued enthusiasm and support of its members and officers.

"Commencing the year with a membership of 224, the additions by election of new members just exceed the resignations and losses by death, so that the total membership at the end of the year was 229, composed of 2 life, 155 ordinary, 65 country, and 7 associate members. One honorary member was elected, His Excellency the Governor-General, Sir Ronald Munro Ferguson, G.C.M.G., having expressed his willingness to become a member; while the list of honorary members was

reduced by the death of Colonel W. V. Legge, R.A., who was elected in 1889.

"Your committee desires to place on record the great loss to the Club by the death of Mr. O. W. Rosenhain, who died at sea while on a voyage to Japan. The late Mr. Rosenhain was a regular attendant at the Club's monthly meetings and excursions, and had held office as a member of committee, always taking an active interest in all that concerned the Club. His efforts in connection with the protection of our native birds are especially worthy of notice, and the sympathy of the Club is extended to his widow and family.

"To four members of the Club, Messrs. F. G. A. Barnard, C. C. Brittlebank, J. H. Gatliff, and C. Vincent, each of whom has lost a son on active service abroad, your committee desires to convey the deep sympathy of fellow-members in their sad bereavement. Much concern is also felt at the continued illness of Mr. J. R. Tovey, for a time hon. secretary of the Club, and sincere hopes are expressed that a permanent and speedy recovery may be granted to him.

"The financial statement to be submitted by the hon. treasurer shows that the ordinary receipts and expenditure for the year were £159 17s. 6d. and £151 8s. 2d. respectively, the year thus closing with a credit balance increased to £61 8s. 8d., with no outstanding accounts.

"The regular monthly meetings have been well sustained by an average attendance of about 60. The papers read at the meetings numbered twelve, and were in most cases of great interest. The authors and titles were as follow:—Mr. D. J. Paton, 'The Buffalo Plateau in January'; Mr. G. F. Hill, F.E.S., 'A Naturalist in the Northern Territory'; Mr. F. Chapman, A.L.S., 'A Sketch of the Geological History of Australian Plants: the Palæozoic Flora'; Mr. E. E. Pescott, F.L.S., 'Notes on the Reproduction of Australian Orchids' (illustrated); Mr. C. Daley, F.L.S., 'A Visit to the Grampians' (illustrated); Messrs. J. Shephard, J. Searle, and J. Stickland, 'The Result of Twelve Months' Collecting of the Micro-Fauna of the Botanic Gardens Lake'; Mr. J. A. Kershaw, F.E.S., 'Two Snakes New to Victoria'; Mr. A. N. Burns, 'Notes on the Butterflies of the Wandin District'; Prof. Sir Baldwin Spencer, K.C.M.G., 'What is Nardoo?' and 'Notes on Some Aboriginal Kitchen Middens at Wilson's Promontory'; Mr. A. D. Hardy, F.L.S., 'The Tall Trees of Australia'; and Mr. J. W. Audas, F.L.S., 'The Characteristic Vegetation of the Yarram District.' The papers were in most cases accompanied by specimens, illustrations, maps, &c., explanatory of the statements made.

"Considerable interest is attached to the exhibits shown by the members at the monthly meetings, and of these there has

been a fine display throughout the year. The explanatory notes which are frequently given by the exhibitors have added considerably to the interest in the exhibits.

"Numerous half-day excursions to localities of interest and of easy access to the metropolis have been made during the year, the attendance of members and friends in almost every case being excellent. In addition, several whole-day trips, visiting places further afield, have been made, and these also have attracted a goodly number, His Excellency the Governor-General on one occasion honouring the Club by taking part in the outing. One week-end excursion was made to Toolangi in January last, while a five-days' visit was made to the Colac district at Easter. These were productive of much material for investigation, and proved delightful naturalists' outings. Several Club members took advantage of the Government Tourists' Bureau excursion to the Grampians in September, and greatly appreciated the wealth of floral beauty for which the district is deservedly famous.

"Perhaps the most important event of the year was the exhibition of Australian wild-flowers, held in the Melbourne Town Hall on the 2nd October last. Such a collection of native floral beauty, representing every State in the Commonwealth, had never been brought together before, and it is gratifying to know that the effort was appreciated, as is evidenced by the net cash result—£212 5s. 1d.—which the committee was enabled to hand over to the Y.M.C.A. National Fund for the benefit of the soldiers on active service. Great credit is due to the members who ungrudgingly gave of their best in time, labour, or material to the effort, but much of the success is attributable also to the many kind friends of the Club, scattered throughout the metropolis, State, and Commonwealth, who readily assisted in ways too numerous to mention. We accord them our thanks. Apart from the worthy object of augmenting the fund before referred to, the wild-flower exhibition of 1917 resulted in the creation of a greater general interest in the study of our native flora. The numerous similar exhibitions organized by various societies and bodies in the suburbs and elsewhere in the State give at least some witness of this interest.

"While the study of botany is always a popular subject with many of our members, valuable research work has been conducted by members interested in microscopy, especially as regards the micro-fauna of our lakes and streams, of which more will probably be heard later. Other branches of natural history have not been overlooked, and in conjunction with the Fisheries and Game Department the Club has rendered valuable support in such important matters as the protection

of the Mutton-bird, the preventing of the extension of the Quail season, and similar matters coming under the jurisdiction of that Department.

"The National Park at Wilson's Promontory, in which the Club takes a kind of maternal pride, is more and more continuing to prove its worth as a sanctuary for our native fauna and flora.

"The Plant Names Committee has met regularly, and is proceeding quietly with its arduous task, and is now reconsidering the provisional published list of vernacular names.

"The Club's library continues to increase, mainly by donations from kindred societies and Government Departments. Your hon. librarian is deserving of hearty thanks for the attention he has given to his duties during the year, and it is gratifying to learn that its constant use by members is some criterion that it is more than a mere appendage of the Club.

"The Club's journal, the *Victorian Naturalist*, so eagerly looked for by members and others, is also no mean asset of the Club. The numbers comprising the thirty-fourth volume have been regularly issued to members, and for its continued success the Club is again indebted to the kindly offices of the hon. editor, Mr. F. G. A. Barnard, who this year completes a quarter of a century in that capacity.

"With the view of obtaining a correct and concise report of the remarks made by members at the monthly meetings, which are often of great importance, your committee invited the assistance of some member in recording these by shorthand. We are pleased to state that Miss D. Philpott has voluntarily undertaken this duty, and we trust that in future the reports of the monthly meetings will contain a complete record of the statements made.

"Occasion will be taken at the annual meeting to do honour to those from our ranks and from the homes of our members who have enlisted in the Empire's service. The honour roll to be unveiled is the least we can do to enshrine their sacrifice and heroism. It is pleasing to record that quite recently the distinction of C.B.E. (Commander of the British Empire) has been conferred upon one of our members, Mr. A. E. Kitson, F.G.S., F.R.G.S., who is now engaged on geological work in West Africa. Mr. Kitson, it may be mentioned, served for a period on the committee.

"The thanks of the Club are due to those who, by leading excursions, contributing papers, &c., have helped in the success of the Club, and your committee is deeply indebted to Messrs. Coghill and Haughton for kindly placing their conveniently-situated offices at its disposal for committee meetings.

"The continuance of the Club's growth and operations

depend largely on the interest evinced by all the members, and we trust that in the coming year no effort will be spared to further in every possible way so invaluable and instructive a study as that of natural history.

"On behalf of the Committee,

"F. PITCHER, *President.*
"E. S. ANTHONY, *Hon. Secretary.*

"29th May, 1918."

On the motion of Mr. E. Cox, seconded by Mr. J. Wilcox, the report was received and adopted.

FINANCIAL STATEMENT.

The hon. treasurer, Mr. G. Coghill, read the financial statement for 1917-18, which was as follows:—

RECEIPTS.

To Balance, 30th April, 1917						£52	19 4
,, Subscriptions—							
Ordinary Members ...	£113	6	9				
Country Members ...	23	16	0				
Associates	2	0	0				
				£139	2 9*		
,, *Victorian Naturalist*—							
Subscriptions and Sales	10	8	9				
Advertisements ...	3	15	0				
Reprints	2	19	3				
				17	3 0		
,, Sales of Badges, Photographs, &c. ...				2	2 0		
,, Interest, Savings Bank and War Loan ...				1	9 9		
						159	17 6
,, Wild-flower Exhibition—							
Admissions				164	0 0		
Sales of Flowers				79	12 2		
Refreshments				10	17 0		
						254	9 2
						£467	6 0

*Subscriptions:—Arrears, £21 17s. 6d.; 1917-18, £114 12s. 9d.; 1918-19, £2 12s. 6d.—total £139 2s. 9d.

EXPENDITURE.

By *Victorian Naturalist*—							
Printing	£92	12	0				
Illustration	0	16	0				
Free Reprints ...	5	17	9				
Reprints charged ...	0	15	0				
				£100	0 9		
,, *Victorian Naturalist*—							
Wrapping and Posting				14	9 7		
,, Rooms—Rent and Attendance				13	10 0		
,, Library—Periodicals ...	5	0	0				
Insurance ...	0	7	0				
				5	7 0		
Carried forward				£133	7 4		

Brought forward	£133	7	4	
By Hire of Lantern	1	10	0	
,, Badges	2	2	0	
,, Printing and Stationery	7	0	0	
,, Postages, &c.	7	8	10	
				151 8 2
,, Wild-flower Exhibition—				
Rent of Hall, &c.	22	11	0	
Expenses	19	13	2	
Cheque to Y.M.C.A. Fund	212	5	1	
				254 9 2
,, Balance in Savings Bank	16	12	8	
,, ,, London Bank	44	16	0	
				61 8 8
				£467 6 0

G. COGHILL, *Hon. Treasurer.*
14*th May*, 1918.

Audited and found correct.

F. KEEP,
F. WISEWOULD, } *Auditors.*
22*nd May*, 1918.

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

ASSETS.

Balance—Savings Bank and London Bank	£61	8	8
War Loan Bond	20	0	0
Arrears of Subscriptions (£60), say...	40	0	0
Library and Furniture (Insurance Value)	150	0	0
	£271	8	8

LIABILITIES.

Subscriptions paid in advance	£2	19	0

On the motion of Mr. G. Coghill, seconded by Mr. J. Stickland, the statement was received and adopted.

A vote of thanks to the officers for the past year was proposed by Mr. C. C. Plante and seconded by Mr. F. Wisewould, and on being put to the meeting was carried unanimously.

ELECTION OF OFFICE-BEARERS, 1918–19.

The following office-bearers, being the only nominations received, were declared duly elected:—President, Mr. A. D. Hardy, F.L.S.; hon. treasurer, Mr. G. Coghill; hon. librarian, Mr. P. R. H. St. John; hon. editor, Mr. F. G. A. Barnard; hon. secretary, Mr. E. S. Anthony; hon. assistant secretary and librarian, Mr. W. Glance.

On a ballot being taken for two vice-presidents, Messrs. F. Chapman, A.L.S., and J. Gabriel were duly elected.

On a ballot being taken for five members of committee, Messrs. C. Daley, F.L.S., J. A. Kershaw, F.E.S., F. Pitcher, J. Searle, and Dr. C. S. Sutton were duly elected.

The chair was then taken by the newly-elected president, Mr. A. D. Hardy, F.L.S.

UNVEILING OF HONOUR ROLL.

At this stage His Excellency, Sir Ronald Munro Ferguson, G.C.M.G., attended by Major Kerr-Pearse, arrived, and was introduced to the meeting by the chairman, Mr. A. D. Hardy, F.L.S., who said that the Governor-General's presence was a great honour, for, although Sir Ronald was already an honorary member of the Club, his time was so occupied that he could not be expected to attend many meetings. His reputation as a forester was sufficient to give him a welcome among field naturalists, and without further words he would ask His Excellency to proceed with the function of the evening—the unveiling of the honour board, bearing the names of those members who had felt the call of duty, and had gone across the sea to take their places by the side of the defenders of justice and freedom in the Great War. The Club was indebted to Mr. J. Gabriel, one of the vice-presidents, for the construction of the honour board, which was made of Victorian blackwood and Queensland maple, and to Mr. P. R. H. St. John, the hon. librarian, for the lettering.

The following are the names on the honour board :—S. B. Abbott, A. O. Archer, E. O. Armytage, C. L. Barrett, L. G. Chandler, F. Cudmore, S. Herriot, D. J. Mahony, W. Macgillivray, W. J. Searle, Harvey Sutton, (Rev.) T. Webb, H. Wilson, and L. P. Winchcombe.

The names of the sons and daughters of members who are serving in various capacities were also read.

Sir Ronald Munro Ferguson, on rising, was greeted with applause. He said :—"Before proceeding to perform the ceremony which I have been invited to do this evening, I should like to express the great pleasure with which I find myself in the Royal Society's Hall in Melbourne, and to find also the Field Naturalists' Society in temporary occupation of it and making use of other space in the same building. I remember attending, some little time ago, a conference in the Town Hall, when I advocated closer union between societies like the Royal Society, the Field Naturalists', the Wattle Society, and the different forest and horticultural societies, in view of my favourite pursuit of growing timber. It is, I am sure, a great matter to have these different societies, all interested in common objects, closely affiliated, and possibly making use of one another's property, to their mutual advantage. I had often wished to be in this hall, but I have never been able to get in before. It is worth coming here to see the bookcases—not only because of the books, but because it would be difficult to find

a better example of good Australian cabinet work, making good use of our splendid Australian timber. The Royal Society at home was presided over for many years by Sir Joseph Banks, whose name is so well known to all field naturalists. He did more than any other man to make Australia known in England. He himself was well known in England, and commanded so much respect as a scientist and a man, as well as a botanist and field naturalist, that what he said of Australia carried more weight than anything said by anybody else. He was a great friend of my great-grandfather. He introduced a Black Swan from Australia, which sailed about one of the ponds at home until about the year 1830, when it was killed as a natural pastime by some of the youths of the neighbourhood. At that time a Black Swan was a most remarkable thing in England. No man was more closely associated with the Royal Society than was Sir Joseph Banks, and it is an infinite pleasure to me to find myself in this hall, which shelters a long-established society, and I trust that the Field Naturalists will remain closely affiliated with that and other societies pursuing similar interests. Your field excursions here are very delightful. In all British towns, in all parts of the world, the tendency is for the town population to segregate in masses, and those of us who are country bred have always felt that the town people would be better off than they are if they knew more about the country. A society like this, with its excursions, its many interests, its power of making Nature known to all who are members, and the greatly awakened interest in life which follows from that knowledge, can do much good, which cannot be over-estimated, especially when, as in modern society, the town is crowded, and its people know so little of the country. Townspeople look down upon us country folk, but we know that certainly a man who is at home in the country has two strings to his bow, and is the better fitted to serve his king and country in time of war. The ceremony that I have to perform to-night is the unveiling of this memorial of the members of the society who have gone to the front. They have done their duty; they have done what was best worth doing, and which those of us even who have not been able to get to the front can estimate at its true value. Those of us who have not been at the front will never feel on the same level with those who have been there. Those who have gone have suffered many hardships; they have suffered pain; many of them have suffered death; but, on the other hand, for all the time they have been there they have never been worried by any of those small cares that afflict most of us in our daily life. They have, at a time of great crisis, when everything that is worth having—our country, and the future of our race—is at

stake, been able to play their part like men, and to take their share in warding off the evils that menace our country. The news received this evening reminds us all again that there is only one way of doing one's duty, and that is by following the example of the men whose names appear before us to-night. It is a responsibility, no doubt, to assert public duty, but it is a duty that is plain—it is a duty that members of a society like this, and, indeed, members of any society, can assist in the doing of; and until this war is over, and until Australia and the rest of the Empire is made safe, and our Allies in the cause of freedom and the world, there is only one thing that counts, and that is, doing everything we can—by giving our lives, our money, our work—to secure victory and freedom. All honour to these men! It is a great privilege to come here to-night in order to unveil this handsome board, which, I hope, may have additional names added to it yet, which will go down to posterity as the most honourable record of a very honourable society."

On the Union Jack being drawn aside by His Excellency, the National Anthem was sung.

A cordial vote of thanks to His Excellency for honouring the Club with his presence was proposed by Mr. C. Daley, F.L.S., seconded by Mr. F. G. A. Barnard, and carried by acclamation.

PRESENTATION.

The chairman announced that, Mr. F. G. A. Barnard having now completed a quarter of a century as hon. editor of the Club's journal, it had been decided by a number of the members to present him with a small token of the Club's esteem and good wishes. He would ask the past president, Mr. F. Pitcher, to make the presentation.

Mr. Pitcher briefly referred to the various offices Mr. Barnard (who was an original member of the Club) had occupied since its inception, and said that he was of opinion that the regular appearance of the *Naturalist*, greatly due to the editor's efforts, was one of the principal means of maintaining the Club as a live society. He then handed to Mr. Barnard a pocket aneroid bearing the following inscription:—"F. G. A. Barnard, Esq., from the F.N.C. of Victoria, in recognition of 25 years' valuable services as hon. editor. June, 1918."

Mr. Barnard, in replying, said that he had been quite taken by surprise by the presentation, and, though the instrument would not be so useful to him now as it might have been when he was some years younger, still, he greatly appreciated the kindness of his fellow-members in making him the recipient of such a gift. He had at times felt inclined to resign his position, owing to lack of time to give the work the attention it

needed, more especially after the severe loss he had sustained a few months before, but on further consideration he had resolved to try and carry on a little longer.

NATURAL HISTORY NOTE.

Mr. G. A. Keartland said that the note in the June *Naturalist* (page 20) with reference to Rose-breasted Cockatoos visiting the Preston district recently should read "King Parrots."

EXHIBITS.

The exhibits had been tastefully displayed in the lower hall, and on conclusion of the business of the evening Sir Ronald Ferguson spent some time in examining them and hearing their stories from the exhibitors.

The following is a brief list of the principal exhibits :—

By Mr. E. S. Anthony.—Collection of aboriginal stone knives, from Tasmania ; stone knives with handles and bark sheaths, carved wooden and stone churingas, death-bones, &c., from Northern Territory ; mill stones, from New South Wales, &c.

By Mr. F. G. A. Barnard.—Pair of Flying Mice, *Acrobates pygmæus* (mounted).

By Mr. D. Best.—Case of rare or striking Victorian beetles.

By Mr. C. C. Brittlebank, on behalf of Vegetable Pathologist's branch of Department of Agriculture.—Fungi affecting the potato, vine, peach, plum, and apricot ; collection of phalloides.

By Mr. F. Chapman, A.L.S.—Lantern slides of characteristic Victorian scenery ; Victorian fossils ; photographs of characteristic land formations of Great Britain.

By Mr. H. Clinton.—Insect preparations under microscope.

By Mr. J. Cronin.—Nine species of growing Victorian ferns, from Melbourne Botanic Gardens ; also branches of Lilly-pilly, *Eugenia Smithii*, and leaves of Victorian Cabbage Palm, *Livistona australis*, for decoration of hall.

By Miss C. Currie.—Branch and wood of Myall, *Acacia pendula*, from New South Wales.

By Mr. C. Daley, F.L.S.—Representative collection of rocks and minerals from Maldon, Victoria ; types of stone axes, hammer stones, knives, grinding stones, chipped and flaked cutting and scraping implements, &c., of the Victorian aboriginals ; about fifty characteristic photographs of Victorian lake, mountain, and ocean scenery (lent by the Government Tourist Bureau).

By Mr. E. Fischer.—Collection of about 300 species of minute Victorian beetles.

By Mr. C. French, jun., on behalf of Entomological branch of Department of Agriculture.—Cabinet drawers of Victorian insects destructive to fruit, fruit trees, garden plants, seeds,

&c.; cabinet drawer of Australian Phasanidæ (stick insects); cabinet drawer of Victorian beneficial insects; cabinet drawer of Victorian scale insects (Coccidæ); twelve Victorian insectivorous birds (mounted).

By Mr. C. J. Gabriel.—The largest Victorian volute shell, *Voluta mamilla*, Gray, showing different stages of growth; examples of rare Victorian shells; ship-worms, showing destruction caused to marine constructions; and a common cowry and its varieties.

By Mr. J. Gabriel.—Collection of Victorian seaweeds (mounted). The greater part of the collection was made by the late Mr. H. Watts, one of the founders of the Club.

By Mr. W. Glance.—Auriferous quartz specimens from Western Australia.

By Mr. A. D. Hardy, F.L.S.—Specimens of nests of trap-door spiders, from Queensland; collection of timbers of Victorian trees; honey from twelve species of eucalypts; forest fungi destructive to timber; and other exhibits relating to forestry, on behalf of the Forest Department of Victoria.

By Mr. J. H. Harvey.—Stereoscope, with views of Yarrangobilly Caves, N.S.W.

By Mr. R. A. Keble.—Minerals occurring in basalt at Richmond and Clifton Hill quarries.

By Mr. J. A. Kershaw, F.E.S.—Platypus and young; Echidna and young; case of common Victorian shore crabs; Paper Argonauts, *Argonauta nodosa*, with animal and eggs; case illustrating life-histories of common Victorian insects; Bot-fly, *Gastrophilus equi*, and portion of stomach of horse with larvæ ("bots") attached; large silken bag constructed by the larvæ of the Bag-shelter Moth, *Teara contraria*.

By Mr. G. A. Keartland.—About forty Australian bird-skins, including Alexandra Parrakeet, *Spathopterus alexandræ*, Yellow-collared Parrakeet, *Platycercus semitorquatus*, Keartland's Honey-eater, *Ptilotis keartlandi*, Crow-Shrike (albino), *Gymnorhina leuconota*, and Painted Finch, *Emblema picta*; also aboriginal stone axes, glass and quartzite spear-heads, hair girdles, string made from wild cotton, and bag made from palm-leaf fibre.

By Mr. J. P. M'Lennan.—Aboriginal stone axes, wedges, hammers, and mill stones.

By Mr. E. E. Pescott, F.L.S.—Series of aboriginal spear-points, from North-West Australia.

By Messrs. E. E. Pescott, F.L.S., and C. French, jun.—Sixty lantern transparencies of Victorian orchids (exhibited by electric light), also living plants of the orchids *Pterostylis reflexa*, *P. nutans*, *P. concinna*, and *Acianthus exsertus*.

By Mr. F. Pitcher.—Mounted specimens of Victorian ferns, grasses, sea-weeds; flowering specimen (female) of Stunted

Sheoke, *Casuarina distyla*, Vent., from Belgrave; young and mature specimens of fungus known as Native Bread, *Polyporus mylitta*, from Warburton and Somerville; dried specimen of foliage of Long-leaved Box, *Eucalyptus elæophora*, F. v. M., some leaves measuring 10 inches in length, from Beechworth.

By Mr. A. L. Scott.—Granite under microscope—(*a*) ordinary light, (*b*) under polarized light between cross nicols.

By Mr. J. Searle.—Drawings of fresh-water crustacea; fresh-water crustacea, &c., under microscope.

By Mr. F. Spry.—Cabinet drawer of Australian ants; also moth, *Stathmopoda melanochra*, Meyr., the larva of which is very destructive to scale insects; Victorian aboriginal weapons.

By Mr. J. Stickland.—Various objects under microscope.

By Mr. A. C. Stone.—Aboriginal implements, &c.

By Mr. P. R. H. St. John.—Essential oils prepared from Victorian trees and shrubs.

By Dr. C. S. Sutton.—Flowering examples of the "Sandringham Flora" from Langwarrin, including *Correa alba*, *Melaleuca squarrosa*, &c.

By Mr. J. Wilcox.—Under microscope, tube-building rotifer, *Melicerta ringens*.

By Mr. H. B. Williamson.—Fifty photographs of Victorian trees, also drawers of fruits of eucalypts.

By Mr. F. E. Wilson.—Case of Victorian Coleoptera.

By Mr. F. Wisewould.—Flowering specimens of Native Heath, *Epacris impressa*, pink, &c., from Pakenham.

After the usual conversazione the meeting terminated.

The Dodd Insect Exhibition.—It is gratifying to know that Mr. F. P. Dodd's enterprise in bringing his splendid collection of North Queensland and New Guinea insects to Melbourne has been appreciated by southern folks, the attendance having been so good that Mr. Dodd has arranged, after a visit to Adelaide, to reopen the exhibition on the 5th August next. So unique a display has never been seen in Melbourne before, and should certainly not be missed by any nature-lover.

A New Elephant.—The *Illustrated London News* of 2nd February last contains an illustration, from a photograph taken on the spot, of an unidentified species of dwarf elephant recently shot in the Congo State by Mr. J. R. Evans. Two specimens, a male and female, have been received in London by Messrs. Rowland Ward, the famous taxidermists, for mounting. They stand between 5½ feet and 6 feet high, being thus only half the height of the ordinary African elephant, while the tusks are very much smaller in proportion. They are called by the natives the "swimming" or "water" elephant.

THE TALL TREES OF AUSTRALIA.

BY A. D. HARDY, F.L.S., State Forests Department.

(*Read before the Field Naturalists' Club of Victoria, 11th March,* 1918.)

"THE Sequoia is not only the oldest of trees, but the mightiest, and, while from time to time there have been reports of rivals in Australia, yet these rivals, when brought to the ultimate test—that of the tape-line—have shrunk before it, leaving the Sequoia the monarch of them all." Thus the American Museum of Natural History expresses what might be taken to be the last word on the question of tall tree sizes.

It is not the intention in the present paper to challenge the claim quoted above, but I propose to give, among other notes, some tape-line measurements, and introduce some survey figures, in order to raise the Australian record to the point of respectful competition, without boasting.

If reports be true, the greatest girth record belongs to neither Sequoia nor Eucalyptus, for a Cypress at Santa Maria, Mexico, according to F. Starr, has a circumference of 160 feet at 4 feet above ground. In "Les Merveilles de la Vegetation" (F. Marion, Paris, 1866) we may read of some old trees of enormous girth, many of them oaks. The old Dragon Tree, near the summit of Teneriffe, with height 24 metres and diameter 15 metres, and others, are apt to be lost sight of. The circumference of the Mount Etna Chestnut is said to be 180 feet. Knight and Stepp give 50 feet as the diameter of an Oriental Plane near Constantinople, while a Lime (Tilia) in Lithuania has an unchallenged girth record of 87 feet.

And since the height of a tree is also its length, we may note that neither Eucalyptus nor Sequoia is anything like champion among long plants, the reputed length of the Great Sea-Wrack (Macrocystis) being up to 900 feet (one writer gives "500 metres"!); and one of the Climbing Palms (Calamus) is stated by Gosse "to be found almost a quarter of a mile in length," which astonishes even Knight and Stepp, who quote his statement (from "Omphalos"). Schimper, however, states that Treub measured a torn-down portion of one of these climbers, and found it to be 240 metres (788 feet).

American publications treat mostly of living trees that can be viewed to-day by anyone visiting the Sequoia country in California, and this is where we must take second place. We can produce some fine records and some very tall trees, but probably nothing quite so huge as the giant conifers. The great Sequoias have been preserved as objects of national pride and as of wide interest; our giants have vanished, and by this time have rejoined the humic layer, and, unrecognized, stare

at us from the naturally regenerated forest in the juvenility of a succeeding cycle.

Trees of over 300 feet are not plentiful, but while we have unexplored forests in inaccessible places it would be unwise to say that finality has been reached with our present best record.

Although accounts in scientific prints are not necessarily perfect, those of popular journals, judging by some that we have read, should be accepted with caution. Here are some height figures, given at various times, some of which have been referred to without enthusiasm by Mr. Maiden :—

420 feet	.. Dandenongs	..	D. Boyle, 1862.
420 ,,	.. Blacks' Spur	..	Reported by H. Heaton as measured by F. v. M.
415 ,,	.. Cape Otway	..	F. v. M., "Select Extra-Tropical Plants."
521 ,,	.. ,,	..	D. Boyle.
480 ,,	.. Blacks' Spur	..	Klein, quoted by F. v. M., *Jour. Bot.*
480 ,,	.. ,,	..	H. Heaton (measured by F. v. M.)
471 ,,	.. Baw Baw	..	"G. W. Robertson" (F. v. M. in "Extra-Tropical Plants").
500 ,,	.. ,,	..	"W. G. Robinson" (F. v. M.)

The last two probably refer to the same tree, and the name of the surveyor should be G. W. Robinson.

In the *Lone Hand* in 1911 an article appeared in which the writer deplored the incredulity of the times, and stated that "the Baron" (F. v. Mueller) "made a practice not only of estimating the heights of the tallest trees which came under his notice, but of having them actually measured." The value of the article may be measured by Victorian botanists and surveyors in terms of the following extract :—"In this district (Gippsland) a great number of trees measuring 300 feet have been found, while *specimens of* 400 *feet are not uncommon.* . . . Mueller is stated to have said that our gum-trees attain a height of 500 feet, *but the tallest tree even the Baron ever measured was* 480 *feet!*" (The italics and the exclamatory note are mine.—A. D. H.)

Although we are not seriously concerned with estimates, the following extracts from tables of "certified estimates," prepared by Kerner, are of interest :—

Height.—

Peppermint Tree, *Eucalyptus amygdalina*	140–152	metres.
Mammoth Tree, *Sequoia gigantea* ..	79–142	,,

Diameter.—

Mammoth Tree, *Sequoia gigantea* ..	11	,,
Peppermint Tree, *Eucalyptus amygdalina*	8	,,

which, being interpreted, means that Kerner's accepted maximum height and circumference of the White Mountain Ash, *E. regnans*, are respectively 500 feet and 82½ feet, and corresponding figures for the Big Tree, *Sequoia gigantea*, are 466 feet and 113½ feet approximately. Kerner probably accepted F. v. M.'s figures, but this point remains. Anton Kerner von Marilaun was professor of botany in the University of Vienna, and his "Natural History of Plants" was translated by Professor Oliver, of London University, assisted by two graduates in science; and Baron Ferdinand von Mueller, M.D., &c., was Government Botanist of Victoria, and a botanist of world-wide repute. They were not Australians, nor even Britons, and unlikely to be swayed by unconscious bias in favour of Australian trees, but——.

SEARCH FOR TALL TREES ENCOURAGED.

An attempt was made to gather reliable information about our tall or big trees in order to place it on show at the Centennial Exhibition, Melbourne, in 1888. A reward of £20 was offered to anyone who would guide the authorities to a tree of 400 feet in height, with an additional reward of £3 for every 5 feet in excess. The Hon. James Munro personally offered £100 in addition to the foregoing. We may be sure that land surveyors, cattle men, forest rangers, paling splitters, miners fossicking for tin along the mountain forest streams, and others, were on the look-out for tall trees. Then, if ever, was the time for the fabulous giants to materialize: but, although Government surveyors and others were instructed to report, and the money reward widely advertised, the tallest tree found was only 326 feet 1 inch in height, with the small girth of 25 feet 7 inches at 6 feet from the ground. This tree was discovered on a spur of Mount Baw Baw, Gippsland, about 90 miles from Melbourne. The tree of greatest girth was found near Neerim township, about 80 miles easterly from Melbourne; it measured 55 feet 7 inches round at 6 feet from the ground, and 227 feet up to where the top was broken off. The seven trees of note were photographed and measured, and the record shown at the Exhibition was an atlas, folio size, entitled "The Giant Trees of Victoria," the survey and photography having been effected by a party including Mr. J. Duncan Pierce, civil engineer and photographer, and Mr. C. R. Cunningham, surveyor; Mr. W. Davidson, late chief engineer of the Public Works Department, was associated with these. The work cost £600, the cost being borne by the Lands Department, the Public Library trustees, and the Exhibition Commissioners.

The following tabulation is an extract from the State Forests Department's annual report 1910–11, in which a summary of

the giant tree investigation up to that date appeared, the list being one referable to the plates in the album :—

Species.	Height.	Girth.	Locality.
I. Eucalyptus amygdalina regnans	307 feet	22 ft. 8 in. measured 6 feet from ground	Mt. Monda, Fernshaw, 52 miles from Melbourne
II. Eucalyptus amygdalina regnans	227 feet (top broken off)	55 ft. 7 in. measured 6 feet from ground	Neerim Township Reserve, 79 miles from Melbourne
III. Eucalyptus amygdalina regnans	326 ft. 1 in.	25 ft. 7 in. measured 6 feet from ground	Spur of Mt. Baw Baw, Gippsland, 91 miles from Melbourne
IV. Eucalyptus amygdalina regnans	303 ft. 6 in.	25 ft. 7 in. measured 6 feet from ground	Stony Creek State Forest, Narbethong, 60 miles from Melbourne
V. Eucalyptus amygdalina regnans	290 feet (top broken off)	32 feet measured 6 feet from ground	Forest of the Otway Ranges, 113 miles from Melbourne
VI. Eucalyptus amygdalina regnans	..	.. .. ..	Head of Sassafras Gully, Dandenong Ranges, 29 miles from Melbourne
VII. Eucalyptus amygdalina regnans	219 ft. 9 in.	48 ft. 6 in. measured 6 feet from ground	Sassafras Gully, Dandenong Ranges, 31 miles from Melbourne

For extra-Victorian and non-botanical readers a short description of our giant tree *par excellence* may be given. The White Mountain Ash, *Eucalyptus regnans*, F. v. M., is one of about 230 species of the genus, which, as most folk know, is a member of the Myrtle family, and is therefore distantly related to the Pomegranate (Punica), the Monkey Nut (Lecythis), and more closely to Melaleuca, Callistemon, Tristania, and Eugenia.

The White Mountain Ash, often referred to in old publications as *E. amygdalina*, but later as *E. amygdalina* var. *regnans*, F. v. M., was raised to specific rank by Ferdinand von Mueller. It is an evergreen tree, with a gently-tapering trunk,* though old trees, especially in more exposed positions, often have considerable short-length buttresses. The profile of an old, buttressed eucalypt approaches the curve known as cissoid. The tree is thin-skinned and susceptible to scorching by fire, the greater portion of the trunk decorticating in long, thin flakes or ribbons, which taper in thickness from one-eighth or one-tenth of an inch to nothing where they run off above, while about the base and often on the lower fifth, fourth, or even third part of the trunk the rougher bark persists. This butt bark may be an inch or so in thickness just above the buttresses, and to this is due a vernacular synonym, "Blackbutt," a name properly applied to *E. pilularis*. The giant stem supports a comparatively scanty canopy, which, even in old age, is not so ungraceful as that of Sequoia. The leaves are stalked, flat, curved, lanceolate, coriaceous, with pages equally green and shiny, and contain an aromatic oil of a smell akin to peppermint. The flowers

* I have measured five 20-foot logs from one tree, and found the middle section to be of same diameter at both ends—cylindrical.

grow on short stalks radiating from a common peduncle, and form an umbel in the leaf axil. Because the timber resembles European Ash the tree was called Mountain Ash, and, later, White Mountain Ash, in contradistinction to Red Mountain Ash or Victorian Woolly Butt, *E. delegatensis*, the wood of which has a pinkish-brown tinge. It is the chief lumber-tree of Victoria, and luxuriates in the eastern and Otway forests. The fissile, porous wood is used largely for house construction, furniture, and fittings, and for a variety of other purposes, while chemical products such as acetic acid, acetone, formalin, and creosote, charcoal, &c., are obtained by retorting timber of no use to the sawmiller. Defective trees are not milled, but split up into palings, over 10,000 broad palings 6 feet in length having been obtained from one giant. Such, in short, is the tree which we offer as a not unworthy competitor with the Sequoias.

In his "Forest Flora of New South Wales," J. H. Maiden, I.S.O., F.R.S., gives space to the question of giant eucalypts, and is as modest in his claim for the eucalypt as his contemporary, Sargent, in America, is in recording the Sequoia. Maiden is sceptical concerning stories of trees of 400 feet existing in Australia to-day, though he does not go so far as to suggest that such giants never existed.

MEASURED HEIGHTS.

The following are three measurements which exceed those in the atlas of giant trees referred to above:—

(1) In the fifth progress report of the Royal Commission on State Forests and Timber Reserves, in 1889, it is stated that the Engineer of the Shire of Colac had measured a Mountain Ash, *E. regnans*, in the parish of Olangolah, which was 64 feet 6 inches in girth at a height of 8 feet, and that the same surveyor measured a prostrate Mountain Ash in the same parish, the latter being 329 feet to a point at which the top was broken off by the fall; the diameter 4 feet at 16 feet from the base end; and the girth 3 feet 6 inches at a height of 255 feet, and 2 feet 5 inches at 328 feet.

(2) Mr. G. W. Robinson, civil engineer and surveyor, was engaged in the Dandenong forest over 60 years ago. Even then, he says, the tallest and straightest trees had been taken out by the shingle-splitter. The present writer's father (the late John Hardy, Government Surveyor) said a few years ago that he never measured a 400-foot tree, and, though trees of 300 feet were common enough, and up to 350 feet not infrequent, the bigger trees had already been felled and removed by the paling-splitter. Mr. Robinson, however, records as his best big tree measured one which was "342 feet to the com-

mencement of the 'die-back' portion of the tree," and, as the stem there was from 6 to 7 inches in diameter, he estimated the "die-back" portion to have been from 15 to 25 feet, thus giving an approximate length of 360 feet. "The last of the big trees in that district," he says, "were cut down in 1862."

(3) The third is our best measurement, by a legally-qualified measurer. I sent out many inquiries drawing attention to Mr. Robinson's contribution to the *Victorian Naturalist*, seeking evidence as to a taller tree. The replies were, with one exception, in the negative, and the exception was that from Mr. G. Cornthwaite, licensed surveyor, Colac. In response to my further inquiry, I received a letter from Mr. Cornthwaite, and of which, with his permission, I am recording the part appropriate to the subject in hand:—

"Colac, 12th June, 1916.

"Dear Sir,—In reply to yours of the 6th inst., in reference to the big tree measured by me in Gippsland, I beg to say that I cannot find the old notes taken at the time, but I am quite sure as to the measurement of the length. The tree was growing on allotment No. 1, parish of Narracan South, about 2 miles from Thorpdale, and was in a dense forest of tall trees, but this one was manifestly taller than the surrounding trees. The measurements were taken during the Christmas holidays of 1880. I measured the tree as it was standing by means of a clinometer and chain, and made it 370 feet. Afterwards, when it was chopped down, I measured it—375 feet, allowing for the stump. The tree was a Victorian Mountain Ash or 'Blackbutt,' and, where it was spring-boarded, about 12 feet from the ground, was about 6 feet in diameter. About 240 feet length of the barrel was worked up into palings, &c., and all the material for a six-roomed house was obtained from it. My brother also worked a paling tree in the same locality afterwards, which was regarded as the champion paling tree of Gippsland. The palings were worth £100 at the stump. . . My brother had the stack of timber photographed.

"(Signed) G. CORNTHWAITE."

The greatest recorded girth of a eucalypt is that given by the Conservator of Forests (Mr. Hugh Mackay), with photograph, in the "Handbook to Victoria," prepared for the information of the British Association meeting at Melbourne in 1914. The tree pictured is "King Edward VII.," and is an imperfect specimen of *E. regnans* growing near Marysville, on a slope of the main Dividing Range. The girth of 80 feet was measured at about 10 feet from the ground, thus avoiding the greater spread of the buttresses. But the old fire-scarred stumps of larger stems exist in the Otway region. "King

Edward VII." measures about 112 feet round at the ground line; present height of the tree is only 200 feet.

The general slimness of our trees has been animadverted on by at least one American writer, which reminds me of having, with Dr. Eames and Mr. Synnott, M.A., of Harvard University, visited the forest on the slopes of Donna Buang during an official visit for the Forests Department. There (the American visitors assisting) I measured *E. regnans*, of average sawmilling girth, in the locality. One was 242 feet high (by clinometer and tape) and innocent of buttresses, with a diameter of only 4 feet 6 inches at 5 feet from the ground. Another, which I personally measured with clinometer and tape, in the Beenak Ranges, was 290 feet, with girth of only 18 feet at 5 feet from the ground. This tree had very slight buttresses. Near the source of the Bunyip another tree had only 4 feet diameter and a height of 260 feet. Usually old trees are buttressed.

American Tree Records.

In California there are two species of Sequoia. There is the Big Tree, *Sequoia gigantea* (also called *S. Wellingtonia*), and the Redwood, *S. sempervirens*. Both are evergreens, with persistent, rough, thick bark, conforming to the flutings of the stems. The Big Tree is the bulkier of the two. Redwood is the taller, and, while the former has stiff greyish-green foliage something like that of a Cypress or Araucaria, the latter has its small linear leaves flattened out, and the general appearance of a twig is like that of a Yew. Big Tree grows at higher altitudes—5,000–8,000 feet—and remote from the sea; Redwood grows nearer the coast, and below the zone favoured by the Big Trees. Sargent states that *Sequoia Wellingtonia* reaches, at maturity, 275 feet, with trunk diameter of 20 feet near ground, occasionally becoming 320 feet high, with diameter 35 feet. For *Sequoia sempervirens* the same authority records 300–340 feet, with a slightly tapering and irregularly-lobed trunk rarely 28 feet in diameter at the much-buttressed base, and with bark 6 inches to 12 inches thick. In "Silva of North America" Sargent gives 325 feet for a Big Tree as the tallest of two measured, and of Redwood says:—"20 to 28 feet at the much-buttressed base and 350 feet tall. The Redwood, which is the tallest American tree, probably occasionally reaches a height of 400 feet or more. The tallest specimen I have measured was 340 feet high."

According to the Southern Pacific Railway Guide, the Big Tree (there called *S. gigantea*) has specimens that tower nearly 400 feet to the sky, and one is said slightly to exceed this, while many measure from 70 to 90 feet round. The largest, recently discovered, has a base circumference of 109 feet.

"The trees," says the writer, "are not mere poles or slender shafts, such as the eucalypts of Australia, but proportionate and symmetrical in girth and height. The bark varies from 11 to 40 inches in thickness. . . The beauty of the tree is enhanced by its flutings, which traverse the trunk from base to apex." Several trees are specified as being 300 feet high, and one with a girth of 90 feet.

The Department of the Interior (U.S.A.), in "The Sequoia National Park," tells of *S. gigantea* only, and in this park trees of dimensions as follow exist :—

	Height.	Diameter.
General Sherman	279.9 feet ..	36.5 feet
General Grant	264 ,, ..	35 ,,
Abraham Lincoln	270 ,, ..	31 ,,
California	260 ,, ..	30 ,,

The American Museum of Natural History (from a publication of which was selected the quotation that introduces this article) says of the Big Tree, *Sequoia gigantea*, after belittling the eucalypt, that the Kauri Pine of New Zealand, so far as size goes, is a really dangerous rival, and two examples are on record having respective *diameters* of 24 feet and 22 feet.

In a list of fourteen specimens particularized by the Museum are two worthy of special note—viz., specimen "C," of King's River Grove, has a height of 276 feet and a circumference (near the ground) of 116 feet, while specimen "G," of Calaveras Grove (dead, without bark), has diameter 23 feet 2 inches at 3 feet from the ground, and height to present top 365 feet (estimated former height, 400 feet). Other heights mentioned are 302, 321, 325, 319, 315, 311, and 270 feet, the diameters running up to 96 feet.

By the courtesy of the Conservator of Forests I am enabled to quote from the Department's copy of *American Forestry* (June, 1916), wherein Sequoia is described, but in this case it is not the Big Tree, but the *tall* tree—the Redwood, *S. sempervirens*. The writer of the article (S. B. Detwiler) says :—"There are a few trees in the world that have attained greater diameters and some that grow to greater heights, but no other tree with a trunk of huge size rises so gracefully to the majestic height of the Sequoias." He quotes from John Muir as follows :—"Trees from 10 to 15 feet in diameter and 500 feet [a misprint for 300, obviously.—A. D. H.] high are not uncommon, and a few attain a height of 350, or even 400, with a diameter (at the base) of 15 to 20 feet or more, while the ground beneath them is a garden of fresh, exuberant ferns, lilies, Gaultheria, and Rhododendron. This grand tree, *Sequoia sempervirens*, is surpassed in size only by its near relative *Sequoia gigantea*, or Big Tree, of the Sierra Nevada, if, indeed, it is surpassed. The

sempervirens is certainly the taller of the two. . . The greatest size of the Big Trees is 300 to 330 feet in height, and a diameter (10 feet above the base) of 30 to 37 feet. Exceptionally large specimens of the Redwood are 325 to 350 feet high and 18 to 20 feet in diameter 10 feet above the base. Ordinarily the Big Tree does not exceed a height of 250 to 280 feet and a diameter above the swollen base of 12 to 17 feet. The usual size attained by the Redwood is 8 to 12 feet in diameter and 190 to 280 feet in height."

Sequoia sempervirens and *Eucalyptus regnans* have some points in common, however, and a few may be stated.

They are the tallest trees in their respective countries. They are valuable timber trees—each, perhaps, the most useful its country produces. They are both evergreens, the old leaves remaining more than one season. The greater part of the seed is infertile. The seed is exceptionally small for such large trees—in *E. regnans* less than that of a gooseberry. They both rejoice in climatic conditions wherein the temperature rarely falls below 15° F. (30° for Eucalyptus), or rises above 100° F. (90° F. for this Eucalypt), with a rainfall of 20–60 inches. Their woods are fissile.

Having stated their points of agreement, a few differences may be mentioned. The Redwood is immune from fungoid and insect pests. *E. regnans* is subject to longicorn and other borers, termites ("ants"), and fungoid disease such as the bracket-like Xylostroma, with mycelium like a sheet of chamois leather conforming concentrically to the heartwood rings. The wood of Redwood is non-porous, and easily seasoned; that of *E. regnans* has large pores visible to the naked eye, and requires careful seasoning and filling before final dressing. Redwood is a soft, brownish-red colour, and light; *E. regnans* is a pale straw colour, hard as oak almost, and comparatively heavy. The former resists decay in contact with the ground; the latter has not such endurance. Redwood is a conifer; *E. regnans* is of the "Myrtle blooms," to use Lindley's old term. The former has rough, persistent bark, and the latter decorticates annually, leaving the greater part of the trunk smooth; and finally—not to make too long a tale—this point of difference, important in forestry: *Sequoia sempervirens* suckers freely, while *Eucalyptus regnans* reproduces by seed only, so far as I am aware.

Both *Sequoia gigantea* and *sempervirens* are cultivated as ornamental trees in parks and gardens of south-east Australia, especially in the belt between the summit of the Dividing Range and the sea, in Victoria. At Ballarat the Big Tree is doing well, many trees being planted in the park near Lake Wendouree; and fine young specimens about 100 feet high are on Mount

Macedon, at 2,250 feet altitude. The Redwood may be seen in Melbourne Botanic Gardens, with the Big Tree (both small), and also at Macedon and Daylesford.

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AUSTRALIAN METEOROLOGY AND GEOGRAPHY.—A series of lectures on this subject, by Dr. Griffith Taylor, Physiographer in the Commonwealth Weather Service, especially for the benefit of teachers, was commenced at the University on 21st June. Particulars can be obtained from the Registrar.

THE REPRODUCTION OF TERRESTRIAL ORCHIDS.

To the Editor *Victorian Naturalist.*

SIR,—In the *Victorian Naturalist* for February and March last (vol. xxxiv., pp. 160 and 176) is a paper on the above subject by Mr. E. E. Pescott, F.L.S., F.R.H.S. Being interested in the cultivation of orchids, and having had some experience in their growth from seed, I would like to make a few remarks on Mr. Pescott's paper.

There are few terrestrial species of the genera dealt with by Mr. Pescott that are worth growing except from a purely scientific point of view. In my collection, beside half a dozen or more exotics, I have three Australian—*Phaius grandifolius*, *Calanthe veratrifolia*, and *Spathoglottis Souteri*. The Phaius and Calanthe are referred to in Mr. Pescott's paper.

Undoubtedly terrestrial orchids—and in this all others may be included—very rarely grow from seed in a state of nature. Personally, I think this is a wise provision, considering the immense number of seeds ordinarily produced.

I cannot endorse the following statements:—"Little is known regarding the seeds of these plants. . . Whether they are germinable . . . or whether they are all abortive is not known. Apparently there is no necessity for the production of seed, owing to the tuberous increase, and apparently the elaborate apparatus or arrangement of the organs is to some extent but a survival of the pollination and fertilization operations of other days."

It was Darwin's work on orchids that so fascinated me many years since that when I had the opportunity I commenced to grow a few, and since then have largely added to my stock. Though I have not been able to devote as much attention to the subject as I would have liked, I have, however, been successful in raising three varieties of terrestrial orchids from seed, the only ones tried.

As a matter of fact, a good deal is known about the seeds of orchids—how to raise them, that they are germinable, and that there is a distinct necessity in the economy of the plants for the production of fertile seed. The first orchids raised artificially from seed were terrestrial ones.

That orchids are very largely reproduced by tubers below the ground (or by stems or bulbs above ground) is perfectly correct; but that will not account for the wide distribution of the same species where it is not possible, in the course of nature, for the tubers to reach. Then they must grow from seed distributed by natural agencies.—Yours, &c.,

HUGH DIXSON.

"Abergeldie," Summer Hill, N.S.W., 4th June, 1918.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting was held at the Royal Society's Hall on Monday evening, 8th July, 1918.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about eighty members and visitors were present.

CORRESPONDENCE.

From Dr. G. Sweet, University, stating that she had inquiries from America for articles on Australian polyzoa, and asking any member who could spare reprints to forward them to her.

REPORTS.

A report of the extra excursion to Heyington on Saturday, 15th June, was, in the absence of the leader, Dr. G. B. Pritchard, F.G.S., given by Mr. F. G. A. Barnard, who said that there had been a good attendance of members, and an instructive afternoon had been spent. Meeting at Burnley station, the party walked through Richmond Park, where the changes which have taken place in the position of the Yarra in the course of time were pointed out and explained. The river was then crossed, and the geological features of Heyington cutting were demonstrated in an interesting manner. The cutting contains some fine examples of altered bedding; one particularly fine example was figured in the *Naturalist* for September, 1910 (*Vict. Nat.*, xxvii., p. 80), also intrusive dykes, &c. The characteristics of the valley of Gardiner's or Kooyongkoot Creek were then pointed out, and the party separated on reaching the Riversdale-road tram.

A report of the visit to the Economic Museum, &c., at the Botanic Gardens on Saturday, 22nd June, was given by the leader, Mr. F. Pitcher, who reported a good attendance of members. The museum was inaugurated during the *régime* of the late Mr. W. R. Guilfoyle as director of the Gardens, and he (the leader) had had the principal part in its planning and arrangement during the director's absence in England. The value of such a collection was pointed out, and attention directed to the numerous examples of timbers, fibres, food products, fruits, gums, resins, oils, perfumes, &c., all of plant origin. The carpological collection, which occupies a series of show-cases in the centre of the building, was mentioned as being unique; it comprises about 2,500 species of seeds and seed-vessels arranged in botanical sequence, each fully labelled. Those of the eucalypts, acacias, and pines are

found to be of especial value for reference, as the recognition of the species depended so much upon their fruits. The arrangement of the Victorian and Australian herbarium cabinets was also explained, and some of their contents examined. Leaving the Museum about 4 o'clock, the visitors walked across the Oak Lawn to the laboratory, where Mr. P. R. H. St. John, who was co-leader for the afternoon, demonstrated the process of obtaining oil from the leaves of a eucalypt, and exhibited a large series of oils distilled at the Gardens from various Australian shrubs and trees. Afterwards, at the invitation of Mrs. Pitcher and Mrs. St. John, an adjournment was made for afternoon tea to the *employés'* meeting room, when, in proposing a vote of thanks to the leaders and their entertainers, Mr. Barnard referred to the approaching retirement of Mr. Pitcher from his position as assistant director after a period of about forty-nine years' service in the Gardens. Finally, a visit was paid to some of the plant-houses and conservatories, which were gay with begonias, primulas, orchids, &c., the scarlet-bracted poinsettias being greatly admired.

ELECTION OF MEMBERS.

On a ballot being taken, Miss R. S. Chisholm, 64 Henry-street, Windsor, Mr. T. Dunbabin, Elwood, Mr. W. T. C. Kelly, LL.B., 432 Collins-street, Melbourne, and Mr. Phillip Morrison, 1 Bowen-street, Hawthorn, were duly elected as ordinary members; and Mr. Alex. H. Dennett, 286 City-road, South Melbourne, as an associate member of the Club.

GENERAL BUSINESS.

The chairman referred to the success of the exhibition of specimens in connection with the annual meeting, and expressed the Club's thanks to all who had assisted.

REMARKS BY EXHIBITORS.

Mr. P. R. H. St. John called attention to the sample of oil of the Coast Grey Gum of New South Wales, *Eucalyptus punctata*, De Cand., distilled by himself at the Botanic Gardens laboratory at the time of the recent visit to the laboratory.

Mr. F. Keep called attention to a flower of *Eucalyptus pyriformis*, a Western Australian species, grown in his garden at Balwyn, stating that the tree, which was about eight feet, usually had one or two buds on it, which took some six months to develop into the perfect flower.

PAPER READ.

By Mr. T. Steel, F.L.S., communicated by Mr. F. G. A. Barnard, entitled "Tracks of the Garden Snail."

In the paper, which was instigated by some remarks of Professor Sir Baldwin Spencer at the February meeting of the

Club, the author explained what he took to be the method by which the apparently interrupted tracks made by snails are produced. The intermittent track was due as much to the surface crawled over as to the action of the animal, a smooth surface, such as glass, yielding an unbroken line, because the mucus is easily spread by the animal's foot as it progresses, while on rough surfaces the mucus remains where deposited, or the interrupted patches are connected by an almost invisible film.

Prof. Spencer said that he agreed with Mr. Steel's theory, but he had hoped that some less experienced member would have taken the matter up.

The chairman said that he had tried some experiments with a snail by causing it to cross the edge of a razor, which it did by looping its body and avoiding the edge, and so escaped receiving any apparent injury. He said that a somewhat similar question was, "How does the larval form of the Cup Moth move?" This, he thought, would provide an interesting problem for a junior member.

LECTURE.

The president then introduced Mr. Joseph Hatch, of Hobart, who had kindly offered to give an illustrated lecture on "The Bird Life of Macquarie Island."

Before dealing with the question, Mr. Hatch said that stories of cruelty to the birds at the island were in circulation, and he had received from the Premier of Tasmania a copy of a letter from the Society for the Prevention of Cruelty to Animals, Adelaide, calling attention to the matter. At his request the letter was read by the hon. secretary, when the lecturer said he would deal with it during the course of his remarks.

By means of a fine series of lantern slides the lecturer gave some idea of the scenery of Stewart Island, New Zealand, of Antipodes Island, and of Macquarie Island. The latter is situated some 800 miles south of Invercargill, or 600 miles south of Hobart, and had been leased by him for some twenty years for the purpose of obtaining penguin and sea-elephant oils. On the latter are several rookeries of Royal Penguins, but only two of them are utilized for commercial purposes, and then only the birds which have reached the age of twelve months are used, older birds being useless. Three other species of Penguins are found on the island—the King, Emperor, and Victoria; but none of these yields sufficient oil to render its killing profitable. A description was given of the method of treating the birds, and a denial given to the stories which have been circulated ascribing great cruelty in the methods adopted. Some interesting notes were given regarding the

life-histories of the birds. The one-year-old birds return to the rookeries early in January, the date of arrival being almost identical each year. The parent birds arrive in August in order to lay their eggs, and it is remarkable that, though the young birds do not arrive till five months later, they instinctively seek out and attach themselves to the parent birds' nests, while the parent birds will, whenever possible, occupy the nest they occupied on the previous visit. The nest, if it can be so called, consists merely of a few stones and rubbish scratched together; in this a single egg is laid. The egg is afterwards supported on the feet of the bird and covered by an expansion of the abdomen, which seems to take the place of the pouch in the marsupials. When the old birds are taking the young to sea for the first time, should the water be rough, they are able to discharge a quantity of oil from a special gland, and by means of this oil the water is calmed, and the young birds are able to take their first swimming lesson in comfort. The elephant seals, or sea-elephants—so called from the projecting upper lip of the animal, which may be likened to a proboscis—are found only on the west coast of the island, where they land during August for the purpose of changing their coats, which is done almost as completely as by a snake. These seals average from 15 to 20 feet in length. He emphatically denied that anything more than necessary cruelty occurred with regard to the penguin-oil industry, and asserted that, after twenty years of working, the birds were just as numerous as ever, and, as a matter of fact, the birds received a certain amount of protection from his operations, for the Skua Gulls sought every opportunity to secure the penguins' eggs, and had to be kept down by shooting.

On conclusion of the lecture a number of questions were asked, from which it was elicited that the birds are killed by being knocked over by heavy sticks; that the killing season lasted about six weeks, during which perhaps 1,500,000 birds were killed, and yet there would be no diminution the next year; and that the pictures shown had been taken some twelve years ago.

Prof. Sir Baldwin Spencer said that he had listened to the lecture with interest because he wished to call attention to the great destruction of bird-life going on at Macquarie Island, and, notwithstanding the lecturer's statement, he had Sir Douglas Mawson's message in mind—"Can you do nothing against the slaughter that is going on at Macquarie Island?" He thought the Club should approach the Tasmanian and New Zealand Governments and request that the proceedings at the island be placed under some kind of supervision.

Mr. Hatch denied the allegations of Sir D. Mawson, who, he

said, had not written on personal evidence. Prof. Spencer said that Sir D. Mawson was not alone in his statements; other naturalists had made similar statements.

At this stage Mr. Hatch offered to take any accredited representative scientist to the island free of cost next month, and allow him to investigate and photograph as much as he desired.

The chairman said that cruelty of quite as serious a type was practised in Victoria every year with regard to the shooting of quail and wild-fowl, when numbers of maimed birds were not collected by the shooters. He thought that, as the Club had always taken a leading part in trying to lessen the slaughter, an effort should be made, in conjunction with the Ornithologists' Union and other societies, to take advantage of Mr. Hatch's offer.

A hearty vote of thanks to the lecturer was moved by Mr. F. G. A. Barnard, who said that, apart from the question of cruelty, of which he was not competent to judge from the evidence before him, the lecture, combined with the excellent series of views, had been a most interesting one, and had enabled the members to get some idea of the teeming bird-life of the Antarctic. Whether further operations should be stopped was a matter for scientific investigation; the requirements of trade and commerce demanded the utilization of surplus material of every kind.

The motion was seconded by Dr. B. Nicholls, who endorsed the remarks of the mover, and said that the lecturer had been quite frank in his statements, and apparently had held nothing back which might be used to damage his case.

The motion was supported by Mr. A. H. E. Mattingley, who said that Mr. Hatch had shown the meeting one of the wonders of the ornithological world, and they were indebted to him for the lucid manner in which the data had been put before them. Many years ago he had heard of cruelty being practised at the island, and had interviewed one of Mr. Hatch's *employés*, who had been three years on the island. This man assured him that no cruelty was involved in the industry, and that no diminution was noticeable in the number of birds which arrived at the island each season. He had gone so far as to make arrangements to visit the island and see for himself, but unfortunately this *employé*, a Mr. Burton, died before arrangements could be completed, and, as it would have been most dangerous to attempt a landing on the island without a competent guide, he had been forced to abandon the idea. He had also interviewed members of the Mawson expedition on the subject of unnecessary cruelty, and was assured that none took place. He had recently received a communication from the Royal Society for the Protection of Birds, England, of which he had been elected an honorary life fellow, asking him

to make an exhaustive inquiry into the penguin-oil industry, and it was opportune that Mr. Hatch should have happened to be in Melbourne at the present time in order to give his version of the question. He hoped Mr. Hatch's offer to convey an expert to and from the island free of cost would be taken up, and the question settled. He would be pleased to accept the responsibility of the investigation.

On being put to the meeting, the motion was carried unanimously.

EXHIBITS.

By Mrs. Edmondson.—Fresh specimens of a Pimelea from Western Australia, known as "Quaylup Bells," from the locality whence obtained (Quaylup, near Jeeramungup, 60 miles east of Broome Hill).

By Mr. C. J. Gabriel.—Four species of Australian Trigonia shells (marine)—viz., *Trigonia lamarckii*, Gray, N.S.W.; *T. strangei*, Dodd, N.S.W.; *T. margaritacea*, Lam., Victoria; *T. margaritacea*, Lam., var. *bednalli*, Verso, South Australia, with a fossil species, *T. howitti*, M'Coy, from Jimmy's Point, Gippsland Lakes, for comparison.

By Mr. F. Keep.—Flower of *Eucalyptus pyriformis*, a Western Australian species, grown at Balwyn.

By Mr. P. R. H. St. John.—Flowers of Indian Coral Tree, *Erythrina indica*, grown at Botanic Gardens—an unusual flowering time, seeing that it is a tropical shrub; crude oil of *Eucalyptus punctata*, De C., Coast Grey Gum, New South Wales and Queensland, distilled at Melbourne Botanic Gardens, 22nd June, 1918.

After the usual conversazione the meeting terminated.

NOTES ON THE CHARACTERISTIC VEGETATION ABOUT YARRAM.

By J. W. Audas, F.L.S., F.R.M.S., National Herbarium, Melbourne.

(*Read before the Field Naturalists' Club of Victoria, 8th April*, 1918.)

As nothing has yet been presented to this Club on the plants of the Yarram district, the following brief sketch will, I trust, prove interesting to many who delight in the wild-flowers of our State. For the benefit of such enthusiasts, who are unable to get so far afield, and who are desirous of learning something of the botany of the locality, I have prepared a few notes on certain characteristic plants which may be of interest to members. Yarram, it may be stated, is situated near the extremity of the South-Eastern line, about 136 miles from Melbourne, and some ten miles from the shores of Corner Inlet.

Commencing the tour on the 20th October last, and leaving the city by the early train on a typical spring morning, the view presented was both gratifying and restful. Along the route the bounteous season with which the State had been favoured was manifest—wherever the eye ranged there was a growth of vivid emerald. Nothing of material interest was noted until Lang Lang was reached, where a heathy stretch of about seven miles was passed through. Here some colour was given to the scene by the wealth of the pale yellow and glorious golden-brown shades of *Dillwynia floribunda*, the pretty blue of *Dampiera stricta*, the fine, large, peach-like blooms of *Leptospermum myrsinoides*, and the pure white Jasmine-like flowers of *Ricinocarpus pinifolius*—the latter a neat shrub two to four feet in height, with linear leaves and a profusion of fragrant blooms.

On leaving Nyora the nature of the country changes from plain to undulating and hilly. *En route* a stretch of gaunt and dry *Eucalyptus regnans*—the so-called Blackbutt or Mountain Ash—was to be seen. This eucalypt attains the great height of 300 feet—or even more in sheltered forest glens—and is one of the loftiest trees known. Its circumference at six feet from the ground has been known to be sixty feet and upwards. The wood is fissile, well adapted for the manufacture of railway carriages, and second, if not equal, to Blackwood, *Acacia melanoxylon*, for the purpose named. Of late it has been greatly used for the making of household furniture, and is useful also for shingles, fruit cases, staves, inner building material, and other purposes. As the foliage contains much oil, it has to be specially guarded against bush fires, from the effects of which it seldom recovers.

When passing over the Hoddle Range, near Fish Creek, the leguminous shrub, *Gompholobium latifolium*, with its handsome, large pale yellow flowers, was observed in mature bloom. It is a slender shrub of three to four feet in height, and well worthy of cultivation. The red variety of *Correa speciosa* was also in gorgeous bloom, and presented bright red patches to the tops of the hills. From here a grand panoramic view of a portion of Wilson's Promontory is obtained, and some of the intricate and densely-wooded mountains are plainly visible, also a fine view of Corner Inlet, while the picturesque Mount Singapore appears close at hand, though really it is several miles distant.

From Foster onward the country passed through was chiefly covered with grass-trees interspersed plentifully with the widely-diffused Long Purple Flag, *Patersonia longiscapa*, and the "Butterfly Iris," *Diplarrhena Moræa*, also such ubiquitous plants as *Bulbine bulbosa*, *Wahlenbergia gracilis*, *Dillwynia*

cinerascens, Pimelea humilis, Ranunculus lappaceus, and *Goodenia geniculata.*

Detraining at Alberton, a northerly course was taken for Yarram, four miles distant, which I made my headquarters during the visit. "Yarram"—correctly speaking, "Yarram Yarram"—is an aboriginal name meaning "Beautiful beautiful." The place was originally a favourite camping-ground of the natives, and the actual site on which the township is built was the spot where the aboriginals gathered for corroborees, &c. The township came into existence about thirty years ago, and is up-to-date, well laid out, and progressive, being electrically lighted and containing some fine buildings—namely, three large hotels, hospital, banks, post-office, and others.

On the day after arrival an interesting trip to Gellion's Run was undertaken. It is attractive country, close to the coast, on Corner Inlet, between Port Welshpool and Port Albert. Leaving at 11 a.m., the drive was through Alberton. Taking the first turn to the right off the main road and crossing the Albert River, we turned into a track to the left. The recent rains had made the going very heavy, and water seemed to be everywhere. There was little to observe botanically in this flat, swampy ground over which we drove, the vegetation consisting chiefly of Swamp Paper-bark, *Melaleuca ericifolia,* and Swamp Gum, *Eucalyptus ovata.* After about half an hour's drive, crossing, *en route,* Muddy Creek, we reached the entrance to the run. Advancing, the face of the country changed, and beautiful park-like scenery came into view, where Banksia, Casuarina, Exocarpus, Leucopogon, Hakea, Acacia, Cassinia, Pultenæa, Myoporum, and Eucalyptus were the principal genera. The undergrowth consisted chiefly of a multiplicity of small shrubby plants such as *Pultenæa capitata, Hibbertia virgata, Epacris microphylla, Dillwynia ericifolia, Bossiæa cinerea, Daviesia ulicina, Aotus villosa, Ricinocarpus pinifolius, Olearia glutinosa,* and the broad-podded *Platylobium formosum.* The predominant colour of the flowers was yellow, which gave the landscape a bright hue. Notable exceptions of colour were *Tetratheca pilosa,* the magenta-coloured flowers of which were a feature of the hillocks, also *Cæsia vittata,* of a rich blue, and *Comesperma ericinum,* which produces masses of small pinkish-coloured blooms.

The soil was sandy, and it seemed to me that the ground over which this vegetation had spread was originally sand hummocks. A stop was made for lunch in a sheltered hollow, and after that repast we proceeded further, negotiating a few hillocks until a small plain was reached, where a forest of the Common Grass-tree, *Xanthorrhœa australis,* was seen in full

flower, with inflorescence from eight to ten feet in height. The trunks presented a grotesque appearance, being blackened and charred from the effects of a recent bush fire, which had destroyed the dense crowns of wire-like leaves. According to the late Baron von Mueller, this grass-tree is a great source of wealth, as varnish and nitro-picric acid may, with great ease and little cost, be obtained from the resin of these plants. An informative paper on the subject was read before this Club by Mr. R. A. Keble a little time ago, which will be found in the *Naturalist* for November, 1915 (vol. xxxii., page 101). Where the fire had burned off the undergrowth the ground became vegetatively carpeted with orchids which are usually sparsely found in other localities. Generally, fires have a stimulating effect on certain orchids, but here the result was more prolific than could be credited to the buried tubers, and the probable explanation appears to be that conditions have been created which are favourable to the germination of tubers dormant from former seasons. Certain species seldom bloom well except after a bush fire. This is notably the case with *Lyperanthus nigricans*, *Prasophyllum australe*, *P. elatum*, and *Caladenia Menziesii*. Growing abundantly were *Thelymitra ixioides*, in colours blue and pink, *T. longifolia*, *T. aristata*, *T. antennifera*, *Caladenia latifolia*, *C. Patersoni*, *C. carnea*, *C. Cairnsiana*, *C. congesta*, *C. deformis*, *Cyrtostylis reniformis*, *Diuris longifolia*, *D. sulphurea*, *D. maculata*, *Microtis porrifolia*, *Glossodia major*, *Orthoceras strictum*, and *Cryptostylis longifolia*.

After crossing at the top of a lagoon we came into similar country to the first encountered. The track here was a real bush one. Stunted grass-trees frequently appeared in the centre; very often we had a bump or two as the wheel of the jinker caught a stray one. The flowers, however, increased in beauty and profusion, and we pulled up on a level stretch where plants of exquisite beauty were everywhere visible. The bright blue flowers of *Dampiera stricta* were vying with those of *Gompholobium Huegelii* in glowing yellow and red. The handsome Erect Guinea-Flower, *Hibbertia stricta*, the showy Long-leaved Flax Lily, *Dianella longifolia*, and the Tufted Blue Lily, *Stypandra cæspitosa*, which forms characteristic rush-like clumps, were everywhere showing a riot of growth and profusion of flowers. *Tetratheca ciliata*, with its pretty pink four-petalled blossoms and dark-coloured stamens, was in the height of bloom. This is one of the best known and most admired plants of our bush, and when gathered, it may be mentioned, the blooms will last quite a long time as cut flowers. Sometimes it is called "Wild Boronia," which is quite erroneous, as it belongs to the Tremandraceæ, or Milkwort family. *Bauera rubioides* (Saxifragaceæ), sometimes known under the

name of "Native Dog Rose," figured prominently. It is a dainty little pink-flowered, straggling shrub, and well worth cultivating in gardens. *Patersonia glauca* and *P. longiscapa*, two charming plants which are widely diffused, were very much in evidence; their petals are three in number—the former are blue, and the latter a beautiful purple. *Sowerbæa juncea*, a neat little liliaceous plant about a foot high, was fairly plentiful. Its heads of flowers are nearly globular, and of a pale purple colour. The composite plants *Helichrysum Baxteri*, *H. obtusifolium*, *H. bracteatum*, *Senecio lautus*, and *Olearia ciliata* were exceedingly abundant, and presented a beautiful colour scheme, graduating from white to yellow and blue. The most conspicuous leguminous plant was *Dillwynia floribunda*; it is a slender, pretty species, a foot or two in height, and bears a profusion of almost sessile yellow flowers. Small plants of *Sebæa ovata* and *Erythræa australis* were countless in number, the colour of their flowers being yellow and pink respectively. The latter is sometimes used as a tonic medicine, and seems to be increasing in popularity as a domestic remedy. About and upon everything *Billardiera scandens*, often called "Dumplings," entwined itself to a considerable extent, and at times it was difficult to determine the character of the plant over which it had spread. Its conspicuous cylindrical fruit hangs in elegant festoons for several months of the year, and when in blossom its lemon-yellowish flowers make it a desirable acquisition as a climber about a verandah or trellis work. The well-known leguminous climber or twiner, *Hardenbergia monophylla*, with its racemes of small purple flowers, artistically entwined itself around the eucalypt saplings and smaller shrubs. This beautiful twiner has already found its way into the favour of many gardeners, who, perhaps, are not even aware that it is indigenous to our State. Among other interesting plants it was a pleasure to find a fine patch of *Boronia anemonifolia* in full bloom, in colours pale pink and also deep cerise, which gave a charming effect to the scene. Some nice young plants were secured for home cultivation, which I presented, on my return, to the Curator of the Melbourne Botanic Gardens and to the Principal of the Horticultural Gardens, Burnley.

A drive from Yarram to Port Albert *viâ* Brewery Bridge and Tarraville is a delightful trip. In times gone by a large brewery stood by the bridge so named. The building has gone, but the bridge remains. This is a favourite spot for picnic parties in spring and summer, and many may be seen enjoying themselves under the shade of the eucalypts and blackwoods. The charming climbers *Clematis aristata* and *Tecoma australis* were among the most beautiful features of the vegetation, and at this time were a perfect bower, scrambling over everything

they possibly could. The former has pure white flowers and feathery fruits, while the latter bears a profusion of cream-coloured flowers, tinged inside with reddish-purple. The Common Whitethorn or May-tree, *Cratægus oxycantha*, has almost taken possession of the river-banks in some places; it was in full flower, and made a gorgeous display in pink and white. Another introduced plant, *Cytisus linifolius*, one of the Brooms, which has yellow flowers, has spread rapidly, and the Common Reed, *Arundo phragmites*, a tall cosmopolitan grass with shining plumes, made a lovely border along both banks of the stream, and bound the earth on the river-banks with its extensively creeping root-stocks. Proceeding, the roadside was enlivened by numerous Spur-winged Plovers and White-backed Magpies. In the grass lands the Bluebell, *Wahlenbergia gracilis*, the Pointed Everlasting, *Helichrysum apiculatum*, Slender Speedwell, *Veronica gracilis*, Bugle, *Ajuga australis*, Yellow Autumn Lily, *Tricoryne elatior*, Tiny Goodenia, *Goodenia humilis*, Small St. John's Wort, *Hypericum japonicum*, Swamp Mazus, *Mazus pumilio*, and Swamp Isotoma, *Isotoma fluviatilis*, with its bright star-like flower-heads, were blossoming profusely. Soon we reached the little settlement of Tarraville, which, in the coaching days from Sale to Port Albert, was known as a flourishing place, but which now looks most forlorn. At one time sixteen mounted constables were stationed at Tarraville, and old residents say that it was no uncommon sight to see twenty teams camped near the River Tarra (our old friend from the hills, which runs through Tarraville to the sea). Now, alas! only about a dozen or fifteen of the most habitable houses remain. Madame Crossley's old home, much decayed, is pointed out. The church in which she sang in her youth is in fair repair, and this year the congregation celebrated its diamond jubilee.

Resuming our journey and recrossing the Tarra River, the road to Port Albert leads through bush country of a heathy nature, on which the more striking plants seen in full bloom were *Euphrasia collina*, *Hibbertia densiflora*, *H. fasciculata*, *H. acicularis*, *Stylidium graminifolium*, *Stackhousia linarifolia*, *Caustis pentandra*, *Leptocarpus Brownii*, *L. tenax*, *Epacris lanuginosa*, *Arthropodium strictum*, *Platylobium obtusangulum*, *Pimelea phylicoides*, *Cyathodes acerosa*, *Pultenæa paleacea*, *Scævola microcarpa*, *Helichrysum leucopsidium*, *Chamæscilla corymbosa*, and *Comesperma volubile*—the latter, a pretty creeper with delicate blue petals, was climbing over the undergrowth.

Port Albert, landwards, is surrounded by a flat, sandy soil, varied with "tea-tree" swamps; the vegetation is composed chiefly of Coast Bearded Heath, *Leucopogon Richei*, Sea Box,

Alyxia buxifolia, Coast Acacia, *Acacia longifolia*, var. *sophoræ*, Coast Boobialla, *Myoporum insulare*, Coast Tea-tree, *Leptospermum lævigatum*, Scented Paper-bark, *Melaleuca squarrosa*, and Apple Box, *Eucalyptus Stuartiana*. Since the navigation of the Lakes' Entrance was proved practicable, and especially since the formation of the Gippsland railway, Port Albert has dwindled in importance. It has a post and telegraph office, a State school, a mechanics' institute, two churches, &c., and is mainly supported by the fishing grounds. This is one of the principal feeders of the Melbourne market, and one of the best places on the Australian coast to catch the toothsome flounder, which is daily sent by rail to Melbourne. Along the creeks which run into Port Albert and Corner Inlet good sport can be had with the gun. These and the Albert River are a great resort for anglers, all the streams about having been stocked with trout. Ninety-Mile Beach, with its great wash of ocean thundering in giant rollers, is a great picnicking resort, also the old Port—that is, the original Port Albert, a little distance from the present settlement, where, in the fifties, ships direct from England and also Tasmania and Melbourne landed passengers and goods, the latter to be carted many a mile by horse team or bullock waggon. The machinery for the Long Tunnel mine, Walhalla, was all carted from this port.

It had been my intention to pay a visit to Snake Island, an area of 11,500 acres, which lies about eight miles to the south-west of Port Albert; but, as boating facilities could not be arranged, I had to content myself with the shorter journey to Sunday Island, which has an area of 2,537 acres. This island, which lies about three or four miles from Port Albert, in a south-westerly direction, consists of small, unconnected sand hillocks timbered with rather stunted growths of *Eucalyptus viminalis*, *E. ovata*, *E. amygdalina*, *Banksia marginata*, *B. integrifolia*, and *Acacia melanoxylon*. The scrub is composed mainly of *Leptospermum scoparium*, *Melaleuca ericifolia*, and *Leucopogon Richei*, which form dense thickets of bushes or low trees, and which are intersected with salt-water swamps fringed by belts of White Mangrove, *Avicennia officinalis*. On the north-east end the vegetation consists chiefly of Coast Tea-tree, *Leptospermum lævigatum*, and on the south-western parts *Stipa teretifolia*, *Poa cæspitosa*, *Spinifex hirsutus*, *Mesembryanthemum æquilaterale*, and *Scirpus nodosus* tend to arrest the progress of shifting sands, but they are all much inferior to the introduced Marram Grass, *Ammophila arundinacea*, and Sand Lyme Grass, *Elymus arenarius*. *Lomandra longifolia* (Liliaceæ) forms characteristic rush-like clumps over the sand-hills, while *Lepidosperma elatius* and other Cyperaceous plants cover large spaces. On the southern end of the island there is a pier about

a quarter of a mile in length, also a signal station and residence of the harbour master. From the look-out a splendid view of Mount Singapore, Mount Hunter, and the granite ranges of Wilson's Promontory can be obtained. Inland, over the flats of Port Albert and Tarraville, Mount Fatigue and Tom's Cap can be discerned, and to the east a line of sand dunes and the long wash of ocean rolling in and breaking in foamy surf on the Ninety-Mile Beach.

Lying about four miles to the north-east of Yarram there is a large area of forest, which is under the control of the Forests Department. A portion of the forest is fenced and held as a reserve for future high school purposes. Under the guidance of the forest ranger for this district, Mr. Harvey, an indefatigable and enthusiastic guide, I spent a day collecting in this locality. On setting out we were attracted by the beautiful scarlet flowers of *Kennedya rubicunda* clambering over the vegetation along the Tarra River, which we crossed about a mile from the town. After proceeding along the main road for about two miles we diverted to the left, and, passing the cemetery, we soon reached the heart of the forest. Here many of the eucalypts had obtained fair heights and proportions; the principal species represented were Yellow Stringybark, *Eucalyptus Muelleriana*, White Stringybark, *E. eugenioides*, Red Stringybark, *E. macrorrhyncha*, Messmate Stringybark, *E. obliqua*, Common Peppermint, *E. amygdalina*, Blue Gum, *E. globulus*, Long-leaf Box, *E. elæophora*, Mountain Grey Gum, *E. goniocalyx*, and Yellow Box, *E. melliodora*. The trees of the latter were simply a mass of blossom, and bees and other nectar-loving insects were swarming around them. Here I was delighted with the beautiful blooms of *Correa speciosa*, its bells of large red flowers presenting a pleasing appearance. We also noticed a pretty little fragrant plant, *Myosotis suaveolens*, and a Dwarf Currant Bush, *Choretrum lateriflorum*; the latter is a small shrub with erect, slender, broom-like branches and very diminutive scale-like leaves. A little further on our track was enlivened by the showy yellow flowers of *Pultenæa juniperina* and the pretty *Grevillea alpina*, which was covered with its curling clusters of crimson blooms. Passing through some clumps of *Acacia discolor*, we noticed for the first time *Scævola hispida*, one of the prettiest of our smaller native shrubs. It was in full bloom, and its large flowers, with sky-blue petals, were an inch or more in diameter. Here and there an occasional Wild Cherry Ballart, *Exocarpus cupressiformis*, and Black Sheoke, *Casuarina suberosa*, were met with, their coniferous appearance adding variety to the scene.

In many places *Acacia oxycedrus* had reached a height of twelve feet or more, whereas, in its native element (upon the

sea-coasts) it rarely attains a height of more than three or four feet. Everywhere the tops of the Acacias and Cassinias were interwoven with the cord-like stems and branches of the Larger Dodder Laurel, *Cassytha melantha,* rendering some of the parts almost impenetrable. Another smaller species, *C. pubescens,* was met with, but it prefers the smaller shrubs. A third species, *C. glabella,* with a stem hardly thicker than a thread, infests species of Lomandra and Lepidosperma preferentially, but fastens on almost anything in its way ; it is chiefly found on the coast plain and other open tracts. I chanced upon many nice clumps of *Prostanthera rotundifolia* growing in moist places along the valley of a stream, while a little beyond flourished thickets of *Cassinia aculeata,* laden with dense umbel-like flower-heads, varying from white to pink. Most of the shrubs were similar to those met with on any Victorian range, comprising Acacias, Persoonias, Indigofera, Leptospermum, Panax, Exocarpus, Casuarina, Hakea, Pultenæas, and the ubiquitous *Bursaria spinosa.* The fern *Pteris aquilina,* or Bracken, covered large areas. This fern is reputed to have anthelmintic properties, and if it could be manufactured commercially there would, no doubt, be a tremendous scope for it. On our return journey we passed through a fine grove of *Banksia serrata.* This is a proteaceous tree which produces very ornamental timber, and is highly prized for firewood. The trees were laden with quaint bottle-brush-like flowers, beautifully scented and full of honey.

Another outing which I greatly appreciated was that to the Tarra Valley, twenty miles to the north-west of Yarram. An early start was made so that the trip could be accomplished in one day, and my companions were two local residents, Messrs. C. and D. Hill. A few miles out from the township are the well-known " Tooloonook " flats, where large herds of well-bred and sleek cattle were seen grazing in pastures knee-deep in lush grass. A little further on we reached the timber country, which here was composed chiefly of Red Stringybark, Messmate Stringybark, Long-leaf Box, and Blue Gum. Of the latter some splendid tall specimens were seen. One can scarcely praise too highly the qualities of the Blue Gum. Its bark, leaves, and flowers are aromatic, and its dense foliage gives excellent shade, while its remarkable rapidity of growth (sometimes attaining a rate of two feet and upwards a month) render it particularly suitable for avenues. Its wood is deemed to equal the English Oak, and, to all the foregoing qualities, we may add the supreme one—that being its adaptability to climate. It flourishes in almost any altitude, and in India it grows at a height of 8,000 feet above sea-level in such parts as the Himalayas and southwards.

Further on we reached the North Devon State school. Calling on the head-master, Mr. Evans, I was pleased to find that he took a keen interest in wild-flowers, and on learning the nature of my visit he readily (with the children of the school) took advantage of the opportunity to collect some local plants. Upwards of fifty species were gathered during the outing, chief of which was a large blue-flowering orchid, *Thelymitra canaliculata.* It proved a new addition to the Victorian list, but had been previously recorded from Western Australia. Other orchids collected represented seven species, among them being *Caladenia Patersoni,* which was common everywhere on open ground, and presented at least four well-marked varieties in colour and form. *C. deformis* was seen in colours pink and blue; *Caleana major* in rich maroon; *Diuris punctata,* purple; *Thelymitra carnea,* red; *T. flexuosa,* yellow; and *T. pauciflora,* white. The latter has only recently been recorded as new for Victoria. The most interesting among the other plants collected were *Hibbertia diffusa, Stylidium graminifolium, Sprengelia incarnata, Brachycome scapiformis, Rutidosis pumilio, Helichrysum rosmarinifolium, Pultenæa villosa, Lobelia rhombifolia, Lagenophora Billardieri, Cymbonotus Lawsonianus, Microseris Forsteri, Mitrasacme polymorpha,* and *Wahlenbergia gracilis.* The typical form of the latter is generally fifteen or eighteen inches in height, with a blue flower often about half an inch in diameter; but here a form two inches high, with a minute floweret, was found.

On the hills further onward the timber became heavier and the undergrowth more luxuriant. Here I noticed for the first time growing in their natural habitat *Pittosporum undulatum* and *Acacia Howittii*; the latter is endemic to Victoria and peculiar to this district. It is a beautiful species, well worthy of cultivation, and, like the former, makes a useful hedge plant.

As the road approaches the Tarra Valley the signs of practical improvement brought about by the early settlers increase, and the general contour of the country improves. The natural richness of the soil, not only along the hillsides, but right over the tops of the Strzelecki Ranges, proclaims itself by the dense covering of grass. From here to the summit the road winds on hillsides, with the river on one side and hills with giant Mountain Ash on the other. In some places it is hewn out of the rocky cliffs rising sheer from the river. As we ascend we gratefully accept the sitting accommodation provided by a large gum stump to rest awhile, as the atmosphere is close and sultry. From this vantage-point the Christmas Bush, *Prostanthera lasianthos,* and Tree Lomatia, *Lomatia Fraseri,* in full bloom, obtruded themselves on our notice, also the dainty

bronze-coloured foliage of the Myrtle Beech, *Fagus Cunninghami*; growing on a branch of the latter I discovered the rather peculiar edible fungus *Cyttaria Gunnii*, which greatly resembled a bunch of grapes. Advancing, the pretty flowers of *Prostanthera rotundifolia* and *Goodia lotifolia* met our eye at almost every turn. On a clayey cutting we came upon some nice patches of that interesting little moss, *Dawsonia superba*. It is an erect plant, from nine to twelve inches in height. Its dark green foliage and short, thick fruit-stalk, tipped with woolly-looking capsules, give it, as its name implies, a superb appearance. Accompanying it was a very pretty little lichen, *Bæomyces heteromorphus*. This lichen may easily be mistaken for a fungus, but it is a true lichen, and resembles somewhat a tiny mushroom with a rose-pink head, the whole plant not being more than half an inch high. As we proceeded, each step revealed a vista of increasing beauty, and the valley became more clothed by the dense vegetation, comprising Blanket-wood, Sassafras, Silver Wattle, Musk, Mountain Pepper, Hazel, Mutton-wood, Christmas Bush, with the tree-ferns Dicksonia and Alsophila. After ascending a steep incline a sudden bend in the road revealed a picturesque waterfall, with a drop of eighty feet or more. Near it the Valley Tree-ferns grew luxuriantly, and clinging to their brown trunks by adventitious roots were some fine specimens in flower and fruit of the rare shrub *Fieldia australis*, the only representative of the Gesneriaceæ in our State. About a mile further on the head of the gully was reached, and from our elevated position a splendid view of the valley and wooded ranges was obtained.

Working our way through the tangled vegetation for a short distance our path was strewn with fallen trees—the result of decay and storm. Many of the trees were much decomposed, and mosses and fungi had taken possession and beautified them with their varying colours of green and gold. One of the first mosses to attract our attention was *Cyathophorum pennatum*, which had thrown its mantle of feathery greenery over some fallen tree-ferns. Another moss, *Hypnodendron spininervum*, in splendid fruit, and about four inches high, was collected. This plant has a minute palm-like appearance, and makes beautiful herbarium specimens when pressed. Further on we found *Ptychomnion aciculare* and *Thuidium furfurosum* in fruit, besides Plagiochila, Lepidozia, Lejeunia, Frullania, and other hepatics.

During the trip a wide area of country was gone over. About 100 species of the more uncommon flowering plants and 25 species of Cryptogams were collected. The flora was varied and interesting, the outing, on the whole, being a very pleasant one.

The Victorian Naturalist.

Vol. XXXV.—No. 5. SEPTEMBER 5, 1918. No. 417.

FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 12th August, 1918.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about seventy members and visitors were present.

CORRESPONDENCE.

From Royal Australasian Ornithologists' Union, intimating that Mr. A. H. E. Mattingley and Capt. S. A. White, of Adelaide, had been appointed as its representatives to visit Macquarie Island and report on the alleged cruelty practised there in the obtaining of penguin oil, and asking for the Club's endorsement of the appointment.

Professor Sir Baldwin Spencer, K.C.M.G., thought that, as the question had been brought before the Club originally, the Club should take the matter up. It was important to know whether the gentlemen named were going as the guests of Mr. Hatch or independently.

Mr. F. Keep drew attention to a paragraph in the *Herald* of that evening quoting the conditions under which the island had been leased to Mr. Hatch's company by the Tasmanian Government, one of which was that the lessees should provide free transit and sustenance to a representative of the Government who would be authorized to investigate the method of working.

Professor Spencer moved that the president and Mr. J. A. Kershaw be appointed a committee to watch the interests of the Club, and to communicate with the Tasmanian Government on the matter. The motion was seconded by Mr. G. A. Keartland, supported by Messrs. D. Best and J. A. Kershaw, and carried.

REPORTS.

A report of the visit to the Science Branch of the Department of Agriculture on Saturday, 13th July, was given by Mr. C. French, jun., Government Entomologist, who acted as leader so far as his branch was concerned. He reported an attendance of about twenty-five members and friends, who evinced considerable interest in the collections. A number of life-histories of various injurious insects were explained. The cabinets contain, besides Australian species, representative specimens of various kinds from other parts of the world, numbering several thousands, and have been largely added to during recent years, the collection of scale-insects alone

amounting to fully five hundred named species. Those interested in fungus and allied pests were guided by Mr. C. C. Brittlebank, Government Vegetable Pathologist, who pointed out the life-cycles of several diseases affecting agricultural and horticultural products. A number of spirit specimens were examined, also portions of mycological herbarium, including the grain smuts and the various fungi causing disease in garden flowers, fruit and forest trees, potatoes, &c.

A report of the excursion by char-a-banc to Warrandyte on Saturday, 10th August, was given by the leaders, Miss A. Fuller and Miss G. Nethercote, who reported an attendance of about forty members and friends. The weather had been perfect, and the object of the visit—to see the silver wattles in full bloom—was attained, for the trees along the river-banks were at their best. Making the outward route through Kew and Doncaster, the country was found to be fresh and green everywhere, while the return journey through Templestowe and Heidelberg was equally charming. A fair variety of eucalypts was seen, many of which, especially the trees of Red Box, *E. polyanthemos*, were bearing burdens of the Mistletoe, *Loranthus pendulus*, which was also noticed on a Tagasaste, commonly known as Tree-Lucerne. Several other acacias, such as the Spreading Acacia, *A. diffusa*, Golden Wattle, *A. pycnantha*, Prickly Acacia, *A. verticillata*, Hedge Acacia, *A. armata*, were noted, in addition to the Silver Wattle, *A. dealbata*. On reaching Warrandyte a halt was made at the bridge, and the stream crossed to the northern side, where a ramble of a few hundred yards was taken to a vantage spot, from whence was obtained a lovely view of wattle, river, and woodland. Being early in the season for most flowering plants, but few species were found in bloom, among them being the Native Heath, *Epacris impressa*, Common Hovea, *Hovea heterophylla*, Purple Coral-Pea, *Hardenbergia monophylla*, Scented Sundew, *Drosera Whittakeri*, Dusty Miller, *Spyridium parvifolium*, Snow-bearded Heath, *Leucopogon virgatus*. After partaking of afternoon tea a start was made for town, which was reached shortly after six.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Irene Hearn, 64 College-parade, Kew, Mr. Edward Dakin, Mount-street, Kew, and Mr. Leonard Thorn, 69 Wattletree-road, Malvern, were duly elected ordinary members; Mr. F. P. Dodd, Kuranda, North Queensland, a country member; and Miss Alice Hearn, 64 College-parade, Kew, as an associate member of the Club.

GENERAL BUSINESS.

The chairman stated that the caretaker of the Royal Society's premises, Mr. Laurence, had enlisted, and was about

to proceed to the front, leaving his wife and young daughter to keep the home together. His brother had come from New Zealand to take up the duties of caretaker, and he desired, on behalf of the Club, to congratulate Mr. Laurence on the step he had taken, and to wish him "God-speed" and a safe return. The announcement was received with acclamation.

Mr. Laurence, who was in khaki, thanked the meeting for the endorsement of the chairman's kind words, and said that he greatly appreciated the goodwill of the members.

Professor Sir Baldwin Spencer, K.C.M.G., said that since the last meeting of the Club a matter of some importance had arisen about which he desired to say a few words. For many years past this Club has taken a very great interest in the National Park at Wilson's Promontory; as a matter of fact, it is due to the efforts of this Club some twenty years ago that steps were taken to try and secure Wilson's Promontory as a National Park for Victoria.* During the last few weeks there has been a determined attempt made to have certain portions of the reserve thrown open to tin-mining. Should such an attempt succeed it would practically be farewell to the National Park, and all the work done so far in enclosing, stocking, and planting the Park would be so much labour wasted. He hoped that it would not be necessary to make more than a formal protest to the Government in the matter; but, in order to be ready for any occasion that might arise, he would move—"That the president, hon. treasurer, and hon. secretary be the official representatives of the Club to act on any deputation which might be arranged before the next meeting of the Club."

The chairman said that Prof. Spencer's plan would doubtless commend itself to all the members, many of whom of recent standing were not aware of the long struggle made in securing the reservation, which he thought began nearer thirty than twenty years ago. Prof. Spencer had himself been one of the leaders in the movement, and had put a deal of strenuous work into the matter. The only ground for the present menace to the Park could be that, owing to the war, things have to be done now in the interests of industrial affairs which would not be thought of at any other time.

The motion was seconded by Mr. P. R. H. St. John and carried unanimously.

The hon. secretary announced that the Canterbury Horticultural Society purposed holding, in connection with their ordinary show, an exhibition of wild-flowers in the Camberwell Drill Hall on Tuesday, 3rd September, in aid of the Highton (Balwyn) Rest Home for Soldiers.

*A full account of the movement will be found in the *Naturalist* for January, 1905 (vol. xxi., p. 128).—Ed. *Vict. Nat.*

The chairman reminded members of the opportunity of seeing the Grampian flora afforded by the Railway Department's excursion from the 21st to 28th September. He also said that there was a little difficulty as to what object the proceeds of the wild-flower exhibition, to be held by the Club in the Melbourne Town Hall on Tuesday, 1st October, would be devoted, as, to prevent overlapping, the authorities had set aside October for hospital collections, while the Club desired to help the Y.M.C.A. war funds. He hoped to be able to make a definite announcement at the next meeting. There would, however, be no doubt about the holding of the exhibition, and the hall had been secured for the date mentioned.

REMARKS ON EXHIBITS.

Mr. E. S. Anthony called attention to a case of New Guinea insects illustrating the paper to be read later by Mr. F. P. Dodd on his experiences in that island.

Miss A. Fuller exhibited a number of dried Indian flowers, and read some notes concerning them.

Prof. Sir Baldwin Spencer, K.C.M.G., called attention to his exhibit of a number of specimens of wood-lice, collected in the Northern Territory, where he came across a procession of these crustaceans, evidently migrating, which was about thirty yards broad, and took an hour and a half to pass a given spot. The effect of the sight was that the ground seemed to be moving rather than that the creatures were moving over the ground. It was impossible to estimate the countless millions contained in the moving mass.

Mr. A. L. Scott drew attention to his exhibit of a specimen of aventurine felspar, so named from the peculiar sparkle which it shows, due to foreign inclusions in the crystals.

Mr. C. L. Plumridge called attention to his exhibit of a flowering specimen of *Epacris longiflora*, now in full bloom. The plant was obtained by him some five years ago at Wentworth Falls, N.S.W., and was then about one inch in height. He said that the Epacrids should commend themselves to flower-lovers, as they flower at a time when other flowers are scarce. The cultural requirements were very simple—a light, peaty soil, thorough drainage, firm potting, and no coddling.

At this stage the president requested Mr. F. Chapman, vice-president, to take the chair, as he desired to leave early.

PAPER READ.

By Mr. F. P. Dodd, entitled "A Naturalist in New Guinea."

In the absence of the author, the paper was read by his son, Mr. F. W. Dodd, and gave a most interesting account of some

six months spent in New Guinea—from May to October, 1917. The trip was made principally with the view of making collections of butterflies and moths, but other insects were also taken. Some notes were also given about the bird and plant life of the Astrolabe Range, some twenty miles from Port Moresby. The author said that six months was far too short a time to exhaust the novelties of even the limited area visited, while in the higher Owen Stanley Range there should be inexhaustible treasures for naturalists of every taste; but time and the proper season must be at the disposal of any who desire to thoroughly explore any given district.

The chairman said he had been greatly interested in the paper, especially the remarks about the "Fever-bird"—a name given to the Long-tailed Nightjar, on account of its "Chop, chop, chop" note being kept up at intervals during the night, and so annoying patients suffering from fever. He had been told by a doctor recently that if one shifted camp frequently there was not so much danger of malarial fever as when living permanently in one place.

Mr. H. B. Williamson expressed his pleasure at the author's statement that he had killed only two birds in the course of his thirty years' collecting, one of these being a Butcher-bird that was destroying his specimens.

Mr. F. Pitcher asked whether *Eucalyptus platyphylla* is truly deciduous or whether the condition of the tree might not be influenced by some obscure cause. Mr. Dodd said that the same species, known around Kuranda as the "Poplar Gum," lost its leaves regularly during October and November.

EXHIBITS.

By Mr. J. W. Audas, F.L.S.—Fresh flowers of Spreading Acacia, *Acacia diffusa*, Edwds., from plant grown by exhibitor; the species seems to do well in cultivation, and is free of insect pests.

By Mr. F. P. Dodd.—Butterflies, moths, &c., from New Guinea, in illustration of paper.

By Miss A. Fuller.—Dried flowers, &c., from India.

By Mr. C. L. Plumridge.—Pot-grown specimen of *Epacris longiflora*, in bloom.

By Prof. Sir Baldwin Spencer, K.C.M.G.—Specimens of wood-lice, from Northern Territory, in illustration of note.

By Mr. A. L. Scott.—Specimens of aventurine felspar.

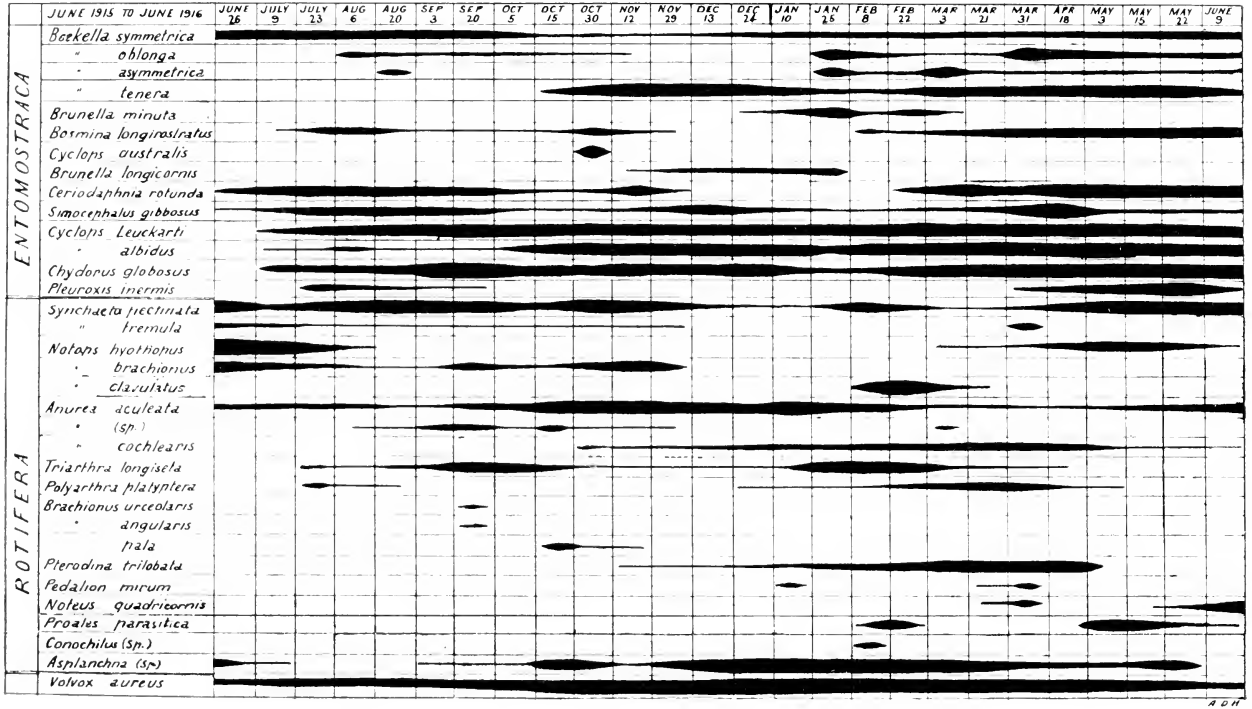
After the usual conversazione the meeting terminated.

GRAMPIANS EXCURSION. — Intending excursionists are reminded that the list at Tourists' Bureau will close in a few days.

EXCURSION TO BURNLEY QUARRIES.

Of the large number who visited these quarries on Saturday, 11th May, only three proved to be pond-lifers. After the departure of the geological section, these three set to work under somewhat disadvantageous conditions, by reason of the rain. Material was collected from several of the pools for home examination, and proved to be fairly good. As some description of the quarries was given after the last Club excursion to the locality (see *Vict. Nat.* for April, 1917, vol. xxxiii., page 176), it need not be repeated here. Concerning the flora and fauna of the pools taken on this occasion, we may say that some forms noted were of considerable interest. Special mention may be made of some fine colonies of Zoothamnium, in which the muscle band running down the centre of the pedicle did not reach the point of attachment thereof, so that when the group retracted part of the pedicle folded up and part remained rigid. One very remarkable diatom taken—viz., *Bacillaria paradoxa*—is an object of perennial interest. Of this organism it may be remarked that it seems to do equally well in salt, brackish, and fresh water. The rare alga Monostroma, sometimes to be obtained in these pools, was not found this time. The following is a list of the forms noted:—Algæ.—Zygnema, sp., Spirogyra, two sp., Lyngbya (? sp.), *Enteromorpha intestinalis*, Synedra, sp., Eunotia (? sp.), *Bacillaria paradoxa*, Pleurosigma, sp. Protozoa.—Sarcodina: Difflugia, sp. Mastigophora: *Euglena viridis*, *Anisonema grande*; Infusoria: Vorticella, sp., *Zoothamnium* (?) *dichotomum*, *Stentor Roeselii*, *Paramœceum aurelia*, *Stylonichia mytilus*, Vaginicola, sp., *Pyxicola* (?) *affinis*, *Thuricola* (?) *operculata*, *Chilodon cucullulus*. Worms.—Rotifera: *Rotifer vulgaris*, *Floscularia ornata*, *Brachionus bakeri*, *B.* (?) *urceolaris*, *Pterodina* (?) *patina*, *Philodina* (?) *citrina*, Gastrotricha: *Chætonotus* (?) *larus*. Arthropoda: Xiphocaris, sp. (?), Chydorus, sp., and a few insect larvæ. Included in above are some kindly identified by Mr. J. Wilcox.—J. Stickland.

Tall Trees.—In connection with Mr. A. D. Hardy's most interesting paper in the July *Naturalist* (vol. xxxv., p. 46), I would like to call the attention of readers of the *Naturalist* to a valuable paper by Mr. T. F. Cheeseman on "The Age and Growth of the Kauri," in vol. xlvi. of the *Trans. New Zealand Inst.* Besides giving information on the height of trees, including Australian, Mr. Cheeseman deals in a masterly manner with the determination of the rate of growth of the Kauri Pine, and describes very clearly the necessary precautions to be taken in making observations of this kind.—Thos. Steel, Sydney.


JUNE 1915 TO JUNE 1916
JUNE 26
JULY 9
JULY 23
AUG 6
AUG 20
SEP 3
SEP 20
OCT 5
OCT 15
OCT 30
NOV 12
NOV 29
DEC 13
DEC 24
JAN 10
JAN 25
FEB 8
FEB 22
MAR 3
MAR 21
MAR 31
APR 18
MAY 3
MAY 15
MAY 22
JUNE 9
ENTOMOSTRACA
Bosmina longirostratus
Cyclops australis
Brunella longicornis
Ceriodaphnia rotunda
Simocephalus gibbosus
Cyclops Leuckarti
albidus
Chydorus globosus
Pleuroxis inermis
ROTIFERA
Synchaeta pectinata
tremula
Notops hyothiopus
brachionius
clavulatus
Anurea aculeata
(sp.)
cochlearis
Triarthra longisela
Polyarthra platyptera
Brachionus urceolaris
angularis
pala
Pterodina trilobata
Pedalion mirum
Noteus quadricornis
Proales parasitica
Conochilus (Sp.)
Asplanchna (Sp.)
Volvox aureus
A D H

ONE YEAR'S COLLECTING MICRO-FAUNA, BOTANIC GARDENS LAKE, MELBOURNE.

By J. Shephard, J. Searle, and J. Stickland.

This investigation was undertaken as a result of a discussion by the members of the council of the Microscopical Society of Victoria. It was intended that members generally should take part in it, but this was not found practicable; but the three members deputed to manage the scheme persevered, and succeeded in making periodical visits for a whole year.

The visits were made mostly between the hours of one and three in the afternoon, and approximately fortnightly. Stick nets were used, but the chief instrument was the tow-net, of the "Kofoid" pattern.

The boat on the lake was made available by the courtesy of the Director of the Gardens, Mr. Cronin, and the attendant concerned materially helped by his willingness to meet the wishes of the workers. As the plankton was the chief aim of the work, on each occasion the net was towed by the boat along open water of different portions of the lake, care being taken to observe nearly the same track on each visit. The resulting gatherings were brought away in jars in living condition, preservatives not being used. The towing was mostly done near the surface, but occasionally in the deeper parts of the lake vertical hauls were made, which gave at times very interesting results. Visits were also paid to the shady parts, and differences in the plankton between them and the open parts were found to occur. Collection from the shore by means of the hand net were made. Mr. Stickland largely devoted his efforts in this direction, the other members paying more attention to the gatherings from the lake by means of the boat and tow net.

The lake has been formed from what was originally a swamp covered with tea-tree, some of which may still be seen growing near the eastern arm of the lake. Part of the scheme for the prevention of floods in the lower reaches of the Yarra was the straightening of the channel of the river. During the course of this work a bend in the river bordering the Gardens was cut off, and when the new boundaries were made this piece of water was enclosed in the Gardens, and made part of the lake, which now covers an area of several acres. The easterly extremity is shallow, being only three or four feet in depth; but the western end, being part of the old river, is considerably deeper, being in places over twenty feet deep. There is a very dense growth of weed, which keeps the Gardens staff well employed in keeping it within reasonable bounds. The interesting plant Vallisneria is the most plentiful. The lake is supplied with

water from a reservoir in Studley Park, which is filled from a pumping station on the Yarra, near Dight's Falls, and therefore it must receive from time to time importations from the reaches of the river higher up.

The first visit of the series was made on 26th June, 1915, when an excursion of the Microscopical Society was held. Afterwards the visits were made approximately fortnightly for a year, the last of the series being on 9th June, 1916. The dates of the visits only varied a day or two either way from the exact fortnightly interval.

It was early noticed that the better swimmers among the plankton were found diffused throughout the lake, and special attention was given to these in order to find indications of periodicity of occurrence. The examination was largely directed to this aim. The material was taken home and searched over as soon as possible — Mr. Searle specializing on the Entomostraca, Mr. Stickland the Protozoa, and Mr. Shephard dealing with the Rotifera. Early examination is specially necessary in the two last-mentioned groups, as, when crowded in the jars, it was found that forms extremely plentiful on collection would disappear in a few hours and leave no trace. As already stated, preservation of the material was not attempted to any extent, attention being focussed chiefly on recording the occurrence of the various forms observed. Estimates of the relative prevalence of the forms were made.

The material obtained would have occupied the whole time of several workers to fully deal with it, and, as the work was effected in the leisure time of those concerned, it will be understood that the list of actual identifications of the groups mentioned by no means represents the whole of those to be found in the lake. It is manifest that sedentary forms collected round the margin from a few positions could not be relied on to give accurate results as to their prevalence at a given time throughout the whole lake, the number of such found on a given occasion being more dependent on the diligence of the collector than the actual occurrence of the animals themselves. A sedentary form cannot spread rapidly, and may occur on the plants at one part of the shore and be entirely absent at another. If, however, a sedentary form is found in every place tried, and on a number of successive visits, it must then be regarded as prevailing throughout the whole area. Such a case would be an exception, and such were found.

Vorticella campanula was on several occasions found on every bit of stick or weed examined over a large area. *Cordyllophora lacustris* also occurred in this way. This latter form, known for many years as an inhabitant of this lake, seemed to disappear for something like fifteen years, but was, during the whole

time of this examination, very plentiful, the growth of colonies on small branches secured to stakes in shady positions being watched for months. Very large aggregations were found on willow roots and floating branches. The sexual stages of this hydroid were not seen, although carefully looked for. Some years ago a sedentary rotifer, *Lacinularia elongata*, occurred very plentifully over a large area of the lake, but no member of this group occurred similarly during the period of this investigation. *Megalotrocha alboflavicans* came nearest to it, being nearly always noted. Polyzoa of the world-wide species, *Plumatella repens*, occurred in great quantity in separated colonies. Another form, *Fredericella sultana*, was found, but was not nearly so plentiful. The free-swimming forms must be regarded as the best subjects to reveal indications of periodicity of occurrence. Volvox—claimed by botanist and zoologist alike—although a slow swimmer, is certainly a diffusible form, and was noted on every visit ; two species were found—a monœcious form, closely resembling descriptions of *V. globator*, and a diœcious species, which is probably *V. aureus*. This latter greatly preponderated in number. Warm weather evidently favoured the growth of this organism, for it was found in the summer in enormous quantity. A relation was established between Volvox and the parasitic rotifer *Proales parasita*. Whenever Volvox was plentiful, then Proales was found in numbers. Two of the workers were able to settle for themselves the question as to how the rotifer finds its way inside the hollow sphere of Volvox, for they were repeatedly observed eating their way through the walls of their temporary cage and swimming away in search of another victim. The converse operation of entering another host was not witnessed, but sufficient of the process was seen to leave no doubt that entrance was similarly effected. Developing ova of Proales were found in Volvox on several occasions.

Regarding the three groups, Entomostraca, Rotifera, and Protozoa, the two former were chiefly obtained by the systematic use of the tow-net, and the results in the case of the species occurring with sufficient frequency are shown graphically on the appended diagram, drawn up with the kind assistance of Mr. A. D. Hardy. Besides the forms thus indicated there were many others, the complete list of forms certainly identified comprising twenty-two species of Entomostraca, forty-eight Rotifera, and fifty Protozoa. The most noticeable feature in the list of Entomostraca is the absence of *Daphnia carinata*, found in most of the ponds around Melbourne. It is a large and variable species, and, when present in a pool, is generally found in considerable numbers. On a visit to the lake some two years prior to starting on this investigation, another—and,

till then, rare—species of Daphnia, *Daphnia lumholtzi*, was found to be extremely numerous; this disappeared very quickly, and during our year's collecting not a single specimen of it was taken. The almost complete absence of the Ostracoda was also noticeable. A few specimens of *Cypridopsis minna* were taken on one or two occasions, but species like *Cypris leana*, that delight in weedy pools, were absent from every gathering we made. The Copepoda in the list are found in all the pools around Melbourne, and one would expect to find other species common to the Yarra valley represented in the lake; but they were not seen throughout the year under notice.

All the great groups of Protozoa were represented in the material collected, with the exception of the Sporozoa, which, being endo-parasitic animals, were, of course, not noted. Fixed and free-swimming forms were nearly equally numerous. Of the genera comprised in the former, nearly half consisted of Vorticella and its allies; one of these latter—a Vaginicola with an annulated tube or lorica—being probably new to science. It is not, however, confined to the Botanic Gardens lake. Protozoa, with few exceptions, were not taken in great numbers at any one time. The times of occurrence of several species, however, seem to indicate that the appearance of many, at any rate, is not confined to special seasons.

Of the Rotifera, the absence of new forms is noticeable. Three forms are, however, possibly new—a species of Anuræa, an Asplanchna, and a Conochilus. The Anuræa was first seen by one of the party some time previously at Laanecoorie, and obtained later by Dr. Kaufmann near Box Hill, and it has been observed in other localities, occurring plentifully. In the lake it was fairly numerous. None of the literature referred to shows any figure at all like it. The genus Asplanchna is a puzzling one to divide into species. Mr. Rousselet endeavoured to make several common species clear, and pointed out some mistakes of identification; yet with his paper at hand it was impossible to certainly identify the form found at the lake, for the characters relied upon by that authority to separate the respective species appeared to occur simultaneously in the form in question. The Conochilus appeared very interestingly in a collection made in Great Lake, Tasmania, during the progress of this work. It was found in immense numbers, and ample opportunity for examination was afforded. Years ago this form was seen in collections from Heidelberg. Mr. Rousselet, to whom drawings were submitted, was inclined to regard it as *C. unicornis*, the species it nearly resembles; but fuller opportunities of examination strongly lead to the decision that it is not identical. In this connection it may be mentioned that *Pterodina trilobata*, a form included in the

appended list, was doubtfully regarded at first, but has since appeared in South African collections, and is now fully accepted.

A full list of the forms identified is given below :—

Entomostraca.

Boeckella symmetrica.
,, oblonga.
,, asymmetrica.
,, tenera.
,, minuta.
Ceriodaphnia rotunda.
Simocephalus gibbosus.
Bosmina longirostratus.
,, (sp.)
Cyclops leuckarti.
,, albidus.
Cyclops australis.
Ilyocryptus (sp.)
Chydorus globosus.
Alonella (sp.)
Brunella viridis.
,, longicornis.
Camptocercus australis.
Atheyella australica.
Pseudomoina lemnæ.
Pleuroxis inermis.

Rotifera.

Rhizota.

Melicerta ringens.
,, conifera.
Floscularia coronetta.
,, campanulata.
Lacinularia elliptica.
,, elongata.
,, socialis.
,, reticulata.
Cephalosiphon limnias.
Œcistes (sp.)
Limnias ceratophylli.
,, natans.
,, annulatus.
Megalotrocha alboflavicans.
Conochilus (sp.)

Bdelloida.

Philodina megalotrocha.
Actinurus neptunius.

Ploima.

Syncheta pectinata.
,, tremula.
Notops hyotopus.
,, brachionus.
,, clavulatus.
Anuræa aculeata.
,, cochlearis.
,, (sp.)
Asplanchna (sp.)
Rattulus carinatus.
,, longiseta.
Diurella stylata.
Triarthra longiseta.
Polyarthra platyptera.
Euchlanis macrura.
,, dilatata.
Brachionus urceolaris.
,, angularis.
,, pala.
,, bakeri.
Monostyla bulla.
Noteus quadricornis.
Salpina macracantha.
Proales parasita.
Metopidia acuminata.
Scaridium (sp.)
Stephanops (sp.)
Pterodina trilobata.
,, patina.
Dinocharis pocillum.
Pedalion (sp.)

Protozoa.

Sarcodina.

Arcella vulgaris.
Centropyxis aculeata.
Difflugia pyriformis.
Actinophrys sol.
Actinosphaerium eichornii.

Mastigophora.

Anthophysa vegetans.
Astasia tricophora (?)
Dinobryon sertularia.
Euglena viridis.
Codosiga (sp.)

Monosiga (sp.)
Phacus triqueter.
Rhipidodendron huxleyi.
Stylobryon petiolatum.
Peridinium (sp.)
Spongomonas intestinalis.
Trachelomonas lagenella.
,, hispida.
,, (sp.)
Uvella virescens.

INFUSORIA.

Carchesium polypinum.
Coleps hirtus.
Chilodon cucullulus.
Euplotes patella (?)
Epistylis flavicans.
Litonotus diaphanus.
Loxophyllum meleagris.
Paramecium bursaria.
,, aurelia.
Platycola dilatata.
,, longicollis.
Pyxicola affinis (?)
,, carteri.
Pyxidium inclinans.
Opercularia nutans.
Ophrydium sessile.
Ophryoglena atra.
Trachelius ovum.
Trachelocerca olor.
Stentor polymorphus.
,, roeselii.
,, barretti.
Stichotricha secunda.
Stylonichia mytilus.
Thuricola operculata.
Urocentrum turbo.
Vaginicola crystallina (?)
,, (sp. nov. ?)
,, grandis (?)
Vorticella campanula.
Volvox globator (?)
,, aureus (?)

CRUSTACEA.

Xiphocaris (sp.)

HYDROIDS.

Hydra oligactis.
Cordyllophora lacustris.

POLYZOA.

Plumatella repens.
Fredericella sultana.

RE-NAMING AUSTRALIAN BIRDS: IS IT NECESSARY?—Mr. A. J. Campbell, C.M.B.O.U., &c., has issued in pamphlet form an address delivered at a conversazione of the Royal Australian Ornithologists' Union on 3rd July last. The object of the address is to call attention to the hopeless confusion into which the list of Australian birds is being thrown by those energetic literary ornithologists who are engaged in searching obscure and scarce literature for chance references and earlier names for many of our birds. He contends that the greater number of Gould's names are scientifically correct, and should remain as the basis of an Australian bird-list. Many of these names have been in use for upwards of seventy years; why replace them with names which, in many instances, are totally inapplicable? And we think most naturalists will agree with his contention. Mr. Campbell promises, after the war, a volume descriptive of his experiences in various parts of Australia, which should have a ready sale.

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 9th September, 1918.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about 60 members and visitors were present.

CORRESPONDENCE.

From Mr. A. H. E. Mattingley, stating that pressure of departmental duties made it impracticable for him to leave the State during the near future, and withdrawing his offer to go to Macquarie Island in connection with the oil industry. —Received.

From the Microscopical Society of Victoria, offering to show micro-exhibits at the wild-flower show on 1st October.—Received.

REPORTS.

A report of the excursion to Bayswater on Saturday, 24th August, was read by the leader, Mr. J. W. Audas, F.L.S., as follows :— Owing to the rainy conditions prevailing, only four members took part in the excursion to Bayswater. The party included two ladies, who expressed themselves pleased with the outing, notwithstanding the unfavourable weather. On leaving the station we proceeded along the railway reserve, and came across many early spring flowers in bloom, but nothing of any great rarity was noticed. On reaching the Dandenong Creek we diverged a short distance from the railway enclosure in a westerly direction, and obtained a good view of the Silver Wattle, *Acacia dealbata*, displaying its annual wealth of beautiful bloom along the banks of the stream. Other Acacias, such as *A. stricta*, *A. melanoxylon*, and *A. myrtifolia*, were in full flower—the latter, a pretty little shrubby plant with its glorious yellow blossom and beautiful scent, being worthy of special mention. Everywhere the dwarf shrub, *Hovea heterophylla*, was met with displaying its bluish flowers, while its relative, the climber *Hardenbergia monophylla*, with bright purple flowers, was equally conspicuous. About twenty-five species of plants were seen in flower, of which the more interesting were :—*Euphrasia Collina*, *Pultenæa stricta*, var. *Gunnii*, *Spyridium parvifolium*, *Acacia tenuifolia*, *A. juniperina*, *Stackhousia linarifolia*, *Leptorrhynchos tenuifolius*, *Pimelea humilis*, *Dillwynia cinerascens*, *Hakea acicularis*, and the orchid *Pterostylis longifolia*. We returned from Ringwood, which

was reached at about 6 p.m., after an interesting walk of about four miles.

The botanical excursion to Clayton on Saturday, 31st August, was reported by the leader, Mr. H. B. Williamson. Fifteen members, including the president and assistant secretary, spent a pleasant and profitable time in the afternoon around Clayton, and were favoured by fine weather. Although rather early for most of the spring flowers, the number of species recorded was very fair. From Clayton railway station the party walked in a north-westerly direction for half a mile into a patch of Manna Gums growing on a sandy rise, and sheltering tea-tree, heaths, and various scrub plants. The form of *Eucalyptus viminalis* growing here and elsewhere on this coastal region is rather puzzling to one accustomed to the smooth-barked form which grows to such a fine tree, and it takes a good deal of inspection to distinguish it from *E. Stuartiana*. Among the scrub, Silky Tea-tree, *Leptospermum myrsinoides*, Wedding Bush, *Ricinocarpus pinifolius*, and Common Heath, *Epacris impressa*, were most conspicuous, the first not yet blooming, the second just coming out, and the last rather past its best. Three Hibbertias—"Guinea-flowers"—made a good show, especially *H. densiflora* and *H. fasciculata*. Grey Bossea, *Bossiæa cinerea*, Gorse Bitter Pea, *Daviesia ulicina*, Common Hovea, Common Flat Pea, *Platylobium obtusangulum*, and Scarlet Coral Pea, *Kennedya prostrata*, were the only leguminous plants found in bloom, except the Acacias, the Bossea being by far the most attractive. Of Acacias in bloom, *A. oxycedrus*, *A. stricta*, *A. juniperina*, and *A. armata* were the only ones noted, the first-named being the most abundant, and the last chiefly along the fences as a hedge plant. One tree of Lightwood, *Acacia implexa*, was seen badly infested with galls, but not in bloom. The search for orchids was rewarded by the finding of *Pterostylis nutans*, Nodding Greenhood, *P. concinna*, Trim Greenhood, the little *Acianthus exsertus*, Common Gnat Orchid, and the larger Glossodia. Of lilies only one was noted in bloom—*Chamæscilla corymbosa*, Blue Squill. This patch of timber and scrub is near the Clayton school, and the leader stated that it formed a favourite collecting-ground for his pupils, who had brought to school and pressed about 360 species since October last, probably 200 of which were gathered in this scrub. With the help of his pupils he intends to make a census of the locality, which comprises about 80 acres. Leaving this area, the party proceeded along the North-road to the railway crossing, and there made a detour to the south into the heath scrub, which was found to contain small areas of depression where water lodges, and which are difficult of access at this time of the year. These areas are worth searching in the late

months of the year. Swamp Daisies, *Brachycome cardiocarpa*, in bloom, were found by our party. After loading themselves with wild-flowers, the excursionists walked by the shortest route to Oakleigh, where they entrained for home.

A report on the botanical excursion to Black Rock on Saturday, 7th September, was read by Mr. J. W. Audas, F.L.S., who, in the unavoidable absence of Mr. J. P. M'Lennan, had led the party. The day was gloriously bright and springlike—an ideal day for collecting botanical specimens—and a large number of excursionists took advantage of the weather. On leaving Sandringham station the party took cabs to Black Rock. Here some little time was devoted to plants growing near the seashore, many of which were seen in flower, such as *Leucopogon Richei*, *Myoporum viscosum*, *Clematis microphylla*, *Rhagodia Billardieri*, *Atriplex cinerea*, *Leptospermum lævigatum*, *Muehlenbeckia adpressa*, *Tetragona implexicoma*, and *Acacia sophoræ*. Under the tea-tree the orchids *Pterostylis nutans* and *P. concinna* were fairly common. On turning inland near the Ebden Park estate the more showy orchids, *Glossodia major* and *Thelymitra antennifera*, were noted. Here also the Acacias *A. suaveolens*, *A. armata*, and *A. oxycedrus* were prominent features, together with *Correa speciosa*, *Bossiæa cinerea*, *Daviesia ulicina*, *Casuarina distyla*, *Ricinocarpus pinifolius*, *Hibbertia densiflora*, *H. fasciculata*, *H. stricta*, and *Leucopogon virgatus*. Having ascended a hill, we had a splendid view of the surrounding country, and noted the much-increased building operations, which have greatly curtailed this collecting-ground during the past few years. From here the party rambled for about two miles through the heathy country towards Cheltenham, and searched for flowers, with very good results. During the afternoon about fifty species of plants were noted in bloom, the more noteworthy being *Pimelea octophylla*, *P. phylicoides*, *Hypolæna fastigiata*, *Trachymene heterophylla*, *Stylidium graminifolium*, *Aotus villosa*, *Microseris Forsteri*, *Goodenia geniculata*, *Kennedya prostrata*, *Platylobium obtusangulum*, *Chamæscilla corymbosa*, *Anguillaria dioica*, and *Hypoxis glabella*. Passing through the Cheltenham Cemetery *en route* we observed some fine specimens of the Lilly-pilly, *Eugenia Smithii*, laden with its large purplish fruits. Taken altogether, the outing was much enjoyed by the members present, who numbered about twenty-one. We returned to town by the 5.15 p.m. train from Cheltenham.

ELECTION OF MEMBERS.

On a ballot being taken, Miss W. Gill, Hawksburn-road, Hawksburn, and Mr. Wm. Miller, St. George's-road, Croxton, were elected as ordinary members; and Miss Elsie Hearn, of College-parade, Kew, as an associate member of the Club.

GENERAL BUSINESS.

Penguin (and other) Oil Industry.—The president reported that Mr. Kershaw and he had made many inquiries, and finally it had been decided to invite Capt. White, of Adelaide, to represent the Club at any inquiry at Macquarie Island into the methods of oil production, especially where it concerned the alleged danger of decimating the penguins and other animals. The Premier of Tasmania had written, in reply to a communication by the sub-committee, as follows:—

"Dear Sir,—Referring to your communication of the 16th instant with regard to the destruction of penguins and sea-elephants at Macquarie Island, I beg to inform you that a licence was granted to Mr. Joseph Hatch in connection with the penguin oil industry, after a very full inquiry, and with the concurrence of the Ornithological Association, Melbourne. The lessees have to provide free transit and sustenance for a Government expert to accompany them. A Captain White, of Adelaide, is undertaking these duties in an honorary capacity.

"Instructions have been issued that no Emperor Penguins are to be killed; neither is the existing plant to be increased, and, if necessary, all arrangements entered into with the lessees are to be subject to three months' notice.—Yours faithfully,

"(Signed) W. H. Lee, Premier.

"29th August, 1918."

Captain White, the chairman said, was willing to represent the Club if occasion offered, but no definite arrangement had been made when that gentleman's letter came to hand. Meanwhile, Mr. Mattingley had, owing to pressure of business, found it impracticable to make good his offer.

Wilson's Promontory National Park.- The president stated that, as a member of the sub-committee appointed at last meeting to watch and act if required in the matter of tin-mining in the park, he had attended a deputation to the Minister of Mines (Mr. Barnes, M.L.A.) Many representative men were present besides naturalists. He asked Professor Sir Baldwin Spencer, who had put the case for the societies, to report the proceedings, and, if he could, forecast the result.

Professor Spencer said:—"We had our deputation to the Minister of Mines, and the Minister of Lands was also there. We had a deputation which was strongly representative of all the societies. We placed the case before the Minister. We were introduced by Mr. Mackey, the present Speaker, who, years ago, when he was Minister for Lands, was instrumental in preserving the Promontory. We put the case as strongly

as we could, and I am glad to say we had the support of all the clubs, and more especially of the A.N.A. They are very strongly with us, and I hope that the result of that will be that there will be no leasing of land for mining purposes in the Promontory. We must leave no stone unturned to achieve that result. The forces against us are very strong, of course, at the present time. No one who feels what the Empire needs would like to feel they were hurting the Empire, but what we do feel is that the claims that have been put before the Minister to obtain the minerals on the Promontory are rather feeble. There are, of course, many other parts of Australia and Victoria which could more easily be exploited than the Promontory. This society was the first to move in the direction of having the Promontory preserved. It is quite possible that the Minister of Mines may go down and see that great extent of country apparently idle; it is, and we hope it will remain so. The deputation was successful, and the representatives of the Club are doing their best to see that the area be maintained always as a National Park."

The president said that there was some danger of the Minister going down there uninstructed from the society's point of view. It was impossible, in the time of a deputation, to cover all the ground without wearying the interviewed one; but what did the average Minister know about natural history? The park was for more than large animals like kangaroos, emus, and the like. The platypus, water-rat, bandicoot, and other shy creatures were desired to multiply there, and the Minister might easily go down and see nothing of these timid ones of the sanctuary. Tin-mining, if allowed, would make their increase impossible, and their extermination probable. He thought that a representative of the Club should be appointed to go down with the Minister if the opportunity was offered.

Sir Baldwin Spencer urged the utmost vigilance by the Club and individual members. He moved, and Mr. Pitcher seconded, a resolution that Mr. Kershaw, F.E.S., represent the Club. The resolution was carried unanimously.

Brisbane Ranges.—Mr. St. John gave notice of his intention to move later for action towards reservation of the Brisbane Ranges as a National Park, which could be visited in a day's excursion. Mr. Chas. French, jun., said he favoured and would support the proposal.

WILD-FLOWER SHOW.

The president said that the show arrangements were well in hand, and he reported progress of the show committee's work. The hon. editor, Mr. Barnard, was in Western Aus-

tralia, and hoped to be able to send over a fair sample of the flora of that State, as he had written enthusiastically concerning it. The assistance of the Microscopical Society would materially help towards success.

An animated discussion took place concerning the time for the sale of floral exhibits at the show. Miss Nethercote desired to have the selling begun before the visitors wearied and dropped out. She suggested 8.45 p.m. as the time. Miss Rollo suggested that the flower exhibits be sold all the time, but that no exhibit so sold be removed before 9 o'clock.

On a motion by Mr. C. J. Gabriel, seconded by Mr. Daley, F.L.S., it was decided to alter the time of selling from 9.30 to 9 o'clock.

REMARKS ON EXHIBITS.

Mr. A. L. Scott described for the uninitiated the meaning of polarized light and cross nicols in connection with his exhibit of zeolites.

Mr. Audas referred to a previous record of *Haloragis rubra*, the late Charles Walter having noted it for the Wimmera district in 1905, and stated that the species is endemic to Victoria.

Mr. P. Crosbie Morrison remarked, in connection with his exhibit of water-beetles, that Professor Sir Baldwin Spencer had raised a question relating to the migratory habits among lower forms of life. He wished to record that at about the beginning of last February he came upon a tremendous crowd of water-beetles, composed of two distinct species, one belonging to the Dytiscidæ and the other to the Gyrenidæ. They covered the whole surface of the river for a quarter of a mile, and the whole mass apparently was moving up-stream.

PAPER READ.

By Mr. F. Erasmus Wilson, entitled "An Ornithological Trip to the Nhill District."

The author gave an interesting account of bird-life in the Nhill district, in the southern part of the Mallee, some 240 miles north-west of Melbourne, where a large number of characteristic birds of the district were met with.

The president congratulated the author on having read an informative and interesting paper. When the National Park question had been settled and the Brisbane Ranges scheme launched, the time would have arrived for the reservation of a Mallee sanctuary, since there were forms of animal and plant life there which would not survive transference to Wilson's Promontory.

EXHIBITS.

By Mr. J. W. Audas, F.L.S.—*Haloragis rubra*, Schindl., Red Raspwort, collected by Mr. Smith at Sunbury, 15/6/18.

By Miss A. Fuller.—Orchids collected during the excursion to Black Rock.

By Mr. C. J. Gabriel.—Marine shells—*Chlamys leopardus*, Rve., from North-West Australia; *C. pallium*, Linn., from Malden Island; *Chlamys plica*, var. *flabelloides*, Rve., from Japan.

By Mr. F. Keep.—*Acacia prominens* and *A. fimbricata*, for comparison.

By Mr. P. Crosbie Morrison.—Water-beetles of the families Dytiscidæ and Gyrenidæ.

By Mr. A. L. Scott.—Zeolites from Giant's Causeway, Ireland, between crossed nicols.

By Mr. H. B. Williamson.—*Grevillea Williamsoni*, F. v. M., collected in Grampians, October, 1893.

After the usual conversazione the meeting terminated.

TRACKS OF GARDEN SNAIL.

By Thos. Steel, F.L.S.

(Communicated by E. S. Anthony.)

(*Read before the Field Naturalists' Club of Victoria, 8th July*, 1918.)

In the *Victorian Naturalist* for March last (vol. xxxiv., p. 171) Professor Baldwin Spencer asks for information regarding the track left by the common introduced garden snail, *Helix aspera*, which is in the form of a series of short, thick, detached lines or patches. I have made a number of observations on the subject, and think I have arrived at the correct explanation.

The mucus which forms the track appears to be discharged intermittingly from the orifice of the large mucus gland near the anterior end of the ventral surface, and its purpose is to serve as a lubricant for the smooth passage of the animal's body. As the animal moves forward the mucus is thus deposited in isolated portions, with the result that on a rough surface, such as asphalt, most of the mucus remains where deposited, and is not spread forward to any extent. On a smooth surface, such as glass, the mucus is carried forward, through the animal's ambulacral surface being in close contact with the glass, and so a continuous trail is formed. When snails crawl on rough surfaces, such as asphalt, wood, or a hard earth footpath, the mucus is frequently carried across from one deposit to another in the form either of a thin film or a mere thread, thus forming

a series of connections or bridges between successive discharges.

Snails crawling on linoleum leave a very clear intermittent trail, the waxy surface of the linoleum not lending itself to the spreading of the mucus as glass does, and thus tending to preserve intact the separate deposits. When a snail is crawling on glass the muscular motion of its foot or sole is very clearly seen from beneath, passing forward in a series of simultaneous waves like those seen in the legs of a crawling myriapod. The tracks of slugs, Limax, &c., closely resemble those of snails, but on a smaller scale, and the bridging from one deposit to another, on rough surfaces, is usually more complete.

Both snails and slugs secrete two kinds of mucus, apart from that secreted by the genital mucus gland. That forming the track is, as has been mentioned, the product of the large ventral mucus gland. In both cases it is a clear, glairy, very tenacious substance. When the animal is crawling quietly, without being disturbed, the mucus is quite translucent, and under the microscope shows only a few scattered rounded cells and some nucleated cells, which I suppose to be epithelium cells. As a distinctive term I would propose to call this secretion the ambulacral mucus. On the other hand, the secretion coating the dorsal surface, both of snails and slugs, and which may perhaps best be distinguished by terming it dermal mucus, is turbid, and when examined microscopically is seen to be densely crowded with minute structureless granules or cells of varying dimensions, mostly sausage-shaped, and reminding one of a crowd of diatoms. When the animal is irritated by touching or in other ways, the secretion is poured out abundantly. It is the product of numerous epidermal glands resembling those described by Dr. A. Dendy in his description of the anatomy of a land planarian, *Trans. Royal Soc. Victoria*, 1889. (See also "Outlines of Zoology," by J. Arthur Thomson, 1892 edition, pp. 319, 321.)

Sometimes, particularly when the animal is disturbed when crawling, the mucus of the track contains portions of the dermal mucus trailed off as the snail moves along. The ambulacral mucus is frequently stained with streaks of yellow or green, through contamination with excrementous matter. Snail mucus is not coagulated by boiling water, but is coagulated through dehydration, by alcohol.

I have used the term "mucus" in referring to these secretions because I think it a better term than slime, which is sometimes used, and besides, in the text-books, the large ventral gland is usually known as the mucus gland.

It may be here mentioned that in *Proc. Linn. Soc. New South Wales*, 1915, p. 114, there is an illustrated paper by the present writer describing the feeding tracks of *Limax maximus*.

AN ORNITHOLOGICAL TRIP TO THE NHILL DISTRICT.

By F. ERASMUS WILSON.

(*Read before the Field Naturalists' Club of Victoria, 9th Sept.*, 1918.)

ACCOMPANIED by my wife, I left Melbourne by train on 3rd October, 1917, *en route* for Winiam East, a district lying about 10 miles south-east of Nhill, and bordering the northern fringe of a so-called desert, which stretches for some 20 miles towards the Grampians. Next evening we arrived at the home of our host, Mr. Robert Oldfield, who had kindly invited us to spend a holiday with him.

Four types of country are found in this district, viz. :—(*a*) Well-grassed flats, timbered with a variety of White Gum, Grey Box, *Eucalyptus goniocalyx*, and Buloke (Casuarina). (*b*) Buckshot ridges, which are densely clothed with Broom-bush, *Melaleuca uncinata*, interspersed with mallee eucalypts of two varieties, Casuarinas, Hakeas, and the beautiful holly-like Grevillea, *G. æquifolium*. These ridges derive their name from the fact that the soil is thickly strewn with ferruginous pebbles somewhat resembling shot in appearance. (*c*) White sandy country, upon which the principal vegetation is Brown Stringybark, *E. capitellata*, a species of Banksia, and an occasional Murray Pine (Callitris). (*d*) The above-mentioned desert, which is mostly low-lying, flat country, with occasional sandy hillocks dotted about. Stunted Sheoke, *C. distyla*, a dwarfed growth of Banksia, and many kinds of short flowering shrubs abound, whilst the hillocks are scantily covered with Brown Stringybark.

Apart from the desert, the country is essentially mallee, but one misses the dense tracts of Porcupine Grass, *Triodia irritans*, that are met with further north, and which provide a home for such interesting forms of bird life as Amytis and Stipiturus. Porcupine Grass is found in the district, but only in small, isolated clumps, and the most diligent search failed to show any trace of the forms above mentioned. Otherwise, the ornithological fauna is much the same as that of the Kow Plains district, with one notable exception—viz., the Chestnut-backed Ground-Bird. Although the country is eminently suitable for this bird, I did not come across it in any of my rambles, and inquiries made locally convinced me that it does not inhabit the locality.

On the flats are many dead eucalypts, the hollow limbs of which provide ideal nesting-sites for the Parrot tribe. The Red-backed Grass-Parrot, *Psephotus hæmatonotus*, is by far the commonest species, and at the time of my visit most of them were busily engaged in rearing their broods. I was much interested in observing a male feeding his mate, which

he usually does in a tree some distance from the nest. Having delivered one beakful, he always seemed to have some difficulty in regurgitating the next lot, and would keep bobbing his head, first down and then up, in his effort, the time taken in regurgitating a beakful averaging about ten seconds. These birds are exceptionally tight sitters, and it is almost impossible to flush them from the nesting hollow by the usual method of hammering the tree with a tomahawk. They are very fond of charcoal, and I have vivid recollections of pilgrimages of these beautiful birds to a charcoal heap in the Gunbower district. Mallee Parrots, *Barnardius barnardi*, Rosellas, *Platycercus eximius*, and Yellow-vented Parrakeets, *Psephotus xanthorrhous*, also breed locally, and Mr. Oldfield informs me that the Many-coloured Parrot also occasionally visits the district. I was disappointed in not meeting with species of the genus Euphema, but, from the description of a parrot supplied to me by a resident, I feel convinced that a more diligent search would have rewarded me. On one occasion I saw a flock of about sixty Black Cockatoos, *Calyptorhynchus funereus*, feeding on the seeds of eucalypts and Hakeas. The hollow trees were also tenanted by Boobook Owls, *Ninox boobook*, and Owlet Nightjars, *Egotheles novæ-hollandiæ*, but neither of these birds was at all plentiful.

The White Gums and a species of mallee were out in full flower, and thousands of Lorikeets had congregated to feast upon the nectar, the Purple-crowned species, *Glossopsitta porphyrocephala*, being by far the most numerous. A few Musk Lorikeets, *G. concinna*, and Swift Parrots, *Lathamus discolor*, were also identified in the flocks. When first I saw Purple-crowned Lorikeets entering a hollow I thought I had located a nest, but further observation, together with an examination of the hollow, showed me that they were only using it as a roosting-place, and had evicted a pair of Red-tipped Pardalotes, *Pardalotus striatus*, to further their convenience. In the case of two hollows observed, the birds would be away all day and return just before nightfall. Unlike other birds, instead of pausing before entering a hole, they dash straight in, and one wonders how they avoid injuring themselves owing to their impetuosity.

Red-tipped Pardalotes were calling everywhere in the White Gum timber, and every available knot-hole seemed to be occupied by them. Some had only started building, whilst occasional nests examined contained fully-fledged young. I discovered three nesting hollows of the dainty little Tree-Martin, *Petrochelidon nigricans*, one being occupied by four birds and the other two by three birds each. One of the latter I was able to reach, and found it to contain a nest constructed of dry

grass and feathers from a young emu, and lined with small eucalypt leaves. It contained three fresh eggs. All three birds were very tame, and kept flying in and out of the hollow whilst I was sitting on a limb about two feet from the entrance. Four feet higher up a pair of Red-tipped Pardalotes were building a nest, and exhibited very little fear.

Wherever a few Grey Box trees grew, there would be found a family of Brown Tree-creepers, *Climacteris scandens*, and never far away would also be a pair of Babblers, *Pomatorhinus temporalis*. A large hollow near the house was occupied by a pair of Laughing Kingfishers, *Dacelo gigas*, and their family was hatched out soon after our arrival. The parent birds were singularly quiet, and I heard them laughing only on one occasion during my fortnight's stay. On 4th October I observed two Sacred Kingfishers, *Halcyon sanctus*, at the Nhill swamp. This is a week earlier than I have noted them in the vicinity of Melbourne.

Black-backed Magpies were very plentiful, and, whilst most of them were accompanied by their young, a few were still sitting on eggs. One was observed devouring one of the large mallee cockroaches, *Geoscaphens robustus*. Only two colonies of Choughs were noticed, and they had long since concluded their nesting operations. Black-winged Bell-Magpies, *Strepera melanoptera*, are rather rare hereabouts, and some had reared their young before my arrival. I succeeded in locating one nest built in a very slender sapling, that contained a pair of hard-set eggs. These birds are very wary, and silently leave the nest long before one gets anywhere near it.

There are some fine swamps in the vicinity that are generally tenanted by hosts of wild-fowl. They had all been dried up in the recent drought, and, having only been lately filled again, very little bird-life was present. The only species I noted were Mountain-Duck, Maned Goose, Black-throated Grebe, Little Cormorant, Spur-winged Plover, and White-fronted Heron. Mr. Oldfield is an adept at imitating the alarm call of the Noisy Miner, and would frequently amuse me by giving it when ducks or parrots were flying overhead. The effect was marvellous, the parrots immediately darting for the most bushy tree available, whilst the ducks dropped instantly into the water, expecting every moment to be attacked by a falcon or hawk. Mr. Oldfield remarked that it was an excellent artifice to utilize when duck-shooting, and had frequently stood him in good stead when the birds refused to alight within gunshot of him. Black-breasted Plover, *Zonifer pectoralis*, frequented the open paddocks, and from their actions I judged them to be nesting.

Mr. W. Blucher showed me two fine old nests of the Wedge-

tailed Eagle that had been used the previous season, and also one that was in course of construction. In the latter instance I was surprised to see the number of sticks beneath the nest, that had evidently fallen away before the birds had succeeded in building a stable foundation. At the base of one of the nests Spotted-sided Finches had built their grass home. A fine Whistling-Eagle was flushed from her nest situated in one of the highest trees in the district. The only other members of the Accipitriformes that I noticed were a Brown Hawk, *Hieracidea orientalis*, and a pair of Kestrels, *Cerchneis cenchroides*.

Above the crops, Brown and Rufous Song-Larks (Cinclorhamphus) vied with each other for vocal supremacy, the latter species being the more numerous. Pipits, *Anthus australis*, were very common in the crop lands, and were also seen on the desert where patches had been burnt. One nest, containing three fresh eggs, was found, completely hidden by a bunch of stubble that was lying over it. The Mallee form of the Australian Brown Flycatcher, which Mr. Gregory Mathews calls *Microeca fascinans howei*, was seen occasionally, and I was fortunate in discovering a nest, placed on a horizontal fork of a eucalypt at a height of fifteen feet from the ground. It contained a handsome pair of fresh eggs. The nest was much more substantial and deeper than those of the Micrœca that I have seen further south. The owners were waging constant warfare with two Black-and-White Fantails that were nesting near by, and who would persist in alighting near the Brown Flycatchers' nest. On two occasions I saw Restless Flycatchers, *Seisura inquieta*, and found their nests, one containing fresh eggs and the other fully-fledged young.

The gums being in blossom, honey-eating birds were naturally present in great numbers. The most conspicuous were the White-bearded species, *Meliornis novæ-hollandiæ*. They were there in thousands, most of them attending to the wants of half-grown chicks. Three or four nests containing eggs were noticed, and I found that the favourite lining material was the felt-like matter that is obtained from the Banksias. The usual nesting site was in a Prickly Hakea bush. Other Honey-eaters identified were *Glyciphila albifrons*, *G. fulvifrons*, *Ptilotis ornata*, *P. penicillata*, *Acanthogenys rufigularis*, *Anthochæra carunculata*, and the Mallee forms of *P. leucotis* and *Melithreptus brevirostris*, the latter being a common bird. Once I thought I caught a glimpse of *P. cratitia*, but it was too far off for positive identification. Mr. A. J. Campbell records seeing this species north of Nhill. A nest of *P. novæ-norciæ* found was in a very unusual situation, and is, I think, worthy of record. It was built in a bare fork of a gum sapling about twelve

feet from the ground; it contained two heavily-incubated eggs.

The genus Pachycephala is represented by two species, *P. gilberti* and *P. meridionalis*, the former being the more frequently met with, and I was fortunate in finding nests of each species. *P. gilberti*, as is well known, usually utilizes a deserted nest of the White-browed Babbler as a nesting site, but in one instance that came under my notice it had departed from the usual custom, and constructed the nest in a fork beside the Babbler's nest; so close was it, however, that it looked like a bulge upon the Babbler's nest. One nest of this species that I located when in course of construction eventually contained the unusual complement of four eggs, which, I was able to ascertain, were laid on four consecutive days. The nest of *P. meridionalis* was also built into a White-browed Babbler's nest; this is rather unusual for this species. Another bird that in the Mallee favours old nests of the Babbler is the Harmonious Shrike-Thrush, the notes of which, as I pointed out in a previous paper in *The Emu*, differ greatly from those inhabiting southern Victoria. The eggs also are smaller. Since my return I have received a unique set of eggs of this bird from Mr. Oldfield; they are almost entirely devoid of markings.

Scrub-Robins, *Drymodes brunneopygius*, were fairly plentiful in the Broom-bush country, and I succeeded in finding five nests, all of which were just ready for eggs. In each case, however, although I studiously avoided touching the nests, they deserted them. One pair of birds rebuilt near by, but I only found their second nest the day before my departure. One large young one was seen in the scrub, and was being fed by both parents. The notes of the Scrub-Robin, although uttered in a low tone, are remarkable for their carrying power, and this is often very misleading when one is endeavouring to locate a bird. *Hylacola cauta* is very rare at Winiam, and was only noticed on three occasions.

The common wren is the Purple-backed species, *Malurus assimilis*, and altogether I found seven nests. Four contained newly-hatched chicks, one was being constructed, and the other two contained sets of four eggs, one set being fresh and the other heavily incubated. Four eggs seem to be the usual complement, as three of the nests contained four young. Having had no previous experience of the nidification of this species, I at first spent much time searching in fairly thick cover, but later discovered that they select the most ridiculously open situations. They seem to rely for protection upon the old appearance of the nest. Most of them I found might easily pass at a first glance for one of last year's nests. One was placed at the foot of a dead Banksia, another in the bare

stems of a clump of Broom-bush, and the others were attached to the partially-foliaged, standing stems of mallee gums that had been cut off by the eucalyptus oil distillers. In each case I found two adult males in close proximity to the nest, apparently living in harmony, as no signs of discord were noticed on any occasion. The Winiam birds are larger than specimens of the same species that I collected at Kow Plains, and have very fine long tails. *Malurus cyaneus* is also present in the district, but is comparatively rare, and only inhabits the outskirts of the scrub. It also was breeding. A specimen I secured of this bird was compared with a series of skins of *M. cyaneus* kindly placed at my disposal by Mr. J. A. Kershaw, of the National Museum, Melbourne. It is small in comparison with skins obtained in Victoria, and approached nearest to a specimen labelled "Junction of Murray and Darling." The wings are paler than those of other Victorian birds, and the eggs are very small indeed, one set I obtained being spotted with black. It seems to be a bleached form, and perhaps an examination of a series of skins may lead to its obtaining sub-specific rank.

On two occasions I came across Black-capped Tree-runners, *Neositta pileata*, six birds forming the flock in both instances. A long search revealed a nest situated about 15 feet up in a dead stringybark sapling. It contained newly-hatched young, and all six birds assembled whilst I was investigating it.

The genus Acanthiza was represented by five species—*A. chrysorrhoa*, *A. lineata*, *A. reguloides*, *A. pyrrhopygia*, and a new species that I have named *A. winiamida*. Whilst speaking of Acanthizas I should like to acknowledge my indebtedness to Mr. Edwin Ashby, M.B.O.U., for placing at my disposal a very fine series of skins of Acanthizas to assist me in working out the new species. Three nests of *A. pyrrhopygia* were found, two containing fresh eggs and one with an incubated set. One of the nests had only just been started on 7th October. The nest was completed on the 10th, the first egg laid on the 11th, second on the 13th, and the third on the 15th. The Red-rumped Tit, like the Brown Tit, is a splendid mimic, and I heard it imitating the Narrow-billed Bronze-Cuckoo, the Short-billed Tree-Tit, and the Silver-eye to perfection. One nest was placed about four feet up in a Hakea, another about the same height in a Casuarina, and a third nest found was situated about a foot from the ground in a tiny Casuarina seedling.

Nesting-mounds of the Mallee-Fowl, *Leipoa ocellata*, were frequently met with in the dense scrub, but in only one instance had they started nesting operations, although an abundance of rain had fallen previously. Only one egg was found in the

nest that was being used. Mr. Oldfield visited this mound at a later date, and evidently disturbed the female just as she was about to lay. The mound had been scooped out, and he found a small conical hole, evidently prepared for the reception of the egg. After a careful examination Mr. Oldfield considered that the bird must have formed the depression by forcing her head into the mixture of sand and *débris*. From an examination of Mallee-Fowls' excreta it was evident that they eat the berries of the native cranberry, which grows rather plentifully in the neighbourhood.

Emu spoors and droppings are met with everywhere in the scrub, but on only one occasion did I see one. They breed in the district, and occasionally bring their offspring to feed on the crops. Mr. Oldfield has seen the old birds following the tracks of the seed-drills and picking up single grains of wheat. At one period of the year they subsist almost solely upon the flowers and berries of the Flame Heath, *Astroloma conastiphioides*. This was proved conclusively by numerous examinations of their excreta, which was almost a solid mass of the undigested seeds and portions of the flowers of this plant.

Two species of Petroica were observed—viz., *P. leggii* and *P. goodenovii*, but only one pair of each. Short-billed Tree-Tits were very abundant, and two nests, both in course of construction, were found.

Golden-rumped Pardalotes, *Pardalotus xanthopygius*, are rather rare, and after a diligent search one nest was found that contained four fully-fledged chicks. On being disturbed one of the chicks flew fully twenty yards, and successfully alighted on a limb, although it was the first time it had left the nesting-burrow. White-browed Babblers may be heard calling everywhere in the scrub country, and their bulky stick nests are quite a feature of the landscape. Eggs and young in all stages were noticed.

The order Columbiformes was represented by two species only—the Ground-Dove, *Geopelia tranquilla*, and the Bronze-winged Pigeon, *Phaps chalcoptera*.

On the last day of my visit Mr. Oldfield kindly drove me out to the salt lake that lies near the heart of the desert. In the summer time this sheet of water dries up, and quantities of beautiful white salt are collected. White Gums and thick tea-tree border the lake, whilst upon the ridge stunted grass-trees, *Xanthorrhœa australis*, and a few clumps of Porcupine Grass grow. The drive across the desert was made particularly enjoyable owing to the wealth of wild-flowers that were blooming on all sides, and the Biblical quotation, "And the desert shall blossom as the rose," never applied more aptly than it did upon that October morning drive. Glorious shades

of pink and blue were contributed by the boronias, *B. filifolia* and *B. cærulescens*, and of yellow by the Yellow Stackhousia, *S. flava*, and the Crowded Parrot-Pea, *Dillwynia floribunda*. Other interesting flowering plants were the Slender Rice-flower, *Pimelea linifolia*, Daphne Heath, *Brachyloma daphnoides*, Rosemary Grevillea, *G. rosmarinifolia*, and the Violet Spyridium, *S. subochreatum*. On the outskirts of the desert two varieties of Myrtle, *Micromyrtus microphylla* and *Calytrix tetragona*, grew in great profusion, their snowy-white and delicate pink-shaded blooms being good to look upon. Amongst this wealth of colour the plaintive call of the Tawny-crowned Honey-eater, *Glyciphila fulvifrons*, seemed much out of place. It assailed us, however, from all sides, as this bird is very common right throughout the desert. An occasional family of Purple-backed Wrens, a few Pipits, and the new Acanthiza seem to be the only species that dwell permanently in this arid country. The small belt of gums at the lake attracts a few other species, the following being noted there :—*Myzantha garrula, Rhipidura tricolor, Artamus sordidus*, and *Pardalotus striatus*.

I am indebted to Mr. Audas, F.L.S., of the National Herbarium, for identifying the various plants mentioned in the paper.

[Owing to pressure on space, the list of birds observed by Mr. Wilson will appear in the next *Naturalist*.—ED. *Vict. Nat.*]

THE GREAT WAR.—We regret to announce that another member of the Field Naturalists' Club has suffered bereavement through the loss of a son while on active service. We extend our sympathy to Mr. F. Pitcher, who was unable to take an active part in the recent exhibition of wild-flowers owing to the receipt of a cable stating that his younger son, Driver Ernest Arthur Pitcher, had died in France on the 17th of September. We trust that his brother Albert, still on active service, may be spared to return to his bereaved parents.

THE EXHIBITION OF WILD-FLOWERS.—It has not been possible to prepare an account of the annual exhibition of wild-flowers held in the Melbourne Town Hall on Tuesday, 1st October, in time for this *Naturalist*. The exhibition was again a marked success, and it is expected that the net result will closely approach that of last year. Members who received tickets for sale will greatly facilitate the closing of accounts by forwarding to the hon. treasurer, at once, all money in hand and unsold tickets.

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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, 14th October, 1918.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about fifty members and visitors were present.

REPORTS.

A report of the excursion to Bendigo on Saturday, 14th September, was given by Mr. C. Daley, B.A., one of the leaders, who said that, considering the distance, a fair number of members had attended. Attention was principally directed to the flowering plants, of which many species not to be found in the neighbourhood of Melbourne were noted. Among them may be mentioned the Fairy Wax-flower, *Eriostemon obovalis*, the Anemone Boronia, *Boronia anemonifolia*, *Loudonia Behri*, &c. He said the district was one exhibiting several plant formations, and should be worth visiting again. He was greatly indebted to his co-leader, Mr. D. J. Paton, for his local knowledge in selecting interesting localities.

A report of the excursion to the Oakleigh golf links on Saturday, 21st September, was forwarded by Mr. E. E. Pescott, F.L.S., one of the leaders, who stated that there had been a good attendance of members, who were greatly pleased to see the way in which the indigenous vegetation on the links had been preserved as far as possible, and that other indigenous trees and shrubs are being introduced whenever an opportunity occurs. A magnificent specimen of the Scarlet Gum of Western Australia, *Eucalyptus ficifolia*, was seen adorning the lawn in front of the club-house. The Coastal Tea-tree, *Leptospermum lævigatum*, was doing well, and is increasing yearly from seed. Of acacias there are many species, all doing well, and it was interesting to note that here *Acacia Elata* was flowering in the spring instead of in summer. The party was entertained at afternoon tea by Messrs. Plante and Stewart, who have evinced great interest in the welfare of the various trees and shrubs which adorn the links. He suggested that members of the Club might from time to time present to the golf club seeds or plants of uncommon species which they might come across in their rambles, and so increase the variety of the indigenous flora.

A report of the excursion to Alphington on Saturday, 12th

October, was given by Mr. J. Stickland, who acted as leader in the unavoidable absence of Mr. J. Searle. He stated that, owing to threatening weather, the attendance was small, but the afternoon turned out better than expected. A number of interesting captures were made in the various ponds visited. Among the specimens obtained was a very beautiful form of the polyzoan *Fredericella sultana*, possessing an unusually large number of tentacles. Some interesting fresh-water algæ were also secured, and other specimens which had not yet been identified.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. John H. King, "Bolewin," Burke-road, East Malvern, and Mr. F. B. Sutherland, Vauxhall-road, Canterbury, were duly elected ordinary members of the Club.

GENERAL BUSINESS.

The hon. treasurer, Mr. G. Coghill, said that the financial results of the recent exhibition of wild-flowers would not be nearly so good as last year: still, he expected to be able to hand over to the Y.M.C.A. National Fund for Soldiers about £125, as against £212, the result of the previous exhibition. He considered the display as fine, if not finer, than the previous one, but the number of calls being made upon the public for patriotic purposes had probably affected the result. The amount from sale of tickets showed that most of the tickets sold were presented at the doors, whereas in previous years numbers were bought merely for the sake of helping the patriotic object in view.

The chairman said that the Club should not be discouraged by the comparison between the results of the two exhibitions. Last year it was more of a novelty, and the presence of the Governor-General doubtless made it more popular. The weather was better then, whereas this year the evening turned out showery. In the afternoon the Town Hall was well filled, and people had difficulty in getting near the exhibits. In many cases exhibitors had spent considerable sums in going long distances to obtain flowers, and if these sums were added to the net result it would be found that the contribution of the members of the Club and their friends to the Y.M.C.A. National Fund was a very handsome one.

The chairman said that since the last meeting of the Club two members had suffered severe bereavement—Mr. F. Chapman, A.L.S., by the loss of his daughter while on a visit to a neighbouring State, and Mr. F. Pitcher by the loss of his son while on active service in France. To each he desired to offer the sincere sympathy of the Club.

PAPER.

Owing to a misunderstanding, the lantern had not been secured for illustrating the paper by Mr. F. Chapman, A.L.S., entitled "A Sketch of the Geological History of Australian Plants: Second Paper.—The Mesozoic Flora." It was therefore decided to postpone the reading of the paper until it was possible to display the slides prepared at the same time.

NOTES ON WILD-FLOWER EXHIBITION.

An interesting discussion arose as to bettering the exhibition of wild-flowers in future years. Mr. F. Keep suggested that visitors should be requested to move in one direction only, but this was considered impracticable. Mr. D. Best drew attention to the absence of common names, and suggested that if the flowers were sold by auction a larger sum would be raised. Mr. J. Stickland thought that greater publicity might be given by means of calico signs, and the object of the exhibition had not been stated in the advertisements. The hon. secretary stated that the displaying of signs had been refused at the Tourists' Bureau and the Town Hall.

It was suggested by Mr. Best that prizes might be offered for the best exhibits of certain kinds of flowers suitable for sale by auction. Mr. G. Coghill said that the complaint that certain exhibits were missing before the closing of the exhibition was probably due to the lady flower-sellers, who had not a sufficient supply of flowers to meet the demands of the public, and therefore commandeered some of the exhibits. He considered it inadvisable to offer prizes. If such were decided on, then they should be for flowers grown in school gardens by school children. Miss Nethercote thought that many of the flowers taken from exhibits had been used in the effort to make a systematic exhibit of the flowers on view. Mr. F. Wisewould said that had he known there would have been such demand for certain flowers he could have provided much larger quantities, and would do so on another occasion. Mr. P. R. H. St. John deprecated the offering of prizes, which would only add to the expenses of the exhibition. Mr. H. B. Williamson referred to the absence of popular names, saying that it was quite impossible in the limited time available for the few persons capable of doing so to name a tithe of the specimens exhibited. He suggested that printed certificates might be offered for collections of flowers forwarded from schools.

Mr. F. Chapman said that the microscopists suffered from the small space allotted to them. So many people were interested in the exhibits that the table became congested, and persons were unable to move in any direction. Mr. J.

Searle said he would not advocate having microscopes again. The tables available were not suitable, and sufficient space could not be given to the display. A smaller number of microscopes would have been better.

The chairman said the suggestions made and the ensuing discussion should be helpful for future exhibitions. Regarding the sales of flowers, there was a shortage of the particular kinds the people desired. Though £2 worth of waratahs had been obtained from Sydney, they were soon disposed of. Flannel-flowers also were in great demand, also the Blue Pea (Swainsona). These were the flowers wanted and asked for, and, though the visitors bought others rather than go away empty-handed, the sales suffered considerably from the want of these favourite flowers. On a previous occasion, when Mr. Haughton, of Coghill and Haughton, acted as auctioneer, he obtained good prices for *Boronia pinnata*, another of the favourites. The absence of vernacular names was, as Mr. Williamson said, due to the limited time available for the work and the few persons who were capable of naming at a glance any flower presented to them. Those who have the knowledge should be absolutely free from any other duty, but even then the naming of thousands of specimens is a tremendous task. He agreed with Mr. Searle as to the microscopes. He thought there were enough microscopes present to comfortably occupy the whole of the Town Hall and make an entirely microscope display. Too many instruments had been provided for the space available; at the same time he thanked the members of the Microscopical Society for their enthusiasm and help on the occasion. Regarding the affixing of common names to the exhibits, he said that the Plant Names Committee was, as far as possible, adopting children's names for the plants, and if members knew the debates that took place at the meetings of the committee, and the slow progress that is being made in consequence, they would be satisfied that the committee is doing its best in that direction. He urged any who might know of local names for any of our flowers to send them in to the committee for consideration. It was hoped, when finally revised, that the names would be published in such a form as to be useful in schools.

THE NATIONAL PARK.

The chairman said that there was little to report as to the proposal to prospect for tin at the National Park, Wilson's Promontory, except that the Government proposes to allow a trial under strict conditions of the alleged tin deposit in the Park.

Professor Baldwin Spencer said that if it can be shown that there are really valuable national assets in the Park in the

way of tin, it must be allowed to be mined, for, of course, considerations of national welfare, more especially at a time such as this, come first.

Mr. G. Coghill asked if it were possible to get the Park properly proclaimed, as at present the reservation could be revoked at any time, to which Professor Spencer replied that such a course was highly desirable, but he did not think it was possible to do anything in the matter just at present.

The chairman asked Mr. J. A. Kershaw, F.E.S., secretary to the trustees, who had recently been at Wilson's Promontory, if he would say a few words regarding the Park. In response to the request, Mr. Kershaw said that at present the Park is looking very well, and that recently some important improvements had been carried out, especially near the entrance, where a bridge had been erected over the Darby River, and a track made from there to the landing-place, which had considerably shortened the distance to the main "Rest House." Other new tracks had been made, and a number of valuable animals liberated. The emus are doing particularly well; they are breeding again this year. Recently seventeen were counted round a vehicle when driving through the Park. Red and Grey Kangaroos breed regularly every year, and it is believed that the possums are doing so also. The Ring-tailed Possum was there originally, while the Grey and Tasmanian Black Possums have been introduced. The Lyre-bird has been proved to be well established. About ten have been liberated, and on this last occasion I saw undoubted signs of the presence of Lyre-birds along the track. The Straw-necked Ibis has also been introduced. The Koalas are destroying some of the trees along Fraser's Creek, and in other parts have increased to such numbers that they have had to be reduced by killing or removal to other parts. They now extend right over the whole of the Park. The matter of accommodation for tourists is now engaging the attention of the committee, and an endeavour is being made to induce the local people to come forward and supply accommodation; it would then be possible to send much larger parties to the Park than at present.

NOTES ON EXHIBITS.

Mr. H. B. Williamson called attention to some rather interesting wild-flowers, some of the exhibits from the display at Ballarat the previous Saturday, including *Pomaderris phylicifolia, Marsdenia rostrata, Micrantheum hexandrum, Phebalium* (*Eriostemon*) *lepidotus, Eriostemon trachyphyllus,* and *Clematis glycinoides,* collected by Mr. T. S. Hart, M.A., at the Nicholson River, Gippsland.

Mr. F. Chapman, A.L.S., exhibited a bamboo ruler (made in Japan) which was received in Melbourne infested with the larvæ of the Dermestes beetle. When the package was opened this particular ruler was almost black with the pest, while the others were unaffected. He also called attention to the flowers of the Bottle-brush Tea-tree, *Melaleuca ericifolia*, grown at Balwyn, which would be a useful shrub in any garden.

Mr. F. G. A. Barnard called attention to his exhibit of travertin limestone, used as ballast on the Trans-Australian railway, obtained at Tarcoola, about 250 miles west of Port Augusta, South Australia.

NATURAL HISTORY NOTES.

Mr. H. B. Williamson exhibited a live larva of a moth, and asked for information about it. Mr. J. A. Kershaw, F.E.S., said that it was the larva of *Porina* (*Oxycanus*) *fusco-maculata*, one of the Swift moths. It lives underground, making tunnels under the surface of the soil, and feeding on the roots of various grasses. The tunnels are lined with silk. When fully grown it pupates, and awaits a favourable time for emergence, usually after sundown, on the occurrence of the first autumn rains. They often emerge in large numbers, and after a few hours' flight disappear as mysteriously as they arrive.

Mr. F. Chapman, A.L.S., read a note on the rapid growth of a Sugar Gum, *Eucalyptus cladocalyx*, in his garden at Balwyn, and exhibited a photograph of the tree, which, in eleven years and two months, had attained a height of 53 feet, with a stem circumference at the ground of 43½ inches, and, at six feet, 41 inches.

Mr. A. D. Hardy, F.L.S., read a note forwarded by Mr. G. J. Flood, recording young white swallows in a nest at Moorooduc (Mornington Peninsula). On two occasions two white birds had occurred in the brood reared from this particular nest.

EXHIBITS.

By Mr. F. G. A. Barnard.—Travertin limestone from Tarcoola, South Australia.

By Mr. F. Chapman.—Flowers of *Melaleuca ericifolia*, Swamp Paper-bark, grown in his garden at Balwyn ; a desirable garden shrub.

By Mr. F. E. Wilson.—Eight species of Curculionid beetles, from various localities.

By Mr. H. B. Williamson.—Flowering specimens of epiphytal orchid, *Sarcochilus falcatus*, sent by Mr. N. H. Herbert, of Cann River. These were distributed among members for cultivation.

After the usual conversazione the meeting terminated.

EXCURSION TO BENDIGO.

UP to the present year, Bendigo, though possessing many interesting features, had not been selected as a locality for a Club excursion, mainly owing to its distance (100 miles) from town, and the consequent length of time required for travelling; but, by taking advantage of the extra trains usually run in connection with the annual railway picnic, it was determined this year to make an attempt to visit the district, more particularly as an enthusiastic country member living in the town was well acquainted with the principal collecting grounds. Hence, on Saturday, 14th September, eight members of the Club, including two ladies, after some varied experiences due to the confusion of many trains and crowds of passengers, ultimately assembled on the Bendigo station, where they were met by our fellow-member, Mr. D. J. Paton, and Miss Paton. The journey to Bendigo was not without interest either to the student of humankind or to the lover of nature in its less highly developed forms. There is no railway section in Victoria of like extent so varied in feature as that to Bendigo. Passing over the almost treeless basaltic plains of Keilor, dotted here and there by old volcanic vents, and occasionally traversed by deep-cut water-courses, the country rises towards the Divide and the heavily-timbered Macedon forest; thence the course is through mountainous or hilly country, mostly of Silurian and Ordovician sedimentary rocks, in which the quartz reefs occur, interspersed with areas of Plutonic rocks such as granite, granodiorite, and porphyry, and Tertiary deposits, in which the alluvial of the goldfields is deposited. Passing the Divide, one sees the extensive Malmsbury reservoir and the Coliban water-race, which supply Bendigo and the vicinity, as well as a large area of orchards and market gardens north of Castlemaine, with water. The thriving town of Castlemaine, the productive apple orchards of Harcourt, the granitic ranges over which Mount Alexander prominently stands out, are passed through before entering the Big Hill tunnel, at whose further extremity the Ordovician measures again commence in the rich auriferous zones of the Bendigo goldfield. Glimpses of floral luxuriance inviting observation were frequently seen in the railway cuttings or along the slopes of hills adjacent to the permanent way, and spring everywhere clothed mountain, hill, and dale with her verdant or enamelled covering. Before the last members of the scattered contingent were gathered in at Bendigo, and arrangements made for accommodation, it was after mid-day. Then the party proceeded by tram to Back Creek, whence a divergence was soon made into the bush in a southerly direction, along the hills where the outcropping

but unfortunately barren quartz reef shows the southern extension of the famous Garden Gully line to Spring Gully, the farthest point at which shafts have been sunk without striking a profitable lode. These ranges are mostly covered with a secondary growth of ironbark trees, both red and grey, *Eucalyptus sideroxylon* and *E. paniculata*, interspersed with the fragrant Golden Wattle, *Acacia pycnantha*, the Gorse Bitter Pea, *Daviesia ulicina*, whilst purple Tetrathecas, yellow Hibbertias, the Heathy Parrot-Pea, *Dillwynia cricifolia*, Droseras, and the humbler liliaceous plants grew beneath. *Cassinia arcuata*, Drooping Cotton-bush, grows thickly along the lower slopes. Near the outflow in the cutting at Spring Gully reservoir is a good example in vertical section of a synclinal axis, marking "centre-country" on the Garden Gully line of reef, in connection with the saddle-reef formations for which Bendigo is famous. Here a halt was made for our long-deferred lunch, after which we followed for some distance the water-race, amid a profusion of blooming Fairy Wax-flower, *Eriostemon obovalis*, *Dillwynia cricifolia*, *Hardenbergia monophylla*, *Grevillea aquifolia*, and *Acacia armata*, all in fine flower, sprays of the latter being unusually beautiful. Leaving the race, a course was taken south-west towards Diamond Hill, where an extensive but isolated patch of the pink and white *Boronia anemonifolia*, bearing distinctive leaves, perfumed the air with its strong but not unpleasant scent. From here we passed in an easterly direction through the bush towards One-Tree Hill, at the foot of which three members of the party left us to return by road to the railway station, the remainder making the ascent of the hill, on which grew more robust trees, chiefly *Eucalyptus melliodora*, *E. viminalis*, *E. macrorhyncha*, *E. amygdalina*, as well as the ironbarks. From the summit of the hill a very extensive view is obtainable. To the south, over the ranges, Mount Alexander loomed prominently, with lordly Macedon in the distance; eastward could be discerned Mounts Ida and Pleasant, in the direction of Heathcote; northwards, beyond the adjacent ranges, the flat, alluvial plains to the Murray were almost unbroken in contour, the Whipstick Scrub showing distinctly; north-west, on the horizon, were isolated hills or peaks, probably Mount Korong and Pyramid Hill; while westward, past the reservoir, were ranges connected with the Big Hill spur. Spreading away from the outskirts of the bush at our feet, the "Golden City" itself, with its hills and valleys, from which 20 million ounces of gold have been taken, stretched along the Bendigo Creek basin. On the slope at the back of One-Tree Hill was a specimen of *Acacia implexa*, and the common Rock Fern, *Cheilanthes tenuifolia*, and Maiden Hair grew in the moister soil. From here we

followed the track for some distance through the bush, *Acacia pycnantha*, with its lovely blooms, arousing our admiration. Then, leaving the track, return was made as direct as possible to the tram terminus, the city being reached about 7 p.m. Owing to the lack of abundant rain, the bush was not so moist as usual in September, and in consequence some flowers were not at their best. Orchids were rare, *Glossodia major*, *Diuris longifolia*, *Caladenia carnea*, *Pterostylis nutans* (a very fine patch) being observed. The most notable features were the unfailing profusion of the Wax-flower, the gregarious habit of the Anemone Boronia, and the splendid bloom of *Acacia pycnantha*, *A. diffusa*, and *A. armata* amid the ironbark trees. The Geebung, *Persoonia rigida*, was in fruit, also the Cranberry, *Astroloma humifusa*. No Loranthus (Mistletoe) was seen, the ironbarks especially, as the name would indicate, being unsuitable as a host for the parasite.

Next day the intention had been, first, to inspect transversely the main lines of reef along the most productive auriferous zone; but the party, being more interested in the flora, grudged the time, so proceeded by tram at 10 a.m. to Eaglehawk, the north-western extremity of the field. Opportunity was taken *en route* to note incidentally the main lines of reef—New Chum and Victoria, Garden Gully and Hustler's—the many abandoned claims and dismantled plants showing that gold-mining has indeed fallen on evil days. At Eaglehawk, passing through the well-kept public gardens by Lake Neangar, we proceeded under Mr. Paton's guidance to Lightning Hill, which commands a good view. The extensive surface workings, showing the outcropping reef formation and quartz spurs, were inspected; then we proceeded to the fringe merging into the Whipstick Scrub, which in its vegetation is somewhat distinct from the range country, although a continuation of the same auriferous area. The ground is gently undulating, and the soil drier and hotter, so we found earlier flowering than at Spring Gully, and other differences in a changed environment. The eucalypts of the scrub were smaller, more resembling in growth those of the Mallee, *E. viridis*, a Mallee species, being strongly characteristic of the area. *Acacia pycnantha* had faded, but *A. acinacea* was in very fine bloom, whilst the rarer *Acacia calamifolia*, here in luxuriant growth, although slightly past its best, still showed some beautiful masses of golden blossoms, and a little earlier must have made a glorious show along the Raywood road. The Eriostemon was neither so plentiful nor so full of bloom. *Correa speciosa* was very poor. *Tetratheca ciliata* was in good flower. *Brachylome daphnoides*, in bud in the ranges, was here in flower and fruit, as was also *Leptomeria aphylla*, the Leafless

Currant-bush, with its acid fruits. Some interesting and peculiar scrub plants were the pretty Shrub Violet, *Hybanthus floribundus*, the rarer *Westringia rigida*, with its variety *Grevilleana*, *Crowea axillaris*, closely allied to the Wax-flower, also the Star-hair, *Asterotricha ledifolia*, and *Melaleuca decussata*, the Cross Honey-Myrtle. *Boronia anemonifolia* was found dispersed through the scrub. Orchids were represented by *Caladenia carnea*, *C. cærulea*, *C. congesta*, *Diuris longifolia*, *Pterostylis longifolia*, *P. nutans*, and *P. mutica*. *Calythrix tetragona*, the common Fringe Myrtle or Hair-cup, was beginning to flower. Patches of *Loudonia Behrii* were just ready to burst into their golden pennants. *Exocarpus cupressiformis*, with immature fruits, *Casuarina quadrivalvis*, *C. distyla*, and *Hakea rugosa* were represented. A feature of the scrub was the great prevalence of *Cassytha melantha*, the large Dodder Laurel, often strangling its host or weighing its victim to the ground. On humbler plants *C. glabella*, the Tangled Dodder-Laurel, was equally destructive. A few plants of *Marianthus procumbens* and *Prostanthera hirtula* were seen. *Hibbertia acicularis*, in profuse bloom, was gay with its guinea flowers, whilst three or four species of the Droseras glittered in the sun. We had lunch at the Blue Jacket reservoir, which supplies Raywood with water, and found on our trip that the water-races which we encountered were of great advantage to us and the flora alike. We further explored the scrub as far as Wallace's Reef, spending a very interesting time. Birds were not very numerous at our visit. We heard or saw the Brush Wattle-bird, the Harmonious Thrush, the Pallid and the Bronze-Cuckoos (the latter calling continuously), the Derwent Jackass, and Welcome Swallows. At lunch two New Holland Honey-eaters fluttered trustfully around us. It was interesting to note the differences, not only in time of flowering, but in character and growth, of the many plants common to the ranges and the scrub. The delimitation of species to one area or the other, owing to situation and environment, was also noticeable. One is rather surprised to find in such unpromising places, where the stony ribs of the earth are so scantily covered with soil, that there is such a variety and profusion of flowers. This excursion can be profitably repeated, the Bendigo district offering, within easily accessible distances, three or four types of vegetation worthy of study and interesting for comparison. The party returned to Melbourne early on Monday morning, having thoroughly enjoyed the outing, which our enthusiastic fellow-member, Mr. D. J. Paton, and Miss Paton did everything in their power to make pleasant.—C. DALEY.

AN ORNITHOLOGICAL TRIP TO THE NHILL DISTRICT.

By F. ERASMUS WILSON.

(*Read before the Field Naturalists' Club of Victoria, 9th Sept.*, 1918.)

(*Continued from page* 100.)

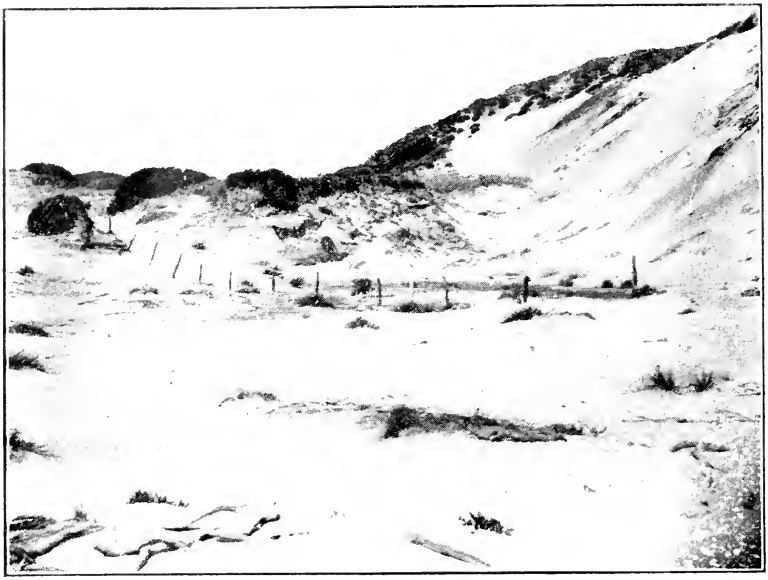
Following is a detailed list of the birds observed during the trip. A longer sojourn in the district would probably have enabled me to add several more species, particularly amongst the aquatic birds:—

Emu (*Dromaius novæ-hollandiæ*).
Mallee-Fowl (*Leipoa ocellata*).
Ground-Dove (*Geopelia tranquilla*).
Bronze-winged Pigeon (*Phaps chalcoptera*).
Black-throated Grebe (*Podiceps gularis*).
Spur-winged Plover (*Lobivanellus lobatus*).
Black-breasted Plover (*Zonifer pectoralis*).
Straw-necked Ibis (*Carphibis spinicollis*).
White-fronted Heron (*Notophoyx novæ-hollandiæ*).
Maned Goose (*Chlamydochen jubata*).
Mountain-Duck (*Casarca tadornoides*).
Little Pied Cormorant (*Phalacrocorax melanoleucus*).
Whistling-Eagle (*Haliastur sphenurus*).
Brown Hawk (*Hieracidea berigora*).
Kestrel (*Cerchneis cenchroides*).
Boobook Owl (*Ninox boobook*).
Musk Lorikeet (*Glossopsitta concinna*).
Purple-crowned Lorikeet (*Glossopsitta porphyrocephala*).
Black Cockatoo (*Calyptorhynchus funereus*).
Rosella (*Platycercus eximius*).
Ring-necked Parrot (*Barnardius barnardi*).
Yellow-vented Parrot (*Psephotus xanthorrhous*).
Red-backed Parrot (*Psephotus hæmatonotus*).
Swift Parrot (*Lathamus discolor*).
Owlet Nightjar (*Ægotheles novæ-hollandiæ*).
Great Brown Kingfisher (*Dacelo gigas*).
Sacred Kingfisher (*Halcyon sanctus*).
Spotted Nightjar (*Eurostopodus guttatus*).
Pallid Cuckoo (*Cuculus pallidus*).
Narrow-billed Bronze-Cuckoo (*Chalcococcyx basalis*).
Bronze-Cuckoo (*Chalcococcyx plagosus*).
Welcome Swallow (*Hirundo neoxena*).
Tree-Martin (*Petrochelidon nigricans*).
Brown Flycatcher (*Micræca fascinans*) (*M. f. howei*).
Scarlet-breasted Robin (*Petroica leggii*).
Red-capped Robin (*Petroica goodenovii*).
Short-billed Tree-Tit (*Smicrornis brevirostris*).
Crested Bell-bird (*Oreoica cristata*).
Southern Whistler (*Pachycephala meridionalis*).
Gibert Whistler (*Pachycephala gilberti*).
White-shafted Fantail (*Rhipidura albiscapa*).
Black-and-White Fantail (*Rhipidura motacilloides*).
Restless Flycatcher (*Seisura inquieta*).
Black-faced Cuckoo-Shrike (*Graucalus melanops*).
White-shouldered Caterpillar-eater (*Campephaga humeralis*).

Scrub-Robin (*Drymodes brunneopygius*).
Rufous-rumped Ground-Wren (*Hylacola cauta*).
Australian Babbler (*Pomatorhinus temporalis*).
White-browed Babbler (*Pomatorhinus superciliosus*).
Brown Song-Lark (*Cinclorhamphus cruralis*).
Rufous Song-Lark (*Cinclorhamphus rufescens*).
White-fronted Bush-Chat (*Ephthianura albifrons*).
Winiam Tit (*Acanthiza winiamida*).
Buff-tailed Tit (*Acanthiza reguloides*).
Yellow-tailed Tit (*Acanthiza chrysorrhoa*).
Striated Tit (*Acanthiza lineata*).
Red-rumped Tit (*Acanthiza pyrrhopygia*).
Blue Wren-Warbler (*Malurus cyaneus*).
Purple-backed Wren-Warbler (*Malurus assimilis*).
Wood-Swallow (*Artamus sordidus*).
Grey Shrike-Thrush (*Colluricincla harmonica*).
Pied Grallina (*Grallina picata*).
White-winged Chough (*Corcorax melanorhamphus*).
Whiteface (*Aphelocephala leucopsis*).
Black-capped Tree-runner (*Neositta pileata*).
Brown Tree-creeper (*Climacteris scandens*).
White-eye (*Zosterops dorsalis*).
Red-tipped Pardalote (*Pardalotus striatus*).
Yellow-rumped Pardalote (*Pardalotus xanthopygius*).
Brown-headed Honey-eater (*Melithreptus brevirostris*) (*M. atricapillus mallee*).
Tawny-crowned Honey-eater (*Glyciphila fulvifrons*).
White-fronted Honey-eater (*Glyciphila albifrons*).
Western White-eared Honey-eater (*Ptilotis novæ-norciæ*).
Yellow-plumed Honey-eater (*Ptilotis ornata*).
White-plumed Honey-eater (*Ptilotis penicillata*).
White-bearded Honey-eater (*Meliornis novæ-hollandiæ*).
Noisy Miner (*Myzantha garrula*).
Red Wattle Bird (*Anthochæra carunculata*).
Spiny-cheeked Honey-eater (*Acanthogenys rufigularis*).
Australian Pipit (*Anthus australis*).
Spotted-sided Finch (*Stagonopleura guttata*).
Australian Raven (*Corvus australis*).
Black-winged Bell-Magpie (*Strepera melanoptera*).
Butcher-bird (*Cracticus*, sp.)
Black-backed Magpie (*Gymnorhina tibicen*).

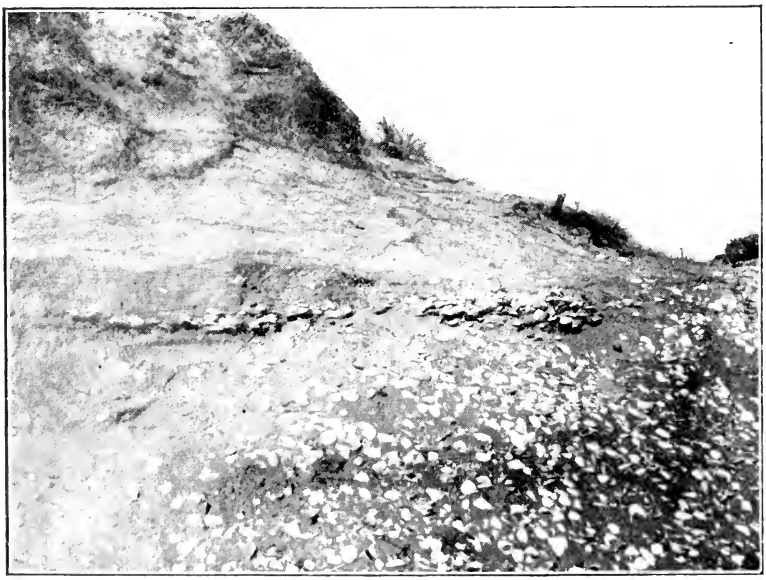
USEFUL VICTORIAN PLANTS.—The October part of the *Journal of Agriculture of Victoria* contains two articles from the pen of Mr. J. W. Audas, F.L.S., of the National Herbarium. The more important, entitled "Indigenous Fibrous Plants of Victoria," lists some fifty-six trees, &c., from which fibres can be obtained. The cultivation of many of these would, however, have to be undertaken, as at present they do not grow in sufficient quantities at any one place to render their treatment profitable. The second article, dealing with the Sunflower and its many valuable qualities, is worth the attention of stock-raisers.

PLATE I.—Fig. 1.



GENERAL VIEW OF KITCHEN MIDDENS ON WILSON'S PROMONTORY.

Fig. 2.



OLD KITCHEN MIDDEN.
Unearthed by the wearing away of a sand hummock.

PLATE II.—Fig. 1.

GENERAL VIEW OF NATIVE OVEN NEAR KOONDROOK.
Behind the trees a swamp leads down to the River Murray.

Fig. 2.

NATIVE SKELETON IN SITU IN AN OVEN NEAR KOONDROOK.
The body was placed lying on its right side.

KITCHEN MIDDENS AND NATIVE OVENS.

By Sir Baldwin Spencer, K.C.M.G., F.R.S., D.Sc.

(*Read before the Field Naturalists' Club of Victoria, 13th May*, 1918.)

During a recent visit to the National Park, at Wilson's Promontory, Mr. C. French and myself spent a considerable amount of time investigating the kitchen middens that cover many acres of ground on its western shores. Though there is nothing of any special importance in connection with them, yet there are one or two points that are perhaps of sufficient interest to record—all the more because we have very few detailed accounts of any kitchen middens in Victoria. We read, for example, in Brough Smyth's "Aborigines of Victoria" that "on the coasts of Victoria . . . they are found to consist mainly of one kind of shell—namely, the mussel, *Mytilus dunkeri*, with a small proportion of the "mutton fish," *Haliotis nivosa*, the periwinkle, *Lunella undulata*, and the cockle, *Cardium tenuicostatum*."

The middens examined by Mr. French and myself were those extending along the coast northwards from the mouth of the Darby River to about half-way to the entrance to Shallow Inlet. Wherever there is a little valley amongst the sand-hills, there the surface is strewn over with shells, that may be scattered more or less irregularly over the depression and up the sides of the hills, or may be gathered together in more definite and restricted heaps.

The sand is very light, and is continually blown about, first one way and then another, by the strong winds, which alternately expose and cover the shells and material of various kinds in the middens. For the most part the shells and other remains form a simple layer on the ground surface, and in many cases look as if the natives had only comparatively recently been holding a feast, except that their great number and the acres of ground that they cover indicate that they represent the accumulations of a long period of time. In other cases, however, they occur in layers that may be several feet below the surface. One such layer is fortunately exposed on the face of a miniature sand cliff, a short distance to the north of Buckley's Rocks. It lies about six feet below the surface of a depression amongst the sand-hills, close to the foot of one of these. As the illustration shows, it has been exposed to view by the gradual wearing away of the sand-hill by which it must once have been covered. The latter is now overgrown with small shrubs and herbage, indicating the fact that a very long time has passed by since the natives fed upon these particular molluscs and left their shells on what was then the ground surface. The outcrop of this special layer

of shells is seen in fig. 2, Plate I. The foreground surface is covered with shells which have been exposed by the shifting of the sand. They may be of comparatively recent date, but the layer on the left-hand side, which is seen projecting from the surface of the sand-dune, must be of some considerable age. Probably many of those in the foreground have been derived from this layer by the gradual wearing back of the face of the little cliff.

There are doubtless many other layers of shells representing old "middens" hidden away under the sand-hills—in fact, in the few places where tracks have been made, as at the mouth of the Darby River, cuttings through the sand and loamy ground have revealed abundant remains of shells, and more especially the opercula of *Turbo undulatus*, indicating the fact that it is long ago since the aborigines first made their camping-ground on the shores of the Promontory.

There are, at the same time, two lines of jagged, rocky reefs running out into the sea a little way to the north of the Darby River, and evidently it was from these that the aborigines derived their main supply of shell-fish. At the present time, though but few shells are seen on the beach, this is strewn with endless numbers of the opercula of *Turbo undulatus*. It is a curious feature that, whilst these opercula are so plentiful, there are very few shells, or even fragments of them, thrown up on the sandy, shelving shore. It must mean that the opercula are more difficult to destroy than the shells; in fact, one can imagine that they could easily, when detached from the soft parts of the animal, be washed ashore and buried on the beach, whilst the shells would become filled with sand, and, weighted in this way, would easily be pounded into fragments when dashed against the rocks or hurled on the sand by the huge breakers that incessantly pound on the shore-line.

The middens contain the remains of various species of mollusca, together with very crude forms of stone implements that the aborigines used for the purpose of smashing the shells. These consist of fragments derived from the adjacent dune sandstone, of small masses of quartzite evidently obtained from the hills in the interior of the Promontory, and of very roughly flaked pieces of chert, the nearest supply of which lies at least 40 miles away, so that it must have been carried here by the natives. There is no doubt whatever that these stone implements, which are scattered about amongst the broken shells on the little flats among the sand-dunes where there is no local outcrop of rock, were made, carried here, and used by the aborigines. They are of the crudest possible form, and, if found away from such indubitable evidence of their actual use, would be difficult to recognize as of human manufacture.

However, in this particular case there is fortunately no doubt whatever in regard to their human origin. It is only very rarely that any well-made implement is found in the middens, which do not indicate the permanent camps of the natives. They were only, so to speak, temporary eating-places—the real camping-grounds lying further inland. We only found one ground axe, and, previously, Mr. Kershaw met with a bone awl; but such more highly developed implements are of rare occurrence, and must have been accidentally left behind.

The following is a list of the mollusca found in the various middens, for the identification of which I am indebted to Mr. J. A. Kershaw. The only other traces of animal life, with one exception referred to later, were a few fragments of claws of the rock lobster, Palinurus, sp., and broken bones of birds, but it is very doubtful how far these are to be regarded as genuinely associated with the middens :—*Haliotis nævosa, Turbo undulatus, Scutus anatinus, Ostrea edulis, Lotorium spengleri, Arca lobata, Voluta papillosa, Purpura succincta, Donax epidermia, Patella tramoserica, Natica plumbea, Mytilus latus, Mytilus rostratus, Mactra rufescens,* and Chiton, sp.

In the great majority of cases various species were found mingled together and often strewn irregularly over considerable areas of ground (fig. 1); but in some middens there were heaps, three or four feet in diameter, composed of only one species, as in the case of *Turbo undulatus,* which, with its opercula, was the most largely represented form; *Patella tramoserica, Donax epidermia, Purpura succincta,* and *Mytilus rostratus.* Deposits of the latter especially were found here and there amongst the fine loamy soil forming the hillocks on the southern bank of the Darby River, a little way in from its mouth. On the north bank of the stream there is also, where the track comes down steeply to the old foot-bridge, a deposit of the same fine loamy material, with abundant remains of ancient middens.

In relatively only a few cases we found traces of charred wood and of the effects of fire on shells, more especially of Turbo and its opercula, that had evidently been cooked in hot ashes; but, for the most part, the animals had been eaten in the fresh state, just as the civilized man now eats his oyster.

As already stated, these shells and crude stone implements indicate the temporary feeding-places of the natives, and not their camping-grounds; but in one case we came across the remains of a native. The bones, consisting of parts of the cranium, the lower jaw, ribs, arms, and leg bones, were lying exposed on the surface of a small midden, mixed up with the remnants of shells. They were all more or less friable, and had evidently been uncovered and re-covered, time after time,

by the drifting sand. Whether the body had been deliberately buried or whether the native had chanced to die on the spot and his body had been left on the surface, it is impossible to say; but there was at least no evidence of definite burial, and the bones lay on the surface amongst the remnants of the shell-fish, on which he had probably been feeding. This is, so far as I know, the only record of remains of an aboriginal in the coastal kitchen middens, but in the interior of Victoria human skeletons are not infrequently found buried in what are usually described as "native ovens," "mirnyong heaps," or "mirnyongs." These have been referred to by Brough Smyth,* who says:—"They occur, so far as I am aware, only in the eastern and south-eastern parts of Australia, where the soil is less absorbent and the climate wetter, and in some parts colder than the sandy Territory of Western Australia. . . They are found in the valleys of rivers and creeks, on the margins of lakes and lagoons, just inside the 'points of timber' or portions of forest which project into the plains, on rising grounds in the plains, near the seashore, and in every locality where fish, game, or food of any description is to be found. The positions of the mirnyongs have been carefully selected, so that, as far as possible, the occupants may obtain an extensive view of the surrounding country, while they themselves are screened from any passer-by."

There is some considerable discrepancy in the accounts of these mounds, ovens, or mirnyongs, under all of which names they have been indiscriminately described, but it is possible that the names as used, for example, by various writers in Brough Smyth's work are applied to two different structures by different workers. One is led to suspect that this may be so partly because they seem to be roughly divided into two series by their shape, and partly because of the nature of their composition and contents. Those of the one set are more or less elongate or oval in shape. Of these Brough Smyth† says:—"There are numerous old *mirrn-yong* heaps on the banks of the River Plenty, on the Darebin Creek, and the Merri Creek, near Melbourne. . . They are in general of an oval shape, about one hundred feet in length and about forty feet in breadth, and rising to a height of twelve feet or more. They are composed of burnt clay, a little soil, quantities of charcoal and ashes, burnt and unburnt bones, and stones. They enclose numerous fragments of black basalt, chips of greenstone, in some places whole and broken tomahawks, and in more than one have been found human skeletons, as if they

* Brough Smyth, "Aborigines of Victoria," vol. i., pp. xxxvi. and 238; vol. ii., p. 233.

† *Op. cit.*, vol. i., p. 239.

had been used in later times as places of burial." These are, without doubt, the remains of cooking grounds.

Those investigated and described by Mr. Etheridge,* on the North-West Bend of the River Murray, near to Morgan, evidently also belong to this series, and were genuine cooking mounds or "ovens." In regard to them Mr. Etheridge says :— "They consist of oval, or, at any rate, longer than broad depressed mounds, often of considerable extent, as much as one hundred feet long, made up of soil, burnt clay, wood ashes, charcoal, burnt fresh-water shells, burnt and unburnt bones, tomahawks (whole or fragmentary), chips of other rocks, and works of industry, such as bone awls, bone nose-ornaments, and the less perishable articles of aboriginal everyday use. Within these heaps the scattered cooking places, composed of stone, occur, each site having been used by generation after generation of blacks, and the entire mass slowly heaped together, thus representing the work of a long period of years."

On the other hand, there is a second series which are always approximately circular in outline, very much in general appearance like huge mound-birds' nests. It is these that are evidently referred to by Chauncy † as existing close to the outlet of Lake Connewarren, near to Mortlake. Unfortunately, he gives no details except as to size. They vary in diameter from 99 feet with a maximum height of five feet to 75 feet with a maximum height of three and a half feet.

In 1898 Mr. R. H. Walcott, Mr. C. French, jun., and myself investigated some of these "native ovens" close to Koondrook, on the Murray River. The latter is here bordered by swamp land covered with gum-trees, many of which are marked with great scars, showing where the natives secured the bark out of which they made their primitive canoes. On the margin of this swamp land, where it gives place to the wide, open plains that stretch for long distances back from the banks of the Murray River, there are many of these mounds or "ovens." A careful examination of ten of these, the general structure and form of which is shown in Plate II., fig. 1, affords really very little indication as to their origin and use. So far as we could discover, the mounds are composed of loose soil with lumps of material looking much like burnt earth ; but we found, except for the latter, no traces of anything that could indicate their having been used continuously as "ovens." We dug trenches right across the mounds, which varied in diameter from 20 to 40 feet, their greatest height being not more than

* R. Etheridge, Proc. R.S., S.A., vol. xvii., p. 22.

† In Brough Smyth's "Aborigines," vol. ii., p. 232.

five feet above the ground level. There was no sign of the alluvial soil being disturbed. In whatever way the mounds had been formed, the material of which they were constructed had been gradually heaped up on the original ground surface. We found no trace of charred wood or stones, nor any remains of animals that had been cooked—in fact, nothing whatever to indicate that they had been used as ovens. It is most unfortunate that none of the early settlers, so far as I can ascertain, have given us any sufficiently definite first-hand information in regard to these remarkable structures. Dawson's account,* though apparently he had never seen them in use, is the best. He says that they " were the sites of large, permanent habitations, which formed homes for many generations. . . The vast accumulation of burnt earth, charcoal, and ashes which is found in and about them is accounted for by the long continuance of the domestic hearth. . . They never were ovens, or original places of interment. . . They were only used for purposes of burial after certain events occurred while they were occupied as sites for residences—such as the death of more than one of the occupants of the dwelling at the same time, or the family becoming extinct, in which instance they were called ' muuru kowuutung ' by the Chaa-wuurong tribe . . . meaning ' ghostly place,' and were never afterwards used as sites for residences, and only as places for burial."

In five of those that we examined we found aboriginal skeletons, the bones of some of which had evidently been disturbed by burrowing rabbits. The bodies did not appear to have been buried in any special position, so far as looking towards any special point of the compass was concerned, and the only animal remains that we found associated with them were sixteen tibio-tarsi of the Native Turkey, *Eupodotis australis*, all of which were lying close to one skeleton. The accompanying illustration (Plate II.) will serve to show the nature of the mounds and the position of the bones of one of the skeletons, which in this case was lying on its right side. In view of the habits of the natives, it is difficult to understand the entire absence of any traces, in the form of stone implements, charred wood, shells, or bones, in mounds such as we examined, if they are the remains of permanent dwelling-places. They persist as relics of our aboriginals who have passed away in Victoria, and, beyond the fact that a certain number of them have been used as burying-grounds, we know very little about them, and have no satisfactory explanation, and now never can have, of their primary origin and use.

* " Australian Aborigines," p. 103.

THE GREAT WAR.—The death, in France, while on active service, of Private Gervase E. Somers, at the early age of 19 years, has caused another blank in the family of a country member of the Field Naturalists' Club—Dr. Edgeworth Somers, of Mornington, to whom the sympathy of fellow-members is extended. Dr. Somers's eldest son fell at Gallipoli in 1915, while a third son is serving as a trooper in Palestine.

COMMONWEALTH MILITARY SURVEY OF AUSTRALIA.—Some time ago attention was called (*Vic. Nat.*, xxxiii., p. 143) to several of the military survey maps of Victoria as being useful to naturalists on their excursions. Since that date a map has been issued, entitled "Ballan, Sunbury, Meredith, and Melbourne," on the smaller scale of half an inch to one mile, equal in area covered to four of the maps previously referred to. This includes two of the maps (Sunbury and Melbourne) already issued on the larger scale of one inch to one mile. The present map is of interest to naturalists because it includes the Lerderderg Ranges, north of Bacchus Marsh, and the tract of semi-tableland country known as the Brisbane Range, south-west of that town, of both of which the late Mr. J. G. O'Donoghue was so fond, and gave so many interesting details in vols. xxvi., xxvii., and xxix. of the *Naturalist*. The highest point of the latter is given as 1,403 feet, and the contour lines show how extremely steep is its eastern face, the 700-feet line being little more than a mile away. The map also includes the course of the Moorabool from Bungaree to Lethbridge, a picturesque valley, some 30 miles in length as the crow flies, but considerably longer by the windings of the stream. The map is issued at the same price as the others—viz., one shilling.

NAMES OF VICTORIAN RAILWAY STATIONS.—There has recently been published, in pamphlet form, a handy list of the railway stations in Victoria, with, as far as ascertainable, the origins and meanings of their names. In accomplishing this difficult task, the author, Mr. Thos. O'Callaghan, J.P., ex-Commissioner of Police, must have spent a large amount of time, for such information as he has got together requires a considerable amount of sifting before it can be accepted as correct. It may be thought that such a work has little interest for naturalists, but a glance at its pages will show that a large number of our towns, and hence railway stations, have derived their names from the native names of natural objects in their vicinity. Take, for instance, "Albacutya." This is given as "Native, from Ngelbakutya, sour quondong." In his introductory remarks the author gives a number of origins of prominent places in other Australian States. An interesting

addition which might have been included would have been the year of opening of each station, and so be an authoritative record to be referred to when discussions arise, as they often do, on such a topic. The work, which extends to just 100 pages, has been published by the Railways Commissioners, and is on sale by booksellers at one shilling per copy. It forms a companion volume to similar lists issued by the Railway Departments of South Australia and Queensland. Another work of a similar character which would be extremely useful, and might well occupy the spare time of an enthusiast, would be the origins and meanings of the names of the counties and parishes of Victoria.

The National Park of Tasmania.—In the *Hobart Mercury* of 4th October last, Mr. J. W. Beattie, the well-known photographer, gives an account of a recent trip to the Tasmanian National Park, which is situated near the terminus of the Derwent Valley railway, about fifty miles north-west of Hobart. The park is some 27,000 acres in extent, and includes several alpine lakes, Mt. Field West (4,721 ft.), and other peaks, and the Russell Falls among its scenic features. The vegetation also is very fine, and the reservation should form a splendid haven for native birds and animals. Mr. Beattie credits the park with having scenery such as will satisfy the most exacting of Australian trippers.

White Swallows.—About the middle of November last year I happened to be visiting at one of my father's farms at Moorooduc, when I noticed an apparently white bird in an ordinary Welcome Swallow's nest in a buggy-shed. On a closer investigation I found that there were four young swallows just ready to leave the nest, two of which were pure white with black eyes, the other two being like their parents. I handled them and showed them to others. When I put them back into the nest, they flew out and round the place with their parents. Next morning I could find only one, but as a Boobook Owl was noticed in a pine tree not far away I presume it was responsible for the missing bird. To-day I received a letter from my father in which he mentions that the swallows had built again in the same place, and, as before, two of the young are white. Should any bird-lover be desirous of seeing these birds I will be pleased to give directions as to finding the place, which is about two miles from Moorooduc station, on the Mornington line.—G. J. Flood. Titles Office, Melbourne, 14th October, 1918.

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, 11th November, 1918.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about sixty members and visitors were present.

DECLARATION OF SIGNING OF ARMISTICE.

The chairman announced that the news had just been posted at the newspaper offices that a cessation of hostilities between the Allied nations and the Germans had taken place that morning, and that the terms of the armistice had been accepted by the German delegates. The meeting immediately rose *en masse* and sang the National Anthem, concluding with three cheers for the King.

REPORTS.

A report of the excursion to Ringwood on Saturday, 19th October, for physiography and orchids, was given, as regards the former object, by the leader, Mr. F. Chapman, A.L.S., who reported a large attendance of members and friends. The afternoon turned out very pleasant, and the view from "Pinemont," which was the vantage-point from whence the physiography of the district was pointed out, was very fine. After discussing the various features in the landscape, the party turned towards Mitcham, examining on the way a quarry on the bank of the Mullum Mullum Creek, where some years ago fragments of a brachiopod were secured by Dr. E. O. Thiele. Mr. C. French, who acted as leader for orchids, reported that about thirteen species were noted during the afternoon, of which *Calochilus Robertsoni*, *Caladenia suaveolens*, and *Thelymitra ixioides* were the most uncommon.

A report of the excursion to South Morang on Saturday, 26th October, was given by Mr. P. R. H. St. John, who acted as leader in the absence of Mr. G. A. Keartland through illness. The party crossed the Plenty by the new bridge, and spent some time in exploring the hills on the eastern side, the country being of quite a different character to the basaltic plateau on the western side. Both flowers and birds were scarce, but the picturesque views along the stream to some extent compensated for the dearth of natural history specimens. Tea was taken

at the hotel, and an hour or so spent in pleasant chat before the train left for town.

A report of the excursion to Labertouche, *via* Longwarry, on Tuesday, 5th November (Cup Day), was, in the absence of the leader, Miss C. Currie, given by Mr. F. G. A. Barnard, who said that a fair party had gone from town to Longwarry, where they were met by the Messrs. Currie, Hardie, and Crabb, and driven out to the Boronia patch, situated alongside the Labertouche Creek, in the parish of Jindivick. The ground covered by the party was much the same as on the previous occasion, as reported in the *Naturalist* for January last. The Boronia, *B. pinnata*, was found to be in fine condition, and the visitors were greatly charmed with the effect produced by the masses of delicately perfumed flowers. With the exception of *Drymophila cyanocarpa*, the other plants seen in flower were not particularly noteworthy. Among the ferns collected was *Lomaria Patersoni*, a species not common so near Melbourne. Birds were not numerous, but the Bell-Miner was heard several times.

On the motion of Messrs. Barnard and Coghill, a hearty vote of thanks was accorded to Messrs. T. B. Currie, A. B. Currie, W. B. Hardie, and F. Crabb for their kindness in providing vehicular accommodation and other hospitality on the occasion.

ELECTION OF MEMBERS.

On a ballot being taken, Miss B. Jennings, 70 High-street, Malvern, was duly elected an ordinary member, and Miss E. Mackenzie, 5 Clissold-street, Ballarat East, as a country member of the Club.

GENERAL BUSINESS.

The chairman said that he had during the day received a communication from the secretary of the Forest League (Victorian branch), stating that the proposal to have the western portion of Kangaroo Island, South Australia, set aside as a national park was to come before the South Australian Parliament that afternoon, and requesting him, if possible, to wire to Capt. White, of Adelaide, the Club's support of the proposition. He had communicated by telephone with a number of members, who were unanimous in their desire to further the proposed reservation, and he had therefore wired Capt. White to that effect.

Mr. F. G. A. Barnard said that he knew the Field Naturalists' section of the Royal Society of South Australia had been for some years endeavouring to have the reservation made, and moved that this meeting endorse the president's action. The

motion was seconded by Mr. J. L. Robertson, and carried unanimously.

The chairman also drew attention to the exhibition of flower and bird paintings executed by Mrs. Ellis Rowan, now on view at the Art Society's rooms, Alfred-place, stating that they were well worthy of inspection. The subjects were mainly New Guinean, and some exceedingly beautiful flowers were represented. Some coloured drawings of Mount Macedon fungi were in themselves worth seeing.

PAPER READ.

By Dr. Griffith Taylor, B.E., B.A., F.G.S., entitled "Science in Antarctica."

This took the form of a lecturette illustrated by lantern slides. The lecturer, who was a member of the Scott Expedition to the South Pole in 1910–14, gave an account of the different scientific investigations carried out on board the vessel as it proceeded south. He then described the surroundings of the winter quarters, with some account of the bird and animal life in the vicinity.

The chairman congratulated the lecturer on the interesting nature of his remarks, and said that, considering the excitement all around on account of the signing of the armistice, if the lecture had not been so interesting the audience would have left the room long before its conclusion.

REMARKS ON EXHIBITS.

Mr. F. G. A. Barnard called attention to some micro-photographs of different objects made by Mr. Garriques, of Broken Hill, who would be glad to correspond and exchange with other workers in the same direction.

EXHIBITS.

By Mr. J. W. Audas, F.L.S.—Twenty-five species of flowering plants from Grampians, collected November, 1918, including *Calectasia cyanea*, R. Br., Blue Tinsel Lily; *Melaleuca squamea*, Lab., Mealy Honey-Myrtle; *Grevillea oleoides*, Sieb., Olive Grevillea; *Pultenæa stypheliodes*, Cunn., Heathy Bush-Pea; *Phebalium pungens*, Bth., Prickly Phebalium; *Epacris paludosa*, R. Br., Swamp Heath; and *Lhotzkya genetylloides*, F. v. M., Snow Myrtle. Also the following peculiar to the Grampians:—*Pultenæa rosea*, F. v. M., Rosy Bush-Pea; *Stylidium soboliferum*, F. v. M., Bristly Trigger Plant; *Bauera sessiliflora*, F. v. M., Showy Bauera; *Leucopogon thymifolium*, F. v. M., Thyme Beard-Heath; *Pultenæa Benthami*, F. v. M., Grampians Bush-Pea; also the orchids *Caladenia angustata*, Lindl., and *Calochilus cupreus*, Rogers, both new for Victoria.

By Miss C. Currie.—Flowering specimens of *Boronia pinnata*, Smith, obtained on Labertouche excursion.

By Mr. F. Keep.—Flowering specimens of *Melaleuca densa*, *Prostanthera nivea*, *Jacksonia scoparia*, *Callistemon rigida*, *C. saligna*, and *Leptospermum scoparium* (N.Z. form), grown at Canterbury.

By Mr. C. Oke.—Rare Victorian bug, *Peltophora pedicellata* (first record for Melbourne district).

After the usual conversazione the meeting terminated.

EXHIBITION OF WILD-FLOWERS.

THE Melbourne Town Hall was a brilliant scene on Tuesday, 1st October, 1918, the occasion of the Field Naturalists' Club's annual exhibition of wild-flowers, the net proceeds being again handed over to the Y.M.C.A. for its National Fund for Soldiers. The exhibition was opened in the afternoon by the Lord Mayor (Cr. Stapley), who, in his remarks, referred to the suitability of many native plants for garden culture, as evidenced by the splendid collection forwarded by Mr. J. Cronin, Director of the Botanic Gardens, representative of the large number of indigenous shrubs, &c., cultivated there. At one time Australian flowers were, he said, reported to be scentless, and the birds without song, but these assertions had long been dispelled, and he thought Australian boys and girls could love their wild-flowers quite as much as English children loved their buttercups and daisies, or the Scotch lassies their bluebells. He commended the Club for donating the proceeds to patriotic purposes. The president of the Club, Mr. A. D. Hardy, F.L.S., in proposing a vote of thanks to the Lord Mayor for opening the proceedings, said that the Field Naturalists' Club was not solely responsible for the exhibition. Many friends outside had co-operated with members by forwarding flowers, and the Microscopical Society of Victoria had provided a large number of microscopes, by which the more intricate portions of the flowers could be made plain. There was a large attendance of members and the general public, especially in the afternoon, when it was difficult to get near some of the more interesting exhibits.

The display of flowers was quite equal to that of previous years, and included specimens from every Australian State. The Western Australian specimens—"kangaroo-paws," everlastings, &c.—obtained mainly through the efforts of Miss Amy Fuller, elicited a great deal of admiration, while the Waratahs from New South Wales were equally popular. The display of cultivated indigenous flowers made by the Melbourne

Botanic Gardens was very fine, and included representatives of other Australian States.

It is impossible to record the flowers sent by the various exhibitors, owing to the limited time available for opening them up and arranging their display. The Club is, however, indebted to the following persons for the interest they took in the exhibition, which was shown by the valuable contributions forwarded. The principal inter-State exhibitors were :—New South Wales.—Mr. J. H. Maiden, I.S.O., Botanic Gardens, Sydney (representative New South Wales flowers) ; Mr. D. W. Shiress, Sydney ; Mr. W. Gall, Broken Hill (Sturt's Desert Pea) ; Mr. B. Chalker, Hilltop ; and Mr. W. R. D. Baker, Kamarah. Queensland.—Director Botanic Gardens, Brisbane ; Miss F. Bage, Brisbane ; and Miss Wade, Toowong. South Australia.—Mr. J. F. Bailey, Botanic Gardens, Adelaide ; Mr. F. G. A. Barnard (Sturt's Desert Pea, from Tarcoola). Western Australia.—Miss Amy Fuller, Melbourne (from various localities) ; Miss Meinke, Laverton ; Mrs. Buchanan, Dumbleyung ; Mrs. Hill, Yalgan ; Mr. J. G. Drummond, Moora and Dandargan ; Mr. Fisher, Perth ; Mr. F. G. A. Barnard (" kangaroo-paws," from Kelmscott). Tasmania.—Mr. C. Lord, Hobart (on behalf of Field Naturalists' Club and National Park Trust) ; and, in addition, there were several parcels without names of senders.

In the Victorian section the principal exhibit was that from the Grampians, for which Miss G. Nethercote, Miss Perry, Messrs. C. Daley, C. J. Gabriel, H. Hughes, and other friends were responsible. The exhibit included very fine specimens of the Native Heath, *Epacris impressa*, Thryptomene, the Tinsel Lily, &c. A double-flowered specimen of the Epacris, and flowers of *Pultenæa rosea*, found only on Mount William, were among rarities shown. The other Victorian exhibits represented nearly every portion of the State, as will be seen by the following list :—Walpeup (Mallee), A. J. Crigan ; Homecroft, *via* Warracknabeal, Miss E. Leeisch ; Golton South, *via* Lubeck, Mrs. A. N. Howard ; Hall's Gap, Mrs. E. C. D'Alton ; Ararat, Miss Bainfield ; Greenwalde, near Heywood, M. Egan ; Prairie, J. C. Thomas ; Bendigo, D. J. Paton, J. J. Ditchbourne ; Dunolly, J. A. Hill ; Alma, Master G. Cornthwaite ; Castlemaine, G. Coghill, Miss K. Ramsay ; Mitta Mitta, S. F. Clinton ; Rutherglen, G. H. Adcock ; Lima East, Mrs. Evans ; Creighton, Miss R. Worland ; Kilmore, Miss Hudson ; Kilmore Junction, Miss Johnson ; Greensborough, Mrs. Ford ; Kangaroo Ground, Miss V. Twyford ; Tooolangi, Mrs. A. P. Smedley ; Marysville, Miss K. Keppel, A. D. Hardy ; Warburton, A. W. Grainger ; Warrandyte, Mrs. Hoyle ; Ringwood and Spring Vale, J. W. Audas ; Emerald, W. Scott ; Narre Warren, G.

Haysey; Pakenham, F. Wisewould; Bunyip, Mrs. A'Beckett; Longwarry, Miss E. Wallace; Thorpdale, G. Cornthwaite; Darlimurla, State School; Narracan, T. Savige; Heyfield, Miss L. Kilpatrick, — Best; Nyora, G. Coghill; Yarram, State School; Alberton, Misses A. and G. M'Kerrow; Laverton, T. S. Hart; Hampton and Sandringham, Misses Mitchell and Nokes; Frankston, J. R. Mann; Balwyn and Sassafras, F. Chapman. In addition, cultivated native flowers were contributed by Mr. W. R. Grimwade, Toorak; F. Keep, Canterbury; C. L. Plumridge, Kew.

That the display was an extensive one is evidenced by the fact that about 1,000 square feet of table space was occupied.

An attempt was made to show some of the flowers in their systematic arrangement, but only a few of the more familiar orders could be carried out in the brief time available.

A number of Victorian ferns in pots were exhibited by the Melbourne Botanic Gardens, while another table was devoted to a representative collection of Australian orchids got together by Messrs. E. E. Pescott, F.L.S., and C. French, jun., which comprised about one hundred species.

A beautiful basket of Native Heath, made up from the Grampians exhibit by Miss Barrow, was greatly admired. The same lady arranged a bouquet of native flowers for presentation to the Lady Mayoress by the little daughter of the president of the Club.

Miss Amy Fuller kindly exhibited a series of her wild-flower paintings, which attracted considerable attention.

A ladies' committee undertook the sale of flowers, and was very successful, their only difficulty being the want of flowers to meet the demands of the buyers. A supply of plants of the Western Australian Pitcher Plant, *Cephalotus follicularis*, Lab., also found ready sale. Pot specimens of native plants were also on sale, and it is proposed to collect seeds of various plants, &c., during the present summer, so as to have a supply for sale next year.

A very extensive display of objects under microscopes was made by members of the Microscopical Society of Victoria and other friends. This was a great centre of attraction throughout the afternoon and evening.

Refreshments were in charge of the Y.M.C.A., and by this means further funds were received. Music was delightfully rendered by a ladies' string orchestra.

The thanks of the Club are due to those Club members who, headed by Mr. J. Gabriel, gave up considerable time in helping to carry out the details of the display, and to the Royal Horticultural Society and the Carnation, Dahlia, and Sweet Pea Society for the loan of specimen glasses, &c.

A NATURALIST IN NEW GUINEA.

By F. P. DODD.

(*Read before the Field Naturalists' Club of Victoria, 12th Aug.*, 1918.)

It had long been my wish to visit New Guinea, if only for a few months: so, the opportunity coming last year, I duly left for that naturalists' paradise in May, accompanied by my son, Mr. W. D. Dodd, an experienced entomological and general collector. Our trip was to be purely an entomological one. Before we could get away we had to obtain a "permit" to leave Australia, requiring sundry visits to the Customs Department, the permit extending to February. Earlier it was imperative to undergo vaccination—not in *our* interests, but in those of the natives. This may be a very wise regulation, but to those who had never been in a small-pox district, and North Queensland having been absolutely free from any cases for many years, it does seem a queer one. With passengers from the North-West, Java, Japan, and elsewhere, where small-pox is not rare, the matter is entirely different, but to healthy residents of North Queensland it is excessively annoying to have to undergo the often very unpleasant experience of vaccination. To my gratification, the vaccine did not affect me, so I was granted an immune certificate; but my companion suffered very much, it being painful to see his dreadfully swollen arm, to note his prostration and appearance of severe illness. However, we duly got away by the *Morinda*. On board I was pleased to see Mrs. Ellis Rowan, on yet another journey to carry on her splendid work of flower, and this time, I believe, bird painting. She purposed going hundreds of miles further on, our destination being Port Moresby. Here there was little to interest an entomologist, or even a botanist, for scarcely an insect did we see, and the only trees noticeable were *Eucalyptus platyphylla* and an Angophora, scarcely a shrub, a few species of introduced weeds, and several coarse grasses on the hills around. Our eyes searched the hills, near and far away, which were generally disappointing to look at, but here and there, on several of them, were to be observed dark masses of vegetation—masses usually termed scrubs, which, if searched, would doubtless yield something new or something beautiful.

In Queensland and on board we had heard of the Astrolabe Range, only some twenty miles from Moresby, with its fair Rona Falls, a garden with tropical fruits, &c.: so upon this range, more prominent than the rest, we gazed and speculated, but in the blue distance nothing of its vegetation could be recognized—poorly or densely wooded, we could not tell; however, that range was our objective.

We tarried three days at Moresby awaiting an opportunity to get away. From our home in Kuranda we had brought some thirty pupæ of our giant moth, *Coscinocera Hercules*, so in our room these were hung on a cord : one had emerged and perished on the way, and nearly all the others came out during the three nights in port. The news soon spread that two people were hatching out some big moths, so we had some curious or interested callers. Then we began to hear of a great moth a gentleman had captured on the Astrolabe, various measurements—from twelve to fourteen inches—being given ; finally the gentleman himself came in, and we learnt that the moth was twelve inches in expanse, but, having no means of killing or preserving it, he allowed it to escape. Still another gigantic creature was mentioned, this being from sixteen to twenty-four inches across, the owner requiring a suit-case to accommodate it ! But accounts differed as to the insect itself—a moth with one, a beetle with another. Finally, we traced this to a fine *Batocera wallacei* given at Samarai to Mr. H. P. Schrader, a Sydney gentleman with a love for natural history, and with whom I had corresponded a little ; but his beetle we afterwards ascertained was not equal to one of ours of the same species, which was $17\frac{1}{2}$ inches across the antennæ before dry. However, from a more reliable source, I have been informed of a larger moth than *C. hercules*. Mr. Schrader, accompanied by his wife, had been to the Astrolabe a year earlier, and I heard of him often. He had not been impressed with the district, so had gone to Woodlark Island, where he remained some weeks, and, though he obtained some interesting beetles, moths, and butterflies, he considered the results of his visit disappointing. When in Sydney several months ago I saw his collection, which is nicely kept, and noticed two handsome Cossidæ from Woodlark. We obtained one from a hill scrub—a pretty, pearly-white insect with metallic greenish and bronzy spots.

To get to the range we travelled in a slow and heavy motor lorry, but, owing to the muddy condition of the road, we got no further than thirteen miles the first day, camping at a hut, the owner of which was working a copper lode near by. Here for the first time we heard the " Tap-tap-tap " of the drums of the natives, a number working at the mine being camped hereabout ; and here we were kept awake by the mosquitoes, their threnodies around our cheese-cloth nets lasting far into the night. In the morning a few minutes' walk across the road brought us to the banks of the Laloki River, a narrow, deep, and fairly rapid stream here, which we had to cross later close to the range. Better trees and longer grass grew here, but still *E. platyphylla* was plentiful. The only butterflies yet seen were a slaty Tenaris and two species of Danaidæ, one being very dark brown, almost black.

The following day we negotiated the rest of the distance to Sapphire Creek (why "Sapphire" no one seemed to know), which joins the Laloki, and which we had to cross to the accommodation house of Mrs. Wright, one of those hard-working and self-reliant women one finds in the bush, far from busy cities and towns. She has a contempt for natives, snakes, thunderstorms, and men afraid to work. Quite a personality is Mrs. Wright, with a bright welcome for all, and quite at home with high Government officials or ordinary folk; a good one to know in times of sickness, for she has been a nurse in a hospital. Here we had an interesting stay, good meals, and good beds; ascertained that Mrs. Wright was an encyclopædia concerning New Guinea; that she took and despatched mails, looked after much of the rubber from, and many of the stores to, the several up-aloft plantations, we often seeing the mules being loaded or unloaded, for they came down and went up the range several times a week. Upon these mules our precious mails and stores promptly reached us; so much we had to thank Mrs. Wright for. Upon the evening of our arrival a gentleman came in, saying "Are you F. Dodd of Stawell?" A hearty handshake, and soon we were deep in conversation upon mining, cricket, and trips along the tram-line to the heathy Grampians, of those days, of over thirty-three years ago, which have passed all too quickly. This gentleman, Mr. R. G. Prior, son of a once well-known mining manager at Stawell, was in charge of the Laloki copper mine, a mile or so over the not very lofty hills to the right, he representing a big firm or syndicate interested in its future development. He showed me a few butterflies—interesting, as several were new to me. We were now seeing Lycænidæ, Pieridæ, and other butterflies, the beautiful *Orithyia albicincta* being plentiful, and often almost at our feet; it is rather finer than in Queensland. Several species of small "blues" freely congregated upon damp spots along the road.

Our destination was now the top of the range, 1,800 feet, up a zig-zag and often steep track, said to be three miles in length, to a rest-house which the Colonial Secretary had very kindly placed at our disposal. To get our property up we had to requisition various blacks; two young fellows had been signed on to us at Moresby, Mr. Prior and Mrs. Wright lent us others, and the latter kindly provided me with a horse, for the road was long and hard. My son had gone up with our boys the second day, and reported a comfortable galvanized iron structure with several compartments, and two tanks, some five hundred yards away to the left of the main track, which went to Bisiatabu Mission Station and to the three plantations further along, the last being thirty miles away—lost in the wilds of New Guinea. No more whites after there,

who from here numbered about twenty-two men, women, and two little children, these few scattered white people being surrounded by the recruited blacks and the wilder and more independent members of the hill tribes—over 500 of the former and doubtless several hundred of the latter. Nearly all the natives are fairly honest and reliable, many being as gentle in manner, looks, and speech as women, and often extremely good-looking, but, of course, there are exceptions. Their wants are few, and the plantation blacks are happy enough, judging by their drumming and singing—on Saturday nights kept up for hours. As Mr. Lawson, the missionary, said, they are but as children, and should be treated as such, and reasonable allowance made for their faults. Some of the western men are hatchet-faced, villainous-looking rascals, but their looks are not to be taken as a fair guide. However, I had no time to interest myself deeply in the dark people; naturally, I came much in contact with them, and merely record my impressions. I shall mention them again in these notes.

We crossed a good bridge over the Laloki, then began the ascent, the valley being on the right. Half-way up the range was a fairly extensive scrub, and down to it my son often came during our stay above at the rest-house, nearly two miles away, and many an interesting capture he made. Up to and past the scrub *E. platyphylla* continued, but a different Angophora accompanied it to the top of the range, and, quite on the summit, what I took to be a Casuarina occurred. *Eucalyptus tereticornis*, a small-leaved Melaleuca, and a Banksia were also present. From above this scrub the Rona Falls, at the head of the Laloki valley, came into view. Though three miles away, they stood out very distinctly, and from our camp, further away, we could hear their roar very often. Accounts differ as to the height of the falls, but 400 feet appears about correct; the water has a sheer drop to a large rock, seemingly half-way down, parting and passing evenly on each side of the rock. They are not easy of access, and but few appear to have closely approached them. The view is said to be very fine, but we were too busy to attempt to reach them. More water flows in the dry season than over the Barron Falls, but less during the wet season. The river takes its rise about twenty-five miles further back, and in the direction we were to go later. Over to the left of our rest-house another scrub occurred, but, outside these masses of vegetation, the country was uninteresting and unproductive. To get about in the open was difficult, the long tangled grasses impeding one's movements and concealing stumps, fallen timber, and rocks, so that much net work was impossible. The scrubs, with masses of shrubby undergrowth, overrun with thin ropy creepers, were not ideal

collecting spots ; besides, they were often wet. However, my companion, stopping at nothing, as a rule brought in fine collections, myself assisting when not engaged in setting, &c. He would often go away for several days, send a black back with the first day's captures, the other black the next day, then turn up himself the third day, having passed the nights at the mission station or a plantation, where he was always welcome.

We were upon what is known as Hombron Bluff, from which magnificent views were obtainable. To the west, towards Moresby, were many hills, with here and there ranges, and also to the north-west. We could not see the town owing to intervening hills. Well to the left was the sea, and beyond Moresby we could see it again. The country past the Sapphire and Laloki junction, and miles on each side, was often buried in mist ; from our lofty perch it was a charming sight, this sea of mist with hills jutting therefrom in divers places. At Hombron, in and along the sides of a valley formed by the semicircular ridge upon which we were, were the Government Gardens, but in an unfavourable locality ; only a little soil was rich and level, many of the beds being at too great a slope. Gradually the gardens lost their interest, and were, when I came away, likely to be let, as there was a comfortable residence on the grounds. Here grew a very fine banana, probably the Gros Michel, which is finding favour in Queensland. We could procure bunches at a trifling cost when we desired, so rarely were we without a good supply. Obtainable also were pawpaws, sweet potatoes, limes, and occasionally beans and tomatoes. These gardens were under the charge of Mr. C. Speedie, a Victorian, but who, for want of labour and means to irrigate, could do little in the way of experimental cultivation ; however, several varieties of coffee were growing luxuriantly, a patch was under tea, another arnatto, and another sisal hemp ; a big area of this aloe was passed on our way to Sapphire. Then there were granadillas, ordinary passion fruit, custard apples, and various citrus fruits, &c. Ornamental plants were few, any good Queensland garden possessing a greater variety of Crotons, and, as to the many-coloured Acalyphas, the graceful Aralias, and the beautiful Dracænas, they were practically unrepresented—rather disappointing to one after being acquainted with so many in North Queensland. There was but one Acalypha, so I sent to Kuranda for some dozen kinds, Mr. Speedie being pleased with their variety and beauty, for the majority throve, and I daresay several of the Astrolabe plantations have these now growing. The one species of Acalypha had been freely used for the purpose of ornamenting the grounds and the tracks around

the Hombron ridge, altogether there being several miles of this rather gay species to be seen—brown intermixed with various shades of red. The gardens are on a scrub-headed creek which runs east, then turns to the north, and, joined by other water-courses, eventually reaches the Brown River, that junctioning with the Laloki some distance away. The upper portion of Hombron is precipitous, the summit, fairly flat, often ending suddenly in a precipice of several hundred feet. In the clefts and on the abutments were various orchids and ferns, &c., inaccessible to those unsupplied with ropes and such necessaries. The rocks are often in great boulders, themselves composed of rounded pieces of various sizes apparently fused together by heat, many being as large as an ordinary cottage; they stand boldly out here and there on the mountain-tops and sides, some in the bed of the river.

At Hombron we obtained many fine insects. Soon we ascertained that *Coscinocera hercules* was present, we taking in our several localities nearly forty cocoons containing living pupæ, but, though some of the cocoons were heavy, the moths were not equal in expanse to the Queensland form, which we frequently had up to 10½ inches—once 10⅞ inches. Three pupæ remained when we reached Kuranda, the last moth proving to be a magnificent female 11½ inches across when spread on the setting board: but, owing to evisceration and drying, may have contracted a little, though it remains the finest specimen that has passed through my hands, and maybe is the largest moth in any collection. As regards wing area, it comes easily first in the giant moths of the world. I have heard of an *Attacus atlas* 11¾ inches in expanse, but the hind wings of *hercules* would easily place it first were *atlas* even of greater expanse.

(*To be continued.*)

THE BUCHAN CAVES.—Satisfaction will be felt at the intention of the Government to light the Buchan Caves with electricity in place of using magnesium ribbon, as at present. Last year 3,465 visitors were admitted to the caves, about £350 being paid in entrance money. The opening of the railway to Orbost has brought these caves within 18 miles of a railway station, but unfortunately the distance from town (225 miles) places them beyond the reach of the tourist possessed of only moderate means or limited by time. To the man of leisure the district offers many attractions besides the caves, which in several respects rival the famous ones at Jenolan, in New South Wales. Some remarkable limestone cliffs occur on the banks of the Murrindal River, the motor trip along the Nowa Nowa Arm of Lake Tyers is unrivalled, while the views in every direction are charming. Folders can be obtained at the Tourist Bureau.

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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, 9th December, 1918. Mr. J. Gabriel, one of the vice-presidents, occupied the chair, and about fifty members and visitors were present.

REPORTS.

A report of the visit to the Zoological Gardens on Saturday, 16th November, was given by Mr. C. Daley, F.L.S., who said that over twenty members and friends had attended. In the unavoidable absence of the Director, Mr. D. Le Souëf, C.M.Z.S., Mr. A. Wilkie, one of the staff, had acted as leader, and pointed out some of the more interesting animals, birds, &c., at the same time relating something of their habits, &c. Unfortunately, before the tour of the Gardens had been completed rain set in, and to some extent interfered with the plans of the leader; however, a very instructive afternoon had been spent, and he desired to move that a vote of thanks be accorded to Mr. Wilkie for having given up his afternoon to the party. This was unanimously agreed to.

The hon. secretary stated that the excursion to Pakenham, arranged for Saturday, 30th November, had been abandoned owing to an accident to the leader, Mr. F. Wisewould, resulting in a broken arm, preventing him from taking the part he desired in the outing. He was glad, however, to report that Mr. Wisewould was progressing favourably.

GENERAL BUSINESS.

Mr. F. G. A. Barnard directed the attention of members to a paragraph in that day's *Argus* recording the names of those who had passed the qualifying examination for shorthand writer, and said that the list included the name of Miss D. Philpot, who for some time had acted as honorary stenographer at the monthly meetings. He desired to offer her the members' congratulations on her success. This was carried by acclamation.

REMARKS ON EXHIBITS.

Mr. F. G. A. Barnard drew attention to an exhibit of flowering branches of *Elæocarpus cyaneus*, Ait., the Blue Olive-berry, a handsome Victorian shrub or small tree, grown by Mr. C. L. Plumridge, who informed him that it was flowering a month later than usual.

Mr. P. R. H. St. John called attention to his exhibit of flowers of the Western Australian eucalypt, *E. erythronema*, Turcz. —the normal form, with crimson stamens, and a variety raised by a member, Mr. B. Hodgins, with pale yellow stamens.

PAPER READ.

By Mr. F. Chapman, A.L.S., entitled "A Sketch of the Geological History of Australian Plants: the Mesozoic Flora."

The author said that in the first paper on the subject, published in the *Naturalist* for January last (vol. xxxiv., p. 140), he had dealt with the Palæozoic or earliest forms of plant life exhibited by Australian fossils. In the present paper he would deal with the forms found in formations belonging to the middle period of geological history. He then gave some account of the principal plant remains found in the various formations belonging to the Mesozoic period, illustrating his remarks by a fine series of lantern slides, many of which depicted forms not previously illustrated. He remarked that further investigation of the interesting flora of this period would probably lead to the discovery of other coal-bearing deposits in Australia at present unknown.

Mr. Barnard said the members were deeply indebted to Mr. Chapman for the interesting paper he had read, and more especially for the excellent way in which his remarks had been illustrated. It was interesting to find so many points of agreement between the fossils of Australia and other parts of the world.

Mr. P. Morrison asked how the fossil ginkgos compared in size with the ginkgo tree of to-day, to which the author replied that the fossil leaves were exactly of the same size and type as the ginkgos now living in Japan and to be seen in our own Botanical Gardens.

In reply to the chairman, he said that, with regard to the preservation of remains of the mud-fish so perfectly, this arose from the fact of the animal being provided with tough scales, which resisted compression more than those of ordinary fishes.

NATURAL HISTORY NOTES.

Mr. P. R. H. St. John said that in a recent issue of the *Mirror*, a Sydney newspaper, in its natural history column, it was stated that the newly-hatched young of Black Swans were white, and those of White Swans were black. This, he said, was wrong, and could be seen at present by examples at the Botanical Gardens, where broods of both swans were almost indistinguishable, being of a dull greyish-white.

Mr. H. B. Williamson said that when visiting Sherbrooke Falls a few days before, he had been surprised at the hundreds

of pieces of unrolled tree-fern fronds lying on the ground, and asked for information as to what had caused the destruction. He exhibited several of the fronds, which appeared as if they had been bitten off. He could find no trace of insect action, and attributed it to birds, but the question arose, What bird ?

Mr. Barnard said he had a long experience of fern gullies, and had never noticed anything of the kind.

[It has since been suggested that this was the work of possums, which are very fond of anything succulent, such as young tree-fern fronds.—Ed. *Vict. Nat.*]

EXHIBITS.

By Mr. F. Chapman, A.L.S.—Specimens of burrowing beetles, *Scitala sericans*, Er., and *Anodontonyx*, sp. (Scarabæidæ), from a turf-heap at Balwyn.

By Mr. C. A. Nethercote.—Fine specimens of the Blue Pincushion flower, *Brunonia australis*, Smith, also white example of the same, from Wandin ; flowers of Austral Bluebell, *Wahlenbergia gracilis*, A. De C., with white example.

By Mr. C. L. Plumridge.—Flowering specimens of Blue Oliveberry, *Elæocarpus cyaneus*, grown at Kew.

By Mr. P. R. H. St. John.—Flowering specimens of *Eucalyptus erythronema*, Turcz., of Western Australia, also yellow-flowered form raised by Mr. B. Hodgins at Essendon.

By Mr. A. L. Scott.—Wolfram from Wilks's Creek, near Marysville.

After the usual conversazione the meeting terminated.

EXCURSION TO RINGWOOD.

The excursion to Ringwood on Saturday, 19th October, was arranged for orchids and physiography, and was well attended, the afternoon being very fine and pleasant. On the botanical side of the excursion little of note was recorded, so it is left to the physiographist to give some little account of the outing. Ascending the prominent hill about half a mile to the north of Ringwood station by a fairly easy, circuitous road, the sandy and rubbly nature of the soil was noticed, conducing to favourable growth and condition of the numerous rock-loving plants seen on the slopes, the cultivated succulents and garden plants becoming more prominent as we neared the residence on the summit of the hill, which stands at about 600 feet above sea-level. The hill affords one of the best panoramic views of this specially interesting country. Here we are in the heart of an area of uplift, block-faulting, river-erosion, and stream-capture. The main river systems are so complicated in their history

that all has not yet been worked out in regard to their past and present phases. The varying and associated levels of ridges, hills, and mountains point to peneplains or denudation levels of moderate to vast antiquity. "Pinemont" stands out, as do other hills in the vicinity, as a monument to the indefatigable work of patriarchal rivers. It is called a monadnock, in keeping with other like hills formed by surrounding denudation, the typical one being Monadnock Hill, in New Hampshire. To the north lie the Plenty Ranges, with Kangaroo Ground and its lava-sealed river-bed in the middle distance. Just below, to the east, is the great strath of the Croydon sunkland, with its prolific orchards, and farther afield the forest-clad volcanic stump, the Dandenong Ranges. Sweeping along the eye-line to the south-east the level of the lower peneplane is strikingly seen, whilst to the west are the lava-covered plains under which lie buried the old river valleys of the Plenty and adjacent river systems. Descending "Pinemont" on the south-western side, a cart track led us to the old quarry. A cursory examination with eye and hammer showed only a few impressions and stains, probably due to the worm *Trachyderma*. It was from this quarry that fragments of a brachiopod were obtained some years ago by Dr. Thiele. As the matter of determining the horizon in this district is of some importance to geologists, it is hoped that future geological collectors will concentrate their attention upon it. The walk to Mitcham station took us along the banks of the Deep or Mullum Mullum Creek for a short distance. The torrential nature of the stream-bed here was noticed, which shows it still possesses considerable erosive force, and to be actually in the phase of rejuvenation, as evidenced by its steep banks. The many interesting problems for geologists arising out of this short ramble amply repaid any special efforts of the members to attend the excursion.—F. Chapman.

Seeds of Native Shrubs and Plants.—With the view of encouraging the growth of those members of our indigenous flora suitable for garden plants, it is hoped to have on sale at the next exhibition of wild-flowers packets of seeds of various kinds. Country members especially can help materially in this direction by collecting, during the summer, seeds suitable for the purpose. Care must be taken that these are true to name. The following gentlemen will be glad to give advice and receive collections:—Dr. C. S. Sutton, Rathdown-street, North Carlton; Mr. P. R. H. St. John, Botanic Gardens, South Yarra; Mr. C. Daley, B.A., Clarinda-street, Caulfield; or Mr. H. B. Williamson, Princes-avenue, Caulfield East.

A NATURALIST IN NEW GUINEA.

By F. P. DODD.

(*Read before the Field Naturalists' Club of Victoria, 12th Aug.*, 1918.)

(*Continued from page* 132.)

We obtained many beautiful moths of the families Pyralidæ and Geometridæ, those of the Milionias of the latter being particularly showy. Sphingidæ were disappointing, all but one we took being well known in Queensland, so evidently it would be necessary to go further north or west, or into the higher mountains, to obtain good species. By rearing and capturing we soon had a good series of the showy Troides, *Priamus pronomus*, and took several worn examples of another of the genus, it having dull sooty wings, with an extensive yellow area in hind wings. The eyed butterflies of the genus Tenaris were plentiful; one large species we failed to capture, but in the Lycænidæ we were very successful. By observing the yellow Œcophylla ant, which is absolutely different from the *virescens* of Queensland, to this day erroneously called Smaragdina (which is an Indian species, and probably different from the Papuan), we bred two brilliant insects of the genus Arhopala and captured two others, one being a magnificent species over two inches in expanse, and of most brilliant violet-purple. To our surprise the common *Arhopala eupolis*, a green tree-ant associate in Queensland, was found with another ant altogether —a black insect with white-grey abdomen, common in the forest country of Queensland and here. At raspberry bushes and a scale-infested shrub we took several species of the beautiful genus Miletus, *M. rovena* and a Philiris being partial to the shrub. Altogether, our Lycænid collections were very satisfactory.

We several times saw *Nyctalemon orontes*, and were puzzled more than once with its flight, the movements appearing quicker than usual with this well-known day-flying moth; but, obtaining some gregarious caterpillars, they duly pupated as Papilios do, so we wondered what we should get in a butterfly. It was a surprise to find that we were rearing *Papilio laglaizei*, an almost perfect mimic of the moth; then we understood the differences in flight, for sometimes we, knowing nothing of the butterfly, had very naturally taken specimens of it for the moth. The deception above is almost perfect, but the under side is widely different in the hind wing; however, like the moth, the mimic keeps its wings flatly spread when at rest. *N. orontes* is not so large as in Queensland, is without the violet reflections from the olive-green bands, but the black is deeper and bands slightly more greenish. At Mrs. Wright's I had seen

two or three species of Euplœas settling on tools that had been used by the natives, these insects, with tongues extended, searching for damp spots left by perspiration. In the building we used later at Sapphire Creek were some bags of rice belonging to the Copper Company, and natives would come for these now and then. These men, hot from the walk, and perspiring, would lean against the verandah posts or against the doorway. After the men left we were always visited by these dark butterflies, they settling where the natives had leaned. Now and then the Hesperid, *Hasora chromus*, would act in a similar way, and once one of these skippers settled on the bare, damp arm of a visitor. Mr. Prior informed me that small butterflies would occasionally settle on his arm. One day I noticed a Lycænid flying about a saddled horse that had just been tied up to a post. Curious, I crossed to it, and found the attraction to be the recently-vacated saddle, the insect resting there with tongue extended; so quiet it was that I caught it between my fingers, it being a male of *Hypolycæna phorbas*, an Œcophylla ant associate. I could relate many instances of curious habits of butterflies—habits somewhat similar to these—however, forbear doing so; but of all the butterflies that drink at damp sand or dirty puddles, I have *never seen a female*. Strange, is it not, that many males on a much higher plane are afflicted with a great thirst too? Strange it is, and occasionally regrettable!

In passing through one plantation at night we were often charmed with the fire-fly display. These beetles would congregate upon several trees adjacent to one another; a little distance from the circle but a few specimens would be observed. Upon the favoured trees the insects would be in hundreds, and it quite seemed that they diffused their light together; there would be the greater flash, and numerous smaller ones in between. The light given out by this species is pale bluish, and from the trees, and above where odd individuals were flying, it was a beautiful sight.

We took three species of large shielded grasshoppers. The name "grasshopper" is inapplicable to these and other long-antennæd Locustidæ. Various small species may be in grass, but the greater number and the larger species are found upon shrubs and trees; moreover, all are much less inclined to jump than the grasshoppers proper. Our largest species was six inches in length.

A large twilight-singing Cicada we did not see, though we often heard its really mournful song; but another evening singer we did get, a grass dweller, which sings for only 25 minutes or so. We approached our first two victims warily, and, seeing whitish things whence the song proceeded, and well knowing

the elusiveness of Cicadas generally, grabbed and caught them. We each caught one, and a "pop" was the result. We had burst the poor things, for, in singing, the body is distended to at least three times the normal size. We found these insects were to be easily caught, and after the abdomen contracted I blew up several, but had no means of keeping them distended then. We took several pairs, the female being the darker of the two.

We changed our camp several times, went 19 miles further to Sogeri rubber plantation, owned by the British New Guinea Development Co., employing 220 to sometimes 240 natives, all kept in order by a manager and two assistants. It was amusing the day we started off from Hombron, bound for Sogeri, we forming quite a procession. Our property, made up in 50 to 80-lb. parcels, was carried by natives, the men's loads on poles resting on their bare shoulders, the silly fellows disdaining pads; consequently, many complained of sore or chafed shoulders. Some women were of the party, they taking good loads, such as two kerosene tins of odds and ends, in a netted dilly-bag resting on their bent back and supported from the forehead with a band. An old pipe-stem-legged fellow was in charge of the females, he looking quite imposing with our lamp-shade on his head, with a cockatoo feather projecting from the top. We got to Bisiatabu Mission Station (eight miles) the first day, finishing the journey the next. On the second day we passed Koitaki plantation, with many trees being tapped. This property is a paying one. Here we saw a small herd of fine cattle in splendid condition. At Sogeri, in a big grass house, surrounded by young rubber trees, and in the midst of acres of sweet potatoes, we passed a pleasant and interesting six weeks, fresh species being captured, as we were in richer country. My companion roamed the district, often being out alone at night with an acetylene lamp, or sometimes with one of our boys, always hunting, and perfectly satisfied with a good day's or night's sport. The natives had a great respect for the man who, alone, would wander through tracks and along scrub margins by himself at night, but we learnt that we had reputations as snake-men, that being spread by Mrs. Jensen, the kindly wife of the manager of the plantation (whom we had met during our sojourn in the Herberton district seven years ago), we being credited as being proof against snake-bite. When we went to the house after our journey we were announced as "Two snake-man, two snake-man come." So we often had a snake dangling near our door, and my companion would frequently tie one to his butterfly net on his shoulder when coming home, and—accidentally, of course—incline it towards any passing blacks, with excellent effect. When a snake was

discovered in the fields we would be hailed and requested to kill it—perhaps a harmless little thing eighteen inches long. During the despatching process various nervous natives would stand back at respectful distances. To pick up a murdered snake and take one step towards a native would set him off at a run. A large legless lizard was a snake to them, too. Even our boys, wilder fellows from a mountain village, greatly disliked snakes, though in some quarters natives ate them; but those fellows were looked upon as low-grade. One of our boys, when allowed a week-end home, generally returned lazy and listless, which we supposed to be the effects of excessive betel-nut chewing (the palm occurred in some of the scrubs). One day, after a prolonged absence, he came to explain that "Snake bite him, he been sick." Pitying the rascal, I asked to see the punctures, which he seemed disinclined to exhibit. I pressed him, and was shown a little place from which the skin had been scratched off by a stick or stone! However, for the trifle of 10s. a month paid these men, and the food and tobacco, &c., we gave them, we could not expect too much. Many a heavy load they carried for us, and they were loyal in a way, but, as to gratitude, the gentle Papuan understands it not. We were regarded as being too tender-hearted towards our dusky assistants, for we rewarded them above their pay, &c., when we supposed their work deserved a little recognition.

As to the birds: At Port Moresby we saw *Rhipidura tricolor*, and, though the friendly little bird was not observed at Sapphire or Hombron, it was at Sogeri, and loved the top of our grass house. It usually roosted in a clump of bamboos, and often during the night would utter its notes, though in an imperfect and sleepy way. It may have been fancy, but the individuals we saw seemed slightly larger than the Queensland form. At Moresby we saw a Black-and-White Butcher-bird fly at a half-fledged chicken and send it off squawking. Probably Butcher-birds are mischievous that way, for the black *Cracticus quoyi* of Queensland scrubs would often bounce and frighten fair-sized chickens and induce them to take cover; but I never saw one actually attack a young fowl. We noticed several handsome pigeons, one being olive-green above with pink feathers in the wing. My companion procured some seven or eight skins, but we were not after birds. It is my boast that I have killed only two birds in 35 years—one being a Black Butcher-bird which was too much interested in some larvæ of *Coscinocera hercules* that I had on a garden tree. We frequently saw the great ungainly Hornbills—jet black birds with white tail and yellow and chestnut neck; they can be heard great distances away, and the swish of the wings of a single specimen may be distinctly heard when the bird is fully 700 feet in the air. Two

Pittas were heard, one having a very mournful note. The Chestnut-breasted Cuckoo was always present, at the foot of the ranges or on the top; its monotonous "Pee-pee-pee" could be heard at all hours of the day and night, so one wonders whether it ever sleeps. At Port Darwin I have heard it hour after hour at night. It has occurred to me that these sleepless birds (Cuckoos) may deposit their eggs in other birds' nests at night. The Koel and Channelbill not only call out at night, but fly too. The Long-tailed Nightjar is another bird with a monotonous note, its "Chop-chop-chop" being kept up, at intervals, at night. Some dislike the species; I am used to it. I have heard it called the "Fever-bird"—an absurd term, but given it because fever patients are often irritated and kept awake by it. A blackish Malurus, with yellow-white patch on the shoulder, was frequently seen; it is rather larger than Australian Wrens, and all individuals seemingly are alike—all that I saw were. In flying they pass readily as males of *Papilio ægeus*. The Dollar-bird and the Shining Starling, *Calornis metallica*, were present at Sapphire Creek in October. The former, I think, purposed nesting in a *E. platyphylla*, but we saw no nests of the latter, they, seemingly, being only intent upon feeding on a shrub with smallish, whitish berries occurring in the vicinity. Whether the Starlings in New Guinea migrate as those in Queensland do I am unable to say; the Queensland communities arrive in August and depart in April.

Kangaroos, wallabies, rats, wild pigs, and Cassowaries were near us at times, our shooting boy getting a fair-sized pig one day, and was accounted a hero by the dusky gentlemen around. We, of course, allowed him nearly all the animal. Nothing was wasted, even the hide, after a perfunctory singeing, passing as a delicacy. Our boys did a thriving trade with the plantation blacks, for they crave for meat, and often came to us with a coin wanting to purchase tinned beef, &c. That "beek" (pig) was talked of for many days.

There grows in the scrubs a very fine nut, maybe a Terminalia. It is egg-shaped, slightly flattened, and from four to four and a half inches long. The kernel is two inches long by three-quarters thick, and is crisp, rich, and tasty. The shell is three-quarters of an inch thick, and extremely hard. The natives open it readily with a sharp stone struck by another. It requires to be eaten soon after falling, or it becomes rather tough. I sent some to Kuranda, which were pronounced good.

Our meals were largely made up of vegetables and fruit. On the plantation we obtained sweet potatoes, bananas, and pineapples; from the blacks pumpkins, two smaller varieties of bananas, and several species of yams; and from port occasional parcels of English potatoes and onions. A selection

of these, with green pawpaw and some rice, with a pigeon or several slices of bacon, made a savoury meal. When we had wallaby the camp oven was requisitioned, and we would feast royally on a baked dinner. Fried bananas were a never-failing source of satisfaction ; fine big ones often figured three times a day on our menu.

At Sogeri my companion contracted a sharp attack of malaria, though I never saw an Anopheline mosquito there, the only one I did see being at Sapphire Creek some weeks later. It alarmed me to find that his temperature in a few hours reached 105°, and I passed an anxious two nights sitting up ; however, after reducing his fever by following Mr. and Mrs. Jensen's advice, they kindly had him conveyed on his stretcher by a party of natives to their house, where he made a good recovery in eight or nine days. The whites think little of fever, many regarding it as a matter of course ; but I think quinine is often taken unnecessarily. The treatment advocated by a well-known doctor is 90 grs. a month, 15 grs. being taken every ninth and tenth day. One evening the overseer, who lived near us, came home complaining of fever ; at 7 o'clock we found his temperature to be 105.1 ; duly sweated him and changed his saturated garments, leaving him at midnight. He was up at the head station at 6.30 a.m. calling the roll and seeing the natives off to work for the day, but was, of course, not right for several days. I incline to the opinion that my son's fever was a recurrence of the Queensland form, which he had contracted at Johnston River some months before, and brought on by a cold bath in the creek, which he had been cautioned against, and over-exertion on the previous day, which was hot, and being too long without a meal. I very rarely took quinine, and then only in 5-gr. doses, though sitting up night after night setting insects gave the mosquito every chance to attack. However, I would exercise greater caution in a district known to be infested with the mosquitoes.

Upon our journey to Sogeri, when passing Kotaki plantation (Mr. Sefton, manager), we saw in the distance the richly red D'Albertis Pea dangling from some tall trees, but were too busy to make a close inspection.

On Sogeri plantation we came across the holes of a great ground spider and dug some of these out, obtaining a dozen fine specimens. The hole was vertical for nine or ten inches, then turned horizontally for another ten inches, where we would find the creature in a chamber containing beetle and other fragments. It exhibited wild surprise when uncovered, and was easily pushed into the lethal jar when frantically endeavouring to climb the sides of the excavation we had made.

Passing from Hombron, and looking inland, we were impressed with the fine views of the Owen Stanley Ranges, perhaps 50 or 60 miles distant, lower mountains in the foreground leading gradually to the lofty ones. They presented a beautiful and imposing appearance. As naturalists we speculated as to the entomological wealth they contained—perhaps more remarkable insects than any yet discovered. What wonders privileged collectors will yet bring from these great and mysterious hills! No part of New Guinea has yet been properly exploited by the naturalist. An expedition here, or one there, in the vast scrubs and mountain fastnesses, with natives as collectors, scarcely yields satisfactory results, so the time has yet to come before any single square mile of the richly-timbered districts can be said to have yielded its best entomological treasures. Then how about the mineral and botanical wealth of these practically unknown scrub-clad heights—these wonderful ranges, so near our beloved Australia? We know that Sir W. Macgregor, with a strong party, many years ago ascended the tallest of these (13,000 feet). Away, far away, we get other mountains, probably towering much higher into cloudland than the Owen Stanley. How galling to many Australians it must be to know that, through the regrettable action of men supposed to have been wise, those wonderful hills and vast areas of marvellously rich country were meekly and sheepishly allowed to pass to other nations! Some we may recover through this awful war; let us hope the balance may be peaceably acquired by purchase or exchange.

Eight miles from Hombron is the Bisiatabu Mission Station, presided over by Mr. and Mrs. Lawson, Seventh Day Adventists, and the most hospitable of people. My son and I were made at home there at once, and, upon my journey to Sogeri and back some weeks later to Hombron, these kindly people, quite unasked, sent me a horse. The mission grounds are delightfully pretty, and are at the margin of the great scrubs, which now stretch forth for miles. The mission produces rubber, splendid pineapples, and other fruits and various vegetables, so probably costs little to maintain. From here Mr. Lawson, generally alone, visits the several native villages about here and beyond the plantations. Here we first heard the "Wok-wok" of the Red Bird-of-Paradise, a common and noisy species from here and onward. The exquisite little King Bird-of-Paradise also occurs about here, but is rare.

Upon our return to Hombron we stayed a month, then journeyed to Sapphire Creek, finding it very hot after our sojourn in the higher country. We remained at Sapphire a month, then caught the *Marsina* back to Cairns, after an absence from Queensland of six months. On board was Mrs.

Rowan, who had been so much further than ourselves, to an out-of-the-way part of New Guinea, and who, though the victim of a severe attack of fever, bravely carried on her interesting and splendid work of flower and also bird painting. That attack of fever I fear she will be long in throwing off, for, meeting and talking to the lady in Melbourne recently, I noticed that she was far from being well, and judged the cause to be the fever contracted in New Guinea.

A six months' visit to New Guinea is far too short a period in which to gain a fair knowledge of the insect life there; moreover, we were not there at the most productive time of the year, nor in a good locality, so, all being well, I hope yet to visit a more interesting and productive spot.

Our thanks are due to all whom we met, Government officials, business, plantation, and mission people being exceedingly kind, and all giving us every reasonable assistance towards prosecuting our inquiries into the natural history of this great country.

"THE GUM TREE."—The December (1918) issue of this journal is to hand, and its articles should all help to promote its objects—the conservation, propagation, and utilization of Australian trees.

BUTTERFLIES.—The month of December, 1918, will long be remembered by lepidopterists for the countless numbers of the fine Meadow Brown butterfly, *Heteronympha merope*, Fab., seen everywhere—in city, in park, and even in houses. This butterfly differs considerably both in the size and the coloration of the sexes, and the uninitiated were probably of opinion that more than one species was concerned in the influx. Though the coloration of this species is simply brown with black markings, the female (the larger of the two sexes) is really a handsome insect, and makes a fine display as it lazily flits from one object to another. The question which has arisen as to why this multitude of butterflies seems unanswerable; whether attributable to abundance of food in the larval state, to suitable temperature at that period of its existence, or to the absence of enemies when in the adult form, are moot points. Seeing that the larvæ feed on various grasses, little apprehension need be feared as to any serious consequences likely to ensue on this visitation. Some years ago the Painted Lady, *Pyrameis Kershawi*, M'Coy, was equally common.

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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 January, 1919.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about fifty members and visitors were present.

CORRESPONDENCE.

From the Advisory Council of Science and Industry, notifying that a copy of Dr. Griffith Taylor's memoir, entitled "The Australian Environment," had been forwarded for the Club's library, and stating that copies could be obtained at a cost of five shillings each.

REPORTS.

In the absence of the leader, Mr. A. N. Burns, a brief report of the excursion to Lower Ferntree Gully on Saturday, 14th December, was given by Miss C. C. Currie, who said that a fair party attended, and that some interesting lepidoptera were taken, but only a few plants in bloom were met with.

A report of the Christmas week excursion to Marysville was given by the leader, Mr. J. Stickland, who reported a very enjoyable time, but the natural history results were not very striking. Mr. F. G. A. Barnard said that the beech and fern scenery met with was very fine, and that the "Glover Walk" excelled any place he had previously visited.

ELECTION OF MEMBERS.

On a ballot being taken, Mrs. E. W. Outhwaite, 769 Malvern-road, Armadale, and Mr. F. W. Mann, LL.B., Walsh-street, South Yarra, were duly elected members of the Club.

GENERAL BUSINESS.

It was suggested by Mr. F. G. A. Barnard that if the names of exhibitors and the particulars of the specimens exhibited were read out before the usual adjournment for inspection took place members would know what exhibits directly appealed to them, and could thus give them more attention. He moved that the order of business be altered so as to enable this suggestion to be tried for a time. Some discussion ensued, and Mr. F. Pitcher seconded the motion, which was adopted.

PAPER READ.

By Mr. J. W. Audas, F.L.S., entitled "Nature in the Serra Range."

The author gave the observations of several days among the wild-flowers in the Serra Range, in the Grampians, during which he met with a large number of interesting species.

Mr. Barnard congratulated the author on the interest of his remarks, but thought the title hardly correct, as he had expected the paper to refer to the Serra Range shown on the map of Victoria as extending from Mount William south-westerly to Mount Abrupt.

Miss Nethercote and Mr. C. Daley, F.L.S., said that the part of the Grampians visited by Mr. Audas is shown on the tourist map as the Serra Range.

NATURAL HISTORY NOTES.

Mr. A. E. Keep made some interesting remarks regarding the presence of Lyre-birds near the Sherbrooke Falls, Dandenong Ranges, during the Christmas holidays. He was fortunate enough to hear and see a male bird on its dancing-mound, and afterwards a young bird came within a few feet of him during its search for food.

The chairman instanced the value of recording natural history notes and particulars of exhibits in the *Naturalist*, stating that a country member, Dr. J. R. M. Thomson, of Lismore, N.S.W., had brought the Society and the *Naturalist* under the notice of the pupils attending the public school at Keerrong in that district, with the result that they had requested him to forward for exhibition at a Club meeting certain specimens then on the table. He considered the Club was indebted to Dr. Thomson for his action, and trusted he would convey to the pupils the Club's appreciation of their thoughtfulness.

EXHIBITS.

By Mr. J. W. Audas, F.L.S.—About forty species of dried plants in illustration of his paper, including *Micromyrtus microphylla*, Benth., Fringed Heath-Myrtle, *Laxmannia sessiliflora*, R. Br., Nodding Lily, *Prostanthera hirtula*, F. v. M., Hairy Mint-bush, *Kunzea parvifolia*, Sch., Crimson Kunzea (white variety), *Correa speciosa*, Andw., Red Correa, *C. æmula*, F. v. M., Hairy Correa, and *Pultenæa laxiflora*, Benth., Spreading Bush-Pea.

By Mr. F. G. A. Barnard.—Flowering specimens of *Nuytsia floribunda*, the Christmas-tree of Western Australia, forwarded by Mr. D. Herbert, Government Botanist, Perth, W.A.; also specimen of wolfram ore (weighing $2\frac{1}{4}$ lbs.) from Wilks's Creek, Marysville.

By Mr. C. E. Cole. — Insects, including specimens of Ichneumonidæ, Lepidoptera, and Hemiptera, the latter having a colour pattern very similar to some Bracon flies (Braconidæ), also exhibited.

By Mr. T. S. Hart, M.A.—Four species of Victorian Cassythas (Dodder Laurels) from various localities; also *Restio tetraphyllum*, from Springs reserve, near Clayton.

By Mr. F. Keep.—Flowering specimens of the White Paperbark Myrtle, *Melaleuca genistifolia*, of Queensland, grown at Canterbury; the flowers, being very sweetly scented, have been very attractive to the brown butterfly, *Heteronympha merope*, so numerous lately.

By Mr. P. C. Morrison.—Photographs of scenes at Marysville taken during recent excursion; branch of beech, with knot, to which the fungus *Cyttaria Gunnii* was attached when found; also specimen of black snail, *Paryphanta atramentaria*, from Marysville excursion.

By Mr. F. Pitcher.—Young specimens of the fungus *Polyporus mylittæ*, Cooke, known as "blackfellows' bread," from Drouin. The sections shown were cut with a penknife a few days after the specimens were unearthed. Also, section of a bitumenized paper drain-pipe recently found during excavations for new buildings at South Yarra.

By Mr. J. Searle.—Specimens of "Narethaite," a form of limestone found at Naretha, W.A., on the Trans-Australian Railway; also *Daphnia longispina*, found at Heidelberg, new for Australia.

By Mr. J. Stickland.—Photographs of Marysville and district, in illustration of excursion report; also frond of *Lomaria fluviatilis*, measuring three feet in length.

By Mr. P. R. H. St. John.—Young plant and seeds of *Ginkgo biloba*, Madien-hair Tree, or "Pa-koo" of China.

By Dr. J. R. M. Thomson, on behalf of pupils of Keerrong public school, N.S.W.—Single valve of large fresh-water mussel, showing fine "mother-of-pearl," for which the shells are collected commercially in the district; also jasper and chalcedony pebbles from a creek tributary of the Richmond River, the chalcedony pebbles being enhydrous (containing water), and a fractured pebble showing mammillate structure of wall of cavity.

By Mr. H. B. Williamson.—Photograph of *Prostanthera Walteri*, taken at Buffalo Gorge, December, 1918.

After the usual conversazione the meeting terminated.

Native Fibre Plants.—In the *Journal of Agriculture, Victoria*, for December, Professor Ewart, D.Sc., Ph.D., Government Botanist, points out in an interesting article that the term "fibre plant" has recently been used in a misleading sense in attempting to indicate opportunities for new industries, and gives the conditions which must govern any idea of utilizing Australian plants for such purposes.

A SKETCH OF THE GEOLOGICAL HISTORY OF AUSTRALIAN PLANTS: THE MESOZOIC FLORA.

BY FREDERICK CHAPMAN, A.L.S., &c., Palæontologist, National Museum, Melbourne.

(*Read before the Field Naturalists' Club of Victoria, 9th Dec.*, 1918.)

IN continuing this sketch of the Australian fossil flora (a contribution on the Palæozoic flora having appeared in *Vict. Nat.*, xxxiv., p. 140, January, 1918), we have seen how several of the Upper Palæozoic types of plant-life survived into Triassic times. Some of these persisted as important components of the succeeding floras of the Jurassic and even Cretaceous periods. Thus, the ferns *Cladophlebis* and *Tæniopteris*, and some conifers, as *Araucarites* and *Brachyphyllum*, ranged throughout the Mesozoic system. This steady survival of so many important plant types seems to indicate that the geographical conditions controlling this area of land-surface—a legacy of the Gondwana-land period—did not suffer any great disturbance during the period extending from the Trias to Cretaceous inclusive.

LOWER MESOZOIC.

In commencing with the Triassic flora, we may note that the sediments may best be studied in New South Wales, whilst, for richness of plant-types, the Queensland Mesozoic beds perhaps take pre-eminence.

In New South Wales the Hawkesbury series comprises, in ascending order—1, *Narrabeen Stage*; 2, *Hawkesbury Stage*; 3, *Wianamatta Stage*. They consist of sands, shales, and conglomerates. These beds represent the sedimentation of a vast area which was undergoing degradation, where shallow lakes, sand-dunes, and local desert conditions formed the prevailing features of the country.

The Narrabeen Stage—with its *Estheria* shales, cupriferous shales, sandstones, conglomerates, and chocolate shales—denotes an oscillatory series between brackish and fresh-water conditions, as shown by the presence of ripple-marks, worm-burrows, and sun-cracks. These conditions were not very favourable for plant-life, excepting of a lowly kind, but the remains of ferns would be brought down by swollen streams acting on loosened soil. At Cremorne Point, Sydney Harbour,* a bore which penetrated the Narrabeen beds proved them to rest on the Newcastle Series (Carbopermian). At 620 feet 6 inches above this junction a series of sandstones, shales, and conglomerates was found, 1,112 feet 6 inches in thickness,

* J. E. Carne, "Kerosene Shale Deposits of New South Wales," Mem. Geol. Surv. N. S. Wales, Geol., No. 3., 1903, p. 141.

containing *Thinnfeldia*, *Sphenopteris*, *Tæniopteris* (*Macrotæniopteris*), *Odontopteris*, *Sagenopteris*, *Schizoneura*, and a branchiopod, *Estheria*.

One of the striking features of Sydney's buildings is the general use that is made of the Hawkesbury sandstone. This is worked as a freestone, and from its weathered structure, which can be well seen on the time-worn cliffs in the harbour, it distinctly shows the cross-bedded nature of the sand-mounds of which it is formed. This cross-bedding is seen in all dune-formations, recent and geologically ancient; but, notwithstanding this, we find certain text-books still attempting to teach an invariable rule that it is due to rippling under water. In some cases, of course, the fine-bedded current stratum is due to sub-aqueous action, and possibly even on occasion in the Hawkesbury sandstone, but in the writer's opinion this was subordinated to wind action.

The handsome fern-like plant, *Thinnfeldia odontopteroides*, is a typical fossil of this stage. It is remarkable that until quite recently no reproductive organs were found in Australian specimens of this genus.* Prof. Seward says, in reference to *Thinnfeldia* †:—"It is by no means improbable that many of the species referred to this genus are closely allied to Palæozoic Pteridospermi," and further suggests that "search should be made for fertile specimens or for evidence as to the association of seeds with *Thinnfeldia* fronds." ‡ It is, therefore, with no little interest that palæobotanists welcome the description by Dr. A. B. Walkom, of Queensland, of fertile fronds of *T. Feistmanteli* and *T. lancifolia*, discovered by Mr. B. Dunstan at Denmark Hill, Ipswich.§ These interesting specimens are so well preserved as to exhibit the cell-structure of the sporangium wall; the latter have no apparent annulus, and thereby show some affinity to the tropical ferns of the family *Marattiaceæ*.

Plant remains are numerous in the Wianamatta shales, one of the most interesting being the large-leaved forerunner of the Jurassic *Tæniopteris—Macrotæniopteris*. This latter genus or sub-genus has also occurred || in the Triassic sandstone at Bald Hill, near Bacchus Marsh. A careful examination of the type of *Tæniopteris Sweeti* fails, however, to reveal any distinction from *T.* (*Macrotæniopteris*) *wianamattæ*. Other

* Raciborski, in 1894, figured a fertile specimen of *T. rhomboidalis*, showing sori but no definite sporangia, from the Jurassic of Poland.

† "Fossil Plants," vol. ii., 1910, p. 537.

‡ *Op. cit.*, p. 538.

§ Queensland Geol. Surv., publ. No. 257, 1917, pp. 15, 16, 18, pl. i., fig. 3; pl. iii., fig. 3; text fig. 5.

|| Proc. R. Soc. Vict., vol. x., part 2, 1898, p. 285.

plant remains in the Wianamatta shales have been referred to by Feistmantel,* and are:—*Thinnfeldia odontopteroides*, Morr., sp., *Odontopteris microphylla*, McCoy, *Pecopteris tenuifolia*, McCoy, *Cladophlebis australis*, Morr., sp., and *Podozamites distans*, Presl. From the fact that this topmost series of the Trias contains myriads of the little branchiopod, *Estheria*, I would be inclined to regard these beds as Rhaetic, as in the northern hemisphere, where this crustacean similarly occurred in geologically ancient fresh or brackish lakes in Scotland and England. Reverting to the Bacchus Marsh locality, McCoy has already named a *Ptilophyllum* (*P. Officeri*) † from the Triassic sandstone of Bald Hill, and provisionally referred other plant fragments to *Schizoneura*.‡ Having examined this specimen afresh, I can confirm McCoy's identification of the *Ptilophyllum*, which, by the way, appears to be closely allied to *P. oligoneurum*, T. Woods.§

The Hawkesbury Series (Triassic) of New South Wales, taken as a whole, is particularly rich in plant remains, amongst which are *Phyllotheca Hookeri* and *Schizoneura australe*, in the equisetalean group; *Thinnfeldia odontopteroides*, *Cladophlebis denticulata*, var. *australis*, *Tæniopteris* (*Macrotæniopteris*) *wianamattæ*, *Tæniopteris lentriculiformis*, *Stenopteris rigida*, and *Cycadopteris scolopendrium*, amongst the ferns or Pteridospermi; *Podozamites lanceolatus*, a cycad; *Ginkgo dilatata* and *Baiera multifida*, in the ginkgoales; and *Araucarites*, a conifer.

The conifers, from their first appearance in Carbopermian times, were becoming established through the Trias and Lower Jurassic, until, in the Middle and Upper Jurassic, they often form the bulk of the Victorian black coal. The ferns and other components of the humid zone were greatly in evidence; whilst the ginkgoales seem to indicate a moist forest vegetation. On the other hand, there were marked differences between the floras of the Lower Mesozoic in New South Wales and the Ipswich Series in Queensland, probably due to differences in local conditions, such as the arid tracts indicated by the æolian deposits of this period. For the coast had been subjected to a stage of base-levelling shown in the wonderfully rich fish fauna that probably had its habitat in numerous chains of brackish lakes periodically inundated by high tides.

* Mem. Geol. Surv. N. S. Wales, Pal., No. 3, 1890, p. 40.

† Proc. R. Soc. Vict., vol. vi., 1894, p. 143.

‡ Ann. Rep. Secy. Mines, Vict., 1891 (1892), p. 30. See also "Records Geol. Surv. N. S. Wales," vol. iv., p. 32. The reference by McCoy to the "*Schizoneura* bed" as underlying the *Gangamopteris* bed is due to an error in Ferguson's first report, but since rectified by him. Officer and Balfour (*op. cit.*, 1894, p. 143) correctly surmises this bed to be above the *Gangamopteris* bed.

§ Proc. Linn. Soc. N. S. Wales, vol. viii., 1883, p. 149, pl. vii., figs. 2-4.

The Lower Mesozoic beds of Queensland are represented by the Ipswich Series. Mr. A. B. Walkom, who has lately devoted much study to this flora,* finds its affinities to lie with the Trias and Rhaetic of other areas (China, South Africa, Europe). Amongst the plants of this series the following have been described by Walkom, Tenison-Woods, and others:—*Phyllotheca australis, Neocalamites hœrensis, Schizoneura,* sp., *Cladophlebis denticulata,* var. *australis, Coniopteris delicatula, Dictyophyllum rugosum, Thinnfeldia Feistmanteli, T. odontopteroides* and *T. acuta, Danæopsis Hughesi, Sagenopteris rhoifolia, Sphenopteris lacunosa* and *S. superba, Tæniopteris spatulata,* var. *Carruthersi, T. lentriculiformis* and *T. Dunstani, T.* (*Macrotæniopteris*) *wianamattæ, Stenopteris elongata, Ginkgo antarcticus* and *G. cf. magnifolia, Baiera Simmondsi, B. bidens, B. ipsviciensis* and *B. ginkgoides, Stachyopitys annularoides* and *S. Simmondsi, Bennettites,* sp., and *Pterophyllum multilineatum.* Having regard to the sequence of the Queensland beds, the flora has proved of great value in determining their relationships, notwithstanding that many of the plants are common to the later (Walloon) Series.

In Tasmania also the Mesozoic flora is well developed, but the beds still require systematic palæobotanical investigation. The series is known as the Upper Coal Measures, and probably both Lower and Upper Mesozoic beds are there represented. Amongst the more striking plant remains are *Phyllotheca australis, Stenopteris elongata, Thinnfeldia odontopteroides* and *T. lancifolia, Cladophlebis denticulata,* var. *australis, Tæniopteris spatulata,* var. *Carruthersi, Pterophyllum,* and *Phœnicopsis elongatus.* This latter species, with grass-like leaves, was formerly referred to *Zeugophyllites*; its plant relationship is uncertain, and Heer and others have suggested its affinities with *Baiera. Phœnicopsis* also occurs in the Stormberg Series of South Africa, which is regarded by A. C. Seward as of Rhaetic age, a period of a uniform and widely-distributed flora. However, Walkom finds this genus in his Walloon Series (Upper Mesozoic) and not in the Lower (Ipswich) Series, so that, in Queensland at least, it is abnormally late in its appearance. The widely-spread *Stenopteris* of the Australian Mesozoic flora may have an alliance with the cycads, as suggested by Saporta.

In the lower part of the Mesozoic series (Trias and Rhaetic) belong the Leigh Creek Coal Beds of South Australia. This occurrence is interesting as being rather exceptional for this

* "Mesozoic Floras of Queensland," 1915-17. Since this paper was written, a detailed and very useful summary of the geology of the Mesozoic rocks of Queensland has been published by Dr. A. B. Walkom (Proc. Linn. Soc. N. S. Wales, vol. xliii., part 1, 1918, pp. 37-115).

horizon to be coal-bearing, unless we include part of the Upper Coal Measures of Tasmania. From Leigh Creek Mr. R. Etheridge, jun., described *Thinnfeldia odontopteroides* and *T.* (*Macrotæniopteris*) *wianamattæ*, from bore cores.

Upper Mesozoic (up to Cretaceous).

Both in Queensland and Victoria a rich assemblage of plant remains of this period have been discovered. So far as they can be correlated, these floras show a close affinity with the Upper Oolite plants of Yorkshire, in England, but embrace several types of an older character found in widely-distributed deposits of the Rhaetic, Lias, and upward. The Victorian black coal deposits in the Gippsland Basin especially, as well as the same beds, poor in coal, on the Wannon River and near Geelong, have furnished many species of ferns and conifers. Of the commonest ferns may be cited *Tæniopteris*, *Cladophlebis*, *Sphenopteris*, and *Thinnfeldia*, the latter including the more ancient species *T. odontopteroides* and one peculiar to the upper beds, *T. Maccoyi*, having a larger and apparently thicker frond, probably a moist-conditioned modification of the species usually found in deposits of a more arid nature. Another species, *T. indica*, of the Rajmahal Hills flora, occurs near Jumbunna, South Gippsland. Roots of ferns found in the Gippsland coal measures, known as *Rhizomopteris*, have been referred by the writer to *Tæniopteris spatulata* * on account of their having been discovered in close relationship and general community. They resemble the creeping root-stock of a Hart's Tongue Fern (*Scolopendrium*). Prof. Zeiller had already referred to the probable habit of *Tæniopteris* fronds growing in tufts as in the genus mentioned. *T. spatulata*, a widely-distributed species, and occurring in the Indian Jurassic flora, is here regarded as the central type, with *T. Daintreei* and *T. Carruthersi* as narrow and broad varietal laminæ respectively. The ubiquitous *Cladophlebis denticulata*, which is found not only in most of the Australian States, but in England, Germany, Austria, Italy, Scandinavia, Siberia, Greenland, North America, Persia, China, Japan, India, and New Zealand, is doubtfully referred to the *Polypodiaceæ* on account of its fructification. *Coniopteris hymenophylloides*, another widely-distributed fern of the Oolitic and Upper Jurassic generally, is closely allied, according to Prof. Seward, to either *Dicksonia* or *Thyrsopteris*, and is definitely a member of the Tree-ferns (*Cyathaceæ*).

Amongst the mosses (*Bryophyta*) we have in Victoria *Marchantites*, a liverwort, as at Scarborough, in Yorkshire;

* Rec. Geol. Surv. Vict., vol. iii., part 1, 1909, p. 110.

whilst the pteridophytes are represented by the Horse-tail, *Equisetites wonthaggiensis*. Of the ginkgoales, both *Ginkgo* and *Baiera* occur, but these two genera are more abundant in the Queensland Mesozoic series.

Conifers are well represented by *Podozamites* (species of McCoy's, probably of Araucarian affinities), *Araucarites* (both leaves and cones), *Palissya*, *Albertia*, *Taxites*, and *Brachyphyllum*. These conifers are also found in the other States—*Araucarites*, *Palissya*, and *Podozamites* in New South Wales, whilst *Taxites* and *Brachyphyllum* have been obtained from the Walloon Series, Queensland.

In Western Australia, at Mingenew, the cycad *Otozamites* and the conifer *Pagiophyllum* occur.

The Talbragar beds of New South Wales contain, besides an important fish fauna, *Tæniopteris Daintreei* and *Cladophlebis*, as well as *Podozamites lanceolatus*.

Tasmania yields a rich fern flora, most of the genera being common to some of the other States. Besides those forms already noted under Lower Mesozoic, we may mention the following, which are common to the Victorian Jurassic :—*Thinnfeldia odontopteroides* (recorded as *T. media*), *T. lancifolia* (recorded as *T. superba*), *Cladophlebis denticulata*, var. *australis*, and *Stenopteris elongatus* (recorded as *Trichomanides spinifolium*). In a note sent to the writer in 1912, the Government Geologist of Tasmania, Mr. W. H. Twelvetrees, mentions the interesting fact that *Phœnicopsis elongatus* ("Zeugophyllites") is found abundantly throughout the Mesozoic in Tasmania, and further adds :—"Our Ida Bay beds would seem to be the lowest, succeeding, I think, our Triassic Sandstones (Knocklofty, &c.)" As regards the occurrence of *Tæniopteris* in the Tasmanian Mesozoic flora, *T. spatulata*, var. *Daintreei*, is absent, but Johnston describes *T. tasmanica* and *T. Morrisiana* from Spring Hill and Longford respectively. These forms seem to be closely allied to *T. Tenison-woodsi*, which in Queensland ranges throughout the Mesozoic.

The Walloon Series (Upper Mesozoic) of Queensland has been investigated by Walkom, who enumerates the following comprehensive flora :—*Equisetites rotiferum*, *Cladophlebis australis*, *Phlebopteris alethopteroides*, *Dictyophyllum Davidi*, *Hausmannia*, *Thinnfeldia Feistmanteli*, *T. odontopteroides*, *Sagenopteris rhoifolia*, *Sphenopteris Baileyana*, *Tæniopteris spatulata* (including var. *Daintreei* and var. *major* = var. *Carruthersi*), *T. crassinervis*, *Stenopteris elongatus*, *Phyllopteris Feistmanteli*, *Ginkgo cf. magnifolia*, *Baiera Simmondsi*, *Ptilophyllum pecten*, *Pterophyllum abnorme*, *P. contiguum*, *P. Nathorsti*, *Pseudoctenis eathiensis*, *Otozamites Queenslandi*, *O. obtusus*, *O. Feistmanteli*, *O. cf. Mandelslohi*, *Araucarites poly-*

carpa, Brachyphyllum crassum, Taxites planus, and *Phœnicopsis elongatus.*

It is beyond the limits of a short summary like the present to give an adequate idea of the richness of the Upper Jurassic flora in Australia. We may, however, point out the chief features noticed in our upward survey of rocks of the Jurassic period. The precocious members of the Jurassic flora found in the Carbopermian epoch, as *Brachyphyllum, Baiera, Ginkgo, Cladophlebis,* and *Tæniopteris,* reach their maximum in the Upper Jurassic of Victoria, Queensland, New South Wales, and Tasmania. It is somewhat puzzling to find *Stenopteris, Phœnicopsis,* and *Thinnfeldia,* genera with a tendency to typify Lower Mesozoic beds elsewhere, commingled with later forms, as *Coniopteris,* the Upper Jurassic types of *Sphenopteris,* and *Cladophlebis* (related to our living Royal Fern, *Todea*). Of the latter genus I have identified *C. indica,* a Rajmahal species, from Bellarine, near Geelong. If we regard the Rajmahal beds as Liassic, one portion of our flora from the Victorian Coal Measures points to a Lower Mesozoic horizon, whilst the other has affinities towards the Oolitic of Europe. Only a full and detailed study of our several Mesozoic floras will help to clear up this seeming stratigraphical discrepancy.

CRETACEOUS.

The Cretaceous palæobotanical record for Australia was, until quite recently, a very meagre one, the plant remains recorded being as follows :—

Algæ.—Remains of Diatomaceæ (*Coscinodiscus,* &c.) have been noted by Messrs. Dun, Rands, and David from limestone at Maranoa, Queensland, belonging to the Rolling Downs formation. Also Coccoliths washed from the Upper Chalk of Gingin, Western Australia, have been recorded by the writer.

An Upper Cretaceous fern, *Didymosorus ? gleichenoides,* was described by R. Etheridge, jun., from the Desert Sandstone formation at the Croydon goldfields. The species to which this fern is provisionally referred is an Indian (Rajmahal) form, of Liassic age.

Blocks of driftwood are found embedded in the Rolling Downs Limestone of Longreach, Queensland, and some of these have been sent to Dr. M. Stopes, of the British Museum, for determination. They are probably either coniferous or cycadaceous.

The record of a *Glossopteris* from the Desert Sandstone of Queensland was long regarded with suspicion. One of the specimens, collected by Norman Taylor, came from the tableland south of the Mitchell River ; the other, by W. H. Rands, from Betts's Creek, near Cape goldfield. This mystery has lately been cleared up by J. H. Reid, of the Queensland Geo-

logical Survey,* who shows the Betts's Creek beds (*Glossopteris* shales and *Vertebraria* beds) to belong to the Carbopermian, upon which the Desert Sandstone lies unconformably.

The Burrum beds, with plant remains and associated mollusca-bearing marine deposits, were formerly referred to the Lower Trias-jura. They have now, through the investigations of Mr. B. Dunstan and Dr. H. C. Richards, been established as part of the Cretaceous Series.† Quite lately the flora has been studied by Dr. Walkom, and that gentleman has most kindly placed at my disposal some valuable lists of determined plants from this series, which are not yet published *in extenso*. The notes by Dr. Walkom are as follows :—

" The Cretaceous floras, as far as Queensland is concerned, are three in number—viz., (1) a small flora from the Marine Cretaceous in the Maryborough Series, (2) the flora of the Burrum Series, (3) the flora of the Styx River Coal Measures.

" 1.—The flora of the Maryborough Series (Publ. 262, Queensland Geological Survey—in the press) consists of some fourteen species, as follows :—*Equisetites cf. E. rajmahalensis, Sphenopteris*, sp., *Tæniopteris elongata*, sp. nov., *T. Tenison-woodsi, Tæniopteris*, sp., *Ginkgo digitata, Ginkgo*, sp., *Ptilophyllum* (*Williamsonia*) *pecten*, (?) *Pterophyllum*, sp., *Araucarites polycarpa, A. mesozoica*, sp. nov., *Araucarites*, sp., *Pagiophyllum Jennetti*, sp. nov., (?) *Taxites*, sp., (?) Roots.

" These occur definitely in the marine beds, in some cases fragments of plants occurring in the same specimen as marine shells. The Maryborough Series is regarded as probably the equivalent of the Rolling Downs Series of Western Queensland.

" 2.—The flora of the Burrum Series has been very inadequately described in the past. I have just completed the MS. of my description of it, and have described some 35 species, as follows :—*Cladophlebis australis*, (?) *Thinnfeldia lancifolia*, (?) *Dictyophyllum*, sp., *Sphenopteris flabellifolia, S. erecta, S. burrumensis*, sp. nov., (?) *Chiropteris*, sp., *Phyllopteris lanceolata*, sp. nov., *P. expansa*, sp. nov., *Microphyllopteris gleichenoides, M. acuta*, sp. nov., *Stenopteris elongata, S. laxum, Ptilophyllum pecten, Zamites takuræensis*, sp. nov., *Nilssonia Schaumbergensis, N. mucronatum, Otozamites*, sp., *Tæniopteris spatulata, T. Howardensis*, sp. nov., *Ginkgo digitata, Baiera bidens, Araucarites polycarpa, Araucarites* (scales), *Brachyphyllum crassum, Elatocladus planus*, (?) *Elatocladus*, sp., *Nageiopsis* (?) *zamioides, Pagiophyllum Jennetti, P.* (?) *peregrinum*, (?) *Sphenolepidium*, sp., *Podozamites Kidstoni, P. lanceolatus, Podozamites*, sp.

* Publ. No. 254, Geol. Surv. Queensland, 1916.

† " The Cretaceous Rocks of Woody Island, Queensland, and its Neighbourhood, and their Relations to the Burrum Formation." Rep. Aust. Assoc. Adv. Sci., Melb. Meeting, vol. xiv. (1913), 1914, pp. 179-188.

"As a result of comparison with other Mesozoic floras, I have come to the conclusion that the Burrum flora is a typical Lower Cretaceous flora (Neocomian-Barremian or Wealden), most closely comparable with the American Kootani and Patuxent floras and the German Wealden.

"In Western Queensland there is a fresh-water series overlying the Rolling Downs, and it is regarded as the equivalent of the Burrum Series. Mr. Dunstan calls the Western Series the Winton Series. Very few fossils come from the latter.

"3.—The Styx River fossil flora has not yet been examined. Plants are not very abundant, but the flora is certainly as recent as the Burrum flora, and I am inclined to think that it may be later, perhaps Upper Cretaceous."

In a later note Dr. Walkom informs me that he finds the Styx Series younger than the Burrum flora, and probably of Lower Cretaceous age. It contains a remarkably interesting assemblage of plant fossils, as there occur, besides *Cladophlebis*, *Tæniopteris*, *Araucarites*, and *Podozamites*, leaves of angiosperms (flowering plants) which have not before been recorded from the Mesozoic of Australia. This flora also shows a strong resemblance to the flora of the Waikato Heads, in New Zealand.

A rather extensive dicotyledonous flora has been determined from flaggy quartzites of the Lakes Eyre, Torrens, and Frome districts, South Central Australia. These, together with others from Queensland described by Ettingshausen, have been referred by Prof. Tate * to the Desert Sandstone Series (Upper Cretaceous), but the components of this flora are so distinctly Miocene in character that not by the greatest effort of the imagination could they be accepted as Upper Cretaceous.

The foregoing rapid survey of the flora of the Australian Mesozoic has been attempted in the hope of revealing the wonderfully interesting character of the plant life of that period. Much remains to be done in systematizing our knowledge of these relics of ancient forest and gully, especially in relation to their distribution in time. When this has been more thoroughly accomplished there is no doubt much will have been learned of the position and occurrence of other coal-bearing deposits in Australia, which up to the present lie hidden and unsuspected beneath the earth's surface.

In the concluding paper of the series, on the Tertiary Flora, it is proposed to figure some of the more typical and interesting forms.

* See Horn Exped., part 3, 1896, pp. 66-68. Also Etheridge, R., jun., Mon. Cret. Invert. Fauna, Mem. Geol. Surv. N. S. Wales, Pal., No. 11, 1902, pp. 51-56. It is there noted (p. 51, footnote) that "considerable uncertainty exists as to the exact stratigraphical position of these plant beds." These beds were referred to by the writer under "Miocene leaf-beds" in "Australasian Fossils," 1914, p. 91.

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FIELD NATURALISTS' CLUB OF VICTORIA.

Owing to the regulations regarding the influenza epidemic prohibiting the holding of public meetings, &c., the February meeting of the Club was not held.

Exhibition of Wild-Flowers.

The following letter has been received from the National Committee of the Y.M.C.A. :—

"To the Hon. Secretary Field Naturalists' Club of Victoria, Melbourne.

"Dear Sir,—I have pleasure in acknowledging receipt of your letter of 8th inst., enclosing cheque for £141 2s. 9d., representing the net proceeds of the wild-flower exhibition held at the Melbourne Town Hall in October last. This generous gift is gratefully appreciated by my committee, and comes as a welcome addition to our funds at this time, when the demands that are being made upon our resources in connection with the demobilization of the troops is becoming increasingly insistent. We recognize that the arrangements in connection with the exhibition must have involved a considerable amount of thought, time, and energy on the part of the responsible officials, and will be glad if you will kindly accept for yourself, and convey to all who in any way helped towards its success, the committee's warmest thanks.—Yours sincerely,

"J. Henry Lang,
"National General Secretary.

"Melbourne, 13th February, 1919."

EXCURSION TO MARYSVILLE.

The Christmas excursion to Marysville proved most enjoyable in every way. A party of eight, including two ladies, proceeded to Healesville by the 8 a.m. train on Christmas morning. Owing to a special having left a little while before, there was little crowding, and we were able to travel together. Healesville (38 miles) was reached in due course ; there we found a vehicle waiting to convey us the remaining twenty-three miles of our journey. As the number of excursionists was smaller than had been expected, some delay was experienced while a smaller vehicle was being substituted for that originally selected to make the trip ; however, by 11.30 a.m. we were on the road. The weather was dull, with showers threatening, the absence of sunshine to fully reveal the beauties of the bush and the surrounding hills being greatly regretted. The road between

Healesville and Marysville is famed as being one of the most picturesque in the State, passing as it does over the Blacks' Spur, celebrated for its tall trees. At about six miles out the turn-off to Mount Juliet was passed on our right, and in another mile the Maroondah River, formerly known as the Watts, was crossed. Here was the site of Fernshaw, a well-known tourist resort in the sixties and seventies, but since resumed in the interests of Melbourne's water supply. Morley's track, a favourite walk of Fernshaw visitors in times gone by, branches off up the valley of the Maroondah just where the road takes a sudden turn to the left at the foot of the Spur. A photograph on the table depicts three tree-ferns, said to be sixty feet in height, which were to be seen along this track. Ascending the Spur, the road rises rapidly—about 1,200 feet in three miles. During the first mile or two the under-scrub has been greatly thinned out during recent years by bush fires, which, at the expense of the beauty, enables more extensive views to be obtained in a south-westerly direction. The splendid scenery of the upper part of the Spur was greatly admired. On the left is the beautiful Myrtle Creek, with its dense vegetation of many kinds, with a heavily-timbered slope rising up behind. Many huge trees are to be seen close to the road, but the trunk of one of the largest, known as "Uncle Sam," now lies prostrate on the side of the road near the drinking trough. While ascending the Spur the remarkable conical hill known as Mount Dom Dom was seen close by, on the right, with the huge mass of Mount Strickland (4,000 feet) a few miles beyond. As we descended the eastern slope, now in the Murray watershed, at a break in the forest known as Zeal's Look-out, a very fine view across the Acheron Valley to the rugged Cathedral Mountain, near Buxton, was obtained. A short halt was made at Narbethong, in the valley of Fisher's Creek, and then progress was resumed through rather uninteresting country to the Acheron bridge, whence the road gradually ascends till it again reaches an altitude of 2,000 feet at the Bald Hill, dropping again 500 feet before reaching Marysville, which township was reached about 4.30 p.m., just as heavy rain, which had been threatening for some time, set in, lasting for an hour or more. Here we were cordially welcomed to the hotel by Miss Keppel, and soon had our rooms allotted to us. There was very little in the way of a floral display along the road we had traversed, the Blue Pincushion, *Brunonia australis*, the pink Trigger-flower, *Stylidium graminifolium*, and the Fringed Lily, *Thysanotus tuberosus*, being perhaps the most noticeable. After tea, as the rain had stopped and there was still an hour or so of daylight, some of the party went for a walk for a couple of miles along the Wood's Point road, which rises sharply beyond the Steavenson River. Here the

sweet-scented *Stackhousia linarifolia*, *Veronica Derwentia*, and the ubiquitous *Goodenia ovata* were blooming freely. Beautiful cloud effects were seen as the sun set, masses of vapour appearing as if entangled among the trees on the hillsides. During the evening we made up plans for the ensuing days, embracing the different trips detailed in the paper contributed to the Club's meeting in March, 1916, by Mr. F. Pitcher and myself, entitled "An October Week at Marysville" (*Vict. Nat.*, xxxiii., p. 32), and it will be needless to repeat in detail the descriptions of the places visited on that occasion.

On Thursday morning most of the party made a before-breakfast visit to the "Beauty Spot"—a group of tree-ferns, &c., at the head of a small stream running into the Steavenson. A visit to the Steavenson Falls had been chosen as the first outing of the excursion, and after breakfast all made their way thither by the easy track which gradually ascends the narrow valley until stopped by the rocky wall forming the falls. Owing to the dryness of the season we had not expected to find much water coming down the falls, so were agreeably surprised at the volume descending. High up among the rocks a flowering shrub attracted attention, and on specimens being secured it was found to be *Callistemon salignus*, var. *viridiflorus*. The Native Elder, *Sambucus Gaudichaudiana* and the Blanket-wood, *Senecio Bedfordii*, were also in bloom. Perhaps the most noticeable feature along the track was the robust growth of *Daviesia latifolia*, often known as the "Native Hop," from the bitter taste of its leaves. Many of the bushes had a height of at least eight feet, with stem diameters of an inch and a half. Only a few flowers remained, but when in full bloom it must have presented a fine sight. In the afternoon a visit was paid to Keppel's Look-out, on Mount Bismarck, about two or three miles south of the township, with an altitude of 3,000 feet, as indicated by Mr. Barnard's aneroid. This instrument, presented to its owner at the last annual meeting of the Club, it may be remarked, was fully availed of during the different outings, and, in such hilly country, added not a little to their interest. All admired the fine view down the Acheron Valley from this elevated spot, and, though rain compelled us to get such shelter as we could, it did not last long, and the after effects on the distant hills fully made up for any discomfort we had experienced. The large Shrubby Pimelea, *P. ligustrina*, with *Helichrysum scorpioides* and *Stellaria flaccida*, were met with during the afternoon. Of course, tree-ferns and smaller species abounded everywhere here, as elsewhere throughout the various trips.

Friday, 27th December, had been set apart for a whole-day trip to the Taggerty Valley and Keppel's Falls. The day

turned out all that could be desired, and the beautiful scenery along the stream was the admiration of all. In about seven miles the pavilion at "The Meeting of the Waters" was reached, and after a little trouble the billy was boiled and luncheon had. After spending as long as we could spare here viewing Keppel's Falls, &c., we turned homewards, making a short detour along the Glover Walk to the Cameron Cascades, a place of exquisite beauty, tree-ferns, beeches, sassafras, and shrubbery combining to make a scene which it is impossible to describe. A remarkably fine growth of the fern *Lomaria fluviatilis* was seen here, some of the fronds being three feet in length and in perfect order. One of the largest beeches seen was growing here, its trunk being about eight feet in diameter. Several flowering spikes of the Potato Orchid, *Gastrodia sesamoides*, were met with, and a plant of *Billardiera longiflora*, laden with purple fruits, was a notable sight. This plant was subsequently noted in full bloom. The creeper *Lyonsia straminea* was found in the "Forest of Arden," both in flower and in fruit. Several of the beautiful green and black butterflies, *Papilio macleayanus*, confined to our higher mountainous districts, were seen flying about the flowering shrubs along the river. The Strap-fern, *Lomaria Patersoni*, so named from its long, narrow, undivided fronds, was noticed in the deep shade of the beeches in many places. A peculiar globular fungus, *Cytharia Gunnii*, which seems to be found only on the beech, was secured by Mr. P. Morrison, in the Forest of Arden, a new locality for this rare species. Some ten years ago I found specimens of this fungus on the same host tree in Myrtle Creek, on the Blacks' Spur. The altitude of the pavilion at "The Meeting of the Waters" was found to be about 600 feet above Marysville, so that the walk was not an arduous one. Afternoon tea was taken at the termination of the Talbot Drive, and the hotel was reached about half-past eight, all having thoroughly enjoyed the fifteen-mile tramp.

Saturday was devoted to the walk to Bald Hill, another view-point overlooking the Acheron Valley. The day promised to be warm, and, though not a very long journey, it was thought better to take lunch and give a whole day to the trip. From the northern end of the Spur, which is bare of timber, an extensive view of the Acheron Valley, the Cathedral Range, the Black Range, and of Narbethong was obtained. Few flowering plants were met with; the flowers of *Brachycome diversifolia*, which were so fine when seen in October, 1915, were at this time of year much diminished in size. After spending two or three hours admiring the view, we returned by the route of the morning. This range is of a different geological formation to most of the country around Marysville, being Silurian or Ordovician instead of the prevailing granite or dacite.

Sunday was spent quietly, most of the party attending the morning service at the local church. In the afternoon some went to "Michael Dene," a nice fern gully not far from the township; others renewed their acquaintance with the Steavenson Falls.

For Monday a visit to the Cumberland Falls, distant about eleven miles along the Wood's Point road, was decided on. Three of the party, considering the trip would tax their walking powers too severely, arranged to join some visitors at the hotel who were driving thither. The others, starting at 6 a.m., breakfasted at a spring on the road about five miles out, and by noon had completed the first half of their journey. The driving party arrived about one, and all had lunch together. The road rises quickly after crossing the Steavenson River, and traverses a part of Mount Grant known as Robley's Spur. At first the densely-timbered valley of the Steavenson River on the right is overlooked, with Mount Bismarck forming a background to the picture. A little further on the road crosses to the other side of the ridge, and the view is now down the valley of the Taggerty, with Mount Margaret beyond. An elevation of 3,000 feet or more is attained, and the road then becomes comparatively level. The views from Nicholls's Look-out and other spots were much admired. Shortly after passing Tommy's Bend, a celebrated beauty spot in former days, the road crosses the divide into the southern (Yarra) watershed. About here some fine beeches were showing the beautiful coppery tints of their young foliage. Halting at the Bellell Creek, or O'Shannassy River, so that the travellers might refresh themselves at the stream, some interesting insect larvæ were noticed in the water on the stones, probably the larvæ of one of the Ephemerids. The road, as it ascended the divide near Mount Arnold, attained about 3,600 feet, and was bordered with flowering shrubs, the white flowers of *Olearia* (*Aster*) *stellulata*, var. *lyrata*, and *O. myrsinoides*, and *Cassinia aculeata* being prominent, with here and there a bush of *Prostanthera mellissifolia* in full bloom, bearing delicate lavender flowers. Several stems of *Dianella tasmanica*, with its beautiful blue flowers, occurred here also. As we descended the slope towards the Corra Linn and Cumberland Creeks many magnificent specimens of the Mountain Ash Gum, *Eucalyptus regnans*, grew alongside the road, and at a spot about half a mile from the road, to which a track has been blazed, is the giant tree known as "King Edward VII.," which has a girth of 87 feet. A photograph of this huge trunk is one of the adornments of the hotel vestibule. One of the features of the road was the fine growth of *Lomaria fluviatilis*, which occurred everywhere on the shady side, while *L. lanceolata* was absent. The only snake of the outing was seen here, but escaped capture. After lunch

at the falls, on the advice of the walking party, who had gone about a mile further and found a group of magnificent gums, we did so also, and were well compensated for the walk, most of the trees being fully 250 feet high. The walking party had been much interested here by the curiosity of a Wonga Pigeon, *Leucosarcia melanoleuca*, which seemed to regard them with wonder and astonishment, so many persons to be seen at one time in such an unfrequented spot being evidently more than it could understand. The falls, which were visited in November, 1890, by the Yarra Falls excursion party of the Club (*Vict. Nat.*, vii., p. 161, with photograph), were found to be largely hidden from view by the wealth of vegetation with which they are surrounded, only the upper part being well seen. The gorge down which the stream precipitates itself is very beautiful, and a fairly easy track descends for some 200 feet or more alongside the rushing water. The pedestrian party left before the others, having decided to add some three or four miles to their return journey by trying to get through to the Taggerty River, along the Glover Walk, and thus return to Marysville by way of the Forest of Arden and the Talbot Drive. This they did without mishap, and report a succession of glorious fern and beech scenes along the Walk, and, notwithstanding that they did not reach the hotel till 10 p.m., seemed thoroughly pleased with their sixteen hours in the open. One of this party, it may be mentioned, was a lady, who seemed perhaps the least tired of all by the hard day's work. Those who returned by vehicle had some glorious sunset scenes over the Taggerty Valley as they made the descent of Mount Grant.

Tuesday, 31st December, was the last day of the stay, which had passed all too quickly. As we were timed to leave for Healesville at 3 p.m., we had a few hours available in the morning, which were devoted to exploring the track to the wolfram mine on Wilks's Creek. This track leaves the Keppel's Look-out track about 1½ miles from the village, and bears southerly through fairly open forest towards Mount Strickland. On reaching Wilks's Creek we found it to be of the usual mountain gully type, with King and other ferns in profusion, but time did not permit the completion of the journey to the mine. We noticed here, as well as in another place, nice plants of *Mimulus moschatus*, the musk of our shade-houses, doing remarkably well. After lunch some of us collected a few seedling ferns from the side of the water-race before packing our belongings. Our final duty was to pen and sign an appreciation of our experiences at Marysville in the visitors' book for the delectation of those who may follow, we having been greatly interested in the notes made by the late Baron von Mueller, Rev. Tenison-Woods, Mr. C. French, and others of kindred tastes in days gone by.

From the number of birds observed while sitting quietly in the bush, it would appear that ornithologically the district is also good, but, as none of us professed much knowledge of birds, little can be said under that heading. One Lyre-bird and many Gang-Gang Cockatoos, King Parrots, Blue Wrens, Robins, &c., were seen. A male Scarlet-breasted Robin was particularly fond of the top of the lamp outside the hotel, and could generally be seen there morning and evening. Insects were very scarce, beetles particularly so. Of butterflies three or four species were noted: the common brown, *Heteronympha merope*, Painted Lady, *Pyrameis kershawi*, and the Mountain Swallow-tail, *Papilio macleayanus*—the last-named insect was seen in considerable numbers in many places. Reptilia were represented by a Blue-tongued Lizard and numerous smaller species, and the Black Snake previously mentioned.

In addition to the plants already named the following were seen in bloom in different places:—*Loranthus pendulus*, *Sisyrinchium pulchellum*, *Helichrysum rosmarinifolium*, *H. ferrugineum*, *H. leucopsidium*, *Dipodium punctatum*, *Lagenophora Billardieri*, *Mentha laxiflora*, *Leptospermum scoparium*, *Viola hederacea*, *Senecio vagus*, and *S. australis*.

Although it cannot be claimed that anything particular was done in the way of scientific work, the beautiful scenery naturally attracting most attention, all of the party seemed well satisfied with the excursion, which was made all the more pleasant by reason of the exceptionally favourable weather experienced at a time of year when extreme heat might have been expected. The elevation of Marysville (1,600 feet), and the presence of ranges up to 4,800 feet within a few miles, may perhaps account for the invigorating air, which enabled us to cover some seventy miles on foot during the week. The outstanding features of the district are undoubtedly the profusion and robustness of the vegetation, many of the Myrtle Beeches of the Forest of Arden possessing trunks six to eight feet in diameter, being correspondingly tall, while other flowering plants usually found as dwarf shrubs are here almost arborescent, and, instead of occurring as scattered specimens, grow in dense thickets to the exclusion of other species. Many more plants might have been mentioned, but only those prominent at the time of our visit are recorded, for the names of some of which I am indebted to Mr. F. Pitcher, who was put down as co-leader of the excursion, but was unfortunately unable to take part in it. The tourist map issued by the Lands Department was found of great service during the outing, and, as a copy of it was posted under the hotel verandah, it was easily referred to and discussed before and after each day's trip.—J. STICKLAND.

Lyre-Birds.—Nature-lovers who have stayed at Sherbrooke this season have had a special opportunity of hearing Lyre-birds. There is quite a family party of these remarkable birds that seems to have its principal habitat in the forest adjacent to the tables and fire-places erected for the convenience of picnickers at the junction of the track from Sherbrooke with those leading to Belgrave and the "Giant Tree." They can be heard calling round this portion of the reserve at almost any time in the day, but the best opportunity is, of course, the early morning. It is well worth the labour of getting out of bed betimes to listen to a performance by this wonderful mocking bird, with his remarkable imitations of the Laughing Jackass, the Coachwhip-bird, and a sound like a stonebreaker's hammer, with many other calls. After a good many attempts, I was one morning fortunate enough to see one of these birds doing his dance on a mound not many yards distant from where I had concealed myself. I watched him going round and round, nodding his head up and down and stamping his feet, all the time emitting strident notes and imitating the birds that I have above mentioned. At times he would spread his wings as well as his tail-feathers and positively rush round the little hillock. At this time there was a whirring sound made, and it was somewhat difficult to distinguish as to whether it came from the fluttering wings or from the bird's throat. I was near enough to be able to notice the beautiful effect of the brown and white bars on the contour of the tail feathers, from which the bird derives its name, gleaming in the sunlight above the vivid green of the bracken fern. I stayed and watched this fascinating performance for some minutes, when all at once something snapped, or else the Pilot-bird, *Pycnoptilus floccosus*, uttered his warning note, for the bird stopped instantly, dropped his tail, and silently sped away far into the bush. I advanced cautiously, and was investigating the freshly-trodden mound, when something moved from under a fallen tree-trunk, and a young Lyre-bird came out—so near that I could almost have touched him. He looked at me and I at him, and, apparently concluding that I was harmless, he continued, to my intense delight, to scratch and pick, and now and again to raise his head and emit his clear, piercing, metallic-sounding note. It was interesting to watch how his throat swelled up as he did so. It is earnestly to be hoped that the rangers will take special care to confiscate, as they have the right to do, all guns or pea rifles carried in this reserve; otherwise it is to be feared that these glories of the bush, who are evidently becoming tamer and more trustful of man than they used to be, will, for this very reason, fall victims to so-called sportsmen.—A. E. Keep. 10th January, 1919.

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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 March, 1919.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about fifty members and visitors were present.

CORRESPONDENCE.

From Mr. F. P. Dodd, Kuranda, Queensland, stating that the report that his collection of butterflies, &c., recently exhibited in Melbourne had been purchased for transmission to America is entirely without foundation.

REPORTS.

A report of the excursion to Balwyn and Bulleen on Saturday, 18th January, was forwarded by the leaders, Messrs. F. Chapman, A.L.S., and A. L. Scott, who stated that, owing to a very unpleasant hot wind day, only a few members met for the ramble over picturesque country to the volcanic plug at Balwyn and thence to the Koonung Creek, near Bulleen. An account of a former visit to the plug, with illustrations, was given in the *Naturalist* for June, 1913 (vol. xxx., p. 35), and would hold good for the present occasion. The wind had now changed to the south-west, bringing up clouds of smoke from distant bush-fires as well as a welcome change in temperature. From the plug the party proceeded across the paddocks to the Koonung Creek, where it is crossed by the road to Templestowe. There, in some Ordovician mudstone used for road-making, some rather minute fossils were obtained, consisting of several well-preserved specimens of *Chonetes Melbournensis*, also a fragment of a rhynchonellid, both belonging to the lamp-shell group. A return was then made to Deepdene or East Kew, as suited the members of the party.

A report of the excursion to Portarlington on Monday, 27th January (Foundation Day), was given by the leader, Mr. J. Gabriel, who said that seven members met on board the *Courier*. Nothing of note was remarked on the way down the river or in Port Phillip Bay. On arrival at Portarlington it was found that fortunately we had struck a low tide, and consequently expected some good spoil, but a walk of some three or four miles towards Indented Head (St. Leonards) revealed very little of interest to the naturalist. Some time was spent in endeavouring to obtain some Nemertine worms from a partly submerged sandy patch, but with poor results, the creatures

being so extremely fragile. One or two specimens of a rather singular crustacean, unidentified, were taken, and a very fine piece of the coral, *Plesiastræa urvillei*,* was afterwards picked up. Our lepidopterist fared somewhat badly, his best would-be capture, one of the mistletoe butterflies, managing to elude his net. A collection of the shells along the beach failed to reveal anything of special interest in the twenty or so species collected. Our badge shell, *Nassa fasciata*, usually fairly plentiful on this beach, was somewhat scarce, probably owing to the fact that the day was a holiday.

[An interesting report of the only previous excursion to Portarlington will be found in the *Naturalist* for July, 1890 (vol. vii., p. 31).—Ed. *Vict. Nat.*]

The president reported that, notwithstanding the close and muggy weather experienced on Saturday, 8th February, a party of about forty members and friends assembled at the Botanic Gardens in response to the committee's invitation to a ramble through the Gardens, followed by afternoon tea. At his request, the director, Mr. J. Cronin, kindly pointed out to the visitors some of the specially interesting features, including the stove-houses and propagating frames, &c. In the nursery beds were seen numbers of seedling Australian trees and shrubs, Mr. Cronin remarking that it had been found that the best results followed if these seedlings were first transplanted when showing their earliest foliage leaves. The method of growing tree-begonias under a tea-tree shelter appealed to the plant-lovers of the party. Earlier in the afternoon an informal invitation given by His Excellency the Governor-General (an honorary member of the Club) to stroll through the adjoining grounds of Government House had been gladly accepted, Sir Ronald and Lady Helen Munro Ferguson accompanying the party, and pointing out some of the more interesting trees, notably a fine New South Wales Spotted Gum, *Eucalyptus maculata*, now about forty feet in height, with corresponding spread of branches. After a visit to the conservatories their Excellencies accompanied the party into the Botanic Gardens and remained some time examining the many fine specimen trees, &c. Tea was taken in the open near the tea kiosk, the tables being decorated with blossoms of the Scarlet Gum, in various shades, and the orange flowers of *Persoonia pinifolia*. After tea votes of thanks to Mr. Cronin and Mr. St. John for their efforts in making the afternoon such an interesting one were heartily given, and with a final glance at the Australian border the party dispersed.

* [It was on this coral that in March, 1899, the late Dr. Hall based one of his practical papers for beginners, entitled "A Hunt for a Name." (*Vict. Nat.*, xvi., p. 7, May, 1899).—Ed. *Vict. Nat.*]

A report of the excursion to the Richmond Quarries on Saturday, 22nd February, was given by the leaders, Messrs. J. Stickland and C. Daley, B.A. The former stated that pond-life was not so prolific as on some former occasions, and had not yet been thoroughly worked out. Mr. Daley drew attention to the fact that the quarries were being made the dumping-ground for rubbish of various kinds, whereas they could be so treated that they could become a picturesque resort. He stated that the geological features of the excavations were worth preserving, and enumerated a number of aquatic birds seen, which appeared to be quite at home in the locality.

Mr. F. G. A. Barnard stated that the excursion to Melton, arranged for Saturday, 8th March, had been abandoned owing to the wet weather.

ELECTION OF MEMBER.

On a ballot being taken, Mr. R. A. Howie, Powelltown, was duly elected as a country member of the Club.

GENERAL BUSINESS.

The chairman warmly welcomed Sergeant C. L. Barrett on his return to the Club after a lengthy service with the A.I.F. in Egypt and Palestine. Mr. Barrett briefly replied, mentioning some of his natural history experiences, and promising to give further details at some future time.

Mr. G. A. Keartland brought under the notice of members the recent attempt to induce the Department of Game and Fisheries to vary the quail season, and extolled the firm attitude taken in the matter by the Minister concerned, who had refused the request. It was resolved to convey to the Department the appreciation of the Club at its action.

Mr. E. Cox referred to the great destruction of fish in inland streams by cormorants during the last few months, and moved that the matter be brought under the notice of the Fisheries and Game Department.

Dr. Sutton stated that similar complaints were being made in Tasmania.

Mr. P. R. H. St. John, in seconding the motion, stated that cormorants were doing considerable damage at the Botanic Gardens lake, though they had suffered for their boldness, he having accounted for two hundred and ten birds with ninety-seven cartridges.

The motion was carried unanimously.

A visitor (Private Potter), at the request of the chairman, mentioned that when at sea, in the vicinity of Cocos Islands, a cormorant had come on board the vessel, and became quite tame, allowing itself to be handled without fear.

PAPERS READ.

1. By Mr. Joseph Gabriel, entitled "On the Destruction of Mutton-Birds and Penguins at Phillip Island."

The author called attention to the serious menace at present threatening the Mutton-bird rookeries at Phillip Island owing to the great increase of foxes. Recently numbers of dead birds had been picked up, showing signs of having been killed by these animals. He suggested the Government be approached with the view of urging that some steps be taken for the destruction of the foxes.

Mr. G. A. Keartland suggested the poisoning of the foxes in June and July, when the skins are of considerable value. He referred to the fertility of the fox in Victoria as compared with England. Here it was no unusual thing to find six, seven, and eight cubs in a litter, whilst in England the litter would consist of two, or three at most. Recently, in destroying a litter at Bayswater, the remains of no less than thirty-six Lyre-birds' tails were found in and around the log in which the animals lived.

Mr. C. J. Gabriel, on whose report the paper was based, gave further evidence of the menace.

Mr. L. Thorn said that he had seen numbers of foxes when at the rookeries lately.

Private Potter, a resident of the district, said that it was generally believed that the foxes gained access to the island by swimming across the eastern channel from San Remo to Newhaven.

On the motion of Messrs. F. G. A. Barnard and C. J. Gabriel, it was resolved that the committee take whatever action it considers advisable in the matter.

[It has since been announced in the *Argus* of 27th March that a reward of one pound per head is to be given for foxes killed on Phillip Island.—Ed. *Vict. Nat.*]

2. By Mr. F. G. A. Barnard, entitled "Notes of a Visit to Western Australia."

The author gave some account of a three weeks' visit to the Perth district in September last, made principally to see the wild-flowers in bloom. He also referred to the geology and general characteristics of that portion of Western Australia. Having travelled by the Trans-Australian railway, he was able to give some idea of the natural history items to be seen along the route, and illustrated his remarks with maps and diagrams.

Owing to the lateness of the hour, remarks on the paper were postponed until the next meeting.

NATURAL HISTORY NOTE.

Mr. H. B. Williamson said that recently, when examining the plant collection of Rev. A. J. Maher, of Wonthaggi, who for eight years had been a diligent collector in the Genoa district, he found eight species of plants which have rarely been collected in Victoria, and are not represented in the National Herbarium collection by any Victorian specimens. The plants are:—*Persoonia lanceolata*, Andrews, *P. salicina*, Persoon, *Goodenia stelligera*, R. Br., *Leptomeria acida*, R. Br., *Oxylobium trilobatum*, F. v. M., *Dodonæa calycina*, Cunn., *Poranthera corymbosa*, Brong., and *Pteris umbrosa*, R. Br. Mr. Clinton, of Mitta Mitta, had sent him specimens of an acacia, determined as *A. rubida* by Mr. Maiden. This appeared to him to have been confused with *A. penninervis*, var. *falciformis*, and he was exhibiting specimens of the latter for comparison, but there was no mistaking the two species when the pods of each were compared. Specimens of all these plants had been presented to the National Herbarium.

EXHIBITS.

By Mr. J. W. Audas, F.L.S.—Dried specimen of orchid, *Caladenia dilatata*, R. Br., Fringed Spider Orchid, with two labella, collected at Evansford, near Talbot, by Miss R. Cleghorn.

By Mr. F. G. A. Barnard.—Growing fern, Asplenium, sp., from Yallingup Cave, Western Australia; also maps, &c., in illustration of paper.

By Mr. C. E. Cole.—Thirty of the thirty-five species of butterflies recorded for Tasmania; also a few Victorian species, taken near Melbourne.

By Mr. C. Daley, B.A.—Basalt from Balcombe Bay, Port Phillip, showing (*a*) gradual result of atmospheric action in weathering and bleaching, (*b*) the result of the lava-flow cooling quickly on the surface; also photographs showing basaltic structure at Richmond Quarries.

By Mr. J. Gabriel.—Photographs showing destruction of Mutton-birds, &c., at Phillip Island, in illustration of paper.

By Mr. C. J. Gabriel.—Victorian marine shells, *Chlamys asperrimus*, Lam., and *Pecten medius*, Lam., from Western Port Bay.

By Mr. A. D. Hardy, F.L.S.—Fang of Tiger Snake.

By Mr. C. L. Plumridge.—Living larvæ of Emperor Gum Moth, *Antheræa eucalypti*, in several stages.

By Mr. J. Wilcox.—Flowering branches of New South Wales Christmas Bush, *Ceratopetalum gummiferum*, Smith, grown at Canterbury; also frond of bracken fern, *Pteris aquilina*, nine feet in length.

By Mr. H. B. Williamson.—Dried specimens of five species of plants not previously recorded for Victoria, viz. :—*Brachycome microcarpa*, F. v. M., collected by himself at Cann River, January, 1918 (it agrees with a specimen in the National Herbarium, Melbourne, collected by Mr. Sayer in the same locality, and the determination has been confirmed by Professor Ewart) ; *Pultenæa polifolia*, Cunn., and *P. procumbens*, Cunn., and *Acacia Dawsoni*, R. T. Baker (these were received from Mr. Clinton, of Mitta Mitta, in November last—the two last-named species were determined by Mr. J. H. Maiden, F.L.S.) ; and *Loranthus longiflorus*, Desr., obtained at Genoa on a Blood-wood Tree, *Eucalyptus corymbosa*, by Rev. A. J. Maher, previously recorded for New South Wales only.

After the usual conversazione the meeting terminated.

"The Australian Environment."—The Commonwealth Advisory Council of Science and Industry has issued a most interesting memoir by Dr. Griffith Taylor, of the Commonwealth Bureau of Meteorology. The work extends to 188 quarto pages, and is well illustrated with 15 contour maps in colour and 167 other maps and diagrams, as well as numerous tables of rainfall, &c. The continent of Australia has been divided into fifteen regional divisions, one of which, comprising south-western Western Australia, he has happily named Swanland, as a set-off to Gippsland at the south-eastern corner of the continent. Each division is considered in the light of its value for settlement from a topographical, drainage, and vegetation point of view, the character and origin of the rainfall being the dominating feature. In dealing with the northern half of South Australia, designated "Eyre," it is remarked that though the Musgrave and Macdonnell Ranges are as high as any Australian mountains, except those in the vicinity of Kosciusko, they have little effect on the rainfall, the lack of moisture arising from the fact that Central Australia is located in the path of the trade wind. The memoir shows a vast amount of painstaking research among different authorities, and weighing of results. It seems probable, unless some violent upheaval takes place, that the greater part of Australia must always remain a pastoral area, the amount of territory that can be irrigated sufficiently for agricultural purposes being a mere trifle. The volume has been excellently produced, and should be of great value in determining policies of settlement. It has been issued at the nominal price of five shillings. The contour maps are also procurable in atlas form at eighteenpence, and will be found useful in any study.

NATURE IN THE SERRA RANGE.

By J. W. AUDAS, F.L.S., F.R.M.S., Assistant, National Herbarium, Melbourne.

(*Read before the Field Naturalists' Club of Victoria, 18th Jan.*, 1919.)

IT was with pleasant recollections of two previous botanizing trips in the Victorian Grampians (*Vict. Nat.*, February, 1913, vol. xxix., p. 146, and June, 1914, vol. xxxi., p. 24) that I found myself able in November last to take advantage of a few days' leisure and renew my acquaintance with what has been aptly named "the wild-flower garden of Victoria." Many parts of the Grampians are still unknown to the ordinary tourist, owing to the inaccessible nature of the country and the absence of habitations; but, by making arrangements for camping out, I was able to botanically examine a large area of the Serra Range, with, I think, interesting results.

Leaving Melbourne by the Adelaide express on Friday, 1st November, I stayed overnight at Stawell, and, making an early start on Saturday morning, reached, about noon, the residence at Hall's Gap of my host, Mr. C. W. D'Alton, who is well known in the district, and who takes a keen interest in all botanical matters, more especially the wild-flowers of the Grampians.

Bent on an orchid excursion, we took, after luncheon, an outing in the vicinity of what is known as the "Wild-Flower Garden." Passing through some country which had been recently burnt by a bush fire, some hundreds of tall, erect spikes of *Xanthorrhœa australis*, or Southern Grass-tree, were observed in full bloom. Here we came upon some nice patches of *Caladenia congesta*, the first being a clump of bright bronze colour, the second consisting of fine spikes of ordinary colouring, some of which had the unusual number of six flower-heads. Hereabouts also flourished abundantly *C. Menziesii*, *C. carnea*, *Thelymitra longifolia*, *T. antennifera*, *T. flexuosa*, and *Diuris longifolia*. After crossing a creek we found *Prasophyllum brevilabre*, *Thelymitra pauciflora*, *T. ixioides*, *Microtis porrifolia*, and *Pterostylis nutans*. Advancing into scrubby country, the shrubs attracted our attention for a while. Fine specimens of *Dillwynia hispida*, a very showy and beautiful shrub, also *D. floribunda* and *D. ericifolia*, were met with. Noticeable also were some nice bushes of *Grevillea parviflora*, *G. oleoides*, *Boronia pinnata*, *Conospermum Mitchelli*, *Astrotricha ledifolia*, *Bossiæa cinerea*, var. *rosmarinifolia*, *Pultenæa juniperina*, and *Kunzea parvifolia* just bursting into bloom. Turning westward in the direction of home, we came upon some fine specimens of *Thelymitra epipactoides* about two to three feet in height, bearing large spikes of beautiful

brownish-coloured flowers. This is one of our tallest and most showy orchids. Near here we also obtained specimens of *Calochilus cupreus*, Rogers, and *Caladenia angustata*, Lindl., both of which are new records for Victoria. Following up a ridge covered with ironstone, we passed great quantities of *Gompholobium Huegelii*, in colours yellow and brilliant red, also *Pultenæa humilis* and *Bossiæa riparia*, both in yellowish shades ; the latter is a leafless plant, and usually attains a height of about two feet. While crossing some recently burnt country we collected some fine specimens of *Lyperanthus nigricans* in full bloom, and before reaching home gathered *Caladenia Patersoni, C. dilatata, Diuris maculata, D. sulphurea, Glossodia major, Prasophyllum australe, Calochilus Robertsoni, Thelymitra carnea, Microtis atrata*, and *Caleana major*, making in all twenty-six species of orchids for the afternoon.

Provisioned with food for a couple of days, we made an early start on Sunday morning for that portion of the Serra Range lying to the south-west of Hall's Gap. The first stage of the journey was *via* the Stony Creek track, past the diggings, during which some fine belts of timber were passed through, comprising *Eucalyptus ovata* and *E. viminalis*. Near Venus's Bath we saw some nice specimens of *Leptospermum lanigerum*, var. *grandifolium*, the white flowers of which were fully an inch in diameter. This shrub, being quick-growing and of handsome appearance, would make a worthy addition to any garden. Other shrubs seen in flower were *Prostanthera rotundifolia, Pomaderris elachophylla, Pultenæa villosa, Indigofera australis, Spyridium parviflorum*, var. *hirsutissimum, Panax sambucifolius, Coprosma hirtella, Dodonæa viscosa*, and *Viminaria denudata*. Continuing up the jinker track, a fine view of Mackey's Peak is obtained, and after passing the "Gulf Stream" we came upon a fine patch of *Utricularia dichotoma*, known locally as "Rock Pansies," many of the plants having the unusual number of four, and in some cases five, purple flowers on each stalk. Further on fine specimens of *Boronia polygalifolia*, var. *pubescens, Leucopogon glacialis, Linum marginale, Pseudanthus ovalifolius, Spyridium vexilliferum, Laxmannia* (*Bartlingia*) *sessiliflora, Acacia vomeriformis*, and *Stypandra glauca*, with its bright blue flowers, were collected. Mr. D'Alton has this plant growing well in his garden at Hall's Gap in three different shades—blue, white, and pink. It is easily grown, and makes a very ornamental plant. Near the entrance to the Grand Canyon we found in flower *Stylidium soboliferum*, peculiar to these parts, also the remarkably handsome orchid *Thelymitra fusco-lutea*. Proceeding along the track, we passed the prettily situated Pansy Fall. At this place the Stony Creek makes its way through a gorge where a number of nice little falls occur.

Hereabouts grew *Prostanthera debilis* and *Bauera sessiliflora*, both peculiar to the Grampians; the latter is a very handsome shrub, with spikes of magenta-coloured flowers, sometimes fully three feet in length. Just below the Turret Falls, which are quite close to the jinker track, beneath some overhanging rocks, some fine bushes of *Prostanthera hirtella* were found. It was too late for blossoms, it having passed that period. Here was seen a fine pair of Black Cockatoos, *Calyptorhynchus funereus*, which had a nest in the hollow of an adjacent tree. The birds were loth to leave their nest, and allowed us to pass within twenty or thirty yards of them. Along the track some good specimens of *Pultenæa styphelioides, P. mollis, Pimelea ligustrina, Caustis pentandra, Phyllanthus thymoides, Grevillea aquifolium, Hakea rostrata, Brachycome multifida, Stylidium graminifolium, Podolepis acuminata, Brunonia australis*, and *Viola betonicifolia* were gathered.

Arriving at Stony Creek diggings at mid-day, we boiled the billy and enjoyed our sandwiches. After a short rest, and before leaving, we collected *Pultenæa subumbellata, Goodia lotifolia* (locally known as Clover-bush), *Epacris obtusifolia, Sambucus Gaudichaudiana, Calytrix tetragona, Daviesia ulicina, Sphærolobium vimineum, Pimelea flava, P. curviflora, Stackhousia flava*, and *Olearia speciosa*, the latter peculiar to these parts. Proceeding on our journey, we travelled in a southerly direction for a couple of miles, gradually working round till we reached the back of Mount Rosea. Having ascended to the top, we were rewarded with a fine view of the Victoria Valley on the one side and Hall's Gap on the other. As the country began to dip towards the Victoria Valley a fine patch of *Melaleuca squamea* in full bloom was met with, and in the gullies below *Bauera sessiliflora* was a magnificent sight. *Grevillea rosmarinifolia*, with its pretty rose-coloured blooms, and *Trymalium Daltoni* were also growing in the gullies; the latter is a very early blooming shrub, and is at its best in July. The four Brachylomas native to Victoria were also found growing in this locality; they were *B. ericoides, B. daphnoides, B. ciliatum*, and *B. depressum*. Following the creek which flows towards the Victoria Valley, we passed large patches of *Pultenæa Benthami*, also *P. rosea*, both of which are peculiar to the Grampians. Some of the latter shrubs were especially fine here, growing to the height of fully eight feet, which is most unusual, as this plant is usually low-growing. Still keeping to the creek, we passed a peculiar rock known as "The Monument," adjacent to which were some fine patches of *Lhotzkya genetylloides, Sprengelia incarnata, Thryptomene Mitchelliana, Melaleuca decussata, Calythrix Sullivani, Correa speciosa*, and *Epacris impressa*; the latter was a magnificent

sight, in colours light and dark pink, and I was surprised to find it in profuse bloom at so late a period of the season. Leaving "The Monument" in the rear, the creek increased in size and volume of water, owing to the many tributaries joining it. On the banks was seen *Epacris paludosa*, with its beautiful heads of wax-like flowers, while further down a large patch, some acres in extent, of *Calectasia cyanea*, or what is locally known as "Satin-flower," presented an unusually pretty scene. Its blue flowers are delightfully glossy, and make beautiful bouquets, which last for months. Another attractive feature here was the abundance and variety of Helichrysums, the well-known everlasting daisies; the three best noted were *H. Baxteri*, *H. bracteatum*, and *H. Blandowskianum*, the latter being one of the most attractive everlastings. Its clusters of flower-heads are borne on stalks of almost equal whiteness, which make it valued for wedding bouquets and wreaths. Near at hand a fine waterfall was met with, fully a hundred feet in height. Mr. D'Alton was of opinion that this waterfall was not previously known, so we bestowed on it the name of Calectasia Fall, in honour of the beautiful plant growing near by. Further afield some very large patches of *Boronia pilosa* in full bloom was passed through, and the strong perfume emitted from this plant, especially when trodden upon, was very noticeable. For the next few miles we passed through very rough, rugged country, which made travelling extremely arduous, and on the way we noticed that the creek we had been following, and which we named Rosea Creek, on account of the large quantities of the beautiful *Pultenæa rosea* growing near its source, had been much flooded at some previous time, as in some places the soil had been scoured out completely, while large heaps of *débris* were accumulated along its course. As dusk was drawing near, we decided to camp for the night, and a sheltered spot was chosen. Soon a large fire was blazing, and the billy boiled, and we were very tired and much in need of our evening meal. After partaking of same we proceeded to make things comfortable for the night by strewing ferns and eucalypt branches on the ground, over which we spread our blankets. It was necessary to keep a large fire going all the time, as the night was extremely cold.

Making an early start in the morning, and following the stream downward, rough country was encountered for four or five miles. The water in the creek became much iron-stained, and presented quite a brown appearance. Hereabouts *Humea elegans* grew abundantly, but no flowering specimens of it were available, as it blooms later in the season. When in full bloom it is a very fine sight, its wide-spreading, drooping panicles and innumerable shining, rose-coloured flowers, which

sometimes vary to white, rendering the plant a valuable acquisition in gardens, where it flourishes without any particular attention. *Boronia polygalifolia, Scævola æmula, Correa æmula,* and *Hakea ulicina* also grew in considerable quantities along the banks of the stream. It is worthy of mention that in this particular locality several shrubs grew larger and more luxuriantly than as usually met with. For instance, *Dillwynia ericifolia* attained a height of fully ten feet, whereas in many districts its usual height is not more than three to four feet. It was quite surprising to see *Micromyrtus microphylla* grown into a large shrub about eight feet in height, this shrub, as a rule, attaining only a couple of feet. *Calythrix Sullivani,* which is a very ornamental shrub, was unusually large and robust, being about twelve feet in height; this shrub is peculiar to the Grampians, and grows readily under cultivation. *Leucopogon thymifolius,* also peculiar to the Grampians, had attained a large size, some plants noted being fully six feet in height, while on Mount William, where it grows abundantly, the average height is about eighteen inches.

As the creek emerged into flat country, nice specimens of *Prostanthera denticulata* were found in different colours—namely, bluish-purple and lilac. Here *Restio tetraphyllus* made its appearance. The scrub hereabouts was almost a tangle, caused by the twiner *Marianthus bignoniaceus* connecting all forms of vegetation. From a spectacular point of view it was most picturesque, with its pretty, bell-shaped, orange flowers showing up well amid the different shades of green. *Veronica Derwentia,* a very graceful shrub, was in full bloom, and its racemes of pure white flowers, a foot in length, were beautiful to behold. Here we left the creek and followed the Serra Range in a northerly direction, travelling through rough country which has seldom been trodden by the foot of man. On the lower stretches of the hills a fine forest of *Acacia mollissima* was passed through, the majority of the trees reaching a height of eighty feet, and in some instances having a diameter of two feet. Travelling was slow here on account of the dense and tall growth of *Banksia marginata, Callitris rhombifolia, Cassinia aculeata,* and *Acacia verticillata,* while further on *Acacia verniciflua* and *Kunzea parvifolia* occupied acres in extent, the crimson flowers of the latter making a gorgeous sight. Amid this crimson mass it was remarkable to find one bearing white flowers. Advancing into more open country we passed through fine patches of the following heaths, viz.: — *Styphelia adscendens, Astroloma conostephioides, A. humifusum,* and *A. pinifolium,* in fruit. Several emus were observed feeding on the berries. A little further on we came upon shrubs which had just recently been rooted up (evidently by wild pigs), as the foliage was not at all withered.

From this point we struck out for a track which led from the Victoria Valley round the end of Mount Difficult to Hall's Gap. *En route* nice specimens were collected of *Olearia lepidophylla, Brachycome scapiformis, Grevillea parviflora, Pultenæa laxiflora, Stackhousia viminea, Acacia Mitchelli, Conosperma calymega, C. cricinum, Hibbertia virgata, H. densiflora,* and *Phebalium pungens*—the latter a very pretty, twiggy shrub, twelve to eighteen inches in height, bearing white, waxy flowers. On previous visits to the Grampians I had not met with this shrub. Orchids growing in rather unusual surroundings were observed. In some instances they were seen growing from the small fissures in the sandstone rock, those noted being *Calochilus Robertsoni, Thelymitra antennifera, T. longifolia, T. ixioides, Diuris longifolia, Pterostylis longifolia, P. barbata, P. concinna,* and *Cyrtostylis reniformis.*

Having reached a large, swiftly-flowing creek containing good water, we decided to boil the billy and have lunch, and enjoy a short respite from travelling. Feeling refreshed, we pushed on and negotiated a high ridge, from the top of which a splendid view of the Victoria Valley was obtained. The head waters of the Glenelg River could be traced, running in a north-westerly direction at the start, and finally turning southward after making a circuit of the northern end of the Victoria Range. The principal point of interest from here is the "Asses' Ears"—a bold prominence on the Victoria Range. Continuing from this spot in a northerly direction, some deep and rugged gullies were encountered, the walls of sandstone in some places being almost perpendicular; however, after much difficult climbing, we eventually reached Scrubby Creek. The vegetation along the creek was very luxuriant. Splendid specimens of *Prostanthera lasianthos* and *Pomaderris apetala* attained a height of fully thirty feet, and *Pimelea spathulata,* an elegant shrub in full bloom, made a very effective display with its pretty heads of drooping greenish flowers. The Acacias, *A. melanoxylon, A. verniciflua,* and *A. retinodes,* looked particularly well, the foliage being very regular and ornamental, and of a much lighter shade of green than is usually seen. A great variety of ferns flourished along the banks of the stream; splendid masses of *Gleichenia dicarpa* were observed, and *G. flabellata* was particularly fine. *Todea barbara* grew in profusion, and in some places formed close thickets, while *Lomaria discolor, L. capensis, Aspidium aculeatum, Pteris incisa,* also the tree-fern, *Dicksonia antarctica,* with its stately heads of fronds, added beauty to the scene.

Leaving Scrubby Creek, we soon struck the track we were in search of, and started on our homeward journey. Proceeding now under more comfortable circumstances, along the track

was seen a nice display of *Brachycome diversifolia* growing in a grassy flat, and gleaming gold and white in the sunlight. It was noted that in this particular part of the mountains *Grevillea alpina* and *Styphelia adscendens* assumed trailing forms. Journeying along the slopes of Mount Difficult, *Burchardia umbellata, Helichrysum apiculatum,* and *H. Baxteri* were met with in great profusion. The beautifully cœrulean blue flowers of *Brunonia australis* made a splendid show. Under cultivation this plant should make an uncommon and very pretty border. As the day was bright and sunny, *Thelymitra antennifera* (one of the sun orchids) was showing to the best advantage. Passing the saddle on Mount Difficult and descending towards Hall's Gap, nice clumps of *Euphrasia collina* (a graceful flower, varying in shades from white to deep lavender), *Stylidium graminifolium* (with long spikes of magenta flowers), *Patersonia longiscapa* (with rich purple blooms), *Hibbertia densiflora* (with yellow blossoms), and *Dianella revoluta* (with bluish flowers) presented a charming effect with the blending of the various colours.

After this long and interesting trip through partly unknown country, and having covered about thirty-five miles of rough, trackless parts in the two days, we arrived home safely, heavily laden with specimens collected and highly pleased with the results of our undertaking.

"IN QUEST OF ORCHIDS."—During the years 1917–18 a series of twenty-three articles, each of over a column in length, appeared under this title in the columns of the *Federal Standard,* published at Chiltern, Victoria. The articles were written in a very interesting and chatty manner, and described in detail the expeditions of the writer in search of orchids in the Cravensville district, which is some thirty miles beyond Tallangatta. Some fifty-three species were collected in the twelve months within a 10-mile radius. This is indeed a very good record for any one locality. These articles form the second comprehensive series on Victorian orchids, the first having been published in vols. i.–iv. of the *Victorian Naturalist* more than thirty years ago, from the pen of Mr. C. French, sen. The present valuable contribution is from the pen of Mr. Arthur B. Braine, head teacher of the State school at Cravensville, and both he and his pupils have done good work in making this orchid survey in the North-East. Mr. Braine is the discoverer of *Chiloglottis Pescottiana,* and he has also recorded the following orchids as new for this State :—*Chiloglottis trapeziforme, Thelymitra canaliculata, Drakæa Huntiana,* and *Prasophyllum intricatum.* He has also under observation a *Calochilus* which may prove to be a new species.—E. E. PESCOTT.

ON THE DESTRUCTION OF MUTTON-BIRDS AND PENGUINS AT PHILLIP ISLAND.

By JOSEPH GABRIEL.

(*Read before the Field Naturalists' Club of Victoria, 10th March*, 1919.)

IN January, 1912, in a paper read before this Club (*Vict. Nat.*, xxviii., p. 206, March, 1912), I called attention to the fact that large numbers of Short-tailed Petrels, *Puffinus brevicaudus*, Tem., popularly known as "Mutton-birds," were being destroyed by the presence of barbed-wire fences near their nesting-places, the birds being injured by contact with the fences during their in and out flights.

It is with deep regret that I now have to bring under the notice of members what I consider to be a far greater menace to the birds, and which may lead to their ultimate extermination on Phillip Island—viz., the presence of foxes on the island, and which are rapidly increasing in numbers.

The notes about this latest menace have been supplied to me by my son, Mr. C. J. Gabriel, who learned the facts while spending a holiday on the island during the early part of January. He states that, not trusting to hearsay, he made several visits to the rookeries, and found abundant evidence in support of the statement, as dead birds were lying about in hundreds.

Members will remember that in my paper reference was made to the great mortality which took place among the birds during 1905, and which was afterwards traced to the scarcity of "whale-food" (Pteropoda), said to be the principal food of the birds. In this instance the dead birds were found along the beaches above high-water mark. They numbered many thousands, and were found as far north as Sydney, and in places hundreds of miles away from the rookeries. These birds, when found, had little fat on their bodies. In that year, when on "The Stacks" with the late Mr. H. P. C. Ashworth, of this Club, we saw the birds coming in, and noticed on examination their emaciated condition.

Now, if we examine the dead birds this season, no trace of starvation is apparent—all are plump and well nourished; but we do find marks of foxes' teeth on the heads of a very large proportion of the dead birds.

The following evidence was collected by my son during his brief stay on the island:—

Mr. Redmile, "Lakesyde," Ventnor, said he "had seen, roughly speaking, 400 dead birds lying about, more Mutton-birds than Penguins."

Mr. Gus Smith, Cowes, stated "that foxes started destruction at Smith's Rookery, where the birds cleaned out the burrows

about 15th October, 1918. Hundreds of birds were seen lying about dead near the burrows. The foxes catch them as they go out in the morning. On one track of about ten yards six birds were found which had just been killed. Few birds were eaten, the majority being just pinched at the neck for the purpose of sucking the blood. One day his dog started a fox near his house, which is about four miles from the nearest rookery, when it dropped a Mutton-bird. When examined the bite on the neck of the bird was readily seen." Mr. Smith further stated that the birds carried away from the rookeries are for food for the young foxes.

Mr. G. P. Dixon, Murray's Rookery, and Mr. W. M'Phee, Cowes, both verified these statements, and it was by the latter that the matter was brought under my son's notice. At Mr. M'Phee's invitation he made a visit to Smith's Beach Rookery. Here, to his sorrow, he found abundant evidence of the destruction going on. In ten minutes sixty-five birds were picked up, in all stages of decomposition, and in the case of the fresh birds with the bite on the head distinctly showing.

The photographs on the table, taken by him, will give some idea of the slaughter taking place. The same conditions prevail at the following rookeries, viz. :—Cape Woolamai, The Nobbies, Swan Lake, Murray's, and Forrest's.

I now appeal to the sympathy of my fellow-members. We are faced with the fact that an extremely interesting bird is being destroyed in large numbers, which may lead even to its extermination on the island, where its presence has hitherto been a source of great enjoyment and interest to large numbers of visitors, while the residents in all quarters are deeply concerned at the presence of the foxes.

"Man is a peculiar animal," says Josh Billings. "He eats everything that flies, runs, walks, swims, creeps, wags, or wriggles, and then wonders what is the matter with himself." He has another peculiarity. Wherever he goes he carries one or more plagues with him, eventually to cause himself worry; and the fox, you will agree with me, is the greatest plague of all, for he robs while you are asleep or awake, and kills far more than he ever eats.

Now, can we not, as a Club, do something to lessen this destruction by urging on the proper authorities the great necessity for destroying the foxes on the island? A reward of so much per head would stimulate a number of residents to take up the warfare against the fox who at present are unwilling to give up the necessary time required. The local residents are very keen on the destruction of the animals, as they fear the time will come when both the Mutton-birds and the Penguins will be *non est* so far as Phillip Island is con-

cerned. The fact that foxes in Victoria are more prolific than in England makes the question a very serious one, and one that should be faced without delay.

[The *Argus* of 27th March contained a notification that a reward of one pound per head is to be offered for foxes killed on Phillip Island.—ED. *Vict. Nat.*]

PHYSIOGRAPHY OF THE MELBOURNE DISTRICT.—Readers interested in local physiography will find two useful and well thought out papers in the recently issued part of the Proceedings of the Royal Society of Victoria (vol. xxxi., new series, part i.) They are by Mr. R. A. Keble, on "The Significance of Lava Residuals in the Development of the Western Port and Port Phillip Drainage Systems," and by Dr. C. Fenner, D.Sc., on "The Physiography of the Werribee River Area." In the former the author reconstructs the district before the time of the volcanic activity, showing the supposed position of the valleys afterwards filled up by the lava flows, and then discusses the development of the new streams as shown on our maps of to-day. Dr. Fenner's paper is a very extensive one, and deals minutely with every feature of an area of about 1,500 square miles, and, like Mr. Keble's, is well illustrated with sketch-maps and diagrams. It gives an interest to the Werribee which hardly existed before, and accounts for the sudden and great differences in level which are the main features of the watershed of the Werribee and its tributary streams.

SCENERY PRESERVATION.—In some respects the Government of New Zealand is far ahead of the Commonwealth or any of the State Governments of Australia. It has an eye to the future, and in preserving the scenery will in years to come earn the gratitude of untold generations. The latest report (to 31st March, 1918) on scenery preservation, by the Lands Department of the Dominion, shows that 24 reserves, covering 21,639 acres, were added to the list of such reserves during the previous twelve months. New Zealand now possesses 505 reserves made for scenery preservation, amounting to 305,421 acres. What are we doing in Victoria that future generations may stand on our vantage points and view our landscapes, or wander along our river valleys and enjoy their welcome restfulness, without continually trespassing on private property? Practically nothing. Scenery is an asset to any country, as the United States and New Zealand well know, and we should make the most of what we have, and not allow it to be marred and disfigured by the private individual for his own advantage.

THE

Field Naturalists' Club of Victoria.

FOUNDED MAY, 1880.

MEMBERS,

31st MARCH, 1919

(With Date of Election and particulars of Branch of Study).

HONORARY MEMBERS.

Oct. 1885 †ATKINSON, E. D., Sulphur Creek, Tasmania.
July 1883 BROUN, CAPTAIN T., Howick, N.Z.
Nov. 1917 FERGUSON, SIR RONALD MUNRO, G.C.M.G., Government House, Melbourne.
Feb. 1893 *†LUCAS, A. H. S., M.A., B.Sc., Grammar School, Sydney, N.S.W.

LIFE MEMBERS.

Sep. 1884 BAGE, MRS. EDWARD, "Cranford," Fulton-street, E. St. Kilda.
Sep. 1882 PATEY, B. R., ESQ., Premier Buildings, Collins-street, M.

ORDINARY MEMBERS.

Nov. 1916	A'Beckett, Mrs. T. T., Lansdowne-st., St. Kilda	
Sept. 1916	Alexander, W. B., M.A., W.A. Museum, Perth	Ornith.
Nov. 1913	* Anthony, E. S., Kelburn-street, Caulfield	
April 1906	*† Armitage, R. W., M.Sc., Dipl. Ed., F.G.S., F.R.G.S., Finch-street, Beechworth ...	Biology, Geol.
Jan. 1914	Armytage, E. A., "Holm Park," Beaconsfield	
June 1906	†Audas, J. W., F.L.S., F.R.M.S., National Herbarium, South Yarra	Botany
Feb. 1904	† Bage, Miss F., M.Sc., F.L.S., Women's College, Brisbane, Q.	General Biol.
Aug. 1889	† Baker, H. H., 78 Swanston-street, Melbourne	Microscopy
May 1880	*o* Bale, W. M., F.R.M.S., Walpole-street, Kew	Hydroids
May 1880	*o** † Barnard, F. G. A., 167 High-st., Kew ...	Ent., Bot. (Ferns)
Sept. 1899	* † Barrett, C. L., *Herald* Office, Melbourne ...	Orn. & Reptilia
Oct. 1913	† Bastow, R. A., 575 Sydney-road, Brunswick ...	Mosses
May 1906	Bennett, W. J., St. Kilda-road, Melb. ...	Geology
Nov. 1914	Beuhne, F. R., Tooborac	
May 1880	*o** † Best, D., Mountain-grove, Kew	Ent. (Col.)
Oct. 1916	Blake, A. S., Ivanhoe	
May 1918	Bond, P. H., Scotch College, Hawthorn	
Nov. 1904	Booth, J., M.C.E., B.Sc., "The Gables," Berkeley-street, Hawthorn	Amphibia
May 1917	Borthwick, A., Dulwich Hill, Sydney, N.S.W.	

June 1911 †Brittlebank, C. C., Government Vegetable Pathologist's Department, Melbourne ... ... Ent., Botany
Nov. 1914 Bryant, Miss M., State School, Yarrawonga
June 1916 †Burns, A., "Lucerne," Lower Ferntree Gully Lepid.
Dec. 1909 Bury, Miss E., "Verona," Argyle-street, St. Kilda
Oct. 1916 Carter, Miss R., 17 Claremont-cres., Canterbury
June 1914 †Chandler, L. G., 56 Dixon-street, M. ... Ornith.
May 1902 *†Chapman, F., A.L.S., F.R.M.S., Nat. Museum, Melbourne ... ... Geol., Palæon.
July 1918 Chisholm, Miss R. S., 64 Henry-street, Windsor
July 1902 Clark, Alister, "Glenara," Bulla ... ... Ornithology
Dec. 1908 Clarke, A. Rutter, Collins-street, M.
Sept. 1916 Clinton, H., 605 Flinders-street, M.
July 1882 *Coghill, G., 79 Swanston-street, Melbourne ... Botany
June 1918 Cole, C. E., 39 Wheatland-road, Malvern
Nov. 1916 Cornthwaite, W., "Alma," Thorpdale S.
Nov. 1902 Cowle, Miss L., c/o Mr. Priest, Devonport W., Tasmania
Jan. 1916 Cox, E., 3 Moore-street, Grace Park, Hawthorn
Dec. 1910 Cronin, John, Botanic Gardens, Melbourne
Aug. 1905 Cudmore, F., Murphy-street, South Yarra
May 1917 Currie, Miss C. C., P.O., Lardner
Aug. 1918 Dakin, E., 91 Mount-street, E. Kew
Aug. 1915 *†Daley, C., B.A., F.L.S., Clarinda-street, Caulfield
Dec. 1892 Danks, A. T., Bourke-street, Melbourne
July 1902 †Davey, H. W., F.E.S., Airdrie-road, E. Malvern
May 1880 *o* Dixon, J. E., 37 Swan-street, Richmond Ent. (Col. & Lep.)
Aug. 1918 †Dodd, F. P., Kuranda, North Queensland ... Entomology
Nov. 1917 Drake, Dr. W. E., "Woonda Mia," Upper Beaconsfield
Nov. 1911 Dunn, E. J., F.G.S., Pakington-street, Kew
Dec. 1915 Eaton, J., 70 Rathmines-street, Fairfield
July 1917 Eaves, Mrs. S., Inkerman-road, Caulfield
Dec. 1901 Edmondson, Mrs. C. H., Riversdale-rd., Hawthorn
Jan. 1914 Ernst, Mrs. O., Wynnstay-crescent, Ivanhoe
April 1906 *†Ewart, Professor A. J., D.Sc., Ph.D., F.L.S., National Herbarium, South Yarra ... Botany
Sept. 1917 Exley, H. J., Male-street, Brighton
May 1911 Firth, J., Briagolong
June 1918 Firth, J. M., Beech Forest
Nov. 1916 Fleming, Miss M., State School, Tempy East
May 1880 *o* *†French, C., F.E.S., Kooyong-rd., Malvern... Entomology
July 1883 *†French, C., jun., Government Entomologist, Flinders-street, M. ... Entomology
Mar. 1901 Fullard, A. F., Barker's-road, Hawthorn
Sept. 1914 †Fuller, Miss Amy, 20 Berkeley-street, Hawthorn
June 1900 †Gabriel, C. J., 293 Victoria-st., Abbotsford ... Marine Conc.
July 1883 *†Gabriel, J., Walmer-street, Kew ... ... Oology
Nov. 1889 Gates, W. F., M.A., Selwyn-street, Canterbury
Oct. 1880 *†Gatliff, J. H., 5 Fawkner-street, South Yarra Marine Conc.
Aug. 1911 Gill, A. J., State School, Upper Ferntree Gully
Feb. 1912 Gladman, F. E., Pt. Nepean-road, Elsternwick
Dec. 1913 *Glance, W., 72 High-street, St. Kilda
June 1918 Grainger, A. W., West Warburton
Dec. 1906 Gray, O., Wedderburn, Victoria
Jan. 1901 Greenwood, G. F., Bank of Victoria, M.
Oct. 1913 Gregson, J. B., Lands Office, St. Arnaud
June 1913 Grimwade, W. R., Orrong-road, Toorak
July 1909 *†Haase, J. F., 367A Little Collins-st., Melbourne

Dec. 1905	*†Hamilton, Jas. T., F.L.S., Heidelberg-road, Ivanhoe	Botany, Geol.
Sept. 1887	Hammet, E. R., 151 Grey-street, E.M.	
Nov. 1901	*†Hardy, A. D., F.L.S., F.R.M.S., Forests Dept., Melbourne	Bot. (Freshwtr. Algæ)
Oct. 1914	Harris, Capt. W. J., B.A., High School, Kyneton	Geology
June 1912	Harry, W. L. C., Mentone	
Aug. 1887	† Hart, T. S., M.A., School of Mines, Bairnsdale	Geology, Bot.
April 1913	† Harvey, F. I., 33 Aphrasia-street, Bareena	
Dec. 1905	*† Harvey, J. H., A.R.I.V.A., 128 Powlett-st., East Melbourne	
Nov. 1916	Hearne, Miss K., 64 College-parade, Kew	
June 1913	Herriot, Sergt. S. T., Glen Waverley	
Jan. 1884	* Hill, G. R., "Glenrowan," Dandenong-road, Windsor	
June 1916	Hill, Jas., Westell Farm, Kewell	
April 1901	† Hill, J. A., Galton Sth., *viâ* Lubeck ...	Ent., Orn.
Nov. 1917	Hodgins, B. R., Moreland-road, Essendon	
Sept. 1914	Hollow, J. G., Bamfield-street, Sandringham	
Mar. 1919	Howie, R. A., Powelltown	
June 1918	Hughes, H., 1 Staniland-grove, Elsternwick	
Sept. 1910	Ingle, Daniel, Wiseleigh	
Aug. 1911	James, A., B.A., B.Sc., 70 Ngarveno-street, Moonee Ponds	
May 1916	Jameson, W. R., B.Sc., 41 Charles-street, Kew	
Jan. 1905	Jeffery, H. W., Cochrane-street, N. Brighton	
Nov. 1918	Jennings, Miss B., 70 High-street, Malvern	
Nov. 1915	Johnson, Miss M. T., 316 Bridge-road, Richmond	
June 1910	Johnstone, J., Suptdt. State Plantations, M. ...	Botany
April 1904	Kaufmann, J. C., LL.D., Princess-street, Kew ...	Pond Life, Mic.
Feb. 1886	*†Keartland, G. A., Cramer-street, Preston ...	Ornith., Oology
July 1911	†Keble, R. A., Geological Survey Office, Melb.	
Jan. 1918	Keep, A. E., Alma-road, Caulfield	
Nov. 1915	Keep, F., "Mountfield," Canterbury	
July 1908	† Kelly, Reginald, Healesville	Botany
July 1918	Kelly, W. T. C., LL.B., 432 Collins-street, M.	
Mar. 1888	*† Kershaw, J. A., F.E.S., National Museum, M.	Zoology.
Nov. 1916	Kershaw, Miss E., State School, Rainbow	
Oct. 1918	King, J. H., Burke-road, E. Malvern	
Nov. 1913	Kinnear, E. H., 18 Aberfeldie-street, Essendon	
Dec. 1915	Kinsella, J. T., 187 Stanley-street, W.M.	
July 1893	† Kitson, A. E., F.G.S., C.B.E., c/o J. S. Kitson, Continuation School, Melbourne	Geology
June 1903	Kitson, J. S., Continuation School, Melbourne ...	Geology
Oct. 1914	Laver, John, 31 Queen-street, M.	
Dec. 1902	*† Leach, J. A., D.Sc., Education Dept., M. ...	Biology, Geol.
May 1903	†Lees, E. H., C.E., F.R.A.S., Fairhaven, Mallacoota	
Oct. 1905	*†Le Souëf, D., C.M.Z.S., Royal Park, Parkville	Ornith., Oology
Nov. 1915	Luher, R. E., 38 Park-street, W. Brunswick ...	Geology
Feb. 1902	Luly, W. H., Spring-street, Preston	
April 1888	† Lyell, G., F.E.S., Gisborne	Ent. (Lep.)
Jan. 1918	MacCaskill, A., jun., "Spion Kop," Coleraine	
June 1887	*† Macgillivray, Dr. W., Broken Hill, N.S.W.	Ornith., Oology
June 1915	Mackenzie, M. G., 1 High-street, Prahran	
Nov. 1918	Mackenzie, Miss E. E., Clissold-street, Ballarat	
June 1911	* Mackintosh, W. G., 110 Spencer-st., Melb. ...	Microscopy
June 1904	*McLennan, J. P., School of Horticulture, Burnley	Botany
Aug. 1899	McNab, L. K., "Braeside," Waiora-rd., Caulfield	
April 1917	McPhee, W. D., State School, Rochester	

Dec. 1902	†Madden, Hon. Sir F., Studley Park, Kew	
Nov. 1917	Maher, Rev. A. J., St. George's Vicarage, Wonthaggi	Botany
Jan. 1908	†Mahony, D. J., M.Sc., Dept. of Mines, M. ...	Geology
Jan. 1919	Mann, F. W., LL.B., Walsh-street, South Yarra	
Dec. 1915	Mann, J. G., "Harbury," Frankston	
May 1918	Mann, W., "Rockmount," Narracan	
Sept. 1918	Miller, Wm., St. George's-road, Croxton	
June 1911	Mitchell, C. R., Manningham-street, W. Parkville	
July 1899	Morgan, W. J., 55 McCarron-parade, Essendon	
June 1918	Morris, F. P., 54 Millswyn-street, South Yarra	
July 1918	Morrison, P. C., 1 Bowen-street, Hawthorn	
Oct. 1895	Mowling, G., "Athol," Auburn-road, Hawthorn	
Sept. 1916	Murphy, T. O., Charlton-road, St. Arnaud	
May 1915	Nethercote, C. A., Callantina-road, Hawthorn	
Oct. 1911	†Nethercote, Miss G., Callantina-road, Hawthorn	
April 1903	†Nicholls, Dr. E. B., 164A Victoria-st., North M.	Ornithology
Nov. 1917	Nokes, Miss G., 411 Collins-street, M.	
Dec. 1904	Oke, Chas., 56 Chaucer-street, St. Kilda ...	Entomology
Jan. 1919	Outhwaite, Mrs. M., 789 Malvern-rd., Armadale	
May 1914	Paton, D. J., 80 Anderson-street, Bendigo ...	Botany
April 1918	Perry, Miss E., High School, Geelong	
Dec. 1913	†Pescott, E. E., F.R.H.S., 9 Seymour-grove, Camberwell	Botany
Jan. 1918	Philpot, Miss D., Oswald-street, Garden Vale	
May 1880	*o*†Pitcher, F., Frechencourt, Punt Hill, S. Yarra	Botany
Nov. 1917	Plante, C. C., Glassford-street, Armadale	
Dec. 1914	Plumridge, C. L., Brougham-street, Kew ...	Botany
April 1913	Purnell, A., Talbot-street, Bareena	
May 1892	Quiney, H., Mortlake	Ornithology
May 1909	†Raff, Miss J., M.Sc., 169 Royal-parade, Parkville	Botany
Nov. 1917	Reese, Wm., State School, Strathkellar	
Aug. 1908	Robertson, J. L., M.A., 35 Hutcheson-st., Moonee Ponds	
May 1913	Robertson, Miss A. M., Upper Heidelberg-rd., Ivanhoe	
Nov. 1917	Robertson, Wm., Dalmy-road, Murrumbeena	
Dec. 1916	Robinson, J., Ormond Plant Farm, Ormond	
Jan. 1903	*Roger, W. H. A., National Bank, Swan-street, Richmond	Ent. (Lep.)
May 1904	Rollo, Miss J., 65 Tivoli-road, South Yarra	
Nov. 1915	Römcke, Otto, Woodstock-street, Canterbury	
Mar. 1899	Ross, J. Nanneella Estate, Rochester	
Jan. 1910	Ryan, Dr. E., Collins-street, Melbourne	
Aug. 1916	Sachs, Mrs. W., 70 High-street, Malvern	
May 1918	Savige, T. S., Narracan East	
Jan. 1909	Scott, Alex. L., 13 Gisborne-street, Elsternwick	Geology
Nov. 1885	Scott, W., Barnshaw, Emerald	
July 1885	*†Searle, J., 274 Collins-street, Melbourne ...	Entomostraca
Oct. 1909	Semple, Dr. W. H., Kilmore	
Sept. 1910	Shaw, Dr. A. E., F.E.S., Wynnum Sth., Brisbane, Q.	Entomology
May 1889	*†Shephard, J., Clarke-st., South Melbourne ...	Pond life
July 1884	*Simson, Mrs. J., "Trawalla," Toorak	
July 1917	Sincock, Miss J. F., 82 Barkly-st., E. Brunswick	
Mch. 1917	Singleton, F. A., 126 Anderson-st., South Yarra	Geology
May 1905	Skeats, Professor E. W., D.Sc., Univ., Carlton ...	Geology
May 1880	*o*†Sloane, T. G., "Moorilla," Young, N.S.W.	Ent. (Col.)
April 1914	Smith, F. S., Noorat ...	Ornithology
July 1910	Smith, Sydney, Hawson-avenue, Glenhuntly	

Dec.	1901	Somers, Dr. J. E., Mornington	
April	1916	Spencer, Lady Baldwin, Clyde House, 182 Collins-street, M.	
Aug.	1887	*†Spencer, Professor Sir W. Baldwin, K.C.M.G., D.Sc., M.A., F.R.S., University, Carlton ...	Biol., Zoology
Feb.	1882	†Spry, F., Heather-street, South Melbourne ...	Entomology
Nov.	1908	*†St. John, P. R. H., Bot. Gardens, South Yarra	Botany
Nov.	1916	Stamper, C., 17 Chapman-street, N.M.	
Oct.	1914	Stenning, Dr. A. E., B.Sc., 16 Pratt-street, Moonee Ponds	
Jan.	1908	Stephen, W. J., 28 Robinson's-road, Hawthorn	
Nov.	1880	†Stickland, J., 20 Latrobe-street, Melbourne ...	Pond life
July	1885	*†Stickland, W., Thomas-street, Black Rock ...	Pond life
Nov.	1916	Suding, Miss M. G., Main-street, Bairnsdale	
Oct.	1918	Sutherland, F. B., Vauxhall-road, Canterbury	
Nov.	1900	*†Sutton, Dr. C. S., Rathdown-street, N. Carlton	Botany
May	1910	Sutton, Dr. Harvey, Education Dept., Melbourne	
July	1886	*†Sweet, G., F.G.S., "The Close," Wilson-st., Brunswick	Geology
Jan.	1911	†Sweet, Miss G., D.Sc., Melbourne University	
Mar.	1918	†Taylor, Griffith, D.Sc., B.E., B.A., F.G.S., Commonwealth Bureau Meteorology, M.	
July	1910	Templeton, Mrs. J. M., George-street, E.M.	
Oct.	1909	Thiele, E. F., Tally Ho	Ornithology
Sept.	1916	Thomas, J. F., Tenterfield, N.S.W.	
Feb.	1904	Thomson, Dr. J. R. M., Lismore, N.S.W.	
Aug.	1918	Thorn, L., 69 Wattletree-road, Malvern ...	Entomology
Sept.	1900	†Thorn, W., 29 Chrystabel-crescent, Hawthorn	
April	1883	*†Topp, C. A., M.A., LL.B., I.S.O., Royal-crescent, Armadale	Botany
Aug.	1907	*†Tovey, J. R., National Herbarium, South Yarra	Botany
June	1904	Turner, Miss E. J., "The Grange," Domain-rd., South Yarra	
Jan.	1910	Twyford, J., Noel-street, Ivanhoe	Microscopy
July	1917	Van Cooth, J., Wattletree-road, E. Malvern	
Dec.	1916	Vincent, C., Barkly-street, St. Kilda	
Feb.	1916	Vroland, A., State School, Elmore	
Nov.	1891	Walker, J. B., Bourke-street, Melbourne	
June	1904	†Waterhouse, G. A., B.Sc., F.E.S., Moore-street, Sydney, N.S.W.	Ent. (Lep.)
May	1914	Webb, W. E. 430 Chancery-lane, M.	
May	1906	Wettenhall, Dr. R., University Club, 80 Swanston-street, M.	
Nov.	1916	White, H. L., Belltrees, Scone, N.S.W. ...	Ornithology
April	1913	Whitmore, H., 8 Trafalgar-road, Camberwell	
Sept.	1898	Wilcox, J., 51 Brinsley-road, E. Camberwell	
Jan.	1901	†Williamson, H. B., 11 Waverley-rd., Caulfield E.	Botany
Dec.	1917	Wilson, F. E., Darling-road, East Malvern ...	Ornithology
July	1904	Wilson, J., Moorabbin Pharmacy, Cheltenham	
Aug.	1912	Wise, Miss M. I., Foster-street, Sale	
May	1880	*o*†Wisewould, F., Imperial Chambers, 408 Collins-street, Melbourne	
May	1916	Young, J. H., Meredith	

REFERENCES.

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The Emu: the Journal of the Royal Australasian Ornithologists' Union.
The Geelong Naturalist (Geelong Field Naturalists' Club).

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The Australian Naturalist (New South Wales Naturalists' Club, Sydney

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Publications of the Department of Agriculture.
Proceedings of the Royal Society of Queensland.
The Queensland Naturalist (Brisbane Field Naturalists' Club).

SOUTH AUSTRALIA—
Proceedings of Royal Society of South Australia.

TASMANIA—
Papers and Proceedings of Royal Society of Tasmania.
The Tasmanian Naturalist (Tasmanian Field Naturalists' Club, Hobart).

WESTERN AUSTRALIA—
Records of the Western Australian Museum, Perth.
Proceedings of the Royal Society of Western Australia, Perth.

NEW ZEALAND—
Transactions of the New Zealand Institute, Wellington.
Records of the Canterbury Museum, Christchurch.

GREAT BRITAIN—
The Selborne Magazine : the organ of the Selborne Society, London.
Bulletin of Miscellaneous Information, Royal Botanic Gardens, Kew
United Empire : the Journal of the Royal Colonial Institute, London.
The Austral Avian Record (London).
Journal of the Quekett Microscopical Club, London.

EUROPE—
Mitteilungen aus dem Naturhistorischen Museum, Hamburg.
Bulletin of the Geological Institute, University of Upsala, Sweden.

ASIA—
Annotationes Zoologicæ Japonensis (Tokyo Zoological Society, Japan).

NORTH AMERICA—
Transactions of the Nova Scotia Institute.

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Publications of the Smithsonian Institute, Washington, U.S.A.
Publications of the American Museum of Natural History, New York.
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Proceedings of the Boston Natural History Society.
Publications of the Field Columbian Museum, Chicago.
Publications of the Missouri Botanical Gardens, St. Louis, Mo.
Transactions of the Wisconsin Academy.
Bulletin of the Buffalo Society of Natural Science.
Bulletin of the Wilson Ornithological Club, Oberlin, Ohio.
Minnesota Botanical Studies, University, Minnesota.
Publications of the University of California, Cal.
Pomona Journal of Entomology, Pomona College, Claremont, Cal.
Publications of the Lloyd Library, Cincinnati, O.
Proceedings Hawaiian Entomological Society.

SOUTH AMERICA—
Revista do Museo Paulista, S. Paulo, Brazil.

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