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THE

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OF THE

Field Naturalists' Club of Victoria.

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MAY, 1916, TO APRIL, 1917.

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

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

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CORRECTIONS.

Page 92, line 4—Insert "marine" before "fish."

Page 93, line 23—For "*Mayæ*" read "*Wayæ*."

Page 94, lines 9 and 5 from bottom—For "*Enlimnadia*" read "*Eulimnadia*."

Page 94, line 5 from bottom—For "*Lyncens*" read "*Lynceus*."

Page 94, last line—For "Chyronomus" read "Chironomus."

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, 17th April, 1916.

The president, Dr. C. S. Sutton, occupied the chair, and about 45 members and visitors were present.

REPORTS.

A report of the excursion from Parwan to Coimadai on Saturday, 25th March, was given by the leader, Mr. J. G. O'Donoghue, who said that, owing to the day turning out rather hot, the party was not able to carry out the whole of the proposed trip; however, the outing proved an interesting one, especially to those members who had not been in the district before.

A report of the excursion to the Berwick Quarry on Saturday, 8th April, was given by the leader, Mr. R. A. Keble, who reported an interesting afternoon, the members being fortunate in securing a number of specimens of the fossil leaves for which the quarry is famous, and in obtaining from the top of the hill an extended view of the physiography of the district.

ELECTION OF MEMBER.

On a ballot being taken, Mrs. L. Baldwin Spencer, Clyde House, 182 Collins-street, Melbourne, was duly elected as an ordinary member.

REMARKS ON EXHIBITS.

Mr. J. Gabriel drew attention to his exhibit of a so-called Solomon Islands "Guada Bean." The average length of these "beans" was about six feet, and they were reputed to be edible. The specimen shown was grown at Richmond, and was about four feet in length.

Mr. F. Chapman, A.L.S., in referring to his exhibit of fossil leaves from the Berwick quarry, pointed out the interesting fact that the genera shown were nearly all represented in the present-day flora of Victoria. The pipeclay is a peculiarly good preservative of delicate remains like fossil leaves, and all that is necessary to prevent their drying and curling off the rock is a thin coating of hot size applied with a fairly large camel-hair brush. The size is preferable to varnish, since it does not so obliterate the structure of the leaf.

He mentioned that the geological specimens from Egypt were collected by Private W. D. Chapman, and include some Nummulites from the Mokattam beds. The large form, *N.*

gizchensis, var. *lyelli*, d'Archiac, represents the microspheric shell of a dimorphic couple; whilst the small form, *N. curvispira*, Meneghini, represents the megalospheric stage. In other words, the two forms belong to one true species having an alternation of generation. There are also casts of molluscs, probably referable to *Meretrix* and *Panopæa*. A piece of Olivine Dolerite was also shown, which forms part of a pavement of a ruined temple on the east side of the Pyramid of Cheops. The Biotite Granite with unusually bright flesh-coloured felspar came from the Valley Temple of Kephren.

PAPER READ.

By Mr. J. Shephard, entitled "A Visit to the Great Lake, Tasmania."

Before showing an interesting series of lantern slides depicting some of the principal natural features of the country around Hobart and along the route to the Great Lake, the author, by means of a geological sketch map, pointed out the structural configuration of Tasmania, and mentioned that geological research pointed to the probability of the massive columnar diabase that formed the extensive plateau occupying the central portion of the island, and constituting the capping of Mounts Wellington, Ben Lomond, and Barrow, having been injected, during post-Jurassic times, between the Permo-carboniferous strata and the then overlying Mesozoic beds. Subsequently, the forces of denudation, acting throughout protracted periods of geological time, removed the superincumbent beds, exposed the igneous sill, and, attacking it in turn, interrupted its continuity, as the isolated residuals on the mounts mentioned would seem to demonstrate. Several views of tesselated sandstone pavements were shown, and the opinion expressed that this unique natural phenomenon could only have been induced by heat derived from the proximity of an igneous rock. The south-western portion of the island, it was mentioned, was practically unsettled, and very little had been accomplished in the interpretation of its geological features. The vegetation of that portion consisted chiefly of the so-called "Horizontal Scrub." The exploration of an area whereon this distinctive growth predominated had to be made at an elevation of many feet above the ground, by stepping from branch to branch. Many prospectors, it was alleged, had penetrated into this wilderness, but few had returned to detail the privations they had endured. The formation of "blow-holes" in favourably-jointed rocks exposed to the force of the sea was dealt with, and a series of views shown depicting their ultimate transition to an abrupt-sided rift or gorge. Finally, the chief features of the Great Lake were detailed, and some account given of

the results of an examination of its microscopic plankton, which was the main object of the visit.

In discussing the paper, Mr. F. Wisewould said the author was fortunate in being able to journey to the Great Lake by motor-car. On the occasion of his visit to the lake in January, 1886, he had to make the journey on foot, and had to carry the requisite food and equipment. The vegetation was then so dense that progress was only possible by following up the beds of the streams. At one point along the route he had noticed a large area of dead timber, that had not been ringed or destroyed by fire, and, on inquiring the cause occasioning the death of the trees, had been informed that it was due to an intensely cold winter. Why the timber in this particular spot should be adversely affected by a low temperature and not elsewhere his informants could not explain. He complimented the author on his interesting geological description of Tasmania and on the excellence of the slides shown.

The president expressed his pleasure in listening to the author's remarks, and said that, although he had visited Tasmania on several occasions, he had found the country to the north of the Great Lake, around Cradle Mountain, so interesting that he could not bring himself to proceed further afield.

Mr. A. D. Hardy asked if any investigation of the algæ of the lake had been made, and Mr. Barnard how the Great Lake compared in respect to size with Lake Corangamite, Victoria.

In reply, Mr. Shephard said he had noticed the phenomenon referred to by Mr. F. Wisewould, but could give no explanation of it. The area of the Great Lake was estimated at 28,000 acres, and its shore-line at 90 miles, or about half the size of Corangamite. He had paid little or no attention to the algæ of the lake, although there was a considerable quantity in its waters; he had specimens, however, which he would be pleased to hand over to Mr. Hardy for examination.

EXHIBITS.

By Mr. F. Chapman, A.L.S.—Specimens collected on the occasion of the Club's excursion to Wilson's Quarry, Berwick, 8/4/16; fossil leaves belonging to the genera Lomatia, Fagus, Eucalyptus, Tristanites, and Mollinedia, also sample of Older Basalt from same quarry; geological specimens from Egypt, collected by Private W. D. Chapman.

By Mr. J. Gabriel.—"Guada Bean," four feet in length, grown at Richmond.

By Mr. J. Shephard.—Plankton (formal material); specimens of freshwater crustacean, *Paranaspides lacustris*, from Great Lake, Tasmania.

After the usual conversazione the meeting terminated.

EXCURSION TO THE BERWICK QUARRY.

THOUGH Berwick is within a reasonable distance of Melbourne, and in the early days of the Club was frequently visited by members in search of insects and plants, the visit on Saturday afternoon, 8th April, was the first arranged for the purpose of studying the geological features of Wilson's Quarry and the physiography of the district. The quarry, which is within a short distance of the station, is situated on the south-western slope of One-Tree Hill. It has been worked for many years, and is as well known to palæobotanists as it is to geologists, for the many species of fossil leaves which have been obtained there from time to time. The north and east faces form a section which is typical of a high level lead—the sides of the old valley. The infilling flows of basalt—two main ones and several minor ones—the underlying lignitiferous clay—representing the forest growth immediately preceding volcanic activity—a leaf-bed, and a band of rounded and subangular fragments resting on palæozoic slates and shales, showing the exact relation of the basalt to the underlying bedrock, and the sequence of events during the Miocene volcanic activity. Having examined the section the party proceeded to a face that Mr. Wilson had kindly cleared so that members might more readily inspect the leaf-bed. Many valuable fossil specimens were obtained, and Mr. F. Chapman has kindly permitted me to use the list of identifications made by him. Later in the afternoon the party ascended One-Tree Hill—a view-point from which one may see the main physiographical features of the district. The general trend of the old stream, both north and south, was indicated by the lateral streams—Narre Warren and Cardinia Creeks—that have cut their way back through the palæozoic sediments at the edge of the basalt. To the north the course of the old stream was shown to be directly towards the Lysterfield wind-gap, and it was explained that the flats at the head of Dandenong Creek, and the Lilydale basalt, were directly connected with it. To the south its course was traced on to the pene-plain, and the effect of an east and west fault of large displacement was indicated by the somewhat steeper slopes to the north. From the hill members had the pleasure of witnessing a glorious sunset, which fitly terminated the day's observations.

The plant remains found in the pipe and carbonaceous clay were as follow :—(?) Nephelites quercifolia, Deane ; Tristanites angustifolia, Deane ; Eucalyptus, *cf.* Hootmanni, Ettingshausen ; E., *cf.* Hermani, Deane ; E. Kitsoni, Deane ; Atherosperma Berwickense, Deane ; Mollinedia helicioides, Deane ; M. prælongipes, Deane ; M., *cf.* Muelleri, Deane, previously recorded from Pitfield Plains ; *cf.* Hedycarya, sp. ; Lomatia

Bosistooides, Deane ; L. dubia, Deane ; L. perspicua, Deane ; Fagus Luehmanni, Deane ; F. Muelleri, Ettingshausen ; F., *cf.* Risdoniana, Ettingshausen ; F. (?) sp. nov. ; *cf.* Poacites australis, Ettingshausen ; also rhizomes and stems, seeds (Carpolithes, spp.), and fragments of (?) conifers. Mr. Searle obtained a particularly fine specimen in the end stem of a conifer.—R. A. KEBLE.

EXCURSION TO PARWAN AND COIMADAI.

A PARTY of six took part in the Parwan to Coimadai outing on Saturday, 25th March. Shortly after arriving at Parwan, somewhat behind schedule time, owing to the Ballarat railway picnic traffic, the party set out for the entrance to the basaltic caves, situated about half a mile, in a southerly direction, from the railway station. The narrow aperture whereby access to the underground chambers is gained occupies the centre of a small basin-shaped depression that might be easily overlooked, even by one in quest of the opening. The prevailing surface formation is Newer Basalt, which at no great distance to the south and west is overlaid by Tertiary grits. Descending vertically for about 12 feet one finds himself on a pile of broken basalt that at one time formed the plug of the aperture. A longitudinal opening, having an east and west extension, is at once noted. A rough ramp leads westwards, and downwards into an uneven-floored chamber, situated some 15 or 18 feet below the surface. The chamber is circumscribed, and on the occasion of our visit its walls and roof were invested by glistening beads of moisture. From the eastern extremity of the opening one turns north, and on clambering over a block of basalt finds himself in a long, horseshoe-shaped chamber, whose walls and roof consist of a very dense and sonorous basalt. The duration of our stay in the subterranean world was limited, for it was soon found that the light shed by the two candles in the possession of the party was totally inadequate for either examination or exploration purposes, and that the temperature was such as to induce streams of perspiration from one's head, face, and hands. The floor of the cave was muddy, and there was evidence to prove that at a very recent date a large body of water had coursed over it in a northerly direction. This cave can be designated spacious, since there is ample room for one to move about in a natural position. From two brief and limited examinations I am unable to express a definite opinion as to the probable extent of the underground caverns hereabouts, but, from what I gleaned some years ago, I have reason to believe that they extend for many hundreds of yards, alternately contracting and

expanding, and that pools of water and piles of shingle occur in some of them. In support of the contention that the caves trend in the direction of the river, it is pointed out that an opening similar to that by which we gained access to the cavern occurs in a paddock to the north-east, and that a fox terrier which was lowered into the cave visited by the party made his exit by a hole in the right bank of the Werribee, fully a mile and a half distant. The basalt would seem to rest on a thin stratum of grit and pebbles, and this on limestone. The limestone outcrops about half a mile to the south, on the property of Mr. P. Wheelan, and has been worked to a limited extent. A few hundred yards north a bore was put down in quest of water, and passed through a deposit of lignite. Though no limestone was noted, the cave may owe its origin to the long and continued action of water on this soft and porous formation. In a paper published in the *Naturalist* for February, 1909 (vol. xxvi., p. 157), I cited an instance that occurred at a spot about two miles to the south-west of the caves, that would seem to support the view that beneath the Parwan basaltic sheet there exist extensive subterranean ramifications through which the surface water of the plains and from the Brisbane Range and valleys to the north finds its way to the Werribee. The party quitted the vicinity of the caves shortly after 10 o'clock, and, bearing east, crossed the Werribee below its confluence with the Parwan Creek and the Lerderderg, some little distance above its junction with the former stream. The flood-plain hereabouts was carpeted with long, luscious grass and shaded by large, spreading Red Gums, and from the hillside presented a very pleasing aspect. Proceeding onwards at a leisurely pace, we at length reached the Pyrete Creek, which, before it junctions with the Werribee, flows through a broad and fertile valley in a very narrow channel fully 20 feet in depth. Huge Red Gums line its banks, and extend to where the alluvial is succeeded by the less congenial Silurian shales, when they are supplanted by the Red, Yellow, and Grey Box, the Manna and Yellow Gum, the Bull Mallee, and the Moonah, *Melaleuca parviflora*. Reaches of water occurred here and there in the bed of the creek, but the party found the liquid far too brackish for their liking. Owing to the lack of drinking water, and to the high temperature, such poor progress was made that at 3 o'clock, when still a few miles from our destination, it was decided to abandon the projected visit to Burnip's Quarry, and repair to a neighbouring farm-house to assuage our thirst. From here we made our way to the Lerderderg, where we rested for an hour, and thence to the Bacchus Marsh railway station, which we reached about 7 p.m., after a journey of about twelve miles. The physiography of the district was

dealt with, the probable conditions detailed under which the most interesting of its geological series of beds were imposed, and an outline given of some of the theories advanced to account for the glacial conditions here as elsewhere. On the whole, the members of the party expressed themselves pleased with the outing, and regretted their inability to visit Burnip's Quarry when informed on the railway station of the interesting fossils that are continually being found therein. — J. G. O'DONOGHUE.

[Some notes on the basalt caves of Victoria and their probable method of formation will be found in "Science Notes," by "Tellurian," in the *Australasian* of 22nd April last.—ED. *Vict. Nat.*]

RAMBLES IN RAAK.

BY J. G. O'DONOGHUE.

(*Read before the Field Naturalists' Club of Victoria, 14th Feb.*, 1916.)

DURING our visit to the Mallee in September, 1914, some of the incidents of which were chronicled in the *Naturalist* under the title "Wanderings on the Murray Flood-Plain" (vol. xxxii., p. 26), we heard much of a locality called Raak, situated 30 miles, or thereabouts, west of the camp we had formed on Lake Mournpoul. Remote, as it was said to be, from any human habitation, offering no great inducement to the trapper and less to the sportsman, and lying well to the north of the bridle track leading from the Darling to Ouyen, we had reason to believe it would prove a good field for ornithological investigation. Actuated by what we had heard, and by the peculiarly favourable situation of the district, a visit thereto the following spring was decided upon, provided the season was more propitious than that then prevailing.

The long-expected break in the lengthy sequence of arid months occurred in due course, and the Mallee was visited by a generous rainfall that gave assurance of a favourable spring-tide. Arrangements for our projected excursion were consequently begun early in September, and on Tuesday morning, the 5th October, Mr. A. W. Milligan and I left the city by the 6.30 train for Nowingi, a railway station 321½ miles from Melbourne, 30 miles south of Mildura, and 10 miles east of our contemplated base of operations.

The express by which we had travelled on the previous trip had been discontinued by the Railways Commissioners for economical reasons, and we were perforce obliged to journey by a mixed train that seldom averaged 12½ miles per hour, and that tarried at many of the Mallee stations to such an

extent as to permit of passengers, if they felt so disposed, making extended excursions along the surrounding thoroughfares, or into the country, as the case might be. This innovation was hailed with delight by many train-weary travellers during the daylight hours, but occasioned quite contrary feelings during the hours of darkness, when the mercury barely climbed to a higher altitude than 40 degrees, and one's nerves were frazzled by the loud and persistent bacchanalian songs of parties of uniformed roysterers.

We had not long quitted the environs of the city when we realized that the published reports respecting the bounteous season by which the State had been visited were by no means exaggerated. Wherever the eye elected to range over the more or less level basaltic plain traversed by the line, acres of rank cereal crops, or of native and exotic grasses, were to be discerned. Later on the Silurian, with its swelling contours, ushered in the eucalypts with their tender green sprays, the wild-flowers in variety and profusion, and the birds busy with the cares pertaining to the nesting season. Still later, the brushwood-overgrown spoil-heaps of the abandoned alluvial claims showed up prominently among the dark, rugged boles and vivid green foliage of the ironbarks, *Eucalyptus sideroxylon*, and, as the train sped past and through these imperishable mementos of former men and manners, the busy and varied scenes the now silent and deserted areas had witnessed came crowding fast on one's fancy. Gone is the gold-bearing wash the palæozoic rocks had secreted, and gone, too, are the men who sought it.

At Cope Cope and Swanwater the aspect of the level Tertiary plains was pleasing in the extreme, as mile after mile of the tall, succulent, and billowing crops they nourished stretched away on either side of the railway to the circling horizon, rendering, by their vastness, the homesteads they encompassed like miniature toys. Where pasturages occurred, sleek-skinned horses and cattle and dropsical-looking sheep and lambs viewed the passing train with lazy contentedness. Introduced weeds rioted everywhere. Former cultivated fields blazed with the pale yellow rays of the Cape Dandelion, *Cryptostemma calendulaceum*, and among the crops the Hoary Cress, *Lepidium draba*, the Stonecrop, *Lithospermum arvense*, and the Wild Mustard, *Sinapis arvensis*, showed prominently, and along the headlands the Musk Erodium, *Erodium moschatum*, Fumitory, *Fumaria officinalis*, and Mallow, *Malva nicæensis*, dominated all other plants, the last-named forming, with the Small Nettle, *Urtica urens*, interspersed, immense growths, ofttimes much taller than the fencing posts.

In the railway reserve areas of yellow, blue, and white

succeeded each other in varying succession, as the Pointed Everlasting, *Helichrysum apiculatum*, the Large Podolepis, *Podolepis acuminata*, the Large Billy Buttons, *Craspedia Richea*, and the Common Buttercup, *Ranunculus lappaceus*, gave place to the Trailing Swainsona, *Swainsona procumbens*, and the Austral Bluebell, *Wahlenbergia gracilis*, and these, in turn, to the Dwarf Rice-flower, *Pimelea humilis*, and the White Sunray, *Helipterum corymbifolium*. In many places this flowering composite clothed the fields so densely as to be suggestive, at a distance, of a wide expanse of snow.

In their white or emerald setting, sheets of water of varying extent and outline glistened under the sun's rays. On these a variety of water-fowl disported, and from their margins the Straw-necked Ibis, *Carphibis spinicollis*, White Ibis, *Ibis molucca*, the Plain Plover, *Zonifer tricolor*, the Pacific Heron, *Notophoyx pacifica*, and the Blue Crane, *Notophoyx novæ-hollandiæ*, were often disturbed by the passing train. Flocks of Pink Cockatoos, *Cacatua leadbeateri*, were noted winging their way from spot to spot, and companies of the more sober-hued Black-backed Magpie, *Gymnorhina tibicen*, and Crow, *Corvus coronoides*, enlivened the fields by their continuous change of position, induced either by a lack of amicability or quest of food.

What a different scene was presented when we traversed the same localities twelve months before! Then neither bird nor beast was to be seen. No gleam of water greeted the eye as the train progressed hour after hour through dreary, inhospitable, sunburnt wastes, that yielded their tribute of dust to every vagrant wind. Day by day the settlers beheld their stock sink and die from thirst and starvation. Some gave up the struggle and quitted the Mallee for ever: others, by reason of the possession of more determination, or possibly a lack of initiative, stayed on, hoping for the break in the drought. It came in due course, and they now view, with mingled feelings, the waving, luscious grass with which a beneficent Providence has so lavishly carpeted their holdings after depriving them of the animals and the means to make use of its tardy bounty.

At 4.20 on Wednesday morning the train pulled up in the Mallee, and we were apprised that we had arrived at Nowingi. Descending from our carriage in rather a gingerly fashion, for the drop was fully five feet, we were welcomed by Mr. F. T. Stone, from Mildura, and Johnny Richmond—to whom reference was made in our previous paper—from the Kulkyne Station.

The morning was bitterly cold, the ground in places being white with hoar frost, and no second invitation was needed from Johnny to repair to his gunyah, some few hundred yards

distant, and sample a billy of tea. The camp was picturesquely situated among the Giant Mallee, *Eucalyptus incrassata*, and False Spinifex, *Triodia irritans*, and as we reclined in various negligent attitudes around the genial fire waiting for the billy lid to chatter, we could discern, within the radius of light cast by the leaping flames, numerous blooms of the Satin and Golden Everlastings, *Helichrysum leucopsidium* and *Helichrysum bracteatum*, and that the ground on which we rested was thickly matted with the Austral Stonecrop, *Tillæa Sieberiana*, the Small-leaved Poranthera, *Poranthera microphylla*, the Bent Goodenia, *Goodenia geniculata*, the Pink Purslane, *Calandrinia calyptrata*, and tufts of the Grass Cushion, *Isœtopsis graminifolia*.

Before five o'clock it was possible to see our surroundings. Nowingi, we found, consisted of two repairers' residences and a small portable hut for the ganger. There was no platform, but three rusty iron tanks, a lamp, and a red flag served to mark the stopping-place. The view was limited, being bound on all sides by a seeming impenetrable wall of sombre green. At 6.30, to the accompaniment of the calls of the Singing Honeyeater, *Ptilotis sonora*, and the ventriloquial notes of the Crested Oreoica, *Oreoica cristata*, we broke camp, Johnny driving the springcart laden with our goods and personal effects, we following on foot, the course being due west.

The journey had not long begun when a call from our guide, and his extended arm, directed at some object among the stunted eucalypts in front, claimed our attention. Hurrying forward, we discerned a pair of Plain Plover, with two young ones, running away as fast as possible. On our near approach the young ones secreted themselves on the sand, their immature covering harmonizing perfectly with their surroundings, and the old birds flew off; but, on finding that we had located their brood, they returned, and, alighting at our feet, simulated injury, that we might essay to capture them, and in the effort withdraw a distance sufficiently remote to enable their young to steal away to a more favourable situation. Ignoring these tactics, we picked up the chicks, to the accompaniment of many peeping protests, and started them off towards their distressed parents, who greeted them with manifestations of delight, and lost no time in conducting them to a place of safety.

Shortly after leaving Nowingi the mallee and spinifex, in which we had sojourned for so brief a period, disappeared, and was succeeded by open, well-grassed country on which the Sandalwood, *Myoporum platycarpum*, the Needle Hakea, *Hakea leucoptera*, Leafless Ballart, *Exocarpus aphylla*, Berrigan, *Heterodendron oleæfolium*, Murray Pine, *Callitris robusta*, the

Umbrella Acacia, *Acacia Osswaldi*, and the Furze Acacia, *Acacia colletioides*, flourished. These, in turn, were succeeded by the Belar, *Casuarina lepidophloia*, and the Weeping Pittosporum, *Pittosporum phillyræoides*, and a variety of Chenopodiaceous plants, as the first of the many score of dry lake-beds we subsequently encountered was met with.

The number and extent of these so-called "salt-pans" or "lakes" are the most striking physical feature of Raak. They vary greatly in size, some being of comparatively small dimensions, and others of vast area. Their longer axis is invariably north and south, and they undoubtedly owe their origin to long and continuous wind erosion on the friable arenaceous soil. The occasional isolated residuals, of no mean height and extent, that occur within them tend to support this view. Composed of material of more than average resistance, these residuals have successfully withstood the æolian denudation that proved so destructive to the areas by which they had been at one time surrounded. The "salt-pans" seldom retain water for any lengthy period, and are encircled by sand-dunes, which attain a greater elevation on the eastern aspect than elsewhere. On two occasions during the course of our wanderings we beheld what appeared to be the initial process in the formation of a "pan"—sand-blows of great extent. In these we found several small and slightly scattered piles of weathered ochre—possibly originally a Venetian red, discoloured by fire—that occurs in the locality, the pieces being about the size of a tennis ball. These, we were informed, were "cooking stones" used by the blacks in one of the several processes they adopted in preparing their food. On the other hand, the ochre may have been used by the aborigines in the adornment of their persons in those weird ceremonies they so dearly loved and constantly practised, and lost with the containing "dilly bag" by some careless gin.

As all the "pans" noted by us bore the indubitable appearance of age, it would seem that the agent by which they were formed is not so potent now as formerly, or, if so, is controlled by some factor that holds its power in check. Undoubtedly that factor is the protective influence now exerted on the friable soil by the pines, casuarinas, eucalypts, acacias, &c., the Chenopodiaceous plants, grasses, and composites, which, possibly, were negligible elements, if they existed at all, during the formation of the depressions. The floors of most of the "pans" are perfectly level, but prove tiresome walking, owing to their yielding surface, which gives like velvet pile beneath one's feet. The whole is of a pinkish tint, glints like hoar frost under the sun's rays, and occasions many deceptive

mirages. Sinking to the depth of six inches below the surface, one comes upon a deposit of varying thickness of arrow-shaped crystals of sulphate of lime, or gypsum. Beneath this moist, tenacious, ferruginous sand is met with, but to what depth it continues, or whether other bands of crystals exist, the means at our command did not permit of determining. Chenopodiaceous plants of many varieties margin the "pans," and overgrow some of the more extensive. The Sea Heath, *Frankenia pauciflora*, the Dillon-bush, *Nitraria Schoberi*, and the Angular Pigface, *Mesembryanthemum equilaterale*, are common, and the Murrnong Yam, *Microseris Forsteri*, abounds in thousands. On such areas the Tricoloured and Orange-fronted Chats, *Ephthianura tricolor* and *Ephthianura aurifrons*, and the White-winged and Blue-breasted Wren-Warblers, *Malurus leucopterus* and *Malurus assimilis*, find a congenial home.

Pushing on after our guide, who, with less interest in the surrounding country than ourselves, left us hopelessly in the rear within the first half-hour, we crossed, in succession, lake-beds margined or overgrown with the Sea Glasswort, *Salicornia australis*, and the Dwarf Saltbush, *Atriplex halimoides*; open glades whereon the Fibrous Spear-grass, *Stipa semibarbata*, with the Austral Bluebell intermingled, grew almost waist-high; and expanses of loose, dry sand, seemingly incapable of affording nutriment to any form of plant life, yet on which occurred many luxuriant specimens of the Flannel Cudweed, *Gnaphalodes uliginosum*, the Narrow-leaved Podotheca, *Podotheca angustifolia*, the Slender Podolepis, *Podolepis Siemssenii*, and the Stiff Cup-flower, *Angianthus strictus*.

Now the track winds among the Tall Mallee, *Eucalyptus incrassata*, wherein bewildered companies of White-winged Choughs, *Corcorax melanorhamphus*, shelter and noisily herald our approach: over some flat redolent of the perfume from the Needle Hakea, *Hakea leucoptera*: up a Berrigan (*Heterodendron oleæfolium*) clad hill, and anon winding through the serried ranks of the symmetrical pines. A wire fence that stretches across the path, and the ruins of an old hut, proclaim the fact that our destination is near at hand. These are, however, not needed to demonstrate the neighbourhood of a human habitation. The weeds, the usual concomitants of settlement, are sufficient evidence. Among the Tall Thickheads, *Myriocephalus Stuartii*, which so thickly clothe the slopes and open country as to make walking a task rather than a pleasure, the Large Quaking-grass, *Briza maxima*, the Soft Brome, *Bromus mollis*, and the Canary-grass, *Phalaris canariensis*, nod heavily-weighted panicles, and the Rough Poppy, *Papaver hybridum*, flaunts its bright red petals. The Common Vetch, *Vicia*

sativa, the Wild Melon, *Cucumis myriocarpus*, the French Catchfly, *Silene gallica*, and many others abound, and evidence is not lacking to prove the instrumentality of the recent drought in contributing to the wide distribution of the Ice Plant, *Mesembryanthemum crystallinum*. In normal seasons stock leave the plant untouched, but during the recent drought they were compelled to consume it to assuage their hunger, and thus ensure the dispersal of its seeds over grazing areas hitherto free from this troublesome annual.

Ascending a slight eminence, an extensive expanse of country unfolds to our view. To the north and north-west glimpses of distant lake-beds are to be had, and beyond them a dense background of pines and Belar. To the west, and not very remote, a medley of pines, Belar, Berrigan, and Needle Hakea restrict the view; whilst to the south and south-west an unbroken succession of dry lake-beds of vast dimensions extend to the distant horizon. The eminence slopes gradually to the plain country to the west, and the lake-beds to the north, and ends somewhat abruptly to the south, the whole being thickly clothed with the Tall Thickheads. Nestling among a group of pines a few hundred yards distant was our Mecca—a hut. Hastening towards it, we find it to be a one-roomed structure, roofed with galvanized iron and built of pine logs. The next few hours were busy ones. Provisions had to be unpacked, tent and sleeping bunks to be erected, personal belongings arranged to satisfaction, and the wants of the inner man satisfied.

Shortly after mid-day we set out on the first one of the many daily tours of investigation undertaken during our sojourn at Raak. Bearing due north over a large lake-bed, we ascended a slight elevation on which many trees of Sandalwood, in profuse bloom, and the Sweet Quandong, *Fusanus acuminatus*, heavily laden with bright red pericarps, grew, and entered a dense forest of Belar, *Casuarina lepidophloia*, and Buloke, *Casuarina Luehmanni*, the former predominating. This distinctive class of vegetation, as we afterwards ascertained, extended in an easterly and westerly direction in the form of a crescent for several miles, and was of variable width, half a mile being about its maximum. The ground beneath the trees was littered with fallen cones and filaments, and did not appear, even in an exceptionally favourable season, to contribute to more than a meagre growth of plant life. Of the few met with, the Shrubby Twinleaf, *Zygophyllum fruticulosum*, the Four-leaved Allseed, *Polycarpum tetraphyllum*, and the New Zealand Spinach, *Tetragona implexicoma*, seemed to thrive best in such uncongenial surroundings.

As we wandered through the cool and shadowed vistas of

Buloke and Belar, that rang incessantly with the loud, pleasing calls of Gilbert's Thickhead, *Pachycephala gilberti*, we saw, among other birds, the Black-capped Tree-runner, *Sittella pileata*, the Brown Tree-creeper, *Climacteris scandens*, and the Bronze-wing Pigeon, *Phaps chalcoptera*, the last-named being invariably flushed from beneath, or in the vicinity of, a growth of the Furze Acacia.

Beyond the northern extension of the casuarinas a more arenaceous formation occurred, on which flourished, in more or less abundance, the Murray Pine, the Leafless Ballart, the Furze Acacia, the Tantoon, *Leptospermum flavescens*, and the Small-leaved Waxflower, *Eriostemon difformis*. Some fine specimens of the Australian Bugle, *Ajuga australis*, the Fleshy Senecio, *Senecio Gregorii*, the Immortelle, *Waitzia acuminata*, and Silver Tails, *Trichinium obovatum*, were noted growing among the spinifex and the eucalypts, which comprised the Oil Mallee, *Eucalyptus oleosa*, the Tall Mallee, *Eucalyptus incrassata*, the variety *angulosa*, and a type intermediate between it and the normal form. The Golden Everlasting, and the less sturdy Satin Everlasting, were numerous. The former seemed to favour the open situations, whilst the latter was invariably found growing in, or close beside, a tuft of spinifex. In this respect it was not the only growth that claimed the protection of, or derived its sustenance from, the spinifex, for in many spots the nebulous-like panicles of the Feather Spear-grass, *Stipa elegantissima*, rising like wraiths from out of the centre of innumerable masses of dry and pungent leaves, lent quite a charm to the scene.

Continuing westerly for some little time through vegetation such as has been described, we bore south, and, after traversing the belt of Belar and Buloke previously mentioned, emerged on to open, park-like country. Here, among the flowering Sandalwood and Needle Hakea, we noted the Sordid and the Masked Wood-Swallows, *Artamus sordidus* and *Artamus personatus*, and the Spiny-cheeked Honey-eater, *Acanthochæra rufigularis*, and found the nest and eggs of the Black-eared Miner, owing to the bird's pertinacious attacks on a Bronze-Cuckoo, *Chalcococcyx plagosus*.

A direct traverse was now made for the hut through the Tall Thickheads, the Crested Goosefoot, *Chenopodium cristatum*, and the Variable Senecio, *Senecio lautus*. As we reclined in the shade of the pines after our journey, and listened to the notes of the Black-and-White Fantail, *Rhipidura tricolor*, and the White-shouldered Caterpillar-eater, *Lalage tricolor*, that were borne to our ears on the gentle breeze, it seemed hard to realize that within comparatively recent times the country which we

had just traversed without beholding a wild or a domestic animal was enlivened by thousands of emus and kangaroos, numbers of dusky aborigines, and vast herds of wild horses and cattle. Raak, according to documentary evidence, was first traversed by a white man in 1848, and stocked a year or two later. In the '70's it was the stronghold of innumerable wild horses and cattle, which rendered it difficult for the station-holders on the areas fronting the Murray to keep stock unless great and unceasing vigilance was exercised. Issuing from their native fastnesses during the hours of darkness, these warrigals descended in droves on the home paddocks and inveigled the station stock away to a life of liberty in the remote recesses of the Mallee. So numerous did they become that, in the vicinity of the water-holes and puddles to which they resorted after nightfall, it is said, one could not hold converse with a companion unless by shouting, by reason of the angry and incessant bellowing of the bulls. To reduce their numbers a drive was determined upon, and resulted in 500 head of cattle being yarded and travelled to the Melbourne market. This procedure, however, was not persisted in, owing to the warrigals realizing little more per head in the city than it cost to yard them on their native wild. Shooting was next resorted to, and, with aborigines to flay the victims of his skill, one individual is credited with slaying nearly 1,800 head in a very short period. The number slain in any one day was regulated by the expertness of the flayers, and the greatest number shot in any one week, it is said, was 80, for which a sum of 12s. 6d. per head was paid the hunter, he surrendering to the owner of the run the cured skins. The method invariably adopted in slaying the cattle was to ride hard after the beast selected, and to place the muzzle of a shortened shot-gun, loaded with a heavy spherical ball, close behind its shoulder and fire, the animal in nearly every instance being killed outright by the discharge. The bleached and massive bones of these unfortunates are still to be met with, and, when one comes upon them in the midst of the Mallee, the mind at once reverts to the last headlong rush of the terror-stricken beast through the eucalyptus thickets, closely followed by the wildly-excited horse and its reckless and determined rider, to the loud report that knelled its doom, to the dusky beings who subsequently busied themselves about its body, and to the dingoes that, later on, fought over and gorged themselves upon the reeking flesh.

(To be continued.)

BOOK NOTICE.

THE WORLD OF LITTLE LIVES. By Gladys H. Froggatt ("Millie-Millie"). Sydney: W. Brooks and Co. Ltd. 1916. 169 pp. (4 x 6), with 15 full plates and 35 text blocks. 3s. 6d.

THIS little volume, which is written in the conversational style, will be found very useful by teachers of nature study, dealing as it does with forms of life we see around us almost every day. Miss Froggatt has chosen typical insects of the bush, and told their lives in a very pleasant and instructive manner. Thus she tells of the emergence of a Gum Emperor Moth, familiarly called a bush silkworm:—"The folded wings strove to break the walls; but not in vain, frantic flutterings did they beat, those wings of the softest velvet. Gently he rubbed the edge of each precious forewing against the dome of his weather-hardened prison. Ah, yes! A little sharp blade was ready, though hidden 'neath the felt of the scales. The Great Sculptor had not forgotten. He had foreseen his need. Slit, slit, slit went the tiny, keen blades at the palace roof, while sunbeams loitered without in a land of starry blossoms. The threads gave way. The mesh was rent. Out peeped Big Brother's bright-eyed little head, feathery feelers aquiver with delight and awe. Slowly the soft body and crumpled wings drew clear. Trembling, ecstatic, he rested on the roof of his deserted home. What a world of glory was this! Was ever a fairyland so lovely?"

In twenty-four chapters are given the life-histories of one or more representatives of each order of insects, each being well illustrated. It would have been better, perhaps, to have given some reference in several instances to the actual size of the insects. Thus, in the chapter on the house-fly is an illustration of a hover-fly, fully five or six times the natural size, without a word of explanation. Each chapter concludes with a brief tabular statement of the insect dealt with—*i.e.*, "*Order*, Diptera. *Family*, Muscidæ. *Musca domestica*. Length, ¼-inch. Habitat, world-wide." An introductory chapter, "Just Insects," gives a general glance at the main features of an insect and its life-history, while a concluding chapter, "How to Learn about Them," gives some details as to collecting and preserving specimens. The full-page plates generally give all the stages of the insect figured, while a number of bush-scene photographs are introduced to give an idea of the kind of country where the insect may be found. To give interest to the romance of insect lives was Miss Froggatt's aim, and we think she has succeeded admirably in her difficult task, seeing that in Australia there are no traditions or fairy tales attached to our fauna or flora.

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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, 8th May, 1916.

In the absence of the president, one of the vice-presidents (Mr. F. Pitcher) occupied the chair, and about 40 members and visitors were present.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Ethel M'Lennan, B.Sc., 19 Manningtree-road, Hawthorn, Mr. William R. Jamieson, B.Sc., 41 Charles-street, Kew, and Mr. Percy Sharman, B.Sc., Training College, University, were duly elected as ordinary members, and Mr. James Hay Young, Meredith, as a country member.

GENERAL BUSINESS.

Messrs. J. Stickland and J. Wilcox were elected to audit the accounts of the Club for the year 1915–16, and nominations for office-bearers for the year 1916–17 were made.

REMARKS ON EXHIBITS.

Mr. A. L. Scott said that the *Naturalist* for January, 1915, contained a description and illustration of a rocking stone at North Narre Warren, and at the time the editor asked for information respecting similar stones in Victoria. He was exhibiting a photograph of a stone on the Buffalo plateau, near a striking monolith known both as "The Sentinel" and as "The Piano." The stone might be regarded as a pedal. It measures approximately 14 feet by 9 feet by 2½ feet, and a vibration of 2½ inches is readily obtainable. An attempt to increase the swing caused such growling that the effort was abandoned. The Narre Warren stone is 13 feet by 4½ feet by 3½ feet, with a movement of about 3 inches.

NATURAL HISTORY NOTES.

Mr. P. R. H. St. John stated that nestlings of the Brush Wattle-bird, *Acanthochæra mellivora*, were to be seen in the Botanic Gardens at present. In his lengthy experience of the avifauna of the Gardens so late a brood was unprecedented.

Mr. J. G. O'Donoghue said that the manager of the Kulkyne Station, in a recent letter to him, mentioned that thousands of cormorants of several species were nesting at the present time in the Mournpoul sanctuary. In this particular locality these birds were not hitherto known to breed so late in the season.

PAPERS READ.

1. By Mr. G. A. Keartland, entitled "Bird Life on Fraser Island, Gippsland Lakes."

In describing some of the 70 species of birds noted during a visit to Fraser Island, near Lakes' Entrance, Gippsland Lakes, in October last, the author contrasted the confiding demeanour that was there displayed by the feathered tribe, where shooting and other interference were strictly prohibited, with the extreme shyness and the paucity of birds in equally-favoured spots where unrestricted licence to wreck and destroy prevailed. Various opinions, he said, had been advanced to account for the disappearance of the native birds from spots where, years ago, they were to be met with in large numbers, but whether the cause was due to the greater accentuation of the struggle for existence by the naturalization of the Starling, the Sparrow, the Minah, the Goldfinch, &c., the depredations of the fox and the cat, or the indiscriminate destruction wrought by man, the fact remained that our insectivorous birds, which formerly rendered valuable service to the agriculturist, are now seldom or never seen.

The paper, though a short one, was highly entertaining and instructive, and engendered the wish that the action of Mr. J. H. Syme in affording a sanctuary to our feathered friends in an area over which he exercised control might be followed by others, with undoubted benefits to themselves and the State.

2. By Messrs. F. Pitcher and J. Stickland, entitled "Some October Days at Marysville."

In a paper detailing their daily rambles to spots of interest in and around Marysville during a short sojourn in that locality in October last, the authors endeavoured to convey an idea of the luxuriance and variety of the vegetation that confronted them at every turn, and the many delightful views that were continually unfolding to their inspection.

Herbarium specimens of many of the flowers met with were displayed, and a large number of photographs of the beauty spots visited were shown.

In the discussion that followed, the insufficiency of notice-boards conveying information to tourists as to directions and distances to beauty spots was commented upon, and the opinion expressed that the same regard for the wants and the comfort of visitors was not displayed in Victoria as in New South Wales, where the authorities left nothing undone in the way of assistance to strangers. The great value of the Government tourist plan of the district was, however, cordially acknowledged.

Comments upon the paper were made by Messrs. Cox, Sutton, Hardy, Harvey, Barnard, Coghill, and Luher.

EXHIBITS.

By Miss G. Nethercote.—Flowers of *Cyathodes accrosa*, N.O. Epacrideæ, from Tasmania.

By Messrs. F. Pitcher and J. Stickland.—Series of photographs taken and herbarium specimens collected in and around Marysville, in illustration of their paper.

By Miss J. Rollo.—Flower of *Stapelia bufonia*, Willdenow, syn. *Orbea bufona*, Haworth, N.O. Asclepiadeæ, Starfish, Carrion, or Toad Flower.

By Mr. A. L. Scott.—Photograph of rocking stone, Buffalo plateau, and specimen of granite from same locality.

By Mr. J. Searle.—Young living specimens of *Lepiduris viridis*, adult in formalin.

By other exhibitors.—*Cassinia arcuata*, R. Br., Drooping Cotton-wood or Chinese Scrub, and *Gomphocarpus fruticosus*, R. Br., N.O. Asclepiadeæ, Arghel of Syria.

After the usual conversazione the meeting terminated.

RAMBLES IN RAAK.

By J. G. O'Donoghue.

(*Read before the Field Naturalists' Club of Victoria, 14th Feb.*, 1916.)

(*Continued from page* 15.)

The following morning we were up at 5.30, and after breakfast headed due south through the Tall Thickheads to the first one of the series of large "lake-beds" previously mentioned. Bird-life was fairly numerous, owing to the presence, probably, of a water trough fed from three iron tanks sunk in a small catchment on the northern slope of the depression. Here the drought-resistant properties of the Native Tobacco, *Nicotiana suaveolens*, and the introduced Sea-green Tobacco, *Nicotiana glauca*, were demonstrated in an unmistakable manner. Prior to the recent drought the latter had taken complete possession of vast areas of the country, but at the termination of the aridity few, if any, of the trees remained alive, whilst in and among their dead boles and branches the native plant grew luxuriantly, and paraded its racemes of flowers triumphantly. It was not long before the monotonous sameness of the "lake-beds" induced us to change our course. Bearing west and then north, we came upon some interesting timbered country, wherein the Needle Hakea, the Sandalwood, the Bignonia Emu-bush, *Eremophila bignoniflora*, and the Willow Acacia, *Acacia salicina*, abounded. The Hakea was frequented by the

Black-eared Miner and the White-browed Babbler, *Pomatorhinus superciliosus*, and the Emu-bush by the Spiny-cheeked and Singing Honey-eaters. Among the more lowly forms of vegetation observed were the Club Moss Aster, *Olearia lepidophylla*, the Spreading Scurf-Pea, *Psoralea patens*, var. *cinerea*, the Stiff Westringia, *Westringia rigida*, the Hairy Blennodia, *Blennodia lasiocarpa*, and the Sand Brome and Scaly Meadow-grass, *Bromus arenarius* and *Poa lepida*. The Burr Forget-me-not, *Lappula concava*, and the Narrow Thread Petal, *Stenopetalum lineare*, grew profusely, the former occasioning us much inconvenience owing to the tenacity with which its fruitlets adhered by their spinular asperities to our clothing.

A nest of the Wedge-tailed Eagle, *Uroaetus audax*, was found in a large tree of the Tall Mallee, associated with several Crows' nests. The food on which the eaglets had been nurtured was evidenced by scores of skulls and other skeletal parts of the rabbit that strewed the ground at the base of the tree. The reason of the association of the nests of the two birds might be surmised from the presence of these bones; the wily Crow, no doubt, having realized that, in the vicinity of the Eagles' eyrie, an abundant supply of food for itself and nestlings could be obtained with little exertion owing to the prodigal habits of the bird of prey. The Eagle's nest was a bulky one, and Johnny was induced to ascend the tree and pose therein whilst a series of photographs were taken. During this outing the number of pits of the ant lion that fretted the sandy soil occasioned surprise. So closely were they set that at every step at least a dozen of them were destroyed, and their concealed occupant perturbed.

On this ramble, and during our subsequent ones, we noticed, particularly in the early morning and late in the evening, fresh moist soil on the lip of numerous narrow, elongated openings leading at an angle of 45° or thereabouts into the ground. To our query relative to the identity of the creatures responsible for such excavations, Johnny replied, "Lizards," and when questioned as to the cause actuating them to burrow, he intimated that the lizards preyed on the trap-door spiders, and consequently had to dig to satisfy their desires. As the lidded domiciles of these spiders were extremely numerous in the friable soil, and ranged from the size of a pin's head to the diameter of a shilling, we assumed that the explanation given was correct, but with innate scepticism kept a watch to detect the lizard at its task. One evening, whilst returning in the gloaming to our hut after an extensive ramble, we chanced upon a pile of loose sand beside an excavation that undoubtedly proved, by its fresh appearance, to have been recently brought from below. Mining operations for the miner were at once

instituted, and, after attaining a depth of eight inches, the gentle insertion of the blade of a pocket-knife into the hole resulted in the prompt appearance of a dirty, moist, and aggressive specimen of the so-called Bloodsucker, *Amphibolurus muricatus*. Henceforth we readily recognized the tunnels made by this lizard, and made several futile efforts to establish the identity of the species, as we thought, that made a larger, though not so elongated, opening. At length we encountered one whose soil-heap was of more than the usual dimensions, and after a considerable amount of scratching dead-ended our quarry at a depth of eighteen inches—a large desert cockroach, which, on being submitted with other insects collected during the trip to Mr. J. A. Kershaw, Curator of the National Museum, proved to be *Geoscapheus robustus*.

Stranger than either of the two excavations mentioned was the circular hole, about the diameter of a halfpenny, that went down vertically, and had six or eight plugs of sand, from two to three inches in length, neatly piled at its orifice. How these had been piled upon one another; by what means were they formed; by what creature; and how had they been raised from below, were questions more easily asked than answered. With our fingers and a piece of wood we tried repeatedly, but unavailingly, to solve the miner's identity. Early one morning, having set out on an excursion of more than the usual radius, we chanced upon one of these circular holes with an accompanying pile of fresh sand-plugs. With a pannikin we sank a hole to the depth of three feet in the sandy loam before we brought to light the object of our quest—a large brown beetle, with a long, stout horn set in the middle of its head, and flanked by two smaller ones. It proved to be one of the Digger Beetles, *Bolboceras sloanei*. It would appear that, as the beetle delves vertically with its powerful foreclaws, it forces the excavated material upwards between its abdomen and the wall of the shaft. When the burden above begins to incommode its operations, it backs up the shaft, forcing the plug upwards till it eventually topples over at the margin of the hole. However plausible this explanation may appear, there is one fact that seems to militate against its acceptance, and that is how each successive plug raised from below falls directly upon the previous one rather than elsewhere. The cohesion of the sand appeared to be ensured by means of a mycelium, for some of the fresh plugs examined were invested with a minute mesh, which might possibly have been derived from the spinnerets of some species of the spider tribe.

The object, hereabouts, of the habit of making excavations by the beetles and lizards, if not for the purpose of depositing eggs, must be to make provision to withstand, like the dingo,

the dry season, by attaining the moisture that exists some little distance below the surface. Confirmatory evidence of such an acquired habit was recently published in the *Agricultural Journal* of the Union of South Africa, February, 1914, by Eugene N. Marais, in an article entitled "Notes on Some Effects of Extreme Drought in Waterberg, South Africa."

Along the lee side of the high water mark of some downpour that had temporarily covered the lowest part of the area of a "salt-pan" with a shallow sheet of turbid liquid, the remains of the cockroach *Geoscapheus robustus* could be collected in scores, having been surprised, possibly, in their underground retreats by the storm water, and on coming to the surface perished after protracted and unavailing struggles, and were then cast by the ripples on the shore, there to be entombed by the shifting sand, or eaten by the foraging fox or Lace Lizard. One of the latter, *Varanus gouldi*, was surprised by us whilst it was foraging for these insects on a "lake-bed," and in turn surprised us by the rapidity of its progress over the partially-wet sand and through the Pigface and Prickly Saltwort, *Salsola kali*.

Whilst dealing with insects, it might be here mentioned that it was noticeable, when fire was applied to a large clump of spinifex, the greater number of insects sheltering therein seemed loth to leave their domicile, and were either incinerated by the flames or overpowered by the heat when making a belated break for a safer haven. On the other hand, the moment the flames began to manifest their power, a general exodus of panic-stricken small snakes, lizards, beetles, spiders, grasshoppers, cockroaches, &c., ensued from clumps of spinifex some yards distant from the scene of the conflagration. It was noticeable also that shortly after the smoke occasioned by the combustion of these large growths of tangled and pungent leaves had attained some little height in the heavens, Crows were to be discerned converging towards it from all points of the compass. From experience they appear to comprehend that where there is fire in the Mallee there will be found food in abundance. This peculiarity on the part of the Crow was repeatedly tested by Mr. A. W. Milligan during the course of his extensive ornithological excursions in Western Australia.

Whilst standing watching the play of the flames in a large growth of spinifex, we were surprised to notice an oyster-shell-shaped piece of loam, at the base of the clump, suddenly lift above the level of the surrounding soil, and a dark, hairy form peer forth from beneath the elevated lid with evident trepidation and then disappear. When the fire had exhausted itself we hastened forward to investigate the matter, and found two small oyster-shell-shaped lids leading to a circular shaft

lined with a closely-woven, delicate web. Carefully applying tension to the lids, a silken bag, about eighteen inches in length and one and a half inches in diameter, was withdrawn from the hole, which it fitted perfectly. Slitting up the bag with a knife, we found that its recent occupant had remained in the hole, and that four inches of the end of the bag was wet and discoloured. Having no suitable article with us for excavation purposes, we were left to speculate on the identity of the spider that constructed and occupied such a unique habitation.

During the burning of one very dry clump of spinifex, a large brown cockroach, that was fully two and a half inches in length and one and a half inches in breadth, issued from the grass and hurried towards us. The gigantic insect's approach was watched with close attention and ready collecting bottles, but before it could cross the danger zone the flames spread out wide and low above it, and in an instant converted it into a scorched and shrivelled semblance of its former self. In all probability it was *Geoscapheus giganteus*.

Later in the day we bore east through the pines in the direction of Nowingi. In the area over which the pines exercised dominion the entire absence of young plants or trees did not fail to excite our attention. During all our extensive wanderings in Raak, as in the neighbourhood of Lake Mournpoul, not a single young plant, if we omit the Weeping Pittosporum, of any of the trees or shrubs met with was noticed. Fire seldom or never ravages the district, and the depredations of stock are unimportant or negligible. One is prompted to ask, Why is this so? What favourable conditions induced the contemporaneous growth of the pines and associated vegetation in the past, and, now that they have adapted themselves to their environment, how does it arise that they seem incapable of perpetuating their species? Among the pines we noted the Red-browed Tree-creeper, *Climacteris erythrops*, but not elsewhere. The bird is shy, and seems to have acquired the silence of the shady vistas it frequents.

Maintaining an easterly course, we at length reached our destination — a large lake-bed containing a small area of shallow water. One of the party, discarding his boots and socks, ventured out into the water with a collecting net and bottle, with the view of securing some of its fauna. At no spot was the water of greater depth than two inches, but at every step the pond-life hunter sank knee-deep into the tenacious mud beneath. Subsequently he was obliged to make a lengthy barefooted pilgrimage along a path thickly strewn with the fruit calyces of the Prickly-fruited Salt-bush, *Bassia echinopsila*, to a small puddle to cleanse his feet and legs. At this small puddle, evidently formed by a recent passing shower,

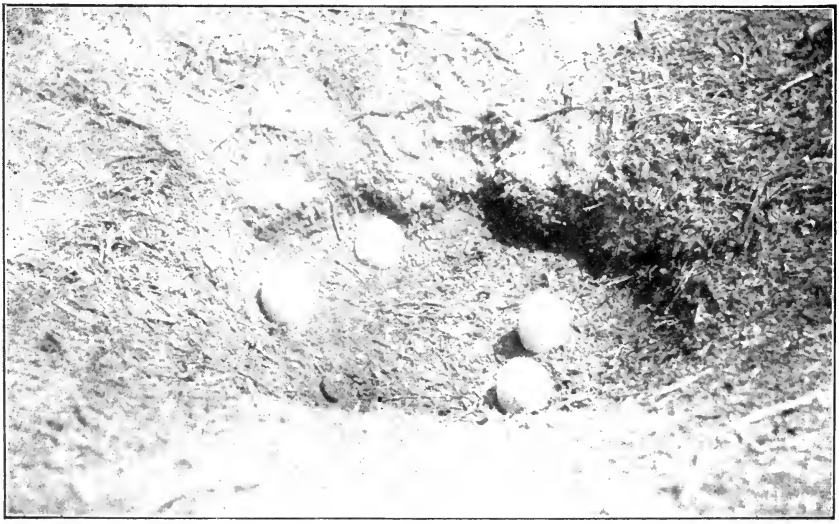
we noted a greater number and variety of the feathered tribe than elsewhere. Among the more numerous species were the Bee-eater, *Merops ornatus*, and the Masked Wood-Swallow, *Artamus personatus*, both of which had just reached the Raak district on their annual migration. In a drooping Moonah, *Melaleuca parviflora*, growing beside the margin of a lake-bed, we discovered the nest and eggs of the Striped Honey-eater, *Plectorhynchus lanceolatus*, and, in a pine tree, the nest and young of the Tawny Frogmouth, *Podargus strigoides*. The young birds appeared very grotesque in their soft white investure, and seemed not more than three weeks old, and incapable of much exertion; yet, on repairing to the tree the following morning to secure a photograph of the mother bird and her brood, we found the nest deserted. Returning homewards at nightfall, we encountered several Black-faced Kangaroo, *Macropus melanops*, and collected the Desert Cassia, *Cassia eremophila*, var. *platypoda*. At one time this plant was very plentiful hereabouts, but now, owing to the partiality shown by the rabbits for its leaves and tender twigs, it is seldom met with. Fortunately for the few plants that still survive, the recent drought dealt as effectively with the rabbits in the Raak district as it did with the introduced Tree Tobacco.

In company with Mr. Charles Thompson, of Kulkyne station, we set out one morning at 7.45 for the purpose of searching the mallee about eight miles to the north of the hut for the nesting-mounds of the Mallee Fowl, *Leipoa ocellata*. Bearing north by east, we crossed a large lake-bed, and forced our way through a bewildering interlacement of dead and prostrate trees of the Sea-green Tobacco, interspersed with sturdy growths of the Silky Blue-bush, *Kochia villosa*, and the Native Tobacco. Beyond this the Berrigan, the flowering Sandalwood, and the fruit-bearing Sweet Quandong prevailed in more or less abundance till the belt of Belar and Buloke already described was reached. On its northern margin a narrow-leaved form of the Giant Hop-bush, *Dodonæa viscosa*, var. *angustifolia*, was met with, and occasional mounds of copi. The Oil and the Tall Mallee succeeded, and, with pines and spinifex interspersed, stretched away northwards as far as the eye could reach.

As we continued in the direction mentioned at a leisurely pace, keeping a keen look-out for the objects of our quest, we noted many flowering plants and shrubs. The most prominent of these were the Green Prostanthera, *Prostanthera chlorantha*, the Spreading Flax-Lily, *Dianella revoluta*, the Holly Grevillea, *Grevillea ilicifolia*, var. *lobata*, the Lambs' Tails, *Trichinium exaltatum*, and the Sand Twinleaf, *Zygophyllum ammophilum*. Several specimens of the Rusty-hood Orchid, *Pterostylis rufa*,

PLATE I.

OPENING MOUND OF MALLEE FOWL (*Leipoa ocellata*).



POSITION OF EGGS IN PIT.

"Rambles in Rask." *Photos.*, F. STONE.

the Desert Boronia, *Boronia clavellifolia*, and the Golden Pennants, *Loudonia Behrii*, were met with, but in every instance these were long past the prime of flowering splendour. The Sweet Appleberry, *Billardiera cymosa*, and the Large Dodder Laurel, *Cassytha melantha*, were much in evidence, the former twining about the base of the eucalypti and the latter sprawling over their tops.

Making a short traverse to the west, we encountered a mound of the Mallee-Fowl, and beside it an egg, much scratched, and having a small hole in the side. As the mound showed no signs of being disturbed by other than its maker, the egg may have been accidentally broken by the bird in the course of one of its periodic inspections, and then discarded. Opening up the mound, we found it to contain but one egg. Later on another mound was investigated, with similar result.

Wandering haphazard through the mallee and spinifex, we were fortunate in obtaining a glimpse of a *Leipoa*. The bird was standing erect and motionless, listening attentively to the noise we occasioned in our progress through the investing vegetation. The moment it detected us, however, it wheeled about, and, with lowered head, disappeared at a rapid run among the spinifex and low mallee. Hastening forward, we discovered its mound, and on opening it up found that it contained four eggs. These were arranged in the form of a circle, the larger end being upward, and projected slightly towards the centre of the small circular excavation around and over which the sand, bark, leaves, and twigs gathered by the bird were heaped. So far as we could see from an inspection of these mounds, and others subsequently met with, the bird was not actuated, as has been alleged, by any motive in the selection of a site other than expediency. Some were closely invested with *Eucalyptus incrassata*, var. *angulosa*, and others were practically destitute of cover.

In the selection of the sites for the mounds examined by us, the birds certainly gave no heed whether an opening occurred or not in the surrounding vegetation to the north and east to permit of the unimpeded rays of the sun falling on the mound. Possibly they realized, as we did, that the impediment offered to the sun's rays by the foliage of the mallee, particularly during the spring and summer months, is more imaginary than real. In every instance the immediate vicinity of the mounds presented a clean appearance by reason of the removal by the bird of all leaves, twigs, and bark within a radius of twenty feet or thereabouts. From the number of holes observed in the sand at the base of the pines we assumed the birds spend much of their leisure in sun-bathing. By this time the heat and flies had become almost unbearable, and, to accentuate

the unpleasantness, a dust-laden north wind sprang up and gradually increased in temperature and intensity. Hastening south, we at length arrived, heated and uncomfortable, at Brighton's Tank, which comprised two small, shallow, oblong, artificial excavations, in a natural depression, containing a few thousand gallons of turbid water. Here we refreshed, and rested in the shade of the pines.

In order to ascertain the extent to which this tank was frequented by the birds and marsupials of the locality, we repaired to it later, and, ensconcing in selected positions, awaited the coming of dusk. As the gloom deepened the flies that had plagued us exceedingly all day withdrew, and small but energetic mosquitoes began to dispense their favours without fear or impartiality; the stridulations of the mole crickets, *Gryllotalpa coarctata*, gradually decreased in volume and intensity; the belated calls of the Crested Oreoica, the Pallid Cuckoo, *Cuculus pallidus*, and the White-winged Chough finally ceased, and the prevailing quiet was broken only by the grating of the large windmill near at hand, the plaintive calls of the Curlews, and the low "Peep, peep" of a pair of tiny Black-breasted Plover as they paraded the muddy margin of the tank. A Large-tailed Nightjar, *Caprimulgus macrurus*, flits into our rapidly-lessening range of view, circles noiselessly above our heads, and then alights on the ground a few yards distant from us to seize a mole cricket its keen eyes had detected. A period of quietude ensues; then, with whistling pinions, a pair of Bronze-wings alight on the ground near at hand, and, after a careful survey of their surroundings, run to the water's edge and drink long and deeply. They depart in due course, and we wait patiently but unavailingly for the next visitant, and then stroll homewards, our route illuminated by repeated vivid flashes of lightning—the precursors of the rain clouds that shed some of their contents on Raak during the night. The outcome of our visit was disappointing; but had it been undertaken later in the season, when the heat had wilted the succulent plants that carpeted the ground, better results would have undoubtedly attended it. In support of this contention, we might mention that the cattle and horses depasturing on Raak had not been near water for over four months prior to our arrival, owing to the Common Sow-thistle, *Sonchus oleraceus*, on which they practically lived, containing sufficient moisture to satisfy their thirst.

Shortly after 9 o'clock one morning, when some miles south-east of the hut, we came upon a tree possessed of several trunks, all of which were piped, and, as we considered, eminently suitable for affording shelter to an Owl-Swallow, *Ægotheles novæ-hollandiæ*. Each in turn was subjected to a careful investiga-

tion, and so occupied were we in this task that we failed to notice a bulky Carpet Snake, *Morelia variegata*, slightly over seven feet in length, that was indulging in an early sun-bath on one of the trunks, in close proximity to an enthusiastic ornithologist's hand. At the alarm signal the whereabouts of a suitable waddy was as vital as the snake's. On divining the identity of the disturbing factor, however, cameras were hastily dragged from their cases and as hastily screwed to tripods. Becoming alarmed at the unusual disturbance in proximity to its domicile, the snake decided to retire into a hollow spout. Johnny, however, frustrated this design by plugging the hole with his soft felt hat. As the baffled reptile coiled about the entrance, a bat issued from out of a smaller exit, and, struggling frantically over several of the ophidian's folds, fell to the ground and simulated death. The snake now resolved to go aloft, and in a few moments lay extended along a small limb some fifteen feet from the ground. This situation not being deemed sufficiently elevated above the danger zone, an effort was immediately made to reach the shelter of the dense foliage above. Slowly the snake erected itself till over six feet of its length was poised rigidly and vertically above the limb on which it rested. The feat was a surprising one to us, and served to demonstrate the great muscular power possessed by these constrictors. The moment the reptile's head reached the upper limb it released its hold of the lower one, and quickly drew its body into the supposed haven of safety and concealment. Johnny now ascended the tree, and summarily shook the snake to earth, where it was measured and examined, and then carried without protest to a neighbouring small bush and photographed, after which, being unfortunately unprovided with a bag or spirit bottle of sufficient size, we left it to glide away to its shelter tree unharmed.

From various causes a visit to the Double Tanks, distant about six miles due west of the hut, was deferred almost to the day of our departure from Raak. The route thither lay for the first mile or so over open country, and then through a forest comprising mostly pine and Belar. Amongst the most conspicuous of the flowering composites noted were the May Weed Sunray, *Helipterum cotula*, the Fringe Daisy, *Brachycome ciliaris*, the Pointed Everlasting, *Helichrysum apiculatum*, and the Soft Millotia, *Millotia tenuifolia*. On issuing from the timber we ascended a sand-ridge and beheld an extensive lake-bed, comprising some thousands of acres, extending for miles to the south and the west. Far off, across this monotonous level depression, which was thickly invested with the Dwarf Salt-bush, a light-coloured patch marked the site of Warrick's Tank. Thither we directed our steps, and on reaching the tank found it over-

grown with the Sea Heath and Sea Glasswort. Continuing onwards, we at length reached the Double Tanks—two oblong, shallow, artificial excavations. The water impounded was fresh, though slightly discoloured, and its muddy margins were fretted with the tracks of many varieties of the feathered tribe. As at Brighton's Tank, no indications were noted of either stock or marsupials having resorted to water for a lengthy period. In and about the shallows the Spoon Mudwort, *Limosella Curdiana*, the Dwarf Arrow-grass, *Triglochin centrocarpa*, and the Trefoil Pennywort, *Hydrocotyle medicaginoides*, grew luxuriantly. On the return journey a fine specimen of the lizard *Varanus gouldi* was captured far out on the lake-bed, and the White-winged Wren-Warbler, *Malurus leucopterus*, noted among the Dillon bushes.

On Saturday evening Mr Stone left for Nowingi to catch the 4.20 train on Sunday morning to Mildura. The following afternoon Mr. A. W. Milligan and I bade adieu to the picturesque spot where we had spent so many pleasant hours, and, journeying east, reached Nowingi in time to erect our tent, partake of tea, and make ourselves comfortable before nightfall. Early Monday morning the crowded train from Mildura pulled up at Nowingi, and we clambered aboard, to stand the greater part of the journey to the city, where we arrived shortly before midnight, with barely sufficient time available to catch the last train to our respective suburbs.

In conclusion, we wish to express our thanks to Mr. J. A. Kershaw, F.E.S., for his kindness in furnishing us with several specimen jars, and subsequently identifying the insects, &c., submitted to him; and to Mr. J. R. Tovey, of the National Herbarium, for identifying and supplying us with the vernacular names of the plants collected. All the ornithological and entomological specimens have been presented to the National Museum, Melbourne.

Among the insects handed to Mr. Kershaw for the Museum he has identified the following:—Coleoptera: Bolboceras sloanei, Blbk.; Cubicorrhynchus calcaratus, Macl. (rare for Victoria). Hymenoptera: Ephutermorpha formicaria, Fabr. (female). Orthoptera: Tinzeda albosignata, Brun. (male); Euzosteria subverrucosa, ? White (a cockroach, immature, a rare species); Plana (Geoscapheus) robustus, Tepp. (a cockroach). Neuroptera: Glenurus ? (young larva). Hemiptera: Chæroceris paganus ? (immature). Spider—Argiope, sp. ?

In some material handed to Mr. J. Searle from the salt-pans, he identified the Crustaceans Paratemia zietziana and Estheria packardi. Some material from a freshwater dam yielded Daphnia carinata and a copepod which will probably prove to be new.

The Victorian Naturalist.

Vol. XXXIII.—No. 3. JULY 6, 1916. No. 391.

FIELD NATURALISTS' CLUB OF VICTORIA.

The thirty-sixth annual meeting of the Club was held at the Royal Society's Hall on Monday evening, 12th June, 1916.

The president, Dr. C. S. Sutton, occupied the chair, and about 45 members and visitors were present.

CORRESPONDENCE.

From Mr. O. W. Rosenhain, regretting his inability, owing to ill health, to be present at the annual meeting, and intimating that he would, as heretofore, do his utmost to further the interests of the Club whether he was re-elected as a member of the committee or not.

REPORTS.

A report of the geological excursion to the Royal Park railway cutting on Saturday, 13th May, was made by the leader, Mr. A. L. Scott, who stated that, owing to unfavourable weather conditions prior to and at the time of starting, very few took part in the outing. On reaching the cutting the stratigraphical relationships of the red beds of the coastal plain, the decomposed Older Basalt, and the bed rock were explained, and their probable history considered. No fossils of worth rewarded the efforts of the party.

The leader, Mr. P. R. H. St. John, stated that only one other member attended the whole-day excursion to Frankston on Monday, 5th June (King's Birthday). A traverse was made across the heath country in the direction of Langwarrin. Flowering plants and shrubs were numerous and varied. The Sweet Acacia, *Acacia suaveolens*, was exceptionally abundant, fragrant, and at the height of flowering perfection. The day proved an ideal one, and he regretted that more members did not take advantage of it.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Isa Cookson, B.Sc., 154 Power-street, Hawthorn, and Mr. Harold Pottenger, 21 Kinross-avenue, Caulfield, were duly elected as ordinary members of the Club; and Master Alaster Burns, "Lucerne," Lower Ferntree Gully, and Mr. James Hill, Kewell, *viâ* Murtoa, as country members.

ANNUAL REPORT.

The hon. secretary, Mr. J. G. O'Donoghue, read the thirty-sixth annual report, for the year 1915–16, which was as follows :—

"TO THE MEMBERS OF THE FIELD NATURALISTS' CLUB OF VICTORIA.

"Ladies and Gentlemen,—By the effluxion of time, the committee you elected in July last vacate office this evening, but before so doing it is incumbent on them to submit a brief review of the progress made and the work done by the Club during their tenure.

"In presenting, then, the thirty-sixth annual report for the year 1915–16, they extend to you their hearty congratulations on the very satisfactory manner in which the Club has emerged from the commercial disquiet and retrenchment that have been such pronounced features in our social economy during the period.

"Regarding the numerical strength of the Club, it is highly gratifying to record that, despite the considerable less sustained by resignations and arrears during the past twelve months, the position is slightly better than at the close of the previous year. Commencing the year with a membership of 210, 5 country and 25 ordinary members were elected, and 1 associate, 1 country, and 20 ordinary members lost by death, resignation, or arrears. The membership thus shows a gain of 8 for the period under review, and now amounts to 218, comprising 2 life, 6 honorary, 57 country, and 150 ordinary members, and 3 associates.

"From the circumstance that four members were elected at the May meeting, and four are nominated for the next meeting, it may be the pleasurable privilege of the next committee to chronicle infinitively better results at the termination of their term of office than has fallen to our lot in that just ended.

"Apart, however, from what the future may have in store, your committee, in the eleventh hour of their stewardship, would urge upon you the necessity of advancing the claims of the Field Naturalists' Club of Victoria to the support of those interested in natural research, when and wherever an opportunity may occur. By this procedure the Club will become more widely known and recognized as affording readier, easier, and cheaper facilities to those desirous of acquiring a special or a general knowledge of the manifold phases of nature than is afforded by any similar body in the State.

"The hon. treasurer, Mr. Geo. Coghill, in his report respecting the financial position of the Club, will show that the receipts for the past twelve months amounted to £139 8s. 11d., and the expenditure to £134 7s. 2d. A profit of £5 1s. 9d. is thus disclosed, and the credit balance increased from £44 2s. 11d. to £49 4s. 8d.

"From the foregoing figures it will be readily realized that though no material acquisition to the Club's funds has resulted

from the transactions for the past year, the slightest lack of that economic and careful administrative policy consistently pursued by your hon. treasurer and committee during the period would have resulted in a less favourable report.

"Arising out of a suggestion made by Mr. A. D. Hardy, your committee decided to hold the Club's 1915 annual exhibition of wild-flowers in the Athenæum Hall, Collins-street, on Thursday, 28th September, make a charge of 1s. for admission, and devote the profit that might result to the Sick and Wounded Soldiers' Fund. An appeal was consequently made to members, and to the Club's patrons, for donations of wild-flowers towards this deserving object, and it is pleasing to record that the tribute received, both in respect to quantity and variety, was such as to seriously tax, not only the large space available for display purposes, but the best efforts of a large body of experienced workers to deal with it in a thorough and advantageous manner. Native flowers were forwarded from even the remotest parts of the State, from the Botanic, Horticultural, and private gardens of Melbourne and suburbs, and from Messrs. R. T. Baker, F.L.S., and J. H. Maiden, F.L.S., Sydney. The floral display that resulted was unquestionably the best yet seen in Victoria, if not in Australasia, and was a revelation to those whose knowledge of our flora was restricted to a limited number of the commoner types. The exhibition was opened in the afternoon by His Excellency Sir Arthur Stanley, before a large concourse of people, and was continued till 10 p.m., when the flowers were auctioned by Mr. A. E. Haughton The outcome of the venture was eminently satisfactory, far exceeding the most sanguine expectations of its promoters, and benefiting the Sick and Wounded Soldiers' Fund to the extent of £54 4s. 11d.

"During the evening two lecturettes, illustrated by lantern slides, were given in the Upper Hall by Mr. E. E. Pescott, F.L.S., and Mr. J. A. Kershaw, F.E.S. The former selected for his discourse the very appropriate subject, 'The Wild-Flowers of Victoria,' and the latter 'The Scenery of the National Park, Wilson's Promontory.' Both lecturettes were well attended, added considerably to the profit of the exhibition, and served, in no small measure, to disseminate a better knowledge of the beauty and variety of our flora, and of the scenic beauties of our little-known National Park.

"In passing, your committee take the opportunity here afforded of again thanking the Victorian Liedertafel for the use of their tables for display purposes, and the members of the Club and their friends for their floral tributes and exhibits; of again expressing their hearty appreciation of the consideration and generosity displayed by Messrs. R. T. Baker and

J. H. Maiden in forwarding some of the choicest representatives of the flora of New South Wales; and in once more placing on record the valuable assistance rendered by Mrs. A. D. Hardy, Misses E. Bainbridge, B. Hall, M. Muntz, E. M'Adam, A. and S. Sutton, and others, during the continuance of the show. To the members who actively associated themselves with the venture a formal expression of thanks in this report is not deemed necessary: the consciousness of having materially assisted to bring about the splendid result achieved, and of having thereby contributed to the wider publicity of the Club, is assumed to be more highly valued than any encomiums to which your committee might give expression.

In comparison with the previous year, the number of papers read at the Club's monthly meetings showed a slight advance; but, whereas only two of the fourteen papers then dealt with were illustrated by lantern slides, nine out of the sixteen papers contributed last year were so popularized. Of the papers read, two were devoted to botany, three each to industrial products, ornithology, and travel, one each to conchology, pond life, and palæontology, and two to general subjects. In the main, the papers were of a high standard of merit and of undoubted value and interest. The authors and the title of their papers are as follows:—Mr. J. Audas, F.L.S., 'Glimpses *en passant* on a Trip to Mount Beenak'; Mr. C. L. Barrett, 'Bird Studies with the Camera' (illustrated); Mr. F. Chapman, A.L.S., 'On Some Fossils from the Red Limestone at Grange Burn, near Hamilton, with a Note on a New Species of *Bolivina*' (illustrated); Mr. L. G. Chandler, 'Some Victorian Birds and Their Haunts' (illustrated); Miss Amy Fuller, 'Some South African Scenes and Flowers'; Mr. J. H. Gatliff, 'Description of two New Australian Varieties of Cowries'; Mr. A. D. Hardy, F.L.S., 'Forests of Victoria,' parts i. and ii. (illustrated); Mr. R. A. Keble, 'Picric Acid and Grass-Tree Gum'; Mr. G. A. Keartland, 'A Study of Birds at Breeding Time'; Mr. J. G. O'Donoghue, 'Rambles in Raak'; Messrs. E. E. Pescott, F.L.S., and C. French, jun., 'A Year Among the Orchids: a Reminiscence' (illustrated); Mr. O. W. Rosenhain, 'A Naturalist in Java' (illustrated); Messrs. J. Shephard and J. Searle, 'A Visit to the Lakes near Colac and Camperdown'; Mr. J. Shephard, 'A Visit to Great Lake, Tasmania' (illustrated); Mr. H. Whitty, 'A Naturalist on the Yorkshire Moors' (illustrated).

"The thirty-second volume of the Club's journal and magazine, the *Victorian Naturalist*, has been published and issued to members and to various scientific bodies, libraries, &c., throughout the world, and it can be claimed that the value and merit of its papers, notes, reports, &c., in no way detract

from the high standard of excellence of previous volumes. The thanks of the Club are again to be accorded Mr. F. G. A. Barnard for discharging the editorial duties in the same efficient manner that has been a characteristic feature during his long association of some twenty-five years with the position.

"Whilst the Club's Saturday afternoon excursions were well attended by members and their friends during the past twelve months, the whole-day outings, on the contrary, were poorly patronized, and, of the three extended excursions listed, one resulted in an attendance of three members and the other two had to be abandoned for reasons that have already been specified. As the result of past experience, it would seem that, in the selection of localities for extended outings at Christmas and at Easter, much better results would be achieved if 'camp-outs' were to be arranged, on such occasions, at places little frequented by tourists and visitors—places where the enthusiastic naturalist might wander about from morn to dewy eve without fear of deprecating glances, by holiday-makers, at his rough but serviceable working apparel, and where Nature, unhampered to little or no extent by man's interference, might be studied to the best advantage. In all probability, your 1916–17 committee, when compiling the next programme of excursions, will give due consideration to this matter.

"During the year an effort was made by an influential party of sportsmen to induce the authorities to annul the Hattah–Mournpoul native game sanctuary, which the Club was instrumental in having reserved a short time previous. Becoming aware of the movement, your committee entered an emphatic protest against the abrogation of the sanctuary, or the curtailment of its area. The representations made in support of the preservation of this sanctuary by the Club and kindred societies were such as to effectually dispel any apprehension of it being again the scene of wanton slaughter, and to earn for it the distinction of being the most ideal of its kind in the State.

"More recently your committee interested themselves on behalf of the honey-eaters, which are now only accorded protection from the 1st July to the 14th February next following —a totally inadequate recompense for the undoubted large and valuable part played by this interesting family in the economy of nature. The result of their representations is not yet available, but Mr. F. Lewis, Acting Chief Inspector for Fisheries and Game, has signified his intention of recommending the Minister that honey-eaters, with the exception of the Wattle-bird and the Leatherhead, be included in the list of protected birds for the whole year.

"Since the last annual report was presented, the Club, as well as the Royal Society, the Australian Association for the

Advancement of Science, and other bodies, has been most unfortunate in being deprived, by death, of the valuable services of Dr. T. S. Hall, who passed away on 21st December last, after a protracted illness, at the age of 57 years. Joining the Club in 1888, he continued in active association with its aims and aspirations up to a few months prior to his death, and contributed many valuable and interesting papers to the *Naturalist*. To commemorate his connection with the Club, and, in a modest way, to give expression to the high esteem and respect with which he was regarded by members, an excellent photograph has been procured and hung in the Club's usual meeting room, Royal Society's Hall, where he so often, and in his kindly, courteous, and genial way, favoured members with simple, lucid discourses on scientific subjects of import. In order to perpetuate his name in a more practical manner, a memorial fund has been inaugurated by representatives from the various societies, clubs, and associations with which he was connected, who will allocate the fund as they deem advisable. An able *résumé* of Dr. Hall's life and works, written by Professor Sir W. Baldwin Spencer, appeared in the January issue of the *Naturalist*.

"On the 18th September last Mr. Charles Frost, F.L.S., one of the pioneers of the Club, died suddenly at the age of 62 years. He was an enthusiastic naturalist, and for a lengthy period actively identified himself with the Club. Of late years, however, he was incapable of following the bent of his inclinations, and was, consequently, little known personally, or by repute, to most of the present members. In the October issue of the *Naturalist* tribute was paid to the value of the services rendered by him when the Club most needed them. To the relatives of each our sincere sympathy and regret are extended.

"The necessity of indexing the thirty-two volumes of the *Naturalist* so as to afford members greater facilities of access to the varied and valuable articles they contain on subjects of popular and current interest was exhaustively dealt with by your committee during the past year, and it was computed that to complete this much-needed work in an efficient manner a sum of not less than £60 would have to be expended in printing, &c. Whilst conscious of the advantages a thorough index of the volumes published would confer, your committee did not feel disposed to sanction the expense at the present juncture, but, impressed as they were with the necessity for the undertaking, they determined upon the temporary expedient of a card index, wherein the outlay is limited to the purchase of a few hundred system cards. The task of indexing the volumes is now in progress, and, in the able hands of Messrs. Barnard, Chapman, Hardy, and Keble, will be carried to a speedy and successful issue.

"The hon. librarian, Mr. P. R. H. St. John, intimates that the library has received many valuable additions, principally by way of exchange, during the past year. It is, however, a matter of disappointment to the committee that members seem to make so little use of the valuable literature it contains.

"The best thanks of the Club are due to Messrs. Coghill and Haughton for their generosity in placing their office, at 79 Swanston-street, at the disposal of your committee for the holding of meetings; to the leaders of the various excursions for their services and reports; to the contributors of papers, notes, &c.; to the exhibitors of specimens; and to all who have contributed, directly or indirectly, to the advancement of the Club.

"In conclusion, your committee are indeed gratified to record that the attendance of members and visitors at the ordinary meetings of the Club during the past year was all that could be desired, and they feel assured that, whilst such an enthusiastic display of interest in its proceedings is evidenced, little fear need be apprehended in the troubled times ahead of the Club's ability to maintain a steady progress and to contribute no mean measure of matter of an informative character to the various sciences.

"On behalf of the committee,

"C. S. SUTTON, *President.*

"J. G. O'DONOGHUE, *Hon. Secretary.*

"*30th May*, 1916."

FINANCIAL STATEMENT.

The hon. treasurer, Mr. G. Coghill, read the financial statement for 1915-16, which was as follows:—

RECEIPTS.

To Balance, 30th April, 1915				£44	2 11
,, Subscriptions—					
Ordinary Members ...	£93	8	6		
Country Members ...	27	10	6		
Associates	1	1	3		
			£122	0	3*
,, *Victorian Naturalist*—					
Subscriptions and Sales	9	11	2		
Advertisements ...	3	15	0		
Reprints	2	15	9		
			16	1	11
,, Sales of Badges			0	4	4
,, Interest, Savings Bank			1	2	5
,, Admissions, &c.—Exhibition of Wild-Flowers in aid of Wounded Soldiers' Fund ...			72	8	6
				211	17 5
				£256	0 4

*Subscriptions:—Arrears, £16 3s.; 1915-16, £99 9s. 9d.; 1916-17, £6 7s. 6d.—total £122 0s. 3d.

EXPENDITURE.

By *Victorian Naturalist*—								
Printing	£75	1	8					
Illustrating	0	18	6					
Free Reprints	5	13	9					
Reprints charged ...	3	14	9					
				£85	8	8		
,, *Victorian Naturalist*—								
Wrapping and Posting				12	18	4		
,, Rooms—Rent and Attendance				13	10	0		
,, Library—Periodicals ...	5	16	6					
Insurance ...	0	7	0					
				6	3	6		
,, Hire of Lantern				3	0	0		
,, Printing and Stationery				8	5	0		
,, Postages, &c.				5	1	8		
,, Wild-flower Exhibition—								
Expenses	18	3	7					
Cheque to Wounded Soldiers' Fund ...	54	4	11					
				72	8	6		
							206	15 8
,, Balance in Savings Bank ...				33	10	10		
,, ,, London Bank				15	13	10		
							49	4 8
							£256	0 4

G. COGHILL, *Hon. Treasurer.*
8th May, 1916.

Audited and found correct.

J. STICKLAND, } *Auditors.*
J. WILCOX, }

10th June, 1916.

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

ASSETS.

Balance—Savings Bank and London Bank	£49	4	8
Arrears of Subscriptions (£60), say...	39	17	0
Arrears for Reprints	2	5	6
Badges on hand	0	15	9
Library and Furniture (Insurance Value)	150	0	0
	£242	2	11

LIABILITIES.

Subscriptions paid in advance	£6	7	6

The report and financial statement were received, on the motion of Messrs. Geo. Coghill and A. D. Hardy.

In the discussion that followed, Professor A. J. Ewart said that, apart from the purchase of periodicals, no expenditure had been incurred on the library for the twelve months. Personally, he did not think it wise to starve the library, as it were, in order to show a surplus at the end of the financial year. In moving the adoption of the report and financial statement,

he would recommend that the profit shown for the period under review be devoted towards binding.

Mr. F. G. A. Barnard said he felt sure that much greater use would be made of the library if it were possible to afford members more frequent access to it than at present.

Mr. E. E. Pescott, in seconding the motion for the adoption of the report and financial statement, concurred with the remarks made by Professor Ewart.

The motion was then put to the meeting, and carried unanimously.

ELECTION OF OFFICE-BEARERS, 1916–17.

There being no other nominations, the following office-bearers were declared duly elected :—President, Mr. F. Pitcher ; vice-presidents, Mr. A. D. Hardy, F.L.S., and Mr. J. Gabriel ; hon. treasurer, Mr. Geo. Coghill ; hon. librarian, Mr. P. R. H. St. John ; hon. editor, Mr. F. G. A. Barnard ; hon. secretary, Mr. J. G. O'Donoghue ; hon. assistant secretary and librarian, Mr. W. Glance.

On a ballot being taken for five members of the committee, the following were duly elected :—Mr. F. Chapman, A.L.S., Mr. J. A. Kershaw, F.E.S., Dr. C. S. Sutton, Mr. J. Searle, and Mr. J. Tovey.

The retiring president, Dr. C. S. Sutton, in thanking the office-bearers who had been associated with him during his occupancy of the chair for their assistance, said it was much to the credit of members that the Club had made such favourable progress for the year 1915–16. By the death of Dr. T. S. Hall they had lost an old, valuable, and esteemed member—a whole-hearted lover of Nature. They were, he was led to believe, losing Mr. Charles Barrett, who had volunteered for active service. The loss, he trusted, would be only a temporary one, and that our member would come through the great trial before him successfully. Members, he felt assured, would join with him in offering hearty congratulations to Professor Baldwin Spencer and to Mr. E. A. Petherick on their recently bestowed honours. He had pleasure in inviting the newly-elected president to assume the presidential duties.

The president, Mr. F. Pitcher, in acknowledging the welcome accorded him, said he would endeavour to the best of his ability to continue to serve the Club and help on its aims and objects. With the very efficient committee with whom he was associated he felt assured he would terminate his term of office with as much satisfaction as his predecessor.

On the motion of Messrs. Stickland and Scott, a hearty vote of thanks was accorded the retiring president and office-bearers, and on the motion of Messrs. Pescott and Gabriel a

vote of thanks was passed to the auditors, Messrs. Stickland and Wilcox, for their services.

REMARKS ON EXHIBITS.

In referring to his and Mr. C. French, jun.'s, exhibit of autumn and winter flowering orchids, Mr. E. E. Pescott, F.L.S., directed attention to the fact that Professor Ewart had recently revived R. Brown's species of *Pterostylis revoluta*, which had for years been grouped with *Pterostylis reflexa*. The collection of *Prasophyllum Dixoni*, F. v. M., was also noticed, this being a very local and exceedingly rare species. Ten species were exhibited, all of which were collected this year.

Mr. J. Searle called attention to his exhibit of a curious gall, *Apiomorpha duplex*, Schr., formed by the fusion of two eucalyptus leaves, and resembling a banana in size and shape, and said the specimen was obtained in the ranges near Warburton on 11th June, at an elevation of about 4,000 feet above sea-level. Galls of various sorts were found, in more or less abundance, throughout the world, and were produced by various orders of insects, but principally by species of Cynips. These interesting growths would seem to be induced by the action of the minute drop of irritant poison injected by the female into one or more cells in the leaf or bud. The cells, being thus abnormally stimulated, increased by a process of subdivision.

Mr. F. G. A. Barnard said he was exhibiting a young specimen of the Slender Tree-fern, *Cyathea Cunninghami*, Hook fl., collected near Sealers' Cove, Wilson's Promontory, during the Club's excursion to the National Park in December, 1914. The plant was then 1½ inches in height, but recent fronds were four or five inches in length. Though Cyatheas 15 to 40 feet high were common at the Promontory, the plant exhibited was the only seedling he had been able to find. He considered the Cyathea the prettiest of our tree-ferns.

Mr. F. Chapman, in directing attention to his exhibit of a spray of the Drooping Sheoke, *Casuarina quadrivalvis*, showing staminate spikes, said the tree from which the specimen was obtained was five years old, of robust habit, and afforded a pleasing contrast to the other trees with which it was associated. It was now displaying staminate flowers. He desired to know if such was now the case with similar species in their natural state.

Mr. St. John, in reply, said that he had noticed many specimens of the Drooping Sheoke bearing male inflorescence at Langwarrin on the occasion of the Frankston excursion on Monday, 5th June. The tree was worthy of cultivation. So far the Melbourne Botanic Garden had one specimen, as against 84 in the Botanic Garden, Mexico.

Mr. F. Pitcher said that two Western Australian gums, *Eucalyptus ficifolia* and *Eucalyptus calophylla*, var. *rosea*, were now flowering profusely in the Botanic Gardens. Some idea of the handsome appearance they presented might be gleaned from the sprays of blossom he was exhibiting. The fact that the trees were flowering so much out of season was rather remarkable. The fasciated branch shown was from the Glaucous Moreton Bay Pine, *Araucaria Cunninghami*, var. *glauca*, growing in the Australian Border, close to the Lily Lake. A discussion on the probable causes occasioning fasciation ensued, in which Messrs. Pitcher, Hardy, and Gabriel took part.

Referring to his exhibit of nearly all the described land shells of Victoria, Mr. C. J. Gabriel remarked on the paucity of the representation as compared with other Australian States. It is anticipated, however, that further species remain undescribed, more particularly of the smaller forms. He also exhibited examples of the Gasteropod or univalve genus Xenophora, the species of which, frequently quoted as "shell-collectors," are remarkable for the fact that the shells have adhering to them other species of univalves, bivalves, and sometimes small particles of stone, &c. In the case of the bivalves it is a consistent feature for the valves to be placed on the shell with the concavity upwards.

WATTLES IN STUDLEY PARK.

Mr. J. Gabriel said that he wished to direct attention to the condition of the Golden Wattles in Studley Park. Some time ago these trees were very good in appearance and in development. Most of them were now partially dead, covered with scale, and presented an altogether uninviting aspect. As no effort is being made to eradicate the scale, he would suggest that the authorities be approached and induced to institute measures having for their object the preservation of the trees still unaffected by the pest. The trees infected required to be destroyed.

The president said the trees in the park were dying fast, and he would undertake to interview the authorities and endeavour to have something done in the matter.

PAPER READ.

By Misses G. M. L. Nethercote and M. J. Johnson, "Notes on a Trip from Walhalla to Talbot Peak."

The authors described a journey, undertaken during last Easter week, from that one-time world-famous but now almost deserted mining township, Walhalla, to Talbot Peak, situated on the Baw Baw plateau. The initial part of the journey was made by moonlight (before daybreak). The shelter on Mount

Erica was reached in due course, after a tramp of about fifteen miles, the latter part through half-frozen snow and with packs that turned the scale at 25 lbs. The paper, though a short one, was exceedingly interesting, and drew attention to many of the birds and plants noticed during the walk.

In the discussion that followed, Messrs. Barnard, Coghill, Hardy, Pescott, and Dr. C. S. Sutton took part.

NATURAL HISTORY NOTES.

Mr. P. R. H. St. John stated that he had noticed a splendid specimen of the Black-shouldered Kite, *Elanus axillaris*, Lath., in the Botanic Gardens on 6th June. It was the first visit of this species to the Gardens since he began to keep a record of the feathered visitants in 1884.

Mr. J. A. Kershaw, F.E.S., mentioned that the committee of management of the National Park had secured, by way of exchange, a pair of Woodward's Kangaroos, *Macropus woodwardi*, which had been liberated in the Park. These marsupials inhabited North and North-West Australia, and it was to be hoped that they would thrive in their new habitat.

In a note received after the meeting, Mr. W. J. Stephen mentioned that during nearly the whole of May an interesting sight was furnished at the Titles Office, corner of Queen and Lonsdale streets, Melbourne, by the arrival, at about 5 o'clock every evening, of large flocks of the Welcome Swallow, the individuals of which congregated under the eaves of the southern and eastern walls till their departure early the following morning. The sheltered electric wires provided a comfortable roosting-place for the birds. A rough count of the swallows present on the 16th May gave the number as between 450 and 500. There was no perceptible diminution of the number till the 31st, when perhaps a quarter of the total disappeared. Next evening there were none to be seen. Although there are some swallows with us right through the winter, their food must have been unusually abundant to keep them here in such numbers so late in the cold season.

EXHIBITS.

By Mr. F. G. A. Barnard.—Growing specimen of the Slender Tree-fern, *Cyathea Cunninghami*, collected near Sealers' Cove track, Wilson's Promontory, December, 1914; also plant of *Lomaria alpina*, Spg., Alpine Lomaria, from Baw Baw plateau.

By Mr. F. Chapman.—Spray from five-year-old tree of Drooping Sheoke, *Casuarina quadrivalvis*, Labl., showing male inflorescence; grown in exhibitor's garden, Balwyn.

By Mr. C. J. Gabriel.—Nearly all the described land shells of Victoria and three species of introduced forms: also species of the marine genus Xenophora.

By Misses G. M. L. Nethercote and M. J. Johnson.—A series of photographic views in illustration of their paper.

By Mr. F. Pitcher.—Flowers of *Eucalyptus ficifolia*, F. v. M., Red-flowering Ficus-leaved Gum, Western Australia, and flowers of *Eucalyptus calophylla*, R. Brown, var. *rosea*, Pink-flowering Port Gregory Gum, Western Australia; also branch of *Araucaria Cunninghami*, Aiton, var. *glauca*, Glaucous Moreton Bay Pine, Queensland and New South Wales, showing fasciation. All from Botanic Gardens, Melbourne.

By Messrs. E. E. Pescott, F.L.S., and C. French, jun.—Autumn and winter orchids—herbarium specimens of *Pterostylis revoluta*, R. Br., *Pterostylis pedaloglossa*, Fitz., *Cryptostylis leptochila*, F. v. M., and *Prasophyllum Dixoni*, F. v. M., and flowering specimens of *Pterostylis vittata*, Lind., *P. reflexa*, R. Br., *P. præcox*, Lind., *P. concinna*, R. Br., *P. parviflora*, R. Br., and *Acianthus exsertus*, R. Br., all collected this season.

By Mr. R. E. Luher.—*Daphnia carinata*, var. *magniceps*, from University lake.

By Mr. A. L. Scott.—Clipping from *Argus re* Australian diatomite, and a sample given to exhibitor as having come from Talbot, Vic.

By Mr. J. Searle.—Curious gall, *Apiomorpha duplex*, from the ranges at Warburton, 4,000 feet above sea-level.

By Mr. P. R. H. St. John.—Specimen of the Black-shouldered Kite, *Elanus axillaris*, Gld.: herbarium specimen of *Eucalyptus obliqua*, L'Heritier, Messmate, showing one leaf with two mid-veins, collected by exhibitor near Langwarrin, 5/6/16.

By Mr. P. R. H. St. John, for and on behalf of the Curator of the Melbourne Botanic Gardens.—Sample of crude oil of *Eucalyptus rostrata*, Schlecht., material obtained from cultivated tree in Melbourne Botanic Gardens: prepared by exhibitor, 24th May, 1916.

After the usual conversazione the meeting terminated.

Recollections of the Early Gippsland Goldfields.—This booklet of about 80 pages, by Mr. Richard Mackay, recently published at Traralgon, does not contain much that can be called natural history; still, in the descriptions given of the trials and difficulties of opening up mines in such inaccessible regions as the Gippsland mountains, there are many paragraphs which only those who are familiar with the geology and botany of similar localities can properly appreciate. As a record of an eventful career Mr. Mackay's recollections are worth reading, especially by young Victorians, whose knowledge of the stirring times of the diggings days has to be obtained secondhand.

BIRD LIFE ON FRASER ISLAND, GIPPSLAND LAKES.

By G. A. KEARTLAND.

(*Read before the Field Naturalists' Club of Victoria, 8th May*, 1916.)

FOR many years the scarcity of native birds in the vicinity of any of the larger towns has been very noticeable, and what few are seen are so wild that nature-students seldom obtain a close view of them without recourse to the gun. Even with that aid many are too shy to be approached within killing range. Various opinions have been expressed as to the cause of this state of affairs. Whilst some attribute it to the introduction of starlings, minahs, and sparrows, which are now to be found in thousands in some of the parks or on farms near Melbourne, others are equally certain that what have not been killed or driven away by thoughtless shooting have fallen victims to the domestic cat. Perhaps both views are to some extent right.

It is, however, a matter for general regret that those insectivorous birds which formerly rendered valuable service to the farmer, gardener, and orchardist are seldom seen, even in places where they were numerous a few years ago. I allude particularly to the common Ground-Lark, *Anthus australis*, the Harmonious Thrush, *Collyriocincla harmonica*, Flame-breasted Robin, *Petræca phœnicea*, Yellow-tailed Tit, *Acanthiza chrysorrhoa*, and others, which made their appearance in numbers immediately ploughing started, and which became so tame that they simply hopped out of the way of the horses or followed the gardener as he dug his trenches in order to feast on the insects and larvæ in the newly turned up soil. It was, therefore, a pleasant surprise to me to find, when visiting Fraser Island, near the Lakes' Entrance, by permission of Mr. J. H. Syme, early in October, 1915, that within the space of about 100 acres over seventy species of native birds resort to its shelter either as visitors or for the purpose of nesting.

Perhaps I had better state here that Fraser Island is situated about 1¼ miles west of Kalimna, and is cut off from the mainland by the channel known as Reeves River, which is about a third of a mile in width. It has a remarkable variety of trees for so small an area, and consequently caters for a corresponding variety of birds. On the slopes of the hill on which the residence stands are some large Banksia trees and eucalypts, whilst strips of tea-tree divide the larger timber from the swampy flats on the eastern and southern sides. On the northern and western sides the flats are cultivated either for growing fodder for the stock or as a means of providing vegetables for domestic purposes. In a strip of tea-tree just above high water mark a few rabbits find a home, and it was through

shooting a couple of them that I discovered the presence of so many birds. As soon as the gun was fired a number of White-fronted Herons flew from the timber, uttering a loud, croaking note as if warning all their feathered friends to beware of the man with the gun. On visiting the trees from which they had gone I was surprised to find a number of their nests. So, putting the gun away, I determined to take an ornithological census of the island. In the milking shed the Welcome Swallow, *Hirundo neoxena*, was building its nest and lining it with white feathers from the fowl-yard. Fairy Martins, *Lagenoplastes ariel*, were busy dashing backwards and forwards in pursuit of flies, mosquitoes, and moths, whilst Tree-Swallows, *Petrochelidon nigricans*, had taken possession of a number of hollow branches in the vicinity. They had evidently forestalled the starlings in securing their nesting-places, as several broods of young ones were noted. The two Banksia trees close to the house are visited many times in the day by Brush Wattle-birds, *Acanthochæra mellivora*, and the Red Wattle-bird, *A. carunculata*, and between their visits the Yellow-eared (*Ptilotis chrysops*) and White-plumed (*P. penicillata*) Honey-eaters feasted on the nectar of the blossoms, whilst the notes of the Striated Pardalote, *Pardalotus ornatus*, resounded from the eucalypts on the flat.

The well-known Black-faced Cuckoo-Shrike, *Graucalus melanops*, seemed quite at home in the orchard and garden, where he appeared to find sufficient caterpillars and other insects to satisfy his wants. Near the coast I was surprised to find our well-known Ground-Lark, *Anthus australis*, fairly plentiful, whilst it was absent from the newly-cultivated land. On walking along the tram line a White-fronted Chat, *Ephthianura albifrons*, fluttered along the grass as if wing and leg were broken. The trick was soon played out, as the bird flew away when followed, but came back when its nest, containing three young ones, was found under a thistle. In the early morning the notes of five species of cuckoos were heard. First, the long-drawn, mournful cry of the Pallid Cuckoo, *Cuculus pallidus*, followed by that of the Brush Cuckoo, *Cacomantis variolosus*; then the Fan-tailed Cuckoo, *C. flabelliformis*, perched on the fence. A pair of Blue Wrens, *Malurus cyaneus*, resented the attempts of a Narrow-billed Bronze-Cuckoo, *Chalcococcyx basalis*, to foist its egg upon them to hatch and rear its young at the expense of their own brood. A solitary Bronze-Cuckoo, *C. plagosus*, was also busy seeking a foster-parent for its offspring. A pair of Black-and-White Fantails, *Rhipidura tricolor*, seemed to be on the best of terms with the Kerry bull, as they alternately hopped round his nose to catch the insects disturbed from the grass, or fluttered over

his back to capture the flies found there. Whilst passing through the tea-tree a White-shafted Fantail, *R. albiscapa*, followed me in order to feast on the flies on my back. Brown Flycatchers, *Micræca fascinans*, were frequently seen perched on the fence posts, from which they darted after any passing insect, and on resuming their perch invariably wagged their tails, as if to display the white side-feathers, which are not otherwise visible. In the large trees within two hundred yards of the residence were seven nests of the White-fronted Heron, *Notophoyx novæ-hollandiæ*, and, as incubation was well advanced in several of the nests, the birds sat still, with their long necks erect, whilst my wife and I admired them. Twice, whilst we were so engaged, the birds cast the shell from which the young one had been hatched out of the nest, and it fell at our feet. In another large tree a pair of Whistling Eagles, *Haliastur sphenurus*, had their nest, but they flew off each time we approached it. They appeared to be on the best of terms with a pair of Mud-Larks, *Grallina picata*, whose mud nest was only about four feet away, on the same branch. Although the latter bird flew off on our approach, it returned and resumed sitting almost immediately. Rosella Parrots, *Platycercus eximius*, were frequently seen, and the Red Lory, *Platycercus pennanti*, came from the mainland at intervals.

Perched on a thick branch, and looking like a piece of dead wood, was a solitary Frogmouth, *Podargus strigoides*. An Owlet Nightjar, *Ægotheles novæ-hollandiæ*, flew silently round the house in the evening, making occasional excursions towards the fruit-trees. Being nocturnal birds, they render valuable aid in the destruction of codlin moths and other night-flying insects. The well-known notes of the Laughing Jackass, *Dacelo gigas*, were often heard, and the birds were easily approached. A Sacred Kingfisher, *Halcyon sanctus*, had its nest in a hollow limb, and betrayed the fact by flying at us whenever a particular tree was approached. Amongst some grass tussocks a Calamanthus, *C. fuliginosus*, frequently ran across the path with its tail erect, as it sought for spiders, &c. Reed-Warblers, *Acrocephalus australis*, were numerous and musical wherever reeds were seen. Busy amongst the grass in search of small insects was a flock of Yellow-rumped Tits, *Acanthiza chrysorrhoa*, and in passing near some undergrowth the White-fronted Sericornis, *S. frontalis*, was disturbed. A pair of Sordid Wood-Swallows, *Artamus sordidus*, were evidently in quest of a site in which to fix their nests, and Harmonious Thrushes, *Collyriocincla harmonica*, were similarly engaged. The White-backed Magpie, *Gymnorhina leuconota*, was busy on the flat amongst the young maize, seeking for grubs. Judging by the noise they made, Butcher-birds, *Cracticus destructor*, must be

numerous. In the scrub three species of Robins were noted —the Yellow-breasted, *Eopsaltria australis*, Flame-breasted, *Petræca phœnicea*, and Scarlet-breasted, *P. leggii*. Brown Tree-creepers, *Climacteris scandens*, were busy searching for insects in the crevices in the bark of the large timber. As mistletoes were fairly plentiful, it was no surprise to find the Swallow Dicæum, *Dicæum hirundinaceum*, feasting on the blossom of that parasite, whilst several Spinebill Honey-eaters, *Acanthorhynchus tenuirostris*, paid frequent visits to the Banksia trees. The loud notes of the Noisy Minah, *Myzantha garrula*, were heard all over the island, whilst its cousin, the Bell-bird, *Manorhina melanophrys*, came over from the mainland. Crows, *Corvus coronoides*, uttered their usual croak as they passed overhead, no doubt regretting the absence of a carcass on which they might regale themselves.

Each evening a Boobook Owl, *Ninox boobook*, repeated his mournful notes near the house. Brown Hawks, *Hieracidea berigora*, soared overhead, and a Kestrel, *Cerchneis cenchroides*, visited the stables in quest of mice. Three Night-Herons, *Nycticorax caledonicus*, were perched on the dead tea-tree near the water, but, although nocturnal birds, were too wary to permit a near approach, whilst a fine Pacific Heron, *Notophoyx pacifica*, was wading in a small patch of swamp. In my endeavour to approach the latter I disturbed a solitary Snipe, *Gallinago australis*, which flew off to the next island. On the flat amongst the Mesembryanthemum four pairs of Spur-winged Plover, *Lobivanellus lobatus*, undoubtedly had their broods running about, as the old birds kept flying around us, screaming loudly whenever we were near certain spots; but, notwithstanding a diligent search, we were unable to find the little ones, as they lie close whenever they hear their parents' warning cry. The note of the male Stubble Quail, *Coturnix pectoralis*, was heard in some long grass near the boat-house, and in trying to find it I disturbed three Brown Quail, *Synoicus australis*. A Bronzewing Pigeon, *Phaps chalcoptera*, passed swiftly towards the mainland. Waterfowl were numerous, especially Black Swans, *Cygnus atrata*, a flock of which, embracing several thousands of birds, took thirty-three seconds to pass a given point. Pacific Gulls, *Gabianus pacificus*, Silver Gulls, *Larus novæ-hollandiæ*, and Bass Strait Terns, *Sterna bergii*, were constantly flying over the water. Three Pelicans, *Pelecanus conspicillatus*, were pluming their feathers or sleeping on the sand every day. Of cormorants (Phalacrocorax), four species were seen either in the water or flying past—viz., large and small black and large and small black and white. Many Musk Ducks, *Biziura lobata*, were swimming placidly on the water, whilst Black Duck, *Anas superciliosa*, and Teal, *Nettion*

gibberifrons, were resting at the water's edge. A Mountain Duck, *Casarca tadornoides*, appeared to be nesting somewhere near, as it came each morning to feed or swim amongst the Swans. Wood Duck, *Chenonetta jubata*, and White-eyed Duck, *Nyroca australis*, were fairly numerous. On the margin of the water-holes were several Black-fronted Dottrel, *Ægialitis melanops*, running backwards and forwards, picking their food out of the mud. But the Red-capped Dottrel, *Ægialitis ruficapilla*, confined itself to the sandy margin of the river.

In addition to the foregoing birds, I was informed that the island is occasionally visited by the Black Cockatoo, *Calyptorhynchus funereus*, Gang-Gang Cockatoo, *Callocephalon galeatum*, Musk Lorikeet, *Glossopsittacus concinnus*, and Blue Mountain Parrakeet, *Trichoglossus novæ-hollandiæ*.

Of introduced birds, the Starling, Sparrow, and Goldfinch were apparently quite at home.

CORRESPONDENCE.

THE F.N.C. AND THE WAR LOAN.

To the Editor of the *Victorian Naturalist*.

SIR,—During the discussion of the annual report at last meeting of the Club, Professor Ewart mentioned the desirability of devoting a considerable portion of the Club's reserve fund to the binding of the periodical literature. I am quite in agreement with him in the view that neglect of this work renders the literature uninviting to the casual reader and inconvenient to the specialist searching for records and other data. In time of peace I would say that the money could not be used to better advantage. I would suggest that, as the Government is inviting both large and small contributions to the War Loan, we should devote an amount—say £50—of our accumulated and (except for the interest it earns) dormant fund to the national cause. There can be little objection to this, even as a business proposition, and I feel sure that Professor Ewart will be quite ready to second the proposal, even though the library should in consequence languish a little longer. In these strenuous times the books are not so much consulted as heretofore, and are not likely to be in increased demand in the immediate future. While not forgetful of the fact that withdrawal of bank deposits lessens the amount of participation by the banks themselves, we, by direct lending, may have the gratification of thus making a certainty of assisting in the Empire's cause, even in a small way, but according to our means.—Faithfully yours,

A. D. HARDY.

Kew, 14/6/16.

THE AUSTRAL AVIAN RECORD.—In No. 3 of vol. iii. (7th April, 1916), the editor, Mr. Gregory M. Mathews, adds about 80 new sub-species to his list of the birds of Australia. Most of them are founded on minute differences in size or colour. He also takes the opportunity to make several changes in generic names. Henceforth we must know the Brown Quail as *Ypsilophorus ypsilophorus australis*, while *Meliphaga* becomes *Dorothina*, with twenty-one species and sub-species instead of the one listed by the R.A.O.U. in its 1915 Check-list.

HONOURS.—Just twelve years ago we had the pleasure of recording that Professor W. Baldwin Spencer had been honoured by King Edward in being created a Companion of the Order of St. Michael and St. George. As a further recognition of his continued services to Victoria and to Australia as a leader of science, especially as regards natural history and ethnology, it was gratifying to find that he had been singled out for knighthood in the customary birthday honours last month, and created a K.C.M.G. Sir Baldwin Spencer occupied the position of president of the Field Naturalists' Club in 1891–2–3 and 1895–6–7, and took part in two of its most strenuous explorations, and we regret that the numerous calls upon his time during recent years have allowed him few opportunities of attending its monthly meetings. It is pleasing to record that another member of the F.N.C., Mr. E. A. Petherick, the Commonwealth Archivist, whose knowledge of works relating to Australia, especially those of past centuries, is unrivalled, was the recipient of the Companionship of St. Michael and St. George on the same occasion; and that a good friend of the Club, Mr. J. H. Maiden, F.R.S., Government Botanist of New South Wales, and director of the Botanic Gardens, Sydney, was honoured with the Imperial Service Order (I.S.O.)

'POSSUMS.—"F.R.," in "Bush Notes" in the *Australasian* of 24th June, has some remarks on the food of 'possums in captivity. He says that in their wild state it was obviously impossible for 'possums to obtain cooked meat, yet in confinement they will eat it freely. Again, before the advent of the white man fruit was practically non-existent in Australian forests; yet a neighbour, who has a choice garden containing some fine apple-trees, finds that as soon as the apples begin to ripen the 'possums begin to arrive, though no one would suspect that there were any of the animals in the neighbourhood. They are very fond of apples, and will also eat peaches and other fruits, while potatoes and other vegetables are also favoured. In another friend's garden the buds of a La France rose were continually disappearing, the cause being put down to snails, but it was afterwards found that 'possums were the

cause, and "F.R." says in his own garden they will leave everything else for a rosebud. Cooked meat, he remarks, seems to have irresistible attractions for many wild things. Cockatoos and parrots are very fond of it, yet, of course, they could not possibly have tasted it in their wild state. There is no accounting for these aberrations, and apparently these strange articles of diet do them no harm—in fact, they seem to thrive on them. Cake and sugar are common articles of diet with tame 'possums. These must be very different from the meals of gum-leaves that formed their natural food. No doubt they also eat grass in their native state, but their staple food is undoubtedly the young shoots and leaves of the various eucalypts.

In the same column "F.R." publishes a note on the homing instinct in a 'possum, forwarded to him by Mr. J. Mack, of Berrybank, near Lismore, who writes:—"On the plains in the old days it was very rare to see a 'possum. One came here in 1855. It quickly got tame, and every night it used to come for cake or bread and sugar. One night the Rev. Mr. Smith, of Bellarine, called, and next day, as he said he wanted it for a pet, it was given him, and he took it to Geelong. Eight days afterwards a scratching was heard at the window, the usual sign that 'Possy' was waiting for supper, and then it, or another exactly like it, appeared. When the window was opened, in it walked, and partook of supper as usual. Next mail a letter came from Mr. Smith regretting to say that the 'possum had got out of its box, and was lost the night he got home. Do you think that it could have travelled the fifty miles and found its way back in eight days? It is well known that horses taken by Mr. Dennis from Colac to the Wimmera, before there were any fences, would take short cuts, and get back quicker than they went." "F.R." confesses that he cannot quite reconcile the story with the facts, and would like to know of any other experience of the kind. He points out that the 'possum is not adapted for walking on the ground, and is practically a night animal, and as the 'possum would have been carried in a closed box, how could it gain any knowledge of the direction in which it was being taken? Yet the facts of the case point to only one animal being concerned in the story.

[The word "'possum" is used because the more familiar name "opossum" is preoccupied by the American animal, which belongs to quite another section of the Marsupialia.—Ed. *Vict. Nat.*]

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, 10th July, 1916.

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

GENERAL BUSINESS.

Mr. A. D. Hardy, F.L.S., referring to his letter in the July issue of the *Naturalist*, advocating the investment of £50 of the Club's credit balance fund in the Government war loan, said that at the recommendation of the hon. treasurer, Mr. Geo. Coghill, he had modified his proposal, and would move—"That the committee be instructed to take the necessary steps to invest the sum of £20 in the Commonwealth war loan."

Mr. H. Witty said the matter was one that required mature consideration. Though the amount proposed to be invested was very small, the Club might need it at a later stage. If the motion found a seconder he intended moving, as an amendment—"That no further action be taken in the matter."

Mr. J. Stickland pointed out that the balance to the credit of the Club was by no means large, and that a few years ago it had been £80. He counselled caution in dealing with the funds at the present juncture.

Mr. A. D. Hardy said, in view of the discussion, he would amend his motion to the effect that "the investment of £20 of the Club's funds in the war loan be referred to the committee for consideration." The motion was seconded by Mr. W. F. Gates, M.A., and carried.

HONOUR BOARD.

The president, Mr. F. Pitcher, said that the committee had decided to have an Honour Board constructed and suspended in the Club's meeting-room, bearing the names of the Club's members who had proceeded or were about to proceed to the front.

Mr. J. Gabriel had signified his willingness to construct the board, and Mr. P. R. H. St. John to do the necessary lettering.

ANNUAL EXHIBITION OF WILD FLOWERS.

The president intimated that the committee had decided to hold the annual exhibition of wild flowers in the Athenæum Hall, Collins-street, on Tuesday, 3rd October, and to devote the profits to the Y.M.C.A. funds, in consideration of the good

work done by that body for the comfort and welfare of the soldiers at the front.

RECORDERS.

Mr. H. Witty asked if the committee had taken any action to appoint recorders for the various branches of natural history, as suggested by him some time ago. If nothing had been done in the matter, he would give notice of his intention of moving —"That recorders be appointed": and would communicate with the hon. secretary later on the subject.

REMARKS ON EXHIBITS.

Mr. P. R. H. St. John called attention to his exhibit of a number of small plant seedlings and herbarium specimens of an undescribed species of eucalypt which he discovered in the Belgrave district in March, 1916. The species resembled *E. viminalis* in some respects. He asked members who might visit Belgrave during the spring and summer months to keep a look-out for the species. So far the number of trees of this undescribed variety was limited.

Mr. F. Pitcher drew attention to his exhibit of a flowering specimen of the Sunshine Wattle, *Acacia discolor*, Willd., which usually flowers in April and May, but is now flowering freely in the Botanic Gardens.

PAPER READ.

By Mr. J. H. Harvey, A.R.I.V.A., entitled "A Holiday Trip to the Jenolan Caves."

In briefly outlining the physiography and geology of the locality in which the caves are situated, the author mentioned that these wonderful underground caverns were discovered in 1841 by a bushranger named M'Ewan, and were made known to the public by the mounted police who were in pursuit of him. Since then they have been visited by thousands of people, and the locality has become one of the most important tourist resorts in New South Wales. The caves are situated on the Jenolan River, about 30 miles from the Mount Victoria railway station, in what is called the Blue Mountain Tableland. This pene-plain, which is now much dissected by stream-erosion, has an altitude of from 3,000 to 4,000 feet, and is believed to have been elevated to its present position towards the close of the Tertiary period. Evidence is not lacking to demonstrate that the pene-plain has been cut out of a still older tableland, Mount Binda (4,460 feet) being instanced as a residual. Following on the uplift a cycle of erosion ensued, and the Jenolan River and its tributary, M'Ewan's Creek, in the course of vast periods of time carved out in the Silurian Cave Limestone those subterranean passages through which the tourist now wanders in amazement. The paper was illustrated by about 130 lantern slides of exceptional merit, most

of them from photographs taken by the author during his several visits to the caves, the latest being only a few months ago. These depicted the road scenery between Mount Victoria and the caves, scenes in the vicinity of the caves, and most of the principal sights and formations in the interior passages and caverns, with a few in illustration of the formation and composition of limestone.

In the discussion that followed, Mr. F. G. A. Barnard said the views shown had brought back to his mind many incidents attendant on his visit to the caves nearly thirty years before, and described in the *Naturalist* at the time.

Mr. J. A. Kershaw, in complimenting the author on the slides shown, asked how the caves, from a scenic point of view, compared with the Buchan Caves in Eastern Victoria.

Mr. J. Stickland said that when he visited the caves he was struck by a large yellow composite flower that grew in their vicinity. So far he had failed to ascertain its name. He had been informed that the bats that had been in the habit of frequenting the caves shifted their quarters elsewhere on the influx of visitors.

Mr. J. Gabriel referred to the limestone formations in many of the caves, that appeared to have been formed in opposition to the laws of gravity. He was of opinion that the phenomenon was probably due to a variation in water pressure.

Mr. Harvey, in reply to Mr. Kershaw, said that the Buchan Caves compared favourably with some of the Jenolan. Bats, as a general rule, were always present in the caves, and do a large amount of damage to the slender, fragile concretions. He thought Mr. J. Gabriel's theory was probably quite sufficient to account for the irregular growths to be seen in the caves.

EXHIBITS.

By Miss A. Fuller.—Pot specimen of a fern, Adiantum, sp., from South Africa.

By Mr. F. Pitcher.—Flowering branches of *Acacia discolor*, Willd., Sunshine Wattle, Vic., Tas., N.S.W., now flowering in Melbourne Botanic Gardens.

By Mr. P. R. H. St. John.—Herbarium specimens and small plant seedlings of an undescribed eucalyptus, collected by exhibitor in the Belgrave district, March, 1916. On behalf of the Curator of Melbourne Botanic Gardens.—Sample of "Oil of Savin," *Juniperus sabina*, Linn., "Savin," N.O. Coniferæ (Pinaceæ), Central and Southern Europe; prepared from cultivated plants in Botanic Gardens, 16th June, 1916.

By Mr. H. Witty.—Hornet, from the trenches at Salonika, sent by Staff-Sergeant W. H. Scott.

After the usual conversazione the meeting terminated.

AN OCTOBER WEEK AT MARYSVILLE.

By F. PITCHER and J. STICKLAND.

(*Read before the Field Naturalists' Club of Victoria, 8th March,* 1910.)

HAVING decided to spend a week's holiday in the Marysville district we left Melbourne, accompanied by Mrs. Pitcher, by the morning train for Healesville, on 13th October last. It was a beautiful morning. The orchards around Croydon, as we passed through, were most picturesque, being then in full bloom, promising what they have since yielded—heavy crops of fruit. In addition to the ordinary spring flowers, which were in profusion along the railway line, the creamy-white bottle-brush spikes of bloom covering the tops of the Swamp Melaleuca, *M. ericifolia*, near Mooroolbark and along the Yarra valley at Yarra Glen, as well as on towards Tarrawarra, covering miles in extent, was a glorious sight from the train as we passed along.

Reaching Healesville soon after 10 o'clock, we sought the motor coach by which the journey to Marysville is completed. With six other passengers, and a varied assortment of luggage and packages for delivery along the road, we left the township just before 11 a.m., and, travelling at fair speed, passed through favourite old Fernshaw, which we all knew under different conditions over thirty years before. Our motor had no difficulty in ascending the well-made road over the Blacks' Spur, with its Devil's Elbow and numerous sharp curves and turns, up to the remains of the once famous monster eucalypt of the forest here, "Uncle Sam." We stopped at this notable spot for some minutes, in order to give the motor water and allow the engine to cool, and, at the same time, enable the passengers to stretch themselves and view the surroundings. Then we continued our journey, thoroughly enjoying the beautiful fern and bush scenery close at hand and the magnificent views of apparently interminable forest-clad hills and lofty mountain ranges in the distance to the north, east, and south. The level summit of the Blacks' Spur is at length reached, the altitude being nearly 2,000 feet, then down the other side, past the well-known house and grounds of "The Hermitage," into the village or hamlet of Narbethong, which is reached by half-past 12 p.m. While remaining there for an hour for lunch we visited the post-office and conversed with the postmistress, a Mrs. Williams, 88 years of age, who performs all the duties of the office, together with those of electoral registrar for the district, in a manner which our chauffeur described as being unexcelled in any similar place on the road. Soon after leaving Narbethong we made a detour along the by-road leading to the well-known tourist resort of "St. Fillan's," which was

formerly the country residence of the late Hon. James Munro. Returning to the main road, we journeyed for six miles over hilly and picturesquely beautiful country, for the last two or three miles along roads edged with abundance of flowers, the most prominent being the rich Golden Goodia, *G. lotifolia*, bright purple Indigo, *Indigofera australis*, pink and white forms of "Pink Eyes," *Tetratheca ciliata*, golden-brown Bitter-Peas and Bush-Peas, Daviesias and Platylobiums, yellows of the Acacias *A. stricta*, *A. longifolia*, var. *mucronata*, and *A. verticillata*, and the pink and white forms of Native Heath, *Epacris impressa*; then, descending, reach Marysville by half-past two p.m. The village is located in a valley almost entirely surrounded by mountain ranges, and specially nestled on the Steavenson River, at the foot of Mounts Grant and Bismarck. It is authoritatively stated by Mr. J. G. Saxton, of the Lands Department, that Healesville, which is about 40 miles from Melbourne, was so named in honour of the Hon. Richard Heales, Chief Secretary of Victoria, 1859, and Marysville, which is 22 miles from Healesville, after Mary, the daughter of Mr. Heales.

We were not very long in finding what proved to be comfortable lodgings at "The Chestnuts," so named after two fine specimens of these English trees immediately in front of the house. They form part of a row of those trees which are planted along the main roadside. After a late luncheon we viewed the surrounding scenery with much delight, crossing the bridge over the Steavenson River, where it was flowing through the village in a bright, sparkling stream about 15 feet wide, and were soon at work searching for naturalists' treasures along the Alexandra road as far as the bridge over the Taggerty River, about two miles from Marysville. The most noteworthy of plants, in beautiful full bloom, was *Acacia pravissima*, which abounded on either side of the road. The prevailing eucalypt in this locality was the Narrow-leaved Peppermint, *E. amygdalina*; it was being cut for palings for fences by splitters, whom we saw at work there.

On the morning of the following day we decided to visit the famous Steavenson Falls. A tourists' and vehicular track on a very level grade has been formed from the village to the site of the falls, a distance of nearly three miles, and they can be comfortably reached with easy walking in an hour and a half. The beautiful "Pink Eyes," with both prostrate and erect stems, clothed with its light pink blooms in their very best condition, and ranging in length from six inches to three feet in length, abounded all along the route. These plants, in bloom, lent a bright colouring to most of the various roads and tracks subsequently traversed by us. Large patches of *Acacia leprosa*, var. *elongata*, were met with in full bloom, and

also the Pointed Acacia, *A. longifolia*, var. *mucronata*, the Silver Wattle, *Acacia dealbata*, Black Wattle, *A. decurrens*, and the Blackwood, *A. melanoxylon*, were found with an occasional spray of bloom still on them. In many cases the stems of the native shrubs were clothed with the pretty blue Love-Creeper, *Comesperma volubile*. All along this valley walk the Steavenson River is not very distant from us. The spaces between the track and river are covered with bracken, and in places large patches of the Common Lomaria, *L. discolor*, with the Shield and Bristle Ferns, *Aspidium aculeatum* and *Blechnum cartilagineum*: while here and there were groups of the soft-stemmed tree-fern, *Dicksonia antarctica*, and, standing sentinel-like at spots all along the valley, the very stately Spiny-stemmed Tree-Fern, *Alsophila australis*, held aloft its beautiful crown of fronds amongst the eucalypts. Many of the other flowering plants noticed on our journey to Marysville were in evidence here also, while the bright red-coloured foliage of the very young sapling eucalypts helped to make the forest appear quite brilliant. Numerous mountain shrubs and plants similar to those met with in the Dandenong Ranges were noted here, such as the Native Musk, *Aster argophylla*, Woolly Tea-tree, *Leptospermum lanigerum*, Manuka, *L. scoparium*, Blanket-tree, *Senecio Bedfordii*, Hazel, *Pomaderris apetala*, Christmas-Bush, *Prostanthera lasianthos*, Native Mulberry, *Hedycarya angustifolia*, Common Cotton-wood, *Cassinia aculeata*, Elderberry Ash, *Panax sambucifolius*, and the Black Sedge, *Gahnia radula*. White Elder, *Sambucus Gaudichaudiana*, Tough Pimelea, *P. axiflora*, and the Sedge Grass, *Carex vulgaris*, var. *Gaudichaudianum*. At one spot an exceptionally extensive area of large and robust plants of the Native Hop, *Daviesia latifolia*, was rendered very distinctive by its silvery-grey foliage.

The Falls are in view for a few hundred yards before we reach the end of the track, and the roaring, foaming mass of water tumbling over the topmost cascade at a height of about 300 feet is a fine sight. The Falls consist of a series of five cascades. The various widths of the stream as it breaks itself up is from three to twelve feet. The last fall has a drop of about 70 feet to the river-bed at the bottom. We have to stand and admire its beauty for some time, and so much enjoyed was this sight that, within the week, we visited the spot on three different occasions. Scrambling up on the hill at the side of the Falls we find the stiff-foliaged Alpine Westringia, *W. senifolia*, Spreading Heath Myrtle, *Baeckea diffusa*, Bush-Pea, *Pultenaea daphnoides*, Mountain Grevillea, *G. alpina*, Pale-fruited Ballart, *Exocarpus stricta*, Small Grass-tree, *Xanthorrhœa minor*, Box-leaved Native Hop, *Daviesia ulicina*, var. *ruscifolia*, the Small-leaved Pomaderris, *P. elachophylla*,

the Purple Coral Pea, *Hardenbergia monophylla*, Snowy Bush-Heath, *Leucopogon virgatus*, Shrubby Everlasting, *Helichrysum ferrugineum*, and Billy Buttons, *Craspedia Richea*. After a stay of half an hour we returned to the village at mid-day. In the afternoon we decided to visit Mount Bismarck (2,500 feet), about four miles from the township, in order to view the district and more distant country from what is known as "Keppell's Lookout." The track thither is due south, past the State-school ground, and through another eucalyptus forest, principally consisting of Yellow Box, *E. melliodora*, Messmate, *E. obliqua*, and Narrow-leaved Peppermint, *E. amygdalina*. It is skirted for a good distance by a creek, with here and there broad areas of tree-fern groves and gullies. A particularly dense mass of the tree-ferns (Alsophila and Dicksonia), of varying heights, together with fine specimens of the large-boled King Fern, Todea, and numerous smaller ferns, with tracks leading to the creek and groves, is well named "The Beauty Spot." It is apparently a favourite resort for visitors to the district, being only about a mile out from the village. A race also runs alongside the track for a distance, which conducts water to some of the homes in the township. This race provides a suitable nursery for many of the smaller ferns, such as those of the genera Gleichenia, Lomaria, and Aspidium, to luxuriate. It is a place where, later, we easily secured some good specimens for our ferneries. By a circuitous track—which at places is not too well defined, although it forms portion of the main track between Marysville and Warburton—we gradually ascend and get well on to the summit of Mount Bismarck through forest land and open country. We soon after reach a cross path, which, although not so indicated, we judge to be a side track leading to our objective. Following along this narrow path on the side of the mountain, we come to a clear spot where there is a fairly broad outcrop of granite, and which we find to be "Keppel's Look-out." A remarkably grand view is to be had from here of range after range, and peak beyond peak. The Cathedral Range, with its striking pinnacles, and Mount Margaret, are immediately in front of us, while Mount Grant (3,300 feet), Mount Arnold (4,300 feet), and Lake Mountain (4,800 feet), may be seen to the north-east. The valleys of the Steavenson and the Acheron Rivers are traceable out in the direction of Alexandra. Around this Look-out two Acacias (*A. pravissima* and *A. leprosa*, var. *elongata*) were in luxuriant flowering condition, and specimens were gathered for our herbaria. After staying some time on the site, we looked around the top of the mountain, but did not find any plants not previously met with. On our journey back, however, we found some nice young plants

of the white-flowering form of *Tetratheca ciliata*. Flower specimens were taken, and some plants noted for subsequent transfer to Melbourne.

On Friday we decided to visit the notable Keppel Falls, but, after journeying along the route for about five miles, heavy rain set in, and we were forced to seek shelter for a long time under the beech myrtles, and afterwards to get back to our lodgings as best we could. We reached Marysville about 5 p.m., soaked through by the rain, but fully determined to venture on the trip another day.

Although heavy rains had continued to fall the previous night, Saturday morning broke fine. We decided to take a walk along the Wood's Point road *via* Robley's Spur, leading up Mount Grant. About 3½ miles out we came to a spot indicated as "Nichol's Look-out." From here long-distance views of ranges on the north and north-east are to be had. Some of the highest ridges were fairly well covered with snow, which, when the sun, at intervals, shone upon them, made very picturesque scenes. The various cuttings on the road-sides were well covered with nice young plants of the Spiny-stemmed Tree-Fern, *Alsophila australis*, with stems six to twelve inches long; these, being well fronded, considerably added to the picturesqueness of the road. The Hickory Acacia, *A. penninervis*, Mountain Pepper, *Drimys aromatica*, Kangaroo Apple, *Solanum aviculare*, Prickly Coprosma, *Coprosma hirtella*, with a number of the plants previously met with, were noted in full bloom along the roadside. In the afternoon we searched the country back along the Narbethong road for two or three miles, but found nothing of particularly distinctive interest. The Blue Pincushion, *Brunonia australis*, and other small flowering plants were noticed growing freely in the local cemetery grounds, and remarkably abundant growths of young seedlings of some of the English heaths planted on some of the graves were observed in this area. A beautiful spot within a quarter of an hour's walk of Marysville is known as "Michael Dene." It is close to the entrance to the Talbot Drive, opposite to the "Kerami" boarding establishment. It is a natural tree-fern grove and gully, well shaded by the forest eucalypts, and for about a mile in length leading from the Wood's Point road to the Taggerty River. Foot-tracks are made through the grove, and occasional rough seats provided. This spot is probably well patronized by visitors in the summer season. The weather on Sunday was showery throughout, but in the afternoon we were able to walk for the second time to the Steavenson Falls, and again admire them, although the rain was falling when there, and the forest vegetation around the Falls and along the track was saturated with it.

Although heavy showers fell again early on Monday morning, we decided to visit a spot known as "Bald Hill," whence, the tourists' plan stated, a very fine view could be obtained. This spot we found was most easily reached with certainty by following the Narbethong road back a distance of 2½ miles. This we did, and noticed beautiful displays of the flowering plants previously mentioned at different spots by the wayside, which reminded us of some of the Grampian natural flower gardens. A notice board indicated where we should turn in and reach Bald Hill at a further distance of about 2½ miles. The track thither was marked by blazed trees. Nothing uncommon in flowering plants was noticed, excepting the very large flowering forms of the beautiful purple Native Violet, *V. betonicifolia*, which was scattered about over the ranges here. When Bald Hill was reached, and we sauntered along to the extreme end of the ridge, there appeared quite a magnificent garden or carpet of what looked like Marguerites. These proved to be plants of the Tall Native Daisy, *Brachycome diversifolia*. They were about six to twelve inches in height, with white and yellow flowers 1½ inches across, and at the time of day, about 2 p.m., they were fully out, making a glorious show of bloom. They covered quite an acre of ground. These plants were interspersed, here and there, with dwarfed specimens of the Snowy Bush-Heath, *Leucopogon virgatus*, and young, rich red-coloured foliage springing from the bases of various sapling gums that had previously been cut down. From the Bald Hill we obtained one of the finest views of mountain scenery we had yet enjoyed. The Cathedral Range was seen from a different aspect to that from Keppel's Look-out, and all the various peaks included in it showed out in bold grandeur. The valley of the Acheron River and the adjacent mountain ranges could be traced right around from the Marysville road on the south to the west and north, the view extending to the Strathbogie Ranges. This constituted a wonderfully beautiful panorama worth travelling a long journey to see. After admiring the scene for some time, we returned through the forest, mainly composed of Messmate and Narrow-leaved Peppermint, and collected good specimens of the Purple Coral Pea, "Billy Buttons," Pink Fingers Orchid, *Caladenia carnea*, Spider Orchid, *C. Patersoni*, Hop Goodenia, *Goodenia ovata*, Australian Indigo, and others *en route*. On returning to Marysville, about 1½ miles out, and near Wilkes Creek, we pass through another of the numerous wild-flower gardens, made up of masses of the different plants previously mentioned, all in combination and in full bloom. The colour effect was ever so much increased by the rich brilliant red tips of the young eucalyptus foliage springing up among the flowering plants.

Fine sprays of bloom and foliage were brought for the decoration of our lodgings each evening.

A bright, clear, frosty morning greeted us on Tuesday, the 20th, and after having procured a few young plants, before breakfast, for taking back to our Melbourne gardens, we did ample justice to our morning meal and then started on our journey for the second time to Keppel Falls. At a spot about half a mile along the Wood's Point road, after crossing the bridge over the Steavenson River at the north end of Marysville, tourists and others cannot fail to observe a well-painted notice board, indicating that it is the commencement of what is known as the "Talbot Drive," which eventually leads to the celebrated Keppel Falls, which are distant about $7\frac{1}{2}$ miles. The "Drive" is so named in honour of a former State Governor, Sir Reginald Talbot. For a mile in length and about 60 feet in width it has been entirely cleared of all timber and scrub. The track then becomes an ordinary but well cleared and fairly level vehicular one, through one of the finest of our Victorian forests. After continuing for half a mile along this track, the Taggerty River (which has been heard in the distance, with its murmurings and gurglings, as it travels over its rocky bed) is reached. A flock of Gang-Gang Cockatoos is seen, and their distinct screechings heard: a wallaby is observed, too, jumping into obscurity among the scrub, and the Harmonious Thrush, with its beautiful song, made the tourists realize they were in one of Nature's vast wild gardens. Where the track first comes alongside, the river is about 12 yards in width—a beautiful clear, white-foamed stream, ever flowing over its rock and boulder-strewn course. It continues in close proximity to the track, always in view, and so makes additionally charming the whole of the remaining six miles of journey. Two stately white Mountain Ash trees, *Eucalyptus regnans* (of which a photograph is shown), one on either side of us, are passed as we enter upon the portion of the track known as "The Valley Beautiful"—a title which but very inadequately describes the place. On either side of the track through the valley are large, healthy specimens of the following plants in full bloom:—The large-flowering form of the Woolly Tea-tree, *Leptospermum lanigerum*, var. *grandiflorum*. Holly-leaved and Long-leaved Lomatias, *L. ilicifolia*, and *L. longifolia*, Native Musk, the several Snow-Bushes, *Olearia stellulata*, var. *lirata*, and other Olearias, *O. myrsinoides* and var. *crubescens*, the Christmas-Bush, Native Hazel, *P. apetala*, the Prickly Coprosma, *Coprosma Billardieri*, Native Mulberry, Sand-fly Bush, *Zieria Smithii*, "Banyalla," *Pittosporum bicolor*, Blanket-tree, Golden Goodia, Elderberry Ash, and others. These shrubs or small trees were never seen by us previously in such luxuriance of growth as here. The

"Banyallas" were over 20 feet in height, and some of them were covered from the bottom to the top with their rich yellow coloured blooms. All the way along the valley we passed through avenues of the tall Mountain Ash eucalypt, and occasionally observed fine lofty trees of the River White Gum, *Eucalyptus radiata*. Stately specimens of the spiny-stemmed Hill Tree-Fern, of varying heights up to 30 feet, were disposed about in picturesque positions. Some of their new fronds measured over nine feet in length. The smaller ferns were seen in great luxuriance along our path. The Prickly Shield-Fern, *Aspidium aculeatum*, had fronds over four feet in length, while the fronds of *Lomaria capensis* were both of a large and extremely bright bronze-red colour throughout. The Common Lomaria, *L. discolor*, had fronds 5 feet 6 inches high. The new fronds of the Batswing Fern, *Pteris incisa*, were seen here, too, of greater length than hitherto observed. Fine specimens of the Silver Wattle, *Acacia dealbata*, Native Sassafras, *Atherosperma moschata*, and Blackwood, *Acacia melanoxylon*, abound near the water's edge and along our path.

After two miles of this "Valley Beautiful" track are passed, we cross a tributary stream of the Taggerty River, known as "Tommy's Bend Creek," and then reach a spot marked "Beech Grove." All along the track we notice the Myrtle Beech trees, *Fagus Cunninghami*, but at this spot they are very abundant, and provide a distinctive contrast to the foliage of the eucalypts with which they are surrounded. Near here is a resting-place provided for parties with motors or other vehicles. Journeying on, we find ourselves in what is called "Murray Pass," so named, we presume, after a former Chief Secretary of this State, whose decease took place only last week. At a bend in the road now we obtain some fine views of the mountain forest and valleys on the opposite side of the river. The Cathedral Range appears to terminate there with the eastern slopes of Mount Margaret. These slopes are tree-fern-clad from top to their bases at the river's edge. It was here that we met with a fine patch of the beautiful Long-leaved Waxflower, *Eriostemon myoporoides*, specimens of which are on the table to-night. The plants were unsually large, being over six feet in height, and were just in their perfection of pink and white blooms. Some pieces were taken for propagation purposes. At five miles from the entrance to the "Drive" we came to what is called "The Forest of Arden." Here is the termination of the vehicular track, and a good resting and picnicking ground. We reached this place the previous Friday, but were forced to return, considerably drenched by the rain. At this spot and onward are to be seen magnificent specimens of our Myrtle Beeches. They are the principal feature of the forest hereabout,

and worth the journey to see. They had been noted increasing in size for some time as we passed along. Some of them were 100 feet high, with trunks 18 to 20 feet in girth, and had extraordinary knobs or excrescences on them, which gave them the appearance of rustic gnarled specimens. Profuse growths of Sphagnum Moss are on the bases of their trunks, which also support immense clusters of several species of Polypodium and other ferns, which are at times found to be epiphytal. Particularly pretty water scenes abound at intervals along the path here, as the water forms little cascades and flows out from the overhanging Beech trees, especially when lit with shafts of sunlight. Up to this spot the track has been about 8 to 10 feet in width. Beyond it is only a footway, but a beautiful one, well defined, and through a continuous avenue of Beeches for two miles, with ferns and mosses as the principal undergrowth. Along this path we observe the Strap Fern, *Lomaria Patersoni*, and thousands of seedling Myrtle Beeches, some of each of which we collect on the return journey to bring to Melbourne. It is while traversing this path at a distance of about half a mile from the entrance to the "Forest of Arden," and near to where the "Glover Walk" (another tourists' track from Mount Arnold) joins our track, that we observe the "Phantom Falls" on the opposite side of the river. These falls are seen plunging down the extreme end of Mount Margaret from a height of about 400 or 500 feet. The waters fall in several series of cascades before flowing into the river. Viewed from our position, the stream appears to be about ten feet in width, and forms a beautiful sight in the sunlight. A slight error regarding the position of these falls is made in the tourists' plan, as they are thereon indicated as being opposite to "Murray Pass," whereas the board drawing attention to these falls, and the falls themselves, are not visible until one has passed through the "Forest of Arden" for half a mile. Although Coachwhip and Lyre birds gave evidence of their presence along our route, it was only here that one of our party observed one of the latter birds.

Soon after mid-day we reached Keppel Falls, and the spot known as "The Meeting of the Waters." This proved to be one of the grandest and most charming places we had ever seen. The waters of the Keppel Falls, which originally proceed from Lake Mountain at a height of 4,800 feet, as they reach their base, and from the Taggerty River, are broken up by immense granite boulders into three or four distinct streams. These, with the Snowy Creek, which comes in from the east from the mountain peak known as Snowy Hill (height 4,700 feet), and another creek flowing in from the north, constitute "The Meeting of the Waters." A substantially built pavilion

has been erected on an island, around which the various creek and falls waters flow. The building is supported by the trunks of Blackwood and Beech trees, the crowns of which had been cut off and a shingled roof fitted on to their tops. Tracks leading up at the side of the Keppel Falls have been made, and footbridges at about 50 and 100 feet up are stretched across the waters, to give visitors further views of the beauties of the place. At the time of our visit the track had not been cleared up for the season's traffic, and one of the bridges had been broken down by a recent storm. As high as we could reach in comfort, the falls were fairly continuous. A particularly noticeable feature was the extraordinary growth of bright green moss, which covered the large boulders in the midst of the surging waters. We enjoyed luncheon in the pavilion, and spent some three hours amid these wonderfully grand surroundings. We would have liked to have gone on for another 1½ miles and ascended Lake Mountain, but, as the track was much overgrown and the ascent stated to be very steep, we decided to leave it for a future occasion. The return journey was as delightfully enjoyable as the going, and specimens of the following plants found in bloom were collected *en route*, viz.:—Forest Bitter Cress, *Cardamyne dictosperma*, Soft Senecio, *S. vagus*, Mudwort, *Limosella aquatica*, Soft Millotia, *M. tenuifolia*, Cymbanotus, *C. Lawsonianus*, Small-leaved Poranthera, *P. microphylla*, Limp Starwort, *Stellaria flaccida*, Tall Sundew, *Drosera auriculata*, The Crowded Woodruff, *Asperula conferta*, Dwarf Pimelea or Rice-flower, *P. humilis*. We reached Marysville soon after 6 p.m.

During our journeyings we observed several kinds of lizards, and, in addition to the birds already mentioned, noted various Parrots, Wrens, Magpies, Robins, Honey-eaters, and Magpie-Larks.

The morning of the following day, the final one of our outing, as it was not necessary to leave for Melbourne till the afternoon, was spent in a third visit to the Steavenson Falls, when, as the weather was bright and glorious, they were seen at their best. On the way an echidna was seen crossing the path. Very little standing water was met with in our rambles, hence there were few opportunities of searching for pond-life, but in a little pool not far from the Steavenson we found specimens of a rather uncommon protozoon, probably a member of the genus Oxybricha. A few more plant specimens were collected before retracing our steps. At three o'clock we commenced the return journey by motor to Healesville, which was reached in time for the evening train to town.

The week had proved so enjoyable that we thought a brief description of some of the beauty spots we had managed to

visit during our rambles might be helpful to other members who might be desirous of spending a few days in what is one of the most charming of Victorian tourist resorts, especially of those not far from town. We estimated that we had traversed altogether about eighty miles on foot, without any feelings of distress, so bracing was the fresh mountain air. On every hand, turn where you would, delightful woodland, mountain, or river scenery, of which we never tired, met the eye. The presence of a public notice-board, placed in some conspicuous position in the village, giving the directions and distances to the various spots of interest, would be a decided advantage to tourists. In its absence, full use had to be made of the map issued by the Tourist Bureau, which we found most valuable.

THE HALL MEMORIAL FUND.—Friends who have not yet contributed to the Dr. T. S. Hall Memorial Fund are reminded that it is intended to close the fund at an early date, so that the allotment of the fund can be considered. Subscriptions should be forwarded at once to the hon. treasurer, Dr. J. P. Wilson, University, Carlton.

BEE-KEEPING IN VICTORIA.—The articles contributed to the *Journal of Agriculture* (Victoria) from January, 1912, to April, 1915, by Mr. F. R. Beuhne, Government Apiculturist, have been reprinted as Bulletin No. 31 of the Department of Agriculture, and form a handy manual of about 130 pages for anyone who intends taking up bee-keeping either as a business or as an addition to another occupation. The author, however, modestly says it must not be regarded as a text-book of bee culture, but rather as a record of those methods which by experience have been found best suited to Australian conditions. It therefore forms just the sort of book wanted by the tyro in apiculture, and as an encouragement to the beginner his first sentence runs thus:—"No other rural occupation will give a better return for the capital invested, and the labour applied, than bee-keeping, if intelligently pursued." Later he says:—"Bee-keeping, if adopted as a calling by anyone having an aptitude and love for it, combined with good business methods, is a profitable and fascinating occupation. If carried on in connection with some other rural industry, it is a valuable side-issue; if pursued as a hobby, it is highly interesting. Bee culture is, above all things, a healthy outdoor occupation of a not too laborious kind, to which many more might turn with

whom city life and an indoor occupation do not agree, and who either do not possess the physical strength or the inclination to engage in some other more monotonous and laborious rural occupation." The bulletin has the merit of being well illustrated, so that one can hardly misunderstand the information it is desired to impart. The author remarks that Australia has such a splendid honey-producing flora that if bee-keepers will only go to it there is no need whatever to raise plants specially for honey. In Victoria only a fraction of the nectar produced annually by our native flora is at present being gathered by bees. This portion of the subject is now being dealt with in a series of articles by Mr. Beuhne in the *Journal of Agriculture*, and when completed will likewise be issued in book form. It is curious, however, that one of our prettiest spring-flowering shrubs, the Manuka, *Leptospermum scoparium*, yields a very poor grade of honey, fit only for manufacturing purposes, and country where much of this shrub exists should be avoided by bee-farmers. The value of bees to the orchardist, he says, can hardly be over-estimated, and successful orchard practice will never result until the work of the bee is recognized practically by the establishment or the temporary locating of bee colonies in or near every orchard. From the statements contained in the work under notice it seems that bee-culture should be a suitable occupation for many of our returned partially incapacitated soldiers, and as the uses of honey are extending every year there seems no reason why many of them should not lead happy and contented lives on their own bee-farms.

Were Extinct Animals Warlike?—Such is the title of an interesting article in the *Age* (Melbourne) of Saturday, 1st July. The author, "Petrophilus," says his remarks are prompted by the fact that the American peace party has been using a *papier-maché* model of a formidable member of the extinct group of the Deinosaurus to illustrate its argument that the peace-loving nations of the world are being crushed by a juggernaut policy of might and oppression. He pictures what might have been the habits of one of these ten-ton monsters, and thinks that the formidable horns, bony frills, and other seemingly terrible weapons with which they were provided were simply for adornment, and if for use were used only during times of courtship, and not as a means of overpowering and crushing members of other groups of the times in which they lived. He considers that reasons for their extinction can be found in the numerous physical changes which have occurred to this earth of ours in the many millions of years it has been in existence.

AUSTRALIAN FOREST LEAGUE.—An illustrated lecture, in connection with the Victorian branch of the Australian Forest League, will be given at the Melbourne Town Hall (supper room) on Wednesday, 16th August, by Mr. A. D. Hardy, F.L.S., on "The Forests of Victoria." The committee of the League will be pleased to have the co-operation of all interested in the objects of the League. Subscriptions may be forwarded to the hon. treasurer, Dr. Heber Green, University, Carlton.

TREE-PLANTING.—The July *Journal of Agriculture of Victoria* contains an interesting report by Mr. J. Cronin, Director of the Melbourne Botanic Gardens, on the results of the tree-planting competitions instituted by the Government in 1912. The State was divided into districts, with as nearly as possible the same physical and climatic conditions. Unfortunately the season 1912–13 was, owing to the absence of rain, extremely unfavourable, and many who had entered for the competition withdrew. Accompanying the report is a list of trees suitable for planting, and some useful hints on the propagation of tree seedlings.

ANIMAL PROTECTION IN NEW ZEALAND.—The annual report of the Department of Internal Affairs, New Zealand, for the year ending 31st March last, contains some notes on the working of the *Animals Protection Act* which are encouraging, whilst others are somewhat sad. It is noteworthy that not more than twenty-five head of native game, such as Grey Duck, Teal, Spoonbill Duck, Pukeko, and Black Swan, are allowed to be killed by any one person in one day. Petitions were received from natives praying that they might be allowed to take native pigeons for food, but, in view of the fact that these birds are becoming rarer every year, the request was declined. A number of new sanctuaries for birds, &c., were proclaimed during the year. It seems that the Huia, a bird whose feathers were an important addition in the olden days to the chief's mantles, may now be regarded as almost extinct, as though the department has, for the past ten years, been endeavouring to obtain a pair to liberate in the Little Barrier sanctuary, it has met with no success, and it is doubtful if the birds reported as having been seen were really Huias. It is gratifying to know that the Tuatara lizards, which are protected on Stephen Island, The Brothers, and Cuvier Island, show no sign of decreasing in either sanctuary. Their principal enemy is hawks, on which a constant war is waged by the lighthouse-keepers.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary meeting of the Club was held in the Royal Society's Hall on Monday evening, 14th August, 1916.

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

CORRESPONDENCE.

From Mr. A. Rutter Clarke, intimating that, owing to his immediate departure for India, he would be unable to act as leader of the Club excursion to "Merriwa," Toorak, on 23rd September, but that he had made arrangements for others to discharge the duties of leader and of host.

REPORT.

The hon. secretary (Mr. J. G. O'Donoghue) reported that, at the request of Mr. O. W. Rosenhain, who for some time past had not been in the best of health, he had acted as leader of the excursion to Hurst's Bridge on Saturday, 12th August. Owing to the fine afternoon the trains from the city to Heidelberg, and from Heidelberg to Hurst's Bridge, were uncomfortably crowded. On reaching Hurst's Bridge at 3.15 p.m. it was found that the party numbered more than fifty persons. As there were no Silver Wattles flowering in the neighbourhood of the township, the party crossed the Diamond Creek, and, after proceeding for a short distance along the Arthur's Creek road, bore westerly up a narrow valley, on either side of which occur numerous specimens of the Sydney Black Wattle, *Acacia decurrens*, var. *normalis*. It was noted that the trees growing on the northern slope of the valley were at the height of their flowering perfection, whilst those in the valley and on the southern acclivity were not so far advanced. Retracing their steps, the party partook of some light refreshment, kindly provided by Mr. Rosenhain, and then returned by the 6 p.m. train to the city. Generally speaking, the excursion was a disappointment, for, owing to the extreme dryness of the hillsides, few flowering plants or shrubs were noted, and by reason of the destruction of the wattles along the course of the Diamond Creek the chief feature of the Hurst's Bridge district at this time of year has ceased to exist.

Mr. F. Keep said that it might be of interest to members to learn that the occurrence of the Sydney Black Wattle in

and on the slopes of the valley visited by the excursionists was due to the efforts of the late Dr. Büttner to establish a plantation there with the view of extracting tannic acid from the bark, which is extremely rich in that constituent.

ELECTION OF MEMBERS.

On a ballot being taken, Miss M. Rowntree, 55 Sutherland-road, Armadale, and Mrs. W. Sache, 66 High-street, St. Kilda, were unanimously elected as ordinary members of the Club.

GENERAL BUSINESS.

ANNUAL EXHIBITION OF WILD-FLOWERS. — The president said that he had pleasure in announcing that the committee had engaged the Town Hall, at a cost of £16, for the Club's annual exhibition of wild-flowers on Tuesday, 3rd October. To ensure the show being worthy of the Club, and the object for which it was undertaken, it would be necessary for members to accord the committee their whole-hearted support. As the hall was a very large one, it would require a vast quantity of wild-flowers for display purposes: hence he would appeal to members, collectively and individually, to interest themselves, and their friends in the country districts, in securing as large and varied collections of our flora as possible. To make provision for, and to deal with the floral tributes as they arrived, in the few hours that were available before the opening of the show, would be a task of some magnitude. He would ask all who could possibly give their services for the whole day on the 3rd of October to hand in their names to the hon. secretary.

Space would be provided for the display of specimens of interest, and members desirous of contributing in this respect would oblige by furnishing particulars of their exhibit and the probable area it would occupy.

LECTURETTE.

By Mr. Chas. Daley, B.A., F.L.S., entitled "Alpine Gippsland."

By means of a sketch map, the author briefly pointed out the area of Gippsland, its physical features, geological structure, and some of the chief incidents relative to its exploration. By reason of the ruggedness of its mountain ranges, the exuberance of its vegetation, and the absence of seaports, Gippsland, in so far as settlement was concerned, was for many years the Cinderella portion of the State. Of the pioneers who toiled arduously and suffered privation in their efforts to fathom the secrets of its remote recesses, two men stood out with marked prominence. These were the late Dr. A. W. Howitt, one of the greatest workers in the interests of science

Australasia has yet produced, and Mr. R. A. F. Murray, a former Government Geologist of Victoria. With a pack-horse bearing the bare necessaries of life, these venturesome men mapped and plotted down and made known the physical features and geological structure of the greater part of alpine Gippsland. So thoroughly did they do their work, in the face of natural difficulties whose magnitude few nowadays are in a position to realize that, when the country had been settled and tolerably cleared, little was left for those who came after them to supplement or rectify.

In depicting, by means of a series of lantern slides, the structural and physical features of the country passed over in a journey by the most accessible route from Heyfield up the Macalister and Wellington Rivers to the Wellington plateau, some 5,000 feet above sea-level, the author mentioned that the plateau was composed, for the most part, of reddish and purplish sandstones, conglomerates, shales, and porphyritic rocks, of supposed Carboniferous age, and had been deeply dissected by the corrosive action of water. In one of the V-shaped valleys thus formed, and at a depth of over 2,000 feet below the crest of Mount Wellington, nestles the alpine tarn, Lake Karng, having an area of about 22 acres and a depth of 150 feet. The lake, though known to the aboriginals, was first discovered by a stockman named Snowden in 1886, and since then has been visited by many people either from motives of curiosity or for scientific investigation. A difference of opinion exists as to the cause, or combination of causes, responsible for its formation. The late Dr. A. W. Howitt was disposed to assign its origin either to landslip or glacial action. Others maintain that it is the result of a huge mass of rock that slid down from a peak opposite Mount Wellington, and infilled the valley for a mile to the depth of 500 feet or thereabouts, impounding the waters of the Nigothoruk Creek ; whilst some disagree with both theories and argue that there is no evidence to show how it was formed. There is no indication of the waters of the lake having at any time overflowed the barrier, but they issue freely from it some 500 feet below the crest. The agistment rights of the plateau, it was mentioned, are leased by the Government at a nominal rate. During the summer and autumn months, when feed is scanty in the plain country, cattle to the number of over 1,000 head are driven up to the plateau for pasturage, and allowed to remain till the first fall of snow. Devastating fires, which rage for weeks up and down the wooded slopes of the ranges, destroying thousands of pounds' worth of timber and innumerable species of our fauna and flora, were often wilfully caused for the selfish purpose of increasing the pasturage.

A series of views, illustrating the ravages wrought by fire amidst the dense and serried ranks of the many varieties of eucalypts that clothe the slopes of the ranges, engendered the general feeling that more efficient control than at present obtains should be exercised by the Government over the actions of the lessees of these agistment areas.

In addition to the Macalister route to Mount Wellington, the approach *via* Ben Cruachan and the Avon River was graphically dealt with. Views of the lofty Snowy Plains in both winter and summer garb were shown; and also bluffs, gorges, and mountain scenery as far north as Mount Howitt (5,715 feet), which overlooks the Buffalo and the King Rivers north of the Divide.

A return was made by the mining track, past "Boyce's," along the picturesque Wonnangatta River, a tributary of the Mitchell, to Crooked River, Grant, and Dargo, old mining centres in the "sixties," but now greatly decayed. Views of the rocky channel of the Avon and on to Maffra completed the series.

About 140 slides, of exceptional merit and interest and embracing a wide range of subjects, were shown. The photographs were taken and the slides prepared by Mr. A. J. Waugh, of Maffra.

In thanking Mr. Daley for the interesting and instructive manner in which he had dealt with his subject, the president said that the views displayed were the best he had yet seen of picturesque Victoria. How the photographer got into position to take some of them he could not realize.

Mr. J. H. Harvey, A.R.I.V.A., remarked that it is often maintained that the work of the camera is purely mechanical. That this is not so half a dozen of the views just shown would demonstrate. The slides exhibited were exceptionally fine, and reflected great credit upon Mr. Waugh.

Mr. Daley, in responding, said that Mr. Waugh had done a great deal to familiarize the scenery of alpine Gippsland. As he had already mentioned, it was due to that gentleman's kindness that he had been able to deal with his trip to the Wellington plateau in a popular manner, and he would like the Club to recognize the good offices of Mr. Waugh by a letter of thanks.

This suggestion was unanimously agreed to.

THE LIBRARY.

The president intimated that, in order to afford members greater access to the library than at present, the hon. librarian, Mr. P. R. H. St. John, had signified his willingness to attend at the hall on the fourth Monday in each month, between 8 and

9 p.m. The offer was a generous one, and would be appreciated by all.

INVESTMENT OF CLUB FUNDS.

The president said that members would no doubt recollect that at the last ordinary meeting the consideration of the proposal of investing some portion of the Club's funds in the Commonwealth war loan was left in the hands of the committee. After mature consideration it was decided to invest the sum of £20.

EXHIBITS.

By Mr. J. W. Audas, F.L.S.—*Erica arborea*, L., Tree Heath, a native of Southern Europe, collected in the scrub near Wheeler's Hill, 12/8/16.

By Mr. C. Daley, B.A., F.L.S.—Typical rock specimens from Mount Wellington, comprising Reddish Shale, Conglomerate, Porphyry, &c.

By Mr. C. J. Gabriel.—Marine shells of the genus Latiaxis, from Japan—viz., *L. lischkeana*, Dunker.; *L. japonica*, Dunker.; *L. mawoe*, Gray; also *Pecten keppelliana*, Sby., from Cape Verde Islands.

By Miss G. M. L. Nethercote.—Flowers of *Acacia decurrens*, var. *normalis*, Sydney Black Wattle, and *Caladenia cærulea*, R. Br., Blue Caladenia, collected at Hurst's Bridge, 12/8/16; *Acacia dealbata*, Link., Silver Wattle, collected at Cockatoo, 13/8/16; *Thryptomene Mitchelliana*, F. v. M., grown at Hawthorn.

By Mr. J. G. O'Donoghue.—Pelargonium leaf, showing tubular growth.

By Mr. F. Pitcher.—*Loranthus pendulus*, Sicher, Drooping Mistletoe, collected at Hurst's Bridge, 12/8/16. For and on behalf of Mr. J. Cronin, Curator of Botanic Gardens.—*Acacia dodonæifolia*, Willd., Port Lincoln and Kangaroo Island Wattle, from Caulfield Park.

By Mr. P. R. H. St. John, for and on behalf of the Curator.—Samples of oil, prepared by exhibitor, the material obtained from cultivated trees in Melbourne Botanic Gardens—*Leptospermum ericoides*, A. Richard, Rawiri, order Myrtaceæ, New Zealand, 14/7/16; *Schinus molle*, Linnæus, Peruvian Mastic or Pepper Tree, order Anacardiaceæ, Tropical America, 26/7/16; *Eucalyptus hæmastoma*, Smith, Scribbly Gum, order Myrtaceæ, Victoria, New South Wales, Queensland, 31/7/16.

After the usual conversazione the meeting terminated.

A VISIT TO GREAT LAKE, TASMANIA.

By J. SHEPHARD.

(*Read before the Field Naturalists' Club of Victoria, 17th April*, 1916.)

A BRIEF holiday in Tasmania in January of this year presented an opportunity of making some natural history investigations of the lake now attracting attention for economic considerations. Tasmania is a very attractive and interesting country. Landing at Devonport and then proceeding *via* Launceston to Hobart by motor-car, with the opportunities for seeing around afforded by this method of travel, impresses a continuous panorama on the mind's eye likely to persist. Huge tree-clad bluffs show themselves in the distance, beautiful mountain streams are crossed, stretches of undulating forest are threaded by the road, until, approaching Deloraine, most magnificent views of the serrated outline of the Western Tier are revealed. Pastoral country of the finest kind is traversed from here to Launceston, but always the mountains—which cannot be escaped in Tasmania—in the background. From Launceston to Hobart an excellent road, 121 miles long, traverses nearly the whole length of the island. Rising by a steady grade, and crossing, some miles out, the South Esk River, the land is sparsely settled, and apparently devoted to grazing. Along the Midlands sheep-farms extend over the plains, and away to the east the highest peak, Ben Lomond, rises abruptly, and on the west the Western Tier rears high above. Towards Oatlands the grade is upward, and there reaches 1,400 feet above sea-level. From this point the remaining fifty odd miles is a winding descent along well-dissected country, until the broad Derwent is reached, with Mount Wellington and the crests associated with it rising some 4,000 feet above Hobart.

A study of the map of Tasmania shows a roughly triangular outline, with broad estuaries running into the island on all sides, but particularly at the southern end, where peninsula is joined to peninsula by narrow necks of land. The geological map, especially when supplemented by visual impressions gained by a journey such as that mentioned, increases the interest greatly. The deep estuaries piercing the land plainly indicate depression of the island in recent geological time, although the highest points reach over 5,000 feet at present. The chief outstanding physiographic feature is the existence of a plateau of from 3,000 to 4,000 feet above sea-level, covering a considerable proportion of the island, and situated centrally, on its north-western boundary terminating in a sudden drop to the fertile plains extending from Deloraine to nearly Oatlands, and known as the Great Western Mountains or Western Tier.

From the south and south-east the rise to this plateau is gradual, and the road from Hobart *via* Bothwell to a little over 3,300 feet at Great Lake has no severe grade in the 80 miles traversed. This plateau shows on the surface a mass of weathered diabase or dolerite, with scattered patches of basalt. It presents a singularly interesting appearance, broken up as it is by ridges and low bluffs, and in the northern portion rising into considerable eminences. Geological research has brought evidence to show that this huge sheet of diabase covering the plateau, capping Mount Wellington in the south and Ben Lomond and Mount Barrow in the north-east, showing also at a lower elevation in Cataract Gorge, near Launceston, and Paradise Gorge, at Orford, on the east coast, is what is known as a "sill." The classical instance of a sill is the Great Whin Sill, in North Yorkshire. This has been traced for 80 miles, and covers an area of about 1,000 square miles. If the diabase of Tasmania can be regarded as one sill, then it is a worthy rival of the Great Whin Sill. This diabase is a rock not dissimilar (on cursory examination) to the well-known bluestone of Victoria, but does not show vesicular structure, being compact. It is composed of augite, felspar, labradorite, and magnetite, and sections from specimens from three localities so wide apart as Great Lake, Cataract Gorge, and Paradise Gorge showed no difference in the mineral constituents, but only a difference in the size of the crystals. Regarding this mass of diabase as a sill or a series of sills, the extent of the denudation required to remove the material originally covering it and that intervening between the main mass and the outliers is enormous, and is another of the many instances justifying the geologist in his extreme liberality with time. On this plateau, towards its northern end, Great Lake is situated.

An interesting trip can be made by road to Tasman's Peninsula. The Derwent is crossed by ferry to Bellerive, and from thence over a causeway crossing an inlet known as Pittwater, passing the town of Sorell. The first isthmus is reached at Dunally; this is narrow, and, crossing it, Forestier's Peninsula is entered. The scenery from here onward is charming; forest-clad hills alternate with seascapes with kaleidoscopic rapidity. Eaglehawk Neck is a connection between Forestier's and Tasman's Peninsulas. Historically famous for reasons a lover of Nature may disregard, it is extremely attractive for the physiographical features it presents. The isthmus is only some sixty yards across. On the east, ocean surges roll into Pirates' Bay; to the west, the placid waters of Norfolk Bay; to the south and north are seen steep tree-clad hills. Marine denudation here exhibits some unique results. At the northern end of Pirates' Bay, the sea, eating into the yielding Permo-

Carboniferous rocks, has left small islets, which, owing to the jointing of the strata, are of square outline. Here is the well-known "natural pavement." The geological speculation in regard to this is that an intruded sill has metamorphosed the sandstone when the igneous rock was still hot, and thus induced the joints, which break up the rock into blocks of very regular shape.

A walk southward over a mile or two of wide sandy beach brings one to the southern extremity of the bay, where the "Blow-hole" is situated. A tongue of land, projecting northward, forms a natural breakwater; it is composed of fossiliferous Permo-Carboniferous rocks, dipping westward, and thus presenting a vertical cliff seaward. This cliff is made up of hard and soft layers, and the unceasing action of the waves attacks the lower soft layers, and, entering along joints, makes tunnels, which come to the surface, owing to the land sloping down from the edge of the cliff inland. This Blow-hole is not an isolated phenomenon, but is a stage in the process of denudation going on for some distance along this coast-line. Tasman's Arch and the open rifts are later developments of a blow-hole.

Another excursion of interest is to follow the Derwent up stream to New Norfolk and thence by the valley of the Russell River to the Russell Falls, near the foot of Mount Field, which, on the occasion of this visit, was capped with snow. It is interesting to know that a considerable area in this district is to be reserved as a national park.

Returning to the subject of Great Lake. Proceeding by road from Hobart, the Derwent is followed for twelve miles to Bridgewater, where the crossing is made by the long bridge. Passing Pontville, Bagdad, and Kempton, the main road is followed to Melton Mowbray, where a turn westward is made into a narrow but good road, passing through Apsley, the railway terminus, and rising until Bothwell is gained, about fifty miles from Hobart. An altitude of about 2,000 feet is attained here. Proceeding, the country becomes very solitary and the landscape assumes a wild and somewhat forbidding aspect, the change in the appearance of the vegetation being obvious even to the non-botanical eye. At a place named The Steppes, where only one solitary cottage is to be seen, some fourteen miles from Great Lake, the level of the plateau is practically reached, only moderate undulations occurring. The altitude is here about 3,300 feet, but fair-sized eucalypts are to be seen, though not numerous. A very noticeable feature is the great growth of lichen which covers the blocks of diabase and basalt which lie everywhere on the surface, the dead timber strewn about, even the living heath plants, being covered with it.

The scenery is altogether of a most peculiar and weird character. This last stage is along level stretches alternating with rocky ridges, which, three years ago, were very rough, but now the whole road is quite equal to the best Victorian main roads, excepting those recently constructed by the Roads Board. The lake is reached at the southern end, where the River Shannon forms the outlet, and, spreading out, forms a lagoon not far from the lake. The Shannon, where it leaves the lake, is now crossed by a weir, provided with sluice-gates to regulate the flow of water to the hydro-electric power station some twelve miles down stream. This has raised the level of the water in the lake some eight or nine feet. Hard by the weir is the Government accommodation house for tourists and fishermen. The day of arrival, 24th January, was during a hot spell, and in the evening the air was mild, and immense numbers of moths and other insects flew about, enjoying a brief period, for the next night scarcely any could be seen. The shore of the lake is low, and, though rising here and there into hillocks formed of tumbled masses of diabase blocks, is not striking from a scenic point of view. The general appearance of the surface of the land is strongly suggestive of long-continued weathering action. To the north could be seen considerable hills, which make that portion of the lake much more picturesque.

The morning after arrival, attention was turned to the chief aim of the visit—an examination of the microscopic plankton. A disappointment was experienced on learning that the motor-boat counted on was out of order, and of the two or three row-boats all were in bad condition owing to previous rough weather, and it appeared probable the tow-net provided would perforce remain unused. A change having come over the weather, rendering the lake too rough even had the boats been available, some work was attempted with a hand net, chiefly in the lagoon about a mile below the lake and in the River Shannon. After a few hours the strong wind, now westerly, brought up very cold squalls of rain, which in a few minutes wet one to the skin. This continued all the afternoon, which was spent before a log fire examining the material collected with a travelling microscope, regardless of two snow-storms which occurred meanwhile. The first observation showed the waters of the lagoon and river to be swarming with two predominant forms —one of the Cladocera, *Bosmina brevirostris*, and a rotifer of the genus Conochilus. The rotifer proved to be one known to the writer since 1902, having been found at Heidelberg, Victoria. It is intermediate between *C. dossuaris* and *C. unicornis*. As was found later, it was swarming in every part of the lake examined in countless numbers. Being so plentiful, a good opportunity for examination was afforded, and the

result arrived at is that it is of specific rank, and description will follow later.

Next morning the wind had dropped, and Constable Collins, who is in charge of the hostel, and, among numerous other duties, is postmaster and meteorolgical observer, most obligingly essayed a risky voyage on one of the very leaky boats to use the tow-net. He very firmly declined any addition to the boat's crew, giving as a reason they would get wet feet; but the writer is inclined to think it was with a view to being unhampered if emergencies occurred. A little instruction enabled him to use the net in a most efficient manner, and, after a strenuous time alternately rowing and baling every few minutes, he managed to cover about a mile of surface, the boat returning in a water-logged condition. This work, combined with the use of the net from the shore at various points, should yield the prevalent forms at the south end of the lake at this time. Examination of the material during the evening, as was anticipated, showed that the river and lagoon, fed from the lake, contained the same prevalent forms, but the more efficient tow-net yielded greater abundance from the latter. The prevalence of the rotifer and the Bosmina already mentioned was most remarkable, no other form approaching them in number. Other rotifers noted were a Syncheta, Asplanchna, Copeus, Euchlanis, Notops, and *Polyarthra platyptera*, besides several others which the means at hand were insufficient to identify. The Entomostraca obtained were *Bosmina brevirostris*, *Daphnia carinata*, and Mr. J. Searle has since identified *Cyclops albicans*, and states that *B. brevirostris* occurs in the Yarra valley. It was intended to obtain a supply of the unique form *Paranaspides lacustris*, which is one of only three living species of the order Anaspidaceæ recorded so far, and, with *Anaspides tasmaniæ*, belongs to the family Anaspididæ, the third species *Koonunga cursor*, of the family Koonungidæ being well known to members as the discovery of the late Mr. A. O. Sayce. *P. lacustris* is a shrimp-like animal found in the weeds near the margin of the lake; but, as the artificial raising of the level has submerged the weed zone and placed it at a distance from the present shore-line, it could not be reached. One specimen was, however, obtained from the stomach of a trout caught during the visit.

Some facts given by Col. Legge will give an idea of the climatic conditions. In 1903 the mean temperature of January was 66.5, the min. 33; in June, mean 38.4, min. 19. The lake is frozen over every year, and when the ice breaks up it is driven by westerly winds to the shores, where it has piled up the diabase blocks in terraces. This effect is not noticeable at the south end, visited on this occasion, and will now be sub-

merged. Col. Legge gives the result of soundings, which show the lake shallow, with a very level bottom, and at the time a maximum depth of 19 feet. He also mentions the rainfall for twelve months in 1902–3 as 63.6 inches at the north end and 17.93 inches at the south. The paper by this observer is a very complete description of the lake and adjacent area (see Aust. Assoc. Ad. of Science, Dunedin, 1904, vol. x., p. 348).

The return journey to Hobart was made on the 27th, and at The Steppes the road going eastward to Interlaken was taken. On this road some very rugged country is traversed, and at the Alma Tier a rise to 3,565 feet is made before the drop from the plateau commences. On this road a Tasmanian black snake was observed in front and disabled by running two wheels of the car over it. This portion of the road is very lonely, and there are some steep though not dangerous descents, proper care being taken. The road surface is very fair, and here also shows much improvement in a three years' interval. At Interlaken, which is situated on a narrow neck between Lake Sorell on the north and Lake Crescent on the south, there is also a Government accommodation house. From this point to Oatlands the descent of some 1,500 feet in the sixteen miles is made by an excellent mountain road through striking scenery, passing through fine pastoral country in the last few miles. From Oatlands the main road is followed for the remaining fifty-one miles to Hobart. From Interlaken there is another road more to the north, coming on the main road at Tunbridge, but from information received it is wiser to go the southerly road even if going in the direction of Launceston.

[The paper was illustrated by a large series of lantern views. —ED. *Vict. Nat.*]

NATIONAL MUSEUM.

A VERY interesting addition has been made to the zoological collection in the form of a celebrated English bulldog named "Kilburn Duke." This was recently purchased by Mr. M. P. Bauld, of Malvern, for the sum of £400, but most unfortunately died on the way out from England. The body was placed in a cool chamber, and, on arrival in Melbourne, was presented to the Museum by Mr. Bauld, to whom the public is indebted for the opportunity of seeing a magnificent specimen of this characteristic British breed. "Kilburn Duke" was only nineteen months old when he died, but he had already made a record for a dog of that age by securing twenty-six first prizes without a break, including the fifty-guinea Berrie Cup—the blue ribbon of the British Bulldog Club. He also secured special prizes for the "best head, best face, best front, best

shoulders, best ears, best ribs, and best brisket." Owing to the kindness of Mr. Bauld, all of these points can be fully appreciated by the public, as both the skeleton and skin have been preserved and mounted, and form a very interesting example of the results of "artificial selection" amongst animals.

VICTORIAN PLANT NAMES.—A further instalment of the suggested vernacular names for Victorian plants appeared in the *Journal of Agriculture of Victoria* for August, covering the orders Labiatæ to Epacridaceæ inclusive.

A CORRECTION.—BATS AT JENOLAN CAVES.—In the August *Naturalist* (page 51) I am reported as having said that the bats "had shifted their quarters owing to the influx of visitors." What I said was that I had seen them when going through the Nettle and Arch caves, where they were noticed hanging from the rocks here and there.—J. STICKLAND.

FOSSIL BLACKWOOD (?)—Recently Mr. W. Baragwanath, of the Geological Survey Office, Ballarat, found a small piece of fossil wood in a mine—the North Prince—at Deep Creek, about two miles north-west of Eganstown, in the Daylesford district. The wood came from a depth of 300 feet below the surface, and was in the wash, under 30 feet of black clay and several layers of basalt. Mr. Baragwanath suspected that the wood might be Blackwood, from its appearance in the hand specimen, and a piece was forwarded to Professor Ewart, who reports as follows:—"The specimen of fossil wood forwarded from Smeaton agrees very closely with that of *Acacia melanoxylon*. The wood fibres are much distorted, but show the same relative proportion to the vessels, and the latter have the same average diameter as in *A. melanoxylon*. The medullary rays are also similar in arrangement, markings, and breadth. The medullary rays cells have the same relative length and breadth and show similar interprotoplasmic communications between the ends of the cells. In the transverse section of the fossil wood the medullary rays cells appear closer together, but the wood has apparently undergone considerable lateral distortion and compression. A curious feature is that the medullary rays cells are better preserved than the wood fibres, probably owing to the abundant tannin content of the former. The wood shows no resemblance to that of any species of Eucalyptus, Casuarina, Banksia, or Grevillea, and can be referred to *Acacia melanoxylon* with as much certainty as is ever possible with the case of a fossil timber." The occurrence of what is apparently a piece of fossil Blackwood at such a depth below the surface seems to be worth placing on record.—CHAS. FENNER. School of Mines, Ballarat, 28th August.

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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, 11th September, 1916.

The president, Mr. F. Pitcher, occupied the chair, and about 45 members and visitors were present.

REPORTS.

In the absence of Mr. Geo. Coghill, Mr. T. S. Hart, B.Sc., acted as leader of the excursion to Cockatoo on Saturday, 26th August, and reported that a party of twelve members and friends took part in the outing, and, favoured by a fine day, thoroughly enjoyed themselves. Though too early for the bulk of flowering plants and shrubs, several acacias were noted in bloom, and trees of the Silver Wattle were met with having an estimated height of 95 feet. During the course of their ramble the party passed over ground that had been swept by fire about three years previously. Upon this *Banksia collina* was very abundant, but the most remarkable feature of the area was the prevalence of fasciation in the species of plants it nourished. This malformation was possibly due to unbalanced nutrition promoted by rich soil conditions which result after the devastation of an area by fire.

A report of the Bayswater–Ringwood excursion on Saturday, 9th September, was received from the leader, Mr. J. W. Audas, F.L.S., and read by the hon. secretary. Mr. Audas stated that the excursion was well attended, and a large number of spring-flowering plants were met with, including several species of orchids.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. Wilfrid B. Alexander, Queen's College, Carlton, and Mr. H. Clinton, 605 Flinders-street, Melbourne, were duly elected as ordinary members, and Mr. T. O. Murphy, Charlton Road, St. Arnaud, and Mr. J. F. Thomas, Tenterfield, New South Wales, as country members of the Club.

GENERAL BUSINESS.

The president briefly referred to the progress made since the previous meeting in connection with the wild-flower display in the Melbourne Town Hall on 3rd October. From the promises of support extended to the committee, he had reason to believe that the show would be a huge success.

REMARKS ON EXHIBITS.

Mr. F. Chapman, in referring to his exhibit of the new modelling clay, "Modela," said that, upon placing a particle of it in a little water, under a microscope with a high power, he was greatly surprised to see a mass of well-preserved coccoliths. These problematic algæ, looking like tiny shirt-studs, form the bulk of many chalks, nowithstanding the text-book dictum that chalk is chiefly made of Globrigerina shells. From the appearance of these coccoliths, and their abundance, One might suppose them to come from the English chalk, especially as they resemble those found in the whiting of commerce, which is possibly the basis of this "clay." Plasticine, under the microscope, differs entirely in being composed of a starch, with comparatively huge grains and much earthy material. He remarked that both of these modelling clays are excellent for taking squeezes from fossils preserved as hollow moulds.

Mr. P. R. H. St. John called attention to his exhibit of a sample of oil from *Eucalyptus rostrata*, var. *borealis*, R. T. Baker, and stated that portion of the sample exhibited at the June meeting, bearing the name of *Eucalyptus rostrata*, had been submitted to Messrs. Baker and Smith, of Sydney, with very interesting results. They maintain that two forms of Red Gum exist—1, *Eucalyptus rostrata*, Murray Red Gum, and 2, *Eucalyptus rostrata*, var. *borealis*, River Red Gum. The first yields an oil containing less than 10 per cent. of cineol, with phellandrene, pinene, and a well-marked constituent named aromadendral. The second contains nearly 70 per cent. cineol, with pinene, but no phellandrene or aromadendral. So far no morphological differentiation has been detected between these two forms, which give such definite results from the examination of the oils. They state, also, that in time of drought cattle will eat the foliage of one, but not the other. Mr. St. John expressed his thanks to the above-named gentlemen for their kindness and trouble in examining the sample of oil submitted to them.

PAPERS READ.

1. By Mr. Eland Shaw, M.R.C.S., F.E.S., entitled "Australian Blattidæ, Part II."

The paper was read by Mr. J. A. Kershaw, F.E.S., who said that he did not intend reading the whole of the article, the principal portion of which was a detailed description of a male specimen of the cockroach determined as *Ischnoptera brunneonigra* by Mr. J. G. O. Tepper in 1895. He said that the author was doing excellent work in a slow and steady way among the Blattidæ. Much of his work was for the National Museum,

Melbourne, and the paper dealt with material therein. As the author pointed out, it was of great importance that type-specimens should be labelled in such a manner as to preclude the possibility of doubts respecting their identity occurring in the future.

2. By Dr. C. S. Sutton, entitled "A Sketch of the Flora of the Keilor Plains."

In dealing with the flora of the Keilor or basaltic plains, within a radius of 30 miles of Melbourne, the author sketched the boundaries of the area investigated, and touched upon its geological structure, physical features, and climatic and soil conditions. He stated that the area under review, about 900 square miles, had not the florestic attractiveness, even in its original condition, as the red-beds of the coastal plain, with which he had dealt some time ago in his papers on the Sandringham flora (*Vict. Nat.*, vol. xxviii., p. 5, and vol. xxix., p. 79). The vegetation of both areas had suffered to a great extent from human interference—the former more so than the latter, on account of the use to which the land had been put for agricultural and agistment purposes. Notwithstanding that these two adverse factors had been in active operation over a lengthy period, a good idea may yet be gleaned of the appearance and the constitution of its pristine flora from the surviving species sheltering in the canyon-like watercourses that traverse the area, and in the railway reserves, despite the annual burning-off. For the most part, the vegetation of the plains consists of tufted grasses, with low shrubs and herbs interspersed. The tree growth of the plains was very meagre. Of the few species of eucalypts that eked out a precarious existence, the most prominent is the River Red Gum, *Eucalyptus rostrata*, short-boled and gnarled trees with spreading limbs, possessing a quaint picturesqueness that seems to redeem the plains in their vicinity of some of their monotony. Though the average rainfall of the area is a little more than twenty inches annually, and this amount is said to be requisite to favour forest growth, wide stretches of the plains are treeless, and have been so since their formation. One of the most interesting features of the flora of the basalt plains, from the point of view of plant distribution, was the occurrence of a number of north-western and south-western plants. No record exists of these having been found in the country intervening between their present habitat and the area under review. Among these might be mentioned the Murray Pine, the Desert Cassia, the Buloke, and the Bull Mallee. Of the area embraced by the paper, 900 square miles, about 400 miles of its roads had been traversed, and 421 plants noted. The list, however, could probably be extended by further search.

The president, in complimenting the author on the result of his investigations, said the paper afforded a fine example of the manner in which a complete botanical census of a locality should be carried out.

Mr. F. G. A. Barnard, in supplementing the president's remarks, solicited information respecting the identity of the eucalypt that occasioned the isolated patch of medium-sized timber between Mount Mary and the Werribee River.

Mr. T. S. Hart, M.Sc., expressed himself to the effect that the plain flora adjacent to Melbourne had been a neglected subject in the past, and that Dr. Sutton was to be complimented on his exhaustive investigation of the area under consideration. The remnant of the plain vegetation still left should be carefully studied whilst the opportunity remains, as cultivation greatly changes the character of the vegetation. The plains at the beginning of summer present a wonderful display of flowers, and it was surprising to note the number of plants of North-Western Victoria that were to be seen. We appeared, however, to assume too readily that these plants had extended from the North-West. It had to be remembered that Victoria was at one time a land of low relief, and possibly the plants had a wider extension than they now enjoy.

Mr. J. G. O'Donoghue asked if the author had noted that the North-Western species of plants in the area under discussion were invariably found where the Miocene or Ordovician formation had been exposed by the denudation of the overlying basalt, and instanced the occurrence of the Murray Pine, Buloke, Cassia, *Senecio Cunninghami*, &c., in the neighbourhood of the Werribee Gorge, and the Murray Pine at Digger's Rest.

Dr. Sutton, in replying, said he had not noted the peculiarity mentioned by the hon. secretary, and was not acquainted with the forest of eucalypts referred to by Mr. Barnard.

NATURAL HISTORY NOTE.

Mr. F. Chapman, A.L.S., contributed a note from Private W. D. Chapman, on active service in France, which stated that the Red Bottle-Brush, *Callistemon lanceolatus*, which he had seen in Gippsland, is a very popular ornamental shrub in the north of France. Other Australian plants were noted, but not to the same extent as in the southern parts of the republic. The common Hydrangea, *Hydrangea hortensis*, in comparison with the plant as it grows in Victoria, is small and weedy in appearance.

EXHIBITS.

By Mr. W. T. Bennett.—Twenty-one specimens of Victorian limestones from the following districts:—Buchan, Orbost,

Benambra, Mansfield, Waratah Bay, Curdie's River, and Toongabbie.

By Mr. F. Chapman, A.L.S.—Specimen of the new modelling clay, "Modela," containing coccoliths from the chalk; an interesting micro-object.

By Mr. Geo. Coghill.—Flowering specimens of *Acacia melanoxylon*, *Acacia dealbata*, *Acacia verticillata*, *Acacia stricta*, *Acacia myrtifolia*, *Acacia juniperina*, and *Indigofera australis*, from Mooroolbark.

By Mr. H. W. Davey.—Fossil crab, *Ommatocarcinus coriocensis*, Cresswell, sp., from the Curdie's River lime quarries (Tertiary), Western District.

By Mr. C. J. Gabriel.—Marine shells from Japan, *Astralium* (*Guildfordia*) *triumphans*, Phil.

By Mr. T. S. Hart, M.Sc.—*Acacia linifolia*, from Cockatoo, showing fasciation.

By Mr. J. A. Kershaw, F.E.S.—Two specimens of *Ischnoptera brunneonigra*, Tepper, in illustration of Mr. Shaw's paper.

By Miss G. Nethercote.—Flowering specimens of *Thryptomene Mitchelliana* and *Bæckia plicata*, grown at Hawthorn.

By Mr. F. Pitcher.—Flowering sprays of *Acacia armata*, *A. acinacea*, *A. montana*, *A. leprosa*, *A. diffusa*, *A. myrtifolia*, *A. longifolia*, var. *sophora*, from the Melbourne Botanic Gardens; mounted specimens of *Acacia armata*, *A. myrtifolia*, *A. dealbata*, *A. stricta*, *A. juniperina*, *A. melanoxylon*, collected on the Bayswater-Ringwood excursion, Saturday, 9th September.

By Mr. J. Searle.—Marine Cladocera, from Western Australia.

By Dr. C. S. Sutton.—Two military contour maps, embracing the greater part of the county of Mornington.

By Mr. P. R. H. St. John.—Oil from *Eucalyptus rostrata*, Schl., var. *borealis*, R. T. Baker, River Red Gum, Vic. and N.S.W.; part of sample exhibited at the June meeting under the name of *Eucalyptus rostrata*.

After the usual conversazione the meeting terminated.

EXCURSION TO BAYSWATER.

THE excursion from Bayswater to Ringwood on Saturday, the 9th September, was well attended, about fifty members and friends arriving at Bayswater by the 1.35 p.m. train from Melbourne to take part in the outing, botany being its main object. Starting in a north-easterly direction towards the Dandenong Creek, the party had not proceeded far before

many early spring flowers were noted, such as *Anguillaria* (*Wurmbea*) *dioica*, *Hypoxis glabella*, *Ranunculus lappaceus*, *Brachycome cardiocarpa*, and *B. decipiens*. The charming flowers of the papilionaceous shrub, *Hovea heterophylla*, were everywhere, while its relative, the climber, *Hardenbergia monophylla*, was in good condition, and probably seen at its best. Passing through a belt of scrub, it was noticed that many of the eucalypt saplings were affected very much from the attacks of the larvæ of the Painted Cup Moth. At the Dandenong Creek it was observed that the introduced Blackberry Bramble, *Rubus fruticosus*, had in many places almost hidden from view some of our beautiful native shrubs, such as the Christmas Bush, *Prostanthera lasianthos*, and Snow Bush, *Olearia* (*Aster*) *stellulata*. Proceeding in a westerly direction, and re-crossing the railway reserve, a good view was obtained of the Silver Wattles, *Acacia dealbata*, growing along the banks of the creek. Other acacias, such as *A. armata*, *A. stricta*, *A. melanoxylon*, and *A. myrtifolia*, were in full bloom and much admired, especially the latter species, which scented the air for many yards round with its sweet perfume. Along the margin of the creek Exocarpos, Bursaria, Casuarina, Spyridium, Pomaderris, Melaleucas, and Leptospermums were in quantity. The Native Heath, *Epacris impressa*, was very plentiful, but the coloured variety was scarce. The Golden Bush-Pea, *Pultenæa stricta*, var. *Gunnii*, and Erect Guinea-Flower, *Hibbertia stricta*, were aflame with colour, and very plentiful. The Long-leaved Greenhood Orchid, *Pterostylis longifolia*, was very abundant, and of large size ; with it were found the orchids *Glossodia major*, *Diuris maculata*, and *Caladenia Patersoni*, var. *dilatata*, also *Correa speciosa*, var. *normalis*, which, though it has been blooming for some months, seemed at its best, the bells being apparently finer and larger than usual. During the walk about eighty species of flowering plants were noted. Of these the rarest were probably *Epacris microphylla*, *Sphærolobium vimineum*, *Comesperma ericinum*, *Glycine clandestina*, *Stackhousia linearifolia*, *Lobelia rhomboidea*, *Acacia tenuifolia*, *A. juniperina*, and *Panax sambucifolius*. Traversing the railway enclosure on the way to the station, many of the party gathered and made up large bouquets of wild-flowers, composed of Acacias, Heaths, Everlastings, Correa, &c., which, together with the so-called Sarsaparilla, made very pretty bunches, in which the Purple Eyebright and the yellow variety of *Daviesia corymbosa* were prominent. After a pleasant walk of about five miles, Ringwood station was reached in good time to catch the 6 p.m. train, by which most of the party returned to town, all well pleased with the outing and the favourable weather conditions.—J. W. Audas.

NOTES ON A TRIP FROM WALHALLA TO TALBOT PEAK, BAW BAW.

BY (MISS) G. M. L. NETHERCOTE AND (MISS) M. T. JOHNSON.

(*Read before the Field Naturalists' Club of Victoria, 12th June*, 1916.)

GOOD Friday dawned a wet, cold day, and only two out of a party of five ladies who had arranged to venture on a walking tour to the Baw Baw plateau took their seats in the Gippsland train. Arriving at Moe (80 miles) shortly before 11 a.m., we were informed that the Walhalla train, due to leave at noon, would most likely be a couple of hours late, as three more trains were expected from Melbourne; so, leaving our packs at the station, we ventured out into the town. But things were wet, gloomy, and cold, consequently we soon retreated to the station, there to await the narrow-gauge train which was to convey us the remaining twenty-six miles of our journey.

Shortly after leaving Moe, the Latrobe River is crossed, and some miles of swamp country passed through. Leaving this behind, we came to heath country, quantities of *Epacris impressa* being in flower, varying from light pink to deep red, bringing exclamations of delight from window-holders, while patches of Sunshine Wattles, *Acacia discolor*, in flower caused wonderment to those who believed the flowering of wattles to be confined to spring. Just beyond Moondarra the train drew up, as a couple of kangaroos were on the line, but the shrill whistle of the engine soon sent them seeking for shelter. The station at Erica (formerly known as Harris) is the highest on the railway (1,320 feet), and the nearest point to Baw Baw; but the extra train journey from here is alone worth the trip —the scenery more than repays for the three miles walk from Walhalla. The train winds in and out among the hills; the engine and guard's van almost touch on some of the bends. On one side rocky cliffs block out the view; on the other one looks down many feet into fresh, green gullies.

Walhalla (1,021 feet) is the relic of a once famous gold-mining town. From a population of over 2,000 people it has dropped to a few hundred. The town is built in a gorge along the sides of Stringer's Creek. It consists of one street, about two miles long, the houses being built on either side, with the hills rising abruptly behind. Many enjoyable days could be spent here visiting the many points of interest. Our plan was to visit Mount Erica, the south-eastern end of the Baw Baw plateau, so we covered what ground we could before daylight waned, including a visit to the famous sports ground, which is on top of a hill 550 feet above the town,

and is thus one of if not the highest sports grounds in Australia.

Next morning, at 5.30 a.m., with food, blankets, and camera strapped on our backs, we started on our fifteen-mile walk, the first three miles being along a well-made, splendidly graded road. No! it was not daylight, but the clear moonlight only added enchantment to an already glorious walk. Words cannot describe that walk—rocky cliffs on one side, while on the other, a hundred feet below, Stringer's Creek glittered like new silver, margined with bush growth, broken here and there by a ghostly poplar in pale-yellow autumn garb. Hills surrounded us, and just as we reached the bridge over the Thomson River daylight broke and lighted up a beautiful reach of the stream. Here we had descended to 700 feet—the lowest point on our journey. Turning sharply to the right, one finds oneself on a comparatively wide though rough track. A huge Narrow-leaved Peppermint, *Eucalyptus amygdalina*, had been blown down during the recent storm, and still remained across the track. The vegetation was similar to that around Gembrook, the Wire Scrub, *Baucra rubioides*, Limp Starwort, *Stellaria flaccida*, Prickly Coprosma, *Coprosma Billardieri*, Heath, *Epacris impressa*, and Golden Goodia, *Goodia lotifolia*, still being in flower in spite of the lateness of the season. Six miles out, at Parker's Corner (1,600 feet), we filled the billy and had breakfast. Several Flame-breasted Robins and Striated Tits hopped about near by, while a Kookaburra gave vent to uncontrollable laughter at seeing two girls enjoying a truly rural breakfast. The clouds which had hitherto enveloped Erica rolled back, and thus, with a blue sky and sunshine, we viewed Mount Erica for the first time. But stay! near the top white, glistening patches could be seen. Yes, and the air was decidedly sharp. With a shiver we quickly rolled up our packs, and started at a brisk walk, for soon we would be amongst the snow. The track dwindled out here, and we wended our way over more or less open, undulating country by the aid of blazed trees. A fair amount of time was spent at the head of the eastern branch of the Tyers River (1,460 feet). Here it was rather discouraging to find we were again lower than Parker's Corner, and that Erica still stood tantalizingly behind more foot-hills; but eventually we reached the foot, and Erica loomed above us. The "blazes" had stopped, and a well-defined foot-track lay before us. The undergrowth had become thick, very similar to that found round Warburton. A few belated flowers of the Christmas Bush, *Prostanthera lasianthos*, still lingered. Fine—very fine—trees towered some two hundred feet or more above us. Two Gang-Gang Cockatoos flew screeching across the track. The

liquid notes of the Harmonious Thrush were heard, and a White-throated Tree-creeper climbed round and round a neighbouring tree.

At the point known as "The Myrtles" (3,500 feet) we made for water, which was quite near the track. Some fine specimens of the Myrtle Beech, *Fagus Cunninghami*, and the Mountain Pepper, *Drimys aromatica*, were noted here. Half a mile further on, "The Rocks" (4,000 feet) were reached. Here a decided change is noticed in the vegetation; all large trees stopped abruptly. One could imagine oneself on a small point of Mount Buffalo, as huge granite boulders abounded everywhere. Birds were not plentiful before, but here they ceased altogether. At this point one of the main interests of the trip began. Hitherto the vegetation passed through could be seen nearer Melbourne; but, once above the 4,000 feet level, we began to meet the more alpine growths. A few odd flowers of *Richea Gunnii* and the Mountain Speedwell, *Veronica nivea*, were collected; but unfortunately the general flowering season was past.

The first patches of snow were now met with, and gradually the whole expanse became one white, glistening mass of snow. The silence was only broken by the rattle of the billy on one of the swags and the sharp yelp of a fox not far distant.

After leaving "The Rocks" the climb became more gradual. The twisted trunks and branches of the Snow Gums, *Eucalyptus coriacea*, added to the weirdness of the scenery. Reaching the top, we traversed for a short distance through boggy country. Clumps of Mountain Gentian, *Gentiana saxosa*, with their white flowers and brown stems, had pushed their way through the snow. Photographs were taken here, but standing caused the snow to thaw, with the result that it trickled in between the boot-laces; so, before reaching Talbot Peak (5,000 feet), we were a decidedly cold-footed company. A fine view was obtained here—Mount Howitt (in the main Divide), the Gippsland Lakes, Wilson's Promontory, and even the narrow strip of Anderson's Inlet were visible. Smoke was issuing from the chimney of the tourists' hut, for a party had not long arrived from the Warburton side. Owing to their kindness we were soon seated in front of a blazing fire, enjoying hot toast and tea. The return journey the next day was accomplished without adventure, and we reached Walhalla thoroughly pleased with our first glimpse of the Baw Baw plateau, and purpose revisiting it during the Christmas holidays, which will be a more favourable time for collecting botanical specimens.

AUSTRALIAN BLATTIDÆ.—Part II.

On the Type of Ischnoptera brunneonigra, Tepper, with a Description of the Male Insect.

By Eland Shaw, M.R.C.S., F.E.S., &c.

(*Read before the Field Naturalists' Club of Victoria, 11th Sept.*, 1916.)

In 1895 Mr. J. G. O. Tepper described this species from a ♀, and there is some doubt as to where his type is, as the National Museum, Melbourne, and the South Australian Museum, Adelaide, each regard their specimen as such.

The facts appear to be that in 1895 the National Museum, Melbourne, sent some Blattidæ to Mr. Tepper, of the South Australian Museum, for determination, and these, with the exception of some duplicates which he retained, were returned, with his labels attached, but in only one case (*Paratemnopteryx blattoides*, ♂), was the word "type" placed on any of the labels.

In his paper dealing with these specimens, in the *Trans. Roy. Soc. S. Aust.*, 1895, pp. 146–166, Mr. Tepper placed the words "Nat. Mus., Melb." after his description of each species of the Victorian collection, and the Melbourne Museum naturally asumed that he had in all cases used the returned specimens as his types. However, in 1915, after he had left the South Australian Museum, Mr. Tepper, at the request of the Museum, re-examined the whole of the species he had named, and marked the types and co-types as such; and amongst the Blattidæ he marked as his types five specimens originally included in those sent by the National Museum, Melbourne, and dealt with in his 1895 paper. These were :—

No. 20.—*Apolyta pallescens*, Tepp. (sex unstated).
No. 29.—*Apolyta marginata*, Tepp., ♂.
No. 44.—*Apolyta marginata*, Tepp., ♀.
No. 19.—*Ischnoptera brunneonigra*, Tepp., ♀.
No. 3.—*Choristima kershawi*, Tepp., ♀.

It is unfortunate that Mr. Tepper did not select his types at the time he described his species, and I think it possible that he originally regarded the Melbourne specimens as the types of these four species, but that a lapse of memory, after twenty years, brought about his marking the Adelaide specimens as such.

In his paper above referred to, Mr. Tepper, on p. 146, says, with reference to the Victorian collection :—"*The rare types of the latter are in the National Museum, Melbourne, when unique ; the remainder also represented in the S.A. Museum.*"

There is room for a difference of opinion as to his precise meaning, but I do not think he meant that some of the types were returned to Melbourne and some retained in Adelaide.

If he used all the specimens of each species before him in drawing up his description, then all such specimens were properly cotypes (*strictu sensu*), specimens equally historical with single types, and which should not be separated.

The matter should be cleared up without delay, and a definite pronouncement made as to where the types of these four species are. Perhaps the best course would be to assemble at one or other Museum all the specimens of each of these four species, and, if found in agreement with Mr. Tepper's descriptions, to regard them as *cotypes*, placing an additional label on each, clearly showing what has been done and when.

As regards *Ischnoptera brunneonigra*, Tepp., the Melbourne and the Adelaide specimens are both females. The male, which has never been described, I discovered at Healesville, in Victoria, and now append a description of it :—

SUB-FAMILY—PSEUDOMOPINÆ.

GENUS—ISCHNOPTERA, Burm.

ISCHNOPTERA BRUNNEONIGRA (male). Female—Tepper, Trans. Roy. Soc. S. Aust., 1895, p. 155.

Head, with the vertex and frons, pale brown, terminal joints of the palpi paler. Eyes black. Antennæ brown, with the distal half of each joint paler, giving the antennæ an annulate appearance ; this is most marked in the proximal 6 or 8 joints, which are nitid, and not so densely ciliate as the distal joints. Pronotum trapezoidal, exposing the vertex ; sides deflexed, brown, shining, much darker laterally and posteriorly. Tegmina extending beyond the apex of the abdomen, brown, shining ; discoidal sectors 9, longitudinal, anterior one bifurcate ; costals 18. Wings hyaline, anterior portion infumate, veins brown ; the anterior radial vein bifurcate beyond the middle ; the posterior radial vein simple ; ulnar vein with one incomplete ramus towards the dividing vein, and four complete rami to the margin of the wing ; first axillary vein tri-ramose ; apical triangle inconspicuous. Abdominal tergites brown, shining, darker laterally and posteriorly ; first and seventh tergites with medial gland openings ; posterior margin of the sixth tergite arcuate. Supra-anal lamina dark brown, shining, produced, posterior margin prolonged into a rounded point. Sub-genital lamina brown, shining, ample, extending beyond the supra-anal lamina, somewhat asymmetrical, being fuller on the right side ; furnished with two broad-based conical styles, placed one medially and the other on the left side. Abdominal sternites brown, shining, with the lateral margins much darker than the disc. Legs pale brown, anterior femora on the anterior borders with four large spines occupying the middle third, succeeded

distally by a row of smaller spines. Formula of genicular spines, 0, 1, 1.

Length.—Body, 11 mm.; tegmen, 10.5 mm.

Cotypes, ♂, two in my collection.

Habitat.—Healesville, Victoria, Australia, Nov. and Dec., 1912.

The gland openings on the first and seventh abdominal tergites appear to be double, placed side by side, not single as in *Ischnoptera australis*, Sauss.

The description is drawn up from two cotypes, neither of the two specimens in my collection being perfect. They were captured from the insides of rather damp, rotting, fallen tree-trunks, the interiors of which were of almost the same colour as the insects.

Wynnum South, Queensland.

Exhibition of Wild-Flowers.—Notwithstanding the severe handicap of seven days' almost continual rain immediately preceding the date fixed, the exhibition of wild-flowers by members of the F.N.C., in the Melbourne Town Hall on 3rd October, in aid of the Y.M.C.A. National Appeal in connection with its war work, was an unqualified success. The exhibits were in abundance, the attendance splendid, and the monetary result will exceed all expectations. Details of the exhibition will appear in the next *Naturalist*.

The September Floods.—The heavy rainfall of September, 1916, in Melbourne amounting to the abnormal quantity of 793 points, will be long remembered by the floods which it caused, not only in the Yarra, but in many other streams throughout the State. In connection with natural history and the floods, the question arises what effect will they have on the fauna during the ensuing twelve months. Doubtless many snakes have been washed out of their winter retreats and drowned. Their loss is not regretted by most people, nor yet that of the rabbits which also lost their lives by drowning. But the question arises to the pond-life man, will he be able to find his favourite species in its accustomed haunts? It will be interesting to have reports from workers during the coming summer as to the distribution and prevalence of species in the various localities they are acquainted with, as compared with normal seasons. It seems hardly likely that after a favourite lagoon has been covered by twenty feet of water, for nearly a week in many cases, that the pond-life there will be as numerous or as varied as it was before. The question is one that might well be systematically investigated during the next few months.

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, 9th October, 1916.

The president, Mr. F. Pitcher, occupied the chair, and about 50 members and visitors were present.

REPORTS.

A report of the excursion to the You Yangs on Saturday, 16th September, was made by one of the leaders, Mr. R. A. Keble, who stated that a number of members and friends took part in the outing. The party left town by the 6.30 a.m. train, reaching Little River at 7.40, and immediately set out for Station Peak, the crest of which was attained about mid-day. After spending some time viewing and dealing with the physiography of the surrounding country, a leisurely descent was made, and a northerly course maintained till a small spring was reached. In the immediate vicinity of this spring a number of skinning flakes, scrapers, &c., relics of the aboriginals, were picked up. The party left the reservation about 3 p.m., returning to town by the 6 p.m. Geelong train.

Mr. P. R. H. St. John reported that the visit to Mr. A. Rutter Clarke's garden at Toorak on Saturday, 23rd September, had to be abandoned, owing to the very wet weather prevailing on that date.

A report of the Digger's Rest–Sunbury excursion on Show Day, 28th September, was furnished by one of the leaders, Mr. A. L. Scott, who said that for several days previous to and including Wednesday, 27th September, the weather was so very unsuitable for outdoor recreation that it was not expected many members would attempt to catch the 6.40 a.m. train at Spencer-street for Digger's Rest on the 28th. As was anticipated, the attendance was *nil.* He, however, went on to the appointed rendezvous, lest any enthusiast should join the train along the line. Proceeding to the Graptolite beds on Jackson's Creek, he found the stream running a "banker," and most of the islands in its bed submerged. Here he spent an hour or so, and then retraced his steps to the station in time to return by the 9.45 a.m. train to the city. On the whole, he enjoyed the brief outing, for, although the ground was sloppy underfoot, the sun and air were pleasant, and the birds extremely vocal. A remarkable experience was the immense numbers of caterpillars met with either drowned in

the numerous puddles or crawling over the rain-sodden earth, into which many of them were trodden at every step.

A report of the excursion to Cheltenham on Saturday, 7th October, was given by the leader, Mr. J. R. Tovey, who said that there had been a good attendance of members and friends. Those interested in botany were well pleased with the afternoon, while those who devoted their attention to pond-life had done extremely well.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Marion Gregson, 2 Fetherston-street, Armadale, Miss R. Carter, 17 Claremont-crescent, Canterbury, and Mr. Alfred Harley Blake, Ivanhoe, were duly elected as ordinary members of the Club, and Miss Doreen Nason, "Kurring-gai," South Wangaratta, as an associate.

GENERAL BUSINESS.

The hon. treasurer, Mr. Geo. Coghill, in making an interim report on the financial result of the recent exhibition of wild-flowers, said that a considerable sum of money, on account of the sale of tickets, was still outstanding, and several accounts for expenditure incurred and labour done had not yet been rendered him. Nevertheless, he felt assured that a profit of at least £115 would be made.

The president complimented the meeting on the splendid result achieved, and thanked members and others, collectively and individually, for their co-operation and assistance on the occasion. A number of votes of thanks were then proposed and passed, having for their object the recognition by the Club of the valuable services rendered by members, their friends, various societies, and the Melbourne press.

REMARKS ON EXHIBITS.

Mr. E. E. Pescott, F.L.S., drew attention to his and Mr. C. French's exhibit of thirteen varieties of the common Spider Orchid, *Caladenia Patersoni*, R. Br., which showed a remarkable variation of colour, form, and stature. The colours ranged from white, pink, and red to green and brown. The form variation showed extreme difference in both width and length of the petals and sepals; whilst the height of the plants ranged from three to fifteen inches. At the same time, the true distinction of the species, the six rows of calli on the labellum, was constant throughout.

Mr. J. A. Kershaw, F.E.S., in referring to his exhibit of a Serpent Eel, *Ophisurus serpens*, Linn., said it had been captured in Hobson's Bay, and had not been previously recorded from Victorian waters. As a rule, it was generally found in sandy localities. The chief feature of interest possessed by the

specimen was the abnormal development of the head, induced by an injury sustained at a very early stage of the creature's existence.

PAPERS READ.

1. By Mr. H. W. Davey, F.E.S., entitled "Upsetting the Balance of Nature."

The author pointed out that, though the evils, in many cases, attendant upon the acclimatization of Old World forms of fauna and flora in Australia and New Zealand have been the theme of many writers, the subject is one that continues, and must still continue, to claim the attention of naturalists. In deploring the gradual displacement and probable extinction, at a not distant date, of our native Blackfish, *Gadopsis marmoratus*, from many of the Victorian streams, where once it reigned supreme, by the introduced Perch, *Perca fluviatilis*, the author expressed the opinion that it appeared to be a natural law that introduced species should displace the indigenous kinds. Many instances of this interesting feature might be cited, from man downwards: but, so far as our native Blackfish was concerned, there seemed to be no good or sufficient reason to hasten this deplorable end by introducing the voracious and practically useless Common Perch into the creeks and rivers, as was now being done by the ill-advised actions of country residents throughout the State. The ultimate extinction of the Great Brown Kingfisher, *Dacelo gigas*, despite the protection accorded it by the Government, by the introduced Starling, *Sturnus vulgaris*, was foreshadowed, provided the natural conditions at present prevailing held sway long enough. No action is being taken to check the pest, and when, as will inevitably happen, the increasing myriads of starlings overtake their food supply, the damage they will then occasion the agriculturist will be incalculable.

Mr. G. A. Keartland expressed himself as being in accord with the author respecting the ultimate result of the struggle for existence now in progress between the native and the introduced fauna. He, however, did not agree with the theory advanced as to the disadvantage under which the Kingfisher and the Rosella were said to labour when brought into competition with the Starling. The reason why the Starlings increased, to the disadvantage of the Kingfisher and the Rosella, was solely due to the circumstance that they commenced to nest as early as July. Consequently, when the time came for the two native birds mentioned to seek hollows wherein to incubate their eggs, they found them occupied. Furthermore, Starlings are so filthy in their habits that few native birds will nest in a hollow vacated by them. Some few years ago one could readily obtain a dozen or more nests of the Rosella

in a very small radius at Thomastown. Now the Starling has complete possession of the holes and hollow spouts in the gums, and the Rosella is seldom or never seen.

Mr. J. Searle said he thought that few of our fish deposited their eggs on the bottom. They float on the surface of the water, and may be taken in large numbers by one using a tow-net.

The president, Mr. J. Gabriel, Mr. A. D. Hardy, and Dr. C. S. Sutton also contributed to the discussion.

2. By Mr. Percy Sharman, B.Sc., entitled "The Structure of Some Australian Orchids."

By means of blackboard sketches, illustrated drawings, and microscopic sections, the author dealt with the internal structure of several common species of that highly interesting genus of orchids popularly known as "Greenhoods." For many years, he said, confusion had existed in the classification of the genus Pterostylis, and in endeavouring to secure a natural classification it was decided to try if any fundamental differences existed in their internal structure. The examination of microscopic sections of root, stem, leaf, flower, &c., revealed no distinctive differences between members of the genus, but disclosed some interesting features in the structure. The floral parts were next examined. These led to the conclusion that Bentham had grouped together, under one species, several which should be distinct. The relative positions of *Pterostylis revoluta*, *P. reflexa*, *P. constricta*, *P. præcox*, and *P. præcox*, var. *robusta*, were shown, and it was pointed out how difficult it was to draw quite hard and fast rules, since evolution is still taking place in the genus. Reference was made to the latest addition to the group, *Pterostylis Toveyana*. This orchid had been named by Professor Ewart in honour of its discoverer, Mr. J. R. Tovey, of the National Herbarium, who had secured specimens of it every year since 1907.

Mr. E. E. Pescott, F.L.S., congratulated Mr. Sharman on the very able and interesting way in which he had dealt with the internal structure of the Greenhoods. In the course of his remarks the author had referred to the absence of stomata in the galea. This peculiarity, he believed, was not noted in orchid literature. Professor Ewart, he considered, was justified in separating *P. revoluta* and *P. reflexa*.

Mr. J. Searle said he had been very interested in the author's remarks, and thought that Mr. Sharman's was the first botanical paper in which an author had attempted to illustrate the internal structure of a plant.

EXHIBITS.

By Mr. F. G. A. Barnard.—Commonwealth military maps of Sunbury, Melbourne, and Ringwood.

By Mr. C. Gabriel.—Marine shells from Victoria—*Pecten medius*, Lam., *Chlamys undulatus*, Sby., *C. asperrimus*, Lam., *C. bifrons*, Lam., *C. aktinos*, Pett., *Cyclopecten favus*, Hedley.

By Mr. T. S. Hart, M.A.—Commonwealth military map of Ringwood.

By Mr. F. Keep.—Herbarium specimens of 30 species of Grampian plants.

By Mr. J. A. Kershaw, F.E.S., for National Museum.—*Ophisurus serpens*, Linn., Serpent Eel, from Hobson's Bay, Victoria.

By Miss G. Nethercote and Mr. C. J. Gabriel.—Flowering specimens of *Thryptomene Mitchelliana*, from the Grampians.

By Mr. E. E. Pescott, F.L.S., and Mr. C. French, jun.—A series of 13 varieties of the terrestrial orchid, *Caladenia Patersoni*, R. Br., showing variations of form, colour, and stature.

By Mr. C. L. Plumridge.—Garden-grown specimens of *Tecoma australis*, *Prostanthera nivea*, and *Phebalium squameus*.

By Miss Patrick.—Dwarf form of *Pterostylis revoluta*, from Ringwood.

By Mr. F. Pitcher. — Blooms of *Acacia saligna*, Wend., Golden Wreath Wattle, Western Australia, and *A. salicina*, Lind., var. *Mayæ*, Shrubby Cooba, South Australia, grown at Melbourne Botanic Gardens ; also branches of *Acacia acinacea* covered with berry-like galls of insect formation, which are more prevalent this season than usual.

By Mr. P. R. H. St. John.—Herbarium specimen of *Comesperma volubile*, Labill., Love Creeper, pink-flowered form (usually light blue), collected by exhibitor at Frankston, 16th September, 1916 ; also fresh specimen of bloom of *Ixia viridiflora*, Persoon, Green-flowered Corn-Lily, South Africa, showing typical, double, and twin flowers on one spike or inflorescence, grown by exhibitor at South Yarra.

By Mr. J. Searle.—Long-limbed Water-bug, Ranatra, sp., infested with nymphs of a water mite—Hydrachna—and living Hydrachna hatched from nymphs, collected at Cheltenham, 7/10/16.

By Dr. C. S. Sutton.—*Pimelea pauciflora*, R. Br., Scanty-flowered Rice-flower, collected between the Djerriwarrh and Coimadai Creeks.

By Mr. P. Sharman.—Nine illustrative drawings of *Pterostylis præcox*, and numerous microscopic sections of same illustrated by nine microscopes.

By Mr. H. Whitmore.—Ground aboriginal axe, from Wartook ; bark of *Pimelea axiflora*, from Grampians, used by residents for tying up bundles ; also a number of geological specimens from the Grampians and from Thorpdale.

After the usual conversazione the meeting terminated.

EXCURSION TO CHELTENHAM.

FAVOURED by a fine afternoon, about forty members and friends took part in the excursion to Cheltenham on Saturday, 7th October. The route followed was through the Cheltenham Park, thence to the heathy ground beyond. Over fifty species of shrubs and plants were noted in flower or fruit, of which the following are worthy of mention: — The Myrrh Tea-tree, *Leptospermum myrsinoides*, and the Coast Tea-tree, *L. lævigatum*, were flowering in great profusion, as was also the Wedding Bush, *Ricinocarpus pinifolius*. The Blue Squill, *Chamæscilla corymbosa*, looked charming amongst the grass and undergrowth. Of the Leguminosæ, which is well represented in the district, the Hairy Aotus, *Aotus villosa*, Gorse Bitter Pea, *Daviesia ulicina*, Grey Parrot Pea, *Dillwynia cinerascens*, and Late Black Wattle, *Acacia mollissima*, were seen at their best. Three members of the Pimelea family were noted —viz., Dwarf Rice-flower, *Pimelea humilis*, Hairy Rice-flower, *P. phyllicoides*, Downy Rice-flower, *Pimelea octophylla*. Two fine specimens of the Kangaroo Apple, *Solanum aviculare*, proved of great interest to the party. A few patches of the Wild Parsnip, *Didiscus pilosus*, were also observed. This plant has been credited with poisonous properties, but recent investigations have disproved this opinion. Amongst the Compositæ, the Curling Everlasting, *Helichrysum scorpioides*, the Big Billy Buttons, *Craspedia Richea*, and the Large Podolepis, *Podolepis acuminata*, were fairly plentiful. Four members of the Orchidaceæ were collected—viz., the Larger Glossodia, *Glossodia major*, the Spider Orchid, *Caladenia Patersoni*, the Yellow Hood Orchid, *Thelymitra antennifera*, and Tall Diuris, *Diuris longifolia*. The Milkmaids, *Burchardia umbellata*, and the Early Nancy, *Anguillaria* (*Wurmbea*) *dioica*, were met with everywhere. Some of the party devoted their attention to pond-life, and Mr. J. Searle has kindly given me the following notes on their captures. He says:—"Although the winter and early spring had been remarkably rainless, and only two weeks had elapsed since practically the first rain fell on the sandy soil of Cheltenham, the shallow depressions were found to be teeming with aquatic life, the beautiful phyllopod, *Enlimnadia dahli*, being the most common and already measuring five-sixteenths of an inch in length. When it is remembered that most of the pools around Cheltenham had been dry for two years or more, the number of specimens taken was most remarkable. The list includes *Enlimnadia dahli*, *Lynecus macleayana*, *Simocephalus gibbosus*, *Ceriodaphnia rotunda*, Camptocercus, sp., *Boeckella oblonga*, *Brunella australis*, *Cyclops albicans*, *Cypris leana*, and *Cypridopsis minna*. The larvæ of Tanypus and Chyrononus were very abundant, while frog-

spawn was hatching in masses everywhere. In the yellow waters of a small dam the elongated bug, Ranatra, sp., was found covered with the nymphs of a water-mite, Hydrachna, sp." It is to be regretted, from a naturalist's point of view, that this splendid collecting-ground, so close to Melbourne, is yearly becoming more circumscribed by the advance of building operations, and in the course of a few years will practically be lost for ever.—J. R. Tovey.

EXHIBITION OF WILD-FLOWERS.

When the announcement was made that the committee of the Field Naturalists' Club had decided to hold the 1916 exhibition of wild-flowers at the Melbourne Town Hall on Tuesday, 3rd October, many members were disposed to regard the determination with misgivings. Yet, in recalling the wealth of flowers displayed in the hall, and the enthusiastic and appreciative concourse that surged round and about them, and later vied for their possession, how little occasion there was to fear that the undertaking would prove what members and their friends willed it to be—an unqualified success.

Preparations for the reception of the flowers were begun at the Town Hall on Monday afternoon, 2nd October, by Messrs. J. Gabriel, F. Pitcher, and J. Searle, and by 10 p.m. the decorative scheme and the arrangement of the display tables and kiosks were satisfactorily completed. Shortly after 9 o'clock on Tuesday morning a number of skilled workers began operations on the floral consignments as they arrived, and by noon had burdened the tables with an infinite variety of our native flowering plants and shrubs.

The Lord Mayor, Sir David Hennessy, in formally declaring the exhibition open, at 3 p.m., congratulated the Club on its fine display of Australian wild-flowers, which were a revelation to him, and undoubtedly to many others. The proceeds arising from the display were to be devoted to a commendable object —the Y.M.C.A. National Appeal—and he hoped the result would be alike satisfactory to the Club and to the Association.

The president, Mr. F. Pitcher, in outlining the aims and objects of the Club, expressed the opinion that but for the unfavourable weather that had prevailed during the week preceding the exhibition a brighter and a much more representative display of the native flora would have resulted.

All of the exhibits contributed by members or forwarded by their friends were admirable, and it is to be regretted that lack of space precludes according them individually the measure of praise their beauty and variety claim ; yet it would seem a grave omission to refrain from reference to the chief

floral attraction of the show—the Grampians exhibit. For so unique a collection of the choicest gems of our flora the Club and the visiting public were indebted to Miss G. Nethercote. Taking advantage of the opportunity afforded by the excursion, promoted by some members of the F.N.C., to the Grampians during the last week of September, she determined to enlighten the Melbourne public regarding the beauty of the flowers those highlands nourish, and to that end spared neither time nor energy in soliciting the co-operation of the residents of Hall's Gap, &c., in securing supplies of the most attractive species. The result of her efforts, in which she was ably assisted by Messrs. C. J. Gabriel, H. E. Coffey, C. Daley, and others, was revealed by the very beautiful and comprehensive collection of flowering plants and shrubs that was so much admired during the afternoon and evening.

The interesting and educative display made by the Microscopical Society calls for special mention, and the Club hastens to place on record its keen appreciation of the great service and assistance rendered by the energetic president, Mr. J. Searle, and other members of the Society. The splendid display so admirably arranged and carried out by the Society was probably the largest ever held in Victoria, 43 microscopes being arranged on a long table stretching right across the hall, and some 15 others could not be used for want of space.

The subject adopted for exhibition was "The Life of a Plant." Starting with the pollen grain, and the pollen attached to the stigma, the formation of pollen tubes and the fertilization of the ovule was shown, as well as the formation and ripening of the seeds. Then the germinating seed, formation of roots, root cap, &c., were shown entire and in sections. Next the growing bud, stem, leaves, hair, stomata, oil glands, developing bud, ovary, stamens, and perfect flower; and finally mitosis in the pollen mother-cells, showing how the pollen grains are formed, and incidentally how plants increase in size by cell division, completed the cycle. Professor A. J. Ewart kindly placed his micro. slides at the disposal of the Society, and his advice was of great value in arranging the display. Mr. P. Sharman, B.Sc., also rendered great assistance in interpreting the slides for non-botanical microscopists, and, with the help of some of the students of the Training College, in providing sketches of the sections under observation. Although visitors were three and four deep round the table waiting their turn to look through the microscopes, there was not the slightest confusion or congestion, as the stream of sightseers moved steadily in one direction round the exhibition, and were thus enabled to view the whole series and to realize that the beauty of a plant did not lie solely in its inflorescence, but that its hidden structure was equally worthy of our admiration.

The two kiosks, situated at the south end of the hall, one under the supervision of Miss J. Rollo, assisted by Misses Dunn, Vidler, Dickenson, and Sutton, and Mrs. C. Daley and Mrs. J. R. Tovey; and the other under the supervision of Mrs. Geo. Coghill, assisted by Mrs. Edmondson, Miss Sutton, and others. did a brisk business in the sale of button-holes and flowers, and eventually handed in the sum of £35 5s. 7d.

The confectionery stall and refreshment buffet, conducted by the Y.M.C.A., were well patronized, and realized a profit of £20.

The thanks of the Club are due to Miss Amy Fuller for arranging and carrying out the appreciated vocal and instrumental programme rendered during the afternoon and evening, to which she, as well as Madame Millie Tree Chapman, Misses Gill, Mahaffy, and J. and M. Moodie, and Messrs. J. Amadio and T. Minogue, so pleasingly contributed.

To Mr. F. Wisewould the Club is deeply indebted for the time he expended and the trouble and expense incurred in procuring and transmitting, from his country residence at Upper Pakenham, the young eucalypti, acacia, and native cherry growths that entered so largely into the decorative scheme.

The Director of the Melbourne Botanic Gardens, Mr. J. Cronin, is cordially thanked for the highly educational and attractive display of Australian shrubs and Victorian ferns; and Messrs. E. E. Pescott and C. French, jun., for their varied collection of orchids.

For the valuable assistance so cheerfully and ungrudgingly given by many ladies and gentlemen whose names do not appear in this brief and superficial sketch, the Club tenders them its keen appreciation and heartiest thanks.

It is expected that the display will result in a profit of at least £130.

In response to invitations, representative collections of wild-flowers were forwarded from the following States:—Queensland.—Brisbane (Dr. Freda Bage). New South Wales.—Sydney (Mr. J. H. Maiden, F.L.S., Director of Botanic Garden), Dural (Miss Todd), Circular Quay (Mr. C. C. Lance). South Australia.—Adelaide (Mr. A. G. Edquist). Western Australia.—Perth (Miss E. Richardson), Dumbleyung (Mrs. Geo. Buchanan), Serpentine (Mrs. A. C. Gill). Tasmania.—Hobart (Mr. J. Hardman, Director of Botanic Gardens).

Collections of greater or less extent were received from the following localities in this State:—Bendigo (Messrs. D. J. Paton and J. A. Dower, Mrs. W. Eskdale, Miss Foot), Wedderburn (Miss Eileen Gray), Dunkeld (Mrs. M. Woodburn), South Wangaratta (Miss Doreen Nason), Bannockburn (Miss Bertha Pilloud), Sale (Miss M'Kerrow), St. Arnaud (Mr. T. O. Murphy),

Frankston (Mr. J. G. Mann), Cheltenham (Mr. J. R. Tovey), Clayton and Oakleigh (Mr. J. W. Audas), Kiata (Misses Pearl, Ada, and Aimee Brooks), Upper Pakenham (Mr. F. Wisewould), Pakenham (Miss F. Hagens), Bunyip (Mrs. A'Beckett), Springhurst (Mr. Reid), Echuca (Mr. A. Jago), Murtoa (Mrs. H. Grinter), Elmore (Mr. A. W. R. Vroland), Portland (Messrs. W. H. Dillon and W. Stukbery), Marysville (Mrs. J. F. Kepple), Melbourne Botanic Gardens (the Director, Mr. J. Cronin), Emerald (Misses E. and I. Ferres), Evelyn (Mr. C. Oke and Mr. F. G. A. Barnard), Hall's Gap (Mrs. E. C. D'Alton and Mr. Barnes), Millgrove (Mr. J. Kierce), Grampians (Miss G. N. L. Nethercote and Mr. C. J. Gabriel), Fernbank (near Bairnsdale) (Mr. Geo. Coghill), Canterbury (Mr. F. Keep), various localities (Messrs. E. E. Pescott and C. French).

Other Exhibits.—Thirty-six samples of essential oils from Australian trees and shrubs were exhibited by Dr. H. Green and Mr. P. R. H. St. John on behalf of the Victorian Research Committee. The latter also exhibited four cases, showing fruits or seed-vessels of 64 species of Victorian eucalypts, while Miss Amy Fuller exhibited a large series of water-colour paintings of Western Australian and South African wild-flowers.

It is greatly to be regretted that it was found impossible to either name all the flowers exhibited or to place on record the more important species shown by the various exhibitors. This is due to the limited time for arranging the specimens, and the comparatively few members who were able to assist during the early part of the day.

ALPINE GIPPSLAND.

DARGO AND THE WONNANGATTA RIVER.

By Chas. Daley, F.L.S.

(*Notes of Lecturette*, 10*th July*, 1916.)

At the July meeting of the Club I gave a series of brief explanations of a number of lantern slides illustrative of alpine Gippsland, more particularly the Mount Wellington and Dargo districts. As the former locality has been the subject of two or three papers in the *Naturalist*, I purpose confining these notes to Dargo and the Wonnangatta River, as up to the present that portion of Gippsland has been unnoticed in our journal.

It was on a September vacation that, in company with a friend, I started from Stratford to walk to the township of Grant, 67 miles distant, *via* Dargo Flat, thence down the Crooked River, reaching the Dargo road again at Waterford. The country between Stratford and Stockdale is fairly well

settled, and not of great interest, red gum, stringy-bark, and yellow box being the chief eucalypts. Approaching Stockdale, for some miles there is an undergrowth of thick scrub, gay with wild-flowers, and comprising most representatives of the typical flora of the Gippsland scrub near the foothills—viz., *Cassinia aculeata*, *Correa speciosa*, *Hovea heterophylla*, *Comesperma volubile*, *Goodenia ovata*, *Helichrysum lucidum*, *Epacris impressa* (in varied tints), *Indigofera australis*, *Tetratheca ciliata*, *Platylobium obtusangulum*, &c. The composites, legumes, Droseras, and Heath-Myrtles were well represented, and this area should well repay botanical research.

We reached Stockdale (16 miles) in time for a good tea. From here the road immediately rises into the densely-wooded ranges, where the Golden Wattle was in profuse bloom on each side of the road. A year before, a destructive bush-fire had raged through the district, and the scorched gums, after the winter rains, were freely sprouting with accelerated energy, the glossy green leaves forming bunches of tender vegetation on the stems of the trees, giving a pleasing effect as the sunshine played on and through them. An interesting conglomerate formation is found shortly after leaving Stockdale, being part of the geological formation of the Carboniferous or Upper Palæozoic era, which extends from Iguana Creek to Mansfield, including the Wellington Range. Alluvial gold has been obtained from this conglomerate, which is peculiar in the respect that in some of the rounded stones are *impressed* other pebbles. A hill is passed over which, with its red shales, is also part of the same geological series. The track, which keeps high up on the range, winding in and out, with steep fall to the valleys beneath, is well shaded by the forest timber. It is wide enough for the passage of one vehicle, and, as the fall of a tree across the track through wind or fire is a frequent occurrence, it is usual to carry an axe in vehicles using the road, otherwise much delay may be caused by the obstruction, the slope from the road being too steep to pass if off the track. From this, known as the "Insolvent Track," a fine panorama of forest, valley, and mountain is seen, especially westwards, towards Walhalla, about 50 miles distant; Lake Wellington is also visible southward through the trees. About Mount Difficulty —which does not belie its name—the climbing is very steep. On the hilly side of the track the Spurious Sarsaparilla hung in festoons; *Hovea heterophylla*, *Veronica perfoliata*, and *Boronia myoporoides* bloomed profusely. In the deep valleys, ferns and bracken, musk and hazel, made a dense undergrowth, and the course of creeks could easily be traced by the golden tint of the wattles in contrast with the green of the gums, mostly stringy-bark, box, ironbark on the ridges, with

white gum, a little red gum, and peppermint in the valleys. Wonga Pigeons repeatedly flew across the track, this fine bird frequenting the new foliage on the fire-blackened gums. Eight miles along he track I was tempted by the sign, "Water," on a tree, to descend into one of the valleys, where a well had been sunk and a pump erected. Although the distance was not great, it took half an hour to get back on the track.

Towards "Gee's Junction" a granite formation occurs, with a slight change in the flora. "Gee's," 16 miles from Stockdale, was the only sign of habitation along the road. I found that the owner was away, leaving the accommodation open to all and sundry who passed. I called for a drink of water, and a carrier who was camped there wanted me to stay; but I decided to push on past Cobannah Creek to Bulgoback, five miles further on. This creek had a good flow of water, and its fern-clad banks and dense vegetation, with the Silver Wattle marking its course from the mountains with the outpoured lavish gold of spring, made a picture of delight. Past Cobannah Creek, fern and musk, wattle, trailers, with gums towering above the verdure, were features of the road. Budgee Budgee, an old alluvial diggings, was passed, tunnels showing where the workings, now overgrown, had once been.

Darkness had fallen when I reached the top of the very steep descent to Hardy's Hotel at Bulgoback, where I stayed for the night. The morning was typical of spring. The air was balmy: the dew on the grass and flowers; birds were singing gaily, and the sun's rays were genially but not unpleasantly warm. Bulgoback is a pretty spot on a shady creek. It is well wooded, a fine forest of mountain ash being in the vicinity. From here to Dargo rabbits were very numerous. A few miles farther on granite again outcropped in succession to the Ordovician. I passed a log hut on the road with the legend, "State School No. ——." on it. It was used by some rabbit-trappers as a sleeping-place. At a farm on the road, where I stopped for a few minutes, a man was skinning some kangaroos recently shot. At the request of some interested persons the protection given to kangaroos had been suspended for a month, and, under certain restrictions, to guard against indiscriminate slaughter, property-owners could shoot the animals. The result was that over 1,000 skins were sent to Melbourne for the month, and the request for further suspension of protection was refused. In conversation with several persons, I found there was a difference of opinion in regard to the damage caused by kangaroos. It was said the opportunity was taken to get rid of a number of skins which otherwise could not legally have been disposed of. As there is such a large area of unused and undeveloped forest country,

I do not think the kangaroos can do much harm. I passed one lot of seven browsing in a valley below the track. A pretty mountain stream is the Castleburn, which, skirting the ranges, flows into the Mitchell. There are several farms on the flats through which it flows. Pardalotes were in great numbers along this creek.

Approaching Waterford, past rocky hills, one sees the Mitchell River for the first time, wattles and willows along its stony course. On the flat, amid the scrub of thistle, bracken, and blackberry, were hundreds of rabbits of all colours and shades, in greater numbers than I have ever seen them. They, and not the native fauna, are the farmer's worst enemy. A fine bridge crosses the Mitchell at Waterford. From the river there is a gradual rise up the track until one comes to The Gap, then a long, winding course into Dargo Flat, evidences of old mining operations being seen along the road.

Dargo is a picturesque town surrounded on every side by mountains, its elevation being only 400 feet above sea-level. Here, again, granite and Ordovician are in contact, the former outcropping here and there. The Dargo is a clear mountain stream, with wattle and willow along its banks, fields of maize, potatoes, millet, &c., along the river flats. Staying at the Dargo Hotel, I got every attention and comfort. During the day spent there I made a short excursion along the road to Omeo in one direction, and to the granite hills in another.

Next morning, with promise of a beautiful day, the *wunderlust* again seized me; and, leaving pleasant, peaceful Dargo, I shouldered my pack and set out for Grant, in the mountains, 16 miles distant. Following the river for some distance, I found the track soon rose rapidly and circuitously with the winding of the Dargo River, on which I saw the Water Lizard, *Physignathus howittii*, a frequent denizen of the water-courses. It has the appearance of the Lace Lizard, but always keeps near or in the water. The view from the ascending track was a splendid one, especially up the Dargo River, with its fern gullies and heavily-timbered adjacent slopes. This track, fifty years ago, was very busy with prospectors, but now is seldom used. His Majesty's mail, in the person of two horsemen, overtook me; one was going to the Crooked River, and the other to the Dargo High Plains. They kept me company for a little while, then passed on, kindly carrying my pack with them to Grant. I found the ascent difficult, as in the sixteen miles there is a rise of 3,600 feet. Woollybutt and Snow Gums were the chief eucalypts, the contrast between these trees being very pleasant as the sun shone through the close verdure on the greens and greys.

Passing the Dargo High Plains road on the right, I reached

Grant, and received a hearty welcome at the hotel. The township, named after the Hon. James Macpherson Grant, one of our earlier and much-respected public men, was founded in 1864. Previous to this a lone shanty had been the only sign of settlement. In 1861 Mr. A. W. Howitt had discovered alluvial gold in the Good Hope Creek, and an alluvial rush set in to the Crooked River. In 1864 the Alpine Expedition to open up tracks for prospectors in the mountains was sent by the Government to the Crooked River. Thence over 200 miles of mining tracks were made by the party, under Angus M'Millan, the discoverer of Gippsland, as far as Omeo to the north-east and to connect with Harrietville over the Snowy Plains to the north-west. Whilst track-cutting at the Crooked River, gold in the quartz was discovered in the Pioneer reef by the party, and the result was a great influx of diggers. Over 200 reefs were opened, and the camp which had been formed at Skye, or Mount Pleasant, became the prosperous mining town of Grant, which in 1865 had a population of thousands. "Ichabod!"—at my visit there were only *two* residents. Year by year after the gold fever had subsided the population dwindled, and the once busy town of the "roaring sixties" sank into nothingness. The town, 4,000 feet above sea-level, stands facing the spur which connects with Mount Wellington. A fine view is obtained of Snowy Bluff, Mount Kent, and Castle Hill—all high mountains, snow-clad in winter, bold and rugged in outline. The district is rich in gold, but its distance from railways, difficulty of access, and the working-out of the lodes near the surface, have prevented further development. The bush is encroaching more and more upon the town, and it is not improbable that, like other decadent mining centres, it will in time completely disappear.

From Grant the track leads down to Talbotville, on the Crooked River, a tributary of the Wongungarra, which, flowing south on the west of the high plateau containing the Dargo High Plains, joins the Wonnangatta, or Big Water, the chief affluent of the Mitchell. From Talbotville, also a decadent mining centre, M'Millan's track leads up the Wonnangatta River about 30 miles to "Bryce's," one of the outposts of civilization in the wilds. This river has eaten deeply into the ancient lofty plateau which forms the alpine system of North Gippsland, and is, here and there—as on the Dargo High Plains, Snowy Plains, Mount Useful, and Mount Lookout—capped with the residuum of a basaltic flow over the Ordovician, Carboniferous measures, and Miocene gravels.

A mining track goes over the Snowy Plains, past Mount Tamboritha, right near the head of the Wonnangatta River, which rises to the north-east of Mount Howitt. From the

latter mountain, 5,715 feet high, a fine panorama extends. Northwards, over the Divide, is the Buffalo River; the basins of the King and Howqua Rivers can also be seen, whilst southwards is the rugged valley of the Wonnangatta, with its bluffs and gorges. Snow Gum, Cider Gum, and occasionally Woolly-butt, are the chief timbers—the former eucalypts much dwarfed on the wind-swept heights; whilst along the sheltered stream and valleys Flooded Gum, White Gum, Stringy-bark, Ironbark, Peppermint, and Silver-top occur. Acacias are chiefly the Black and Silver Wattles, Blackwood, *A. implexa*, and *A. alpina*. In some places the Broad-leaved Native Hop, *Daviesia latifolia*, forms quite a scrubby undergrowth. *Callistemon salignus*, *Leptospermum myrsinoides* and *L. scoparium*, *Kunzea pedunclaris*, *Bursaria spinosa*, *Exocarpos stricta*, *E. cupressiformis*, typical fern vegetation, and musk and hazel, mark the course of the river. On the highlands where the low heath plants can exist are found many species of Leguminosæ, Helichrysums, Epacridæ, Olearias, Pimeleas, and Orchidæ, and lowlier plants. It was pleasing to see the humble woodland violet, *V. hederacea*, and its congener, *V. betonicifolia*, blooming at an altitude of over 5,000 feet. *Hakea acicularis*, with its spare, thorny foliage, is specially suited for growth on the wind-swept heights. Perhaps the most common plants on the ranges are *Veronica perfoliata* and the sweet-scented Stackhousia. *Thelymitra aristata* was the most common of the orchids.

From Talbotville a track above the river leads down the eastern side of the Wonnangatta, giving a varying panorama of the valley and ranges. At one place, Mount Wellington, to the west, with its capping of snow, could be plainly seen; and the bold range on the western side of the valley was an ever-changing picture as the September sun shone fitfully, placing it in "shadow or shine," in a mist of vapour or a veil of rapidly dissolving cloud. From a notable outlook called "Gibraltar," Castle Hill seemed to be in the grasp of a driving snow-storm. Along the river flats cultivation is carried on, with splendid results, maize, lucerne, and potatoes being of high quality. Pigs and cattle can be reared well, a settler usually having part river flat and part hillside in combination. Going down this track I noticed *Persoonia confertifolia* in fine growth. At one place on the river an old "hatter," a Russian Finn, had a trap for catching eels, some of very large size; these he salted or dried for use, and treated Wombats in the same manner. Lower down, the Wonnangatta, joining the Dargo, forms the Mitchell. For a great part of its course it marks broadly the eastern boundary of the great Carboniferous system of rocks extending through to Mansfield, granitic and Ordovician measures lying east of its course.

The fauna of the district is not very diverse or abundant. Kangaroos are fairly numerous in the forests to Dargo; the Native Bear is seldom seen, a disease evidently being prevalent among them which has considerably reduced their numbers. Wallabies are only occasionally seen; Opossums have been almost exterminated; Native Cats, once so numerous, are nearly extinct; "Paddy-melons" extremely rare. The one animal that seems to maintain its own is the Wombat, whose tracks are seen everywhere. It is said to be on the increase. The Platypus, another protected animal, has been almost trapped out of the Gippsland rivers for its fur. Birds in some parts are fairly numerous. Wonga and Bronze-wing rise in whirring flight. Lyre-birds are to be heard, sometimes seen, in the fern gullies. I saw a beautiful tail for sale whilst in the mountains. The Satin Bower-bird is seen also along the rivers, and fairly tame. At Waterford a Blue Wren came on the floor of the room where I was having tea, and picked up crumbs fearlessly. A White-capped Robin kept me company for some distance on the way to Grant. At the Crooked River school, where I went to get a drink of water, a community of Choughs flew down with confidence. They nested in the school-ground, and I afterwards found that the children encouraged them. At Mr. Spall's, where I stayed overnight, two Harmonious Thrushes hopped about the kitchen door unafraid. Another tame bird was the Black-and-White Fantail, a universal favourite. Other birds noticed were the Friar-birds, or Leather-heads, now somewhat scarce, the Noisy Miners, Rufous Fantails, Acanthizas, the Bell Magpies (with nest), Kookaburra, White Cockatoos, Galahs, Blue Mountains, and the Lories, a few Magpies only on the clearings, the Eaglehawk, Brown Harrier, and Mopoke, a Black Duck, White-fronted Heron, and occasionally the Coachwhip-bird, from the safe shelter of thick foliage, sounded its passionate note. One misses in the mountain streams the "tink-tink" of the Bell-birds that haunt the lower reaches of the rivers and lake valleys. A Scarlet-breasted Robin was seen near the cairn on Mount Wellington, 5,363 feet above sea-level. On the ranges bird-life is not very abundant, but in the sheltered valleys along the water-courses, especially after daybreak, the forest warblers are frequently noticeable in song and flight.

"THE GUM TREE."—The issue of a high-class quarterly journal, under the above title, is announced by the Australian Forest League, Victorian Branch, for which a publication fund is being established. Particulars can be obtained from Dr. Heber Green, University, Melbourne.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary meeting of the Club was held at the Royal Society's Hall on Monday evening, 13th November, 1916.

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

REPORTS.

A report of the Croydon to Belgrave excursion on Saturday, 14th October, was made by the leader, Mr. F. Pitcher, who stated that fifteen members and friends took part in the outing. The coaches were utilized to the foot of Mount Dandenong, which was reached about 10 a.m. The road up the mount was taken leisurely in order to admire the views and collect specimens; among those gathered may be mentioned *Tecoma australis* and *Goodia lotifolia*. The trig. station (2,000 feet) was reached about 1 p.m. After lunch the road to Olinda was followed, thence through Sassafras and along the tourist track to the Sherbrooke Falls. A fine plant of the Silk-pod Creeper, *Lyonsia straminea*, which had recently been blown down with its tree support, proved a novelty to many of the party. The Belgrave track was then taken, and after a roadside tea the station was reached after a very enjoyable ramble of about twelve miles. About sixty plants were collected in flower, and a number of interesting birds and butterflies were recorded by Messrs. P. R. H. St. John and A. N. Burns.

The leader, Mr. J. Searle, stated that a party of twenty, comprising members of the Field Naturalists' Club and the Microscopical Society, took part in the excursion to Alphington on Saturday, 21st October. The afternoon proved an ideal one, and a considerable amount of interesting and instructive collecting resulted.

A report of the Coimadai to Lerderderg excursion on Saturday, 28th October, was made by the leader, Mr. J. G. O'Donoghue, who stated that a party of five journeyed to Bacchus Marsh by the morning train. After crossing the Lerderderg, it was decided, as the majority of the party were more interested in botany than in geology or physiography, to proceed up the river. The entrance to the Gorge was reached soon after noon. The steep face of the glacial deposit abutting the Ordovician was negotiated after lunch, and an equally steep descent made to the river on the latter formation. The

course of the stream was then followed for about a mile, the scenery on either side being much admired. Flowering plants and shrubs were numerous along the steep slopes and the narrow alluvial flats. Chief among the latter were the Violet Westringia, the Snow Bush, and the stalked and sessile-leaved forms of the Kangaroo Apple. Of the smaller plants, the Golden Everlasting, the Grey Germander, and the Coarse Daisy were the most prevalent. On the return journey the party had tea on the Goodman's Creek, and then journeyed at a leisurely pace to the railway station, where the 9 p.m. train was taken to the city.

The hon. secretary read a report of the visit to Nobelius's Nursery, Emerald, forwarded by the leader, Mr. O. W. Rosenhain, who stated that, owing to the very heavy rain, the excursion, which should have taken place on the 7th November (Cup Day), was postponed till the following Saturday, when a party of fifteen members and friends took part in the visit. The nursery, which is well known to travellers on the Gembrook line, covers about 600 acres, and contains about eight millions of trees in all stages of growth. For instance, a plot of a million young peach trees was pointed out. All kinds of ornamental, useful, or fruit trees capable of being acclimatized are grown. As an experiment, about 100 acres are devoted to New Zealand Hemp, *Phormium tenax*, which will be ready for cutting next season, when its worth as a profitable crop will be ascertained. The visitors were kindly invited to afternoon tea at the homestead, from whence a delightful view of the rhododendron and azalea borders was obtained, with plots of ornamental trees near at hand, the Baw Baw and other mountain ranges forming a magnificent background. The wish was expressed by Mr. Nobelius that members would make another visit in a larger party about March.

ELECTION OF MEMBERS.

On a ballot being taken, Miss E. Alexander, 28 Raleigh-street, Thornbury; Miss Carew, 120 Gladstone-avenue, Northcote; Miss N. Gawler, Bluff-road, Black Rock; Miss R. Hearne, 64 College-parade, Kew; Miss L. Hocking, 11 Irving-avenue, Armadale; Miss Kershaw, 4 Bay View-terrace, Ascot Vale; Miss M. E. Lewis, 51 Hope-street, South Yarra; Miss A. Mathuson, 50 M'Kinley-avenue, Malvern; Miss A. Showers, Bell-street, Preston; Miss A. H. Skinner, 30 Stephens-street, Preston; Mrs. T. A. A'Beckett, Lansdowne-road, East St. Kilda; Mr. H. E. Coffey, Tourist Bureau, Melbourne; and Mr. Charles Stamper, 17 Chapman-street, North Melbourne, were duly elected as members. Miss G. Archdall, Lyttelton-street, Castlemaine; Miss M. Fleming, State school, Tempy East; Miss U. Robinson,

The Cottage, Rosedale ; Miss M. Sudding, Bairnsdale ; Mrs. A. F. Magill, Nhill ; Mr. W. Cornthwaite, Thorpdale ; and Mr. H. L. White, "Belltrees," Scone, N.S.W., as country members ; and Master T. L. A'Beckett, Lansdowne-road, East St. Kilda, as an associate of the Club.

The president complimented Miss G. Nethercote on her very successful efforts to increase the membership and interests of the Club.

GENERAL BUSINESS.

The president, Mr. F. Pitcher, mentioned that Mr. Gill, teacher of the Upper Ferntree Gully State school, had made a request that a member of the Club would visit the school and afford the children an insight into the natural vegetation and bird-life of the district. The committee had considered the matter, and Mr. P. R. H. St. John had acted as leader to a large and appreciative gathering of scholars on Saturday, 11th inst. Mr. St. John briefly outlined the chief incidents of the outing.

REMARKS ON EXHIBITS.

In referring to his exhibit of dendrites and graptolites from Digger's Rest, Mr. A. L. Scott said that dendrites are deposits of arborescent form found in the joint planes of fine-grained rocks. They usually consist of earthy manganese oxide, and by the uninitiated are often taken for fossil ferns. The formation is, however, a case of crystal growth, or rather crystal aggregation. Graptolites, on the other hand, are fossils, and are characteristic of early Palæozoic formations. While comparatively small in size and simple in structure, a large number of genera and species exist which are readily identifiable.

Mr. A. N. Burns, referring to his exhibit of Microgaster cocoons, said that the larvæ of this insect lived in the larvæ of the common moth, *Nyctemera amica*. Out of five caterpillars of this moth three were infected with these small parasites, which must therefore tend to prevent the moth from becoming plentiful.

In referring to Mr. C. French's and his exhibit, Mr. E. E. Pescott remarked that the recording of *Thelymitra pauciflora* as a new species for the State made a list of six new orchids which they had recorded in two years. There were also two other names added to the list as a result of a rearrangement of species, and two others—a Pterostylis and a Chiloglottis—which were at present under review, and would probably form new species. The Chiloglottis was on exhibition. *Caleya minor*, also exhibited, was a rare species not often seen.

LECTURETTE.

By Mr. A. S. Kenyon, entitled "Notes on the Victorian Mallee."

As a preface to his remarks, which were well illustrated by lantern slides, the lecturer said he felt somewhat diffident in addressing the Club respecting an area wherein it would seem many of its members had spent a good deal of their leisure time, and concerning which one had to go to the pages of the *Naturalist* for information.

The area under review, constituting as it did a fifth part of the State, was till comparatively recent times a "No Man's Land." Differing materially in its fauna and vegetation, and in its physical features and soil conditions, from the better-known and more favoured portions of Victoria, it had been neglected by the agriculturist and only tentatively utilized by the pastoralist during the winter and spring months. Some eight years ago the Government of the day undertook the settlement of the interior portion of the Mallee scrub, with the result that there are now 500,000 acres out of 1½ millions settled under cultivation, and this season not less than 2,000,000 bags of wheat will be garnered from this one-time supposed inhospitable wilderness. The scheme is still being vigorously proceeded with, and in a very short time still larger areas of incomparable wheat-growing country will be made available to settlers on advantageous terms.

In dealing with the physical and geological features of the Victorian Mallee, the speaker stated that it is comprised for the most part of an elevated plateau of lacustrine origin, from 200 to 300 feet above the bed of the Murray, and, although untouched by water forces since its formation in Tertiary times, this low-relief table-land had been singularly diversified by æolian agencies, combined with a notable folding or corrugating on an exceptionally large scale. Numerous salt-pans or lakes of large extent existed, and a recurring series of parallel sand-ridges, having an elevation of not more than 30 feet, and an E.–W. direction, were met with over the greater part. These were intersected by ridges of somewhat lower relief, which followed approximately the folds of the older rocks, but were as many miles apart as the æolian sand-ridges were chains. In past ages this area would seem to have been the bed of a gulf or embayment of the sea that now laves our southern coast line, and that in this expanse of waters, trending north from the then main divide, during Middle Tertiary times, were laid down the sediments which, though practically untouched, are now contributing indirectly a yearly-increasing revenue to the State.

Referring to the artesian water supply of this and the adjacent areas of New South Wales and South Australia, Mr. Kenyon said that a keen and at times acrimonious controversy has taken place respecting the origin of the artesian water and

the cause or causes actuating its flow. Some maintain that it is of Plutonic origin, while others aver it is strictly of meteoric derivation. In his opinion, based on a careful study of acquired facts, there can be no doubt that the water is wholly derived from rainfall, and that it percolates through the porous beds under influence of hydraulic conditions, which are primarily responsible for its rise when tapped by bores. A series of bores put down by the Agricultural Department between Pinnaroo and Cow Plains proved that in the Victorian Mallee the artesian basin was underlaid by a polyzoal rock series, mainly of Miocene age. In all probability the salt lakes, so plentiful in the Mallee, mark the site of depressions or troughs between the fold ridges, where, by reason of earth fissures or fractures, the artesian waters escape and percolate upwards to the surface. Enormous deposits of gypsum or copi, up to 95 per cent. purity, occur in many of these depressions, and afford one of the finest opportunities for the production of plaster of Paris in the world.

The climate of the Mallee is extremely variable. One day it might be so hot as to kill off the eucalypts, even though they might be growing with their roots in the Murray, and the next so cold as to necessitate the wearing of an overcoat in the middle of the day. In favourable seasons the growth of grass is so great as to hide from view the passage of a vehicle.

In his opinion, the seeds of the Porcupine Grass were deserving of the attention of experimentalists, for upon them stock fattened quicker than on any other fodder in Australasia.

The lecturette was illustrated by a number of lantern slides depicting many interesting views of the varied physical aspects and vegetation of the Mallee, its geological features, and the process by which comparatively lightly timbered country is rendered amenable to cultivation.

In the discussion that followed, to which Messrs. Alexander, Hardy, Keartland, Plumridge, Pescott, and Dr. C. S. Sutton contributed, many questions were asked. Mr. Kenyon, in reply, said that he had failed to ascertain when or by whom the title "Mallee" was applied to the north-western part of the State. It was so called as early as 1847. Various theories had been advanced to account for the Pink Lakes of the Mallee. Some contended, reasonably enough, that the colour was due to algæ, and others that it was due to manganese. So far as he was aware, the nearest occurrence of typical Mallee vegetation to that in the neighbourhood of Bacchus Marsh was at Bendigo and Inglewood. Reference had been made to clumps of Spinifex of large dimensions. The diameter of the largest single plant he had seen was between 10 and 12 feet, its height being about 5 feet, apart from the seed stalks. In so far as the so-called water-bearing mallee eucalypt was concerned, he was

of opinion that the roots of almost any species of the mallee gums would yield water in more or less abundance, as would the roots of the Needlewood. The device was seldom or never resorted to by bushmen, because they realized that more fluid would be expended in perspiration in securing the roots than would be yielded by them. To his knowledge, the Quandong, which was believed to be a root parasite, had not yet been cultivated with a view to improvement of its fruit. Mr. Johnson, at the Creswick nursery, had, however, succeeded in getting the seeds to germinate. The fruit had a pleasant sub-acid flavour, and was largely used by the early settlers for jam making.

NATURAL HISTORY NOTE.

Mr. F. Keep referred to the seeming scarcity this season of the Bronze and the Narrow-billed Bronze Cuckoos. The two larger birds, the Pallid and the Fan-tailed Cuckoos, were as numerous as ever.

Mr. St. John stated that both the Narrow-billed and the Bronze Cuckoos were plentiful at Upper Ferntree Gully on Saturday, 11th inst.

Mr. G. A. Keartland mentioned that, as a general rule, Cuckoos were averse to calling in dull or wet weather. This peculiarity might account for their seeming absence from favoured haunts.

EXHIBITS.

By Mr. A. N. Burns.—Group of Ichneumon (Microgaster) cocoons.

By Mr. E. Cox.—Variegated Hedgehog Holly, *Ilex aquifolium ferox variegatum*, from Emerald Nursery.

By Mr. Geo. Coghill.—Native flowers from Mooroolbark.

By Mr. C. Daley.—Fresh specimens of *Actinotus helianthi*, Labill., Flannel Flower, from Manly, New South Wales; also aboriginal grinding stone, from Trida Station, N.S.W., showing on reverse side the depressions made for holding the stone with the fingers when using it for grinding seeds.

By Mr. C. J. Gabriel.—Victorian Mutton-fish shells, *Haliotis conicopora*, Peron, *H. cyclobates*, Peron, *H. emmæ*, Reeve, *H. albicans*, Q. and G., *H. nævosa*, Martyn.

By Miss G. Nethercote.—Flowering specimens of *Westringia glabra*, Violet Westringia, collected 28th October, Lerderderg Gorge; also *Hibiscus Huegelii*, End., Western Australia, grown at Hawthorn.

By Mr. D. Paton.—Wild-flowers from Bendigo, including *Cheiranthera linearis*, *Diuris sulphurea*, &c.

By Mr. F. Pitcher.—Flowers of *Telopea truncata*, R. Br., Tasmanian Waratah, from Devonport, Tasmania.

By Messrs. E. E. Pescott, F.L.S., and C. French.—Fresh

specimens of the Terrestrial Orchids *Diuris sulphurea*, R. Br., *D. punctata*, Smith, *Microtis porrifolia*, R. Br., *Caleya major*, R. Br., *C. minor*, R. Br., *Pterostylis falcata* (formerly *cucullata*), *Chiloglottis Gunnii*, Lind., *C. trapeziformis*, Fitz., *C. Gunnii*, Lind. (var., possibly a new species), a very robust form of *Calochilus Robertsoni*, Benth., also *Thelymitra pauciflora*, R. Br., from Bittern and Tallangatta, new for Victoria.

By Mrs. W. H. Quick.—Fungus, *Polyporus mylittæ*, "Black-fellows' or Native Bread," from Pine Plantation, Mount Macedon.

By Miss J. Rollo.—*Hedycarya angustifolia*, Austral Mulberry, from Nobelius's Nursery, Emerald, used extensively by the aborigines for firesticks; also species of moss, used for packing plants that have to be sent a distance, which will remain moist for months.

By Mr. P. R. H. St. John.—Specimen of *Kunzea pedunc-ularis*, "Burgan," showing double flower.

By Mr. A. L. Scott.—Dendrites and graptolites from Digger's Rest.

After the usual conversazione the meeting terminated.

ERRATA IN NOVEMBER "NATURALIST."—Page 92, line 4—insert "marine" before "fish"; page 93, line 23—for "*Mayæ*" read "*Wayæ*"; page 94, lines 9 and 5 from bottom—for "*Enlimnadia*" read "*Eulimnadia*"; page 94, line 5 from bottom—for "*Lynceus*" read "*Lynceus*"; page 94, bottom line—for "Chyrononus" read "Chironomus."

FAIRY RINGS.—As the heading of a column in the *Age* of Saturday, 30th September, the words "Fairy Rings" might or might not attract the casual reader. Some might expect a sentimental love story, or something of the sort; others might have an inkling of the true meaning of the words, and be tempted to follow "Petrophilus" in his or her remarks. The writer explains, in an interesting way, the cause of the well-known "fairy rings" in English pastures, and points out that the introduced Romulea, commonly known as Onion-grass, a growing menace to our grass-lands, is affected in a similar way, but, instead of the fungus apparently enriching the land and causing a better growth of grass, the Victorian representative seems to partially kill the Romulea and cause circular rings or patches of scorched leaves. Doubtless the loss of the leaves affects the bulbs of the Onion-grass, which, by the way, is really an iris; this, however, can only be determined by careful investigation. But if the fungus could be induced by any means to completely finish its work of destruction it would bring down blessings on its head, alike from the gardener, the pastoralist, and the golfer.

A SKETCH OF THE KEILOR PLAINS FLORA.

By C. S. SUTTON, M.B., B.S.

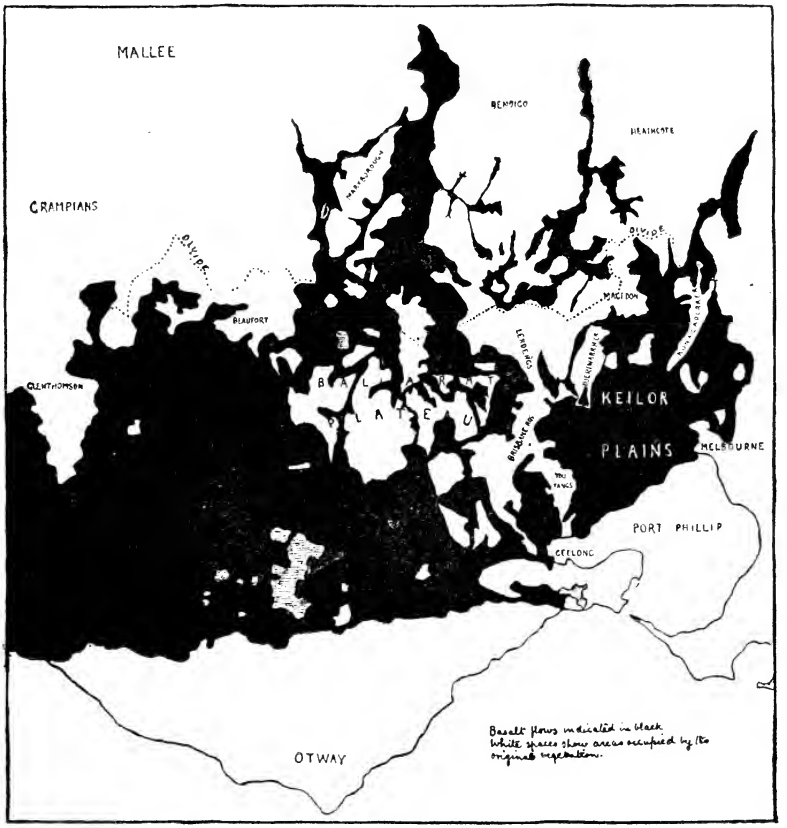
(*Read before the Field Naturalists' Club of Victoria, 11th Sept.*, 1916.)

IN attempting to sketch in an ecologic way the vegetation of the environs of Melbourne, a commencement might perhaps have been made more fittingly with that of the basalt plains, seeing it is apparently the youngest of the three plant formations of the district. That the formation of the coastal sands, already described as the "Sandringham flora," was first dealt with was due, apart from its superior floristic attractiveness, mainly to the fact that a knowledge of its plants, because of the nearness and accessibility of the site, was more easily acquired. Also it was feared that this flora was in such imminent danger of destruction near by that very soon it would not be so conveniently available for study.

The flora of the basalt, however, has suffered even more than that of the "sands" from human interference. The area is not favoured for residential purposes, and has not been much built over; but it has been put so thoroughly to pastoral and agricultural uses that hardly any part now remains in the virgin state. Sufficient of the original flora, nevertheless, in spite of periodical burns, yet exists within the railway reserves, in the stony paddocks which have never yet been cultivated, and more particularly in the canyon-like water-courses and on their steep banks, that a very good idea can be formed of its original appearance and constitution.

In this paper the area considered lies roughly within a circle having a radius of about thirty miles from Melbourne, and measures nearly 900 square miles. The continuity of the basalt is here broken only by the granite near Broadmeadows, by a tongue of the Silurian to the west of Beveridge through which the main branch of the Saltwater River runs, and by Ordovician rocks to the north and west of Sunbury, the same rocks also overlapping the line discontinuously from near Bolinda to Parwan. In the deeper water-courses the bed-rock is also frequently exposed. On the western side the boundary is defined by the Djerriwarrh Creek. To the south-west, where the basalt is continuous with that of the Western District plains extending to the Glenelg River, the limit set just touches the eastern border of the granite of the You Yangs, and reaches the shores of Port Phillip somewhat north of Point Wilson. On the east the meeting with the Silurian is marked roughly in succession by the Moonee Ponds and Darebin Creeks and the Plenty River to near Yan Yean. Thence the line of contact runs north-west to the Merri Creek near Wallan, and then to the gap in the main divide at Pretty Sally's Hill known as

the Kilmore "geocol." This point, about 1,200 feet above sea-level and exactly on the 30-mile line, is of some interest in connection with plant distribution (see "Australia: Physiographic and Economic," by Griffiths Taylor, *Proc. Linn. Soc. of N.S.W.*, xxxi., p. 225). Excepting the extruding or un-



SKETCH MAP OF BASALT FLOWS WEST OF MELBOURNE.

submerged rocks above mentioned, and something more than a score of low hills, the surface, taken as a whole, is a plain. The hills lie mostly in the northern part of the area, mainly along the road from Digger's Rest to Gisborne, and almost all are considered to have been volcanic vents. Over broad spaces the surface, where it is not boulder-strewn, is quite flat, and gradually rises from the coast to a height of 464 feet at Parwan, and to just over 1,200 feet at Riddell and the geocol. In places

where the creek valleys are wide, or where some hills have weathered more than others, there are long, gentle slopes which give a little relief to the general monotony of the locality.

The water-courses draining the area are the Little River, Werribee River, Skeleton Water-holes, and Kororoit Creek, with independent outlets to the sea; and the Maribyrnong or Saltwater River, the Moonee Ponds, Merri, and Darebin Creeks, emptying into the Yarra. All of these, in the fewness of their tributaries, the steepness of their banks and hanging valleys, furnish evidence of youthfulness, and the system contrasts with the more mature state of that of the forest area on the east and with the very ill-defined system of the coastal sands.

The area under consideration is known as the Keilor or Werribee Plains, or the basalt plains, and, while for some reasons it might have been advisable to use the latter name in designation of its flora, for others which seem better the term "Keilor Plains flora" has been preferred.

The vegetation of these wide-spreading plains presents a picture contrasting strikingly with the dense scrub-heath to the south-east and with the forest formation lying between. Inasmuch as it consists mainly of grasses mixed with low herbs and shrubs, it is a grass-land formation, and, like the scrub-heath and forest in their relation to the coastal sands and the Silurian, it is found to conform closely to the basalt. It, in fact, constitutes a quite distinct type of vegetation, exemplifying a large part of the plant cover of the State.

Before dealing in some detail with this plant formation and its constituents, the principal conditions or factors which make up the "habitat" or environment, and of which the vegetation is the "reflex" or result, will be briefly considered.

Climatic Conditions.

Reference to the weather records shows that rainfall is lower over the basalt than on the "sands" or the Silurian, and that this is especially the case as regards the southern and larger part of the area, where the fall averages only a little more than 20 inches annually in about 100 days. We find, for instance, taking only stations where records have been kept for periods longer than five years, that the figures are:—Altona, 19.37 in 7 years; Werribee, 20.19 in 33 years; Little River, 20.01 in 25 years; Bacchus Marsh, 20.93 in 26 years; Melton, 20.90 in 21 years; and Keilor, 21.48 in 16 years. Doubtless there are drier localities than these, as, not far outside the 30 miles radius, Lara has 17.57 in 7 years, and Victoria Salines, near Geelong, only 17.09 in 10 years.

Over the northern portion, at more elevated stations, the

rainfall rises from 23.11 inches at Sunbury in 20 years, 24.97 inches at Yan Yean in 52 years, 26.70 inches at Mickleham in 5 years, 24.58 inches at Wallan in 16 years, to 29.25 inches at Beveridge in 5 years and 30.67 inches at Gisborne in 10 years. On the "sands" the average is about 29 inches, and on the Silurian about an inch more.

Although more rain falls in the spring and autumn, precipitations are pretty evenly distributed throughout the year. The bulk of the area, as well as the country about Geelong and the Bellarine Peninsula, is termed by meteorologists a "locally dry" or "shadow" area, and the comparative lowness of the rainfall is apparently due, apart from the low elevation, to the interception of the moisture in the south-westerly winds by the high ground of the Otway, and perhaps to a lesser degree the Divide has the same influence on those from the north. In spring and summer southerly winds prevail; in autumn and winter those from the north are most common and strongest. East winds are by far the lightest and least prevalent.

As regards air temperatures, records are available only for Laverton and Bacchus Marsh, and do not differ materially from those taken at Melbourne, Brighton, and Camberwell.

With the surface so sparsely covered and the so frequent occurrence of projecting boulders, the soil temperature must surely be higher than in the other areas. For the same reasons it is pretty safe to conclude that evaporation is greater. Radiation must be relatively high, and frosts are probably more frequent. Sunlight, too, has full play in producing the greatest effects.

Soil Conditions.

The soil is black or reddish, and formed *in situ* from the generally closely underlying rock. It is stiff and tenacious, with little humus, appears to have considerable water-holding capacity, and the proportion "available" for support of plant life is less than that in the "sands," at least. Though the slope is so gradual, water does not anywhere lie long into the summer, no doubt quickly percolating through the vertically fissuring rock beneath; and in midsummer, under the unmitigated influences of sun and wind, the surface cakes to an extreme degree and cracks freely.

The influence of animal life has probably always been present, and it may be safely assumed that these plains have in the past been the favourite grazing grounds of such indigenous game as kangaroo, wallaby, and emu.

The configuration of the surface and the absence of cover exposing it to the influence of wind and the sun's light and heat in the fullest degree, the comparatively scanty rainfall, the shallow, dark, boulder-containing, heat-absorbing soil, and

the continual grazing of animals have each in varying degrees been responsible for the low, sparse plant cover we see to-day. The grass-land is, then, the "reflex" of the sum total of these comparatively severe conditions which constitute the "habitat."

While the conditions are by no means so extreme as those responsible for certain grass-lands in other parts of the world known as grass-steppes, the principal examples of which are the steppes of Russia, the prairies of North America, and the veldt of South Africa, they have yet been sufficiently pronounced to have impressed on the vegetation of the basalt plains many of the features of grass-steppes. Thus, the short plant cover of dominant grasses, with herbs and stunted undershrubs, is mainly xerophytic; it does not form a close carpet as in a meadow, the bare ground being constantly visible, and it fades in summer. Many of its grasses are tufted and have rolled leaves, and composites (16 per cent.) and annuals (12 per cent.) form large proportions of its constituent species. While bulbous and tuberous plants and perennials with deep tap-roots or thick root-stocks are present, they are, however, not prominent. Thus the formation, if it may not be called a grass-steppe, is at least a grass-land with steppe-like characters, though Diels would possibly regard it as dry pasture or "trift" in his classification.

Further, it is agreed that all undisturbed land surfaces are destined, sooner or later, to pass, either indirectly by way of scrub-land or directly, into forest. It is also laid down that a rainfall of at least 20 inches in about 100 days is required to favour forest growth. Although over wide stretches of the basalt plains trees are absent, and from all appearances, or want of them, have never existed, it is quite obvious that the change from grass-land to forest has been steadily but very slowly taking place. In the southern portion, where the necessary condition as regards rainfall just exists, this change is not at once visible, though individual trees and groups of them are to be found widely scattered. It is in the northern part of the area, with a higher rainfall, that the change is more obvious, partly in the advance of trees up the branches of the main water-courses and over the edges of the latter on to the plain, but principally at the outskirts, by the invasion of trees from the neighbouring forest formations.

The surface of the basalt is comparatively new—it is assumed that it is newer than those adjoining—but probably not so new that it would not at the present time have supported forest if conditions had been more favourable. The transition, so far as it has gone, appears to have been direct. Adverse conditions have delayed it, and it may be concluded that ultimately, if

natural conditions had continued, the whole area would have maintained a growth of trees in the shape of open forest, the reasons for the present cover being partly climatic, partly edaphic, and partly secular.

The Grass-Steppe.

It will help, in describing the flora of the grass-land, to contrast with it that of the coastal sands, with which we are all so familiar. In the first place, while this latter presents only two seasonal "aspects"—the blossoming time of spring and early summer (spring aspect) and the dull sage-green of the rest of the year (autumn aspect)—the plains exhibit three phases. Only in autumn and early winter is the general greenness of the dominant grasses almost unrelieved by blossoming plants (autumn aspect). Long before the winter is past many species are in flower, and by September the ground is golden with numerous composites, which play by far the greatest part in forming the spring aspect. Later, when the hot sun has burnt the grasses to a uniform brownness, many of this great order, with a sprinkling of other plants, long continue to brighten the uniform drab of the summer aspect. The fires of spring, as we know indeed, never quite die down, but always some ever-bloomer like *Convolvulus erubescens* or Wahlenbergia, some belated or precocious plants, keep their flags bravely flying, and link one flowering season with the next.

Although some hundred or more species are common to each formation, it is soon evident, on the most cursory survey, that none of those most characteristic of the Sandringham flora * are to be found on the basalt; Leptospermums, Hibbertias, Epacrids, Ricinocarpus, Amperea, Isopogon, Aotus, *Casuarina distyla*, *Bossiæa cinerea*, all are absent. *Correa speciosa* certainly does occur, but in such different form, with shining, glabrous leaves and more spreading habit, that it is at first almost unrecognizable, and it, moreover, affects rocky places just below the brow of the river-banks.

Of grasses, one is surprised to find in a grass-land some lack of variety, nearly half of those listed being more or less strictly confined to the coast. *Danthonia penicillata* is most prevalent over the driest stretches, and often is unmixed with others; but now and then Anthistiria is most noticeable. The tussocky *Poa cæspitosa*, *Stipa setacea*, *S. semibarbata*, and *Dichelachne crinita* seem to prefer moister places, and especially is this so with the Panic grasses. The others are less common or more restricted in range.

Composites constitute more than 16 per cent. of the total

* "Notes on the Sandringham Flora," vol. xxviii., p. 5; vol. xxix., p. 79.

plants of the area (as compared with 9 per cent. at Sandringham), and form a still greater proportion of the strictly grass-land plants. The most prominent species are the Podolepis, Leptorrhynchos, Craspedias, Vittadinia, Minuria, Helichrysums, Brachycomes, and Calocephalus.

Apart from those occupying the foreshore, the Chenopodiaceæ make a better showing here.

Excepting the eucalypts, the Myrtaceæ are quite unrepresented; the Proteaceæ are also absent, and Leguminosæ play a very insignificant part. The most frequent member of the last order is the secretive *Bossiæa prostrata*. *Eutaxia empetrifolia*, flattening itself out into a mat form, is fairly often seen, but *Lotus australis*, the Psoraleas, the Glycines, and the rest are rather uncommon.

Epacrids are practically non-existent, only *Astroloma humifusa* (at Bulla) and *Lissanthe strigosa* being recorded in Mr. St. John's notes.

Orchids are a somewhat rare feature of the flora. Only *Diuris punctata*, var. *alba*, in the North-Eastern railway reserve, is at all frequent. The others are all sparingly distributed, the Microtis, *Diuris pedunculata*, and *Thelymitra longifolia* perhaps less so than the others.

The lilies are fairly well represented, principally by the Arthropodiums and Dianellas, Burchardia and Wurmbea.

Two ferns manage to exist in the open country. Strangely enough, one of these is *Cheilanthes tenuifolia*, amongst the most delicate and fragile of all, and the other the diminutive little Adder's Tongue, *Ophioglossum vulgatum*. Both occur frequently and widely, the latter seeming to have been unusually abundant this past season.

As one would expect, the Cyperaceæ and their allies, save in the rare wet places and in the trenches in railway reserves, are almost confined to the creeks and the coast.

Apart from grasses and composites, the plants most typical of the grass-land belong to many less important orders. *Velleya paradoxa*, now only found on the clay cliffs just south of Brighton Beach, is here abundant, with its close relation, *Goodenia pinnatifida*. Five Pimeleas can be collected, all but one being quite common. *P. serpillifolia* and *P. curviflora*, with a very similar growth form, do not exceed a few inches in height, though the latter in the shelter of the forest attains almost as many feet, and bears flowers of a lighter shade. *Stackhousia linarifolia*, also in stunted form, is constantly seen; so is *Asperula scoparia* and the Trichiniums, especially *T. spathulatum*; and these last, in their thickened root-stocks, present a feature commonly possessed by plants growing in dry places. Generally when the grass is dried up does the

very beautiful wedgewood-blue of the *Eryngium rostratum* most compellingly take the eye, and with it are very often associated *Convolvulus erubescens*, Erythræa, Wahlenbergia, and the Calocephalus.

Many other plants are individually even more numerous than the above-mentioned, but their insignificance or nondescript appearance or colour prevent easy recognition. Some of these, subordinate in spite of numbers, are *Helipterum dimorpholepis*, *Lobelia concolor*, Sebæas, Tilleas, Hydrocotyles, Lœwenhockia, Oxalis, *Veronica gracilis*, Erodium, and *Stuartina Muelleri*. Except those species occupying the infrequent patches of damp ground, definite plant associations are not easily recognizable on the plains. The changes in the composition of the vegetation are gradual and subtle, and the whole area may be considered, with the above qualification, as one large "association." Where water lies longest plants commonly found elsewhere in similar situations, such as *Isotoma fluviatilis*, *Lythrum hyssopifolia*, *Selliera radicans*, Epilobium, *Lobelia anceps*, Cotulas, and others, are also noticed here. Damasonium and Alisma may not uncommonly be discovered in company, and Marsilea is occasionally met with. At the outskirts of the plains, where members of the neighbouring formations are pushing in, in the shelter of the canyons, and especially towards the coast, where the varying moisture and salinity of the ground determine the grouping, quite well-marked associations are noticeable.

Tree Growth.

Before dealing with these groups, reference may be made here to the tree growth of the area. Although ten eucalypts have been noted, only four exist in such numbers that they may be said to belong to the basalt. Of these, the River Red Gum, *E. rostrata*, is undoubtedly predominant, exceeding the others in numbers, distribution, and range. In the eastern part, especially about and between Epping and Woodstock, it forms fine open forests, where trees quite often attain imposing proportions. Perhaps no other of the great genus shows so much individuality as this species, no two trees being quite alike except in that they all bow more or less to the pole in deference to the will of the strong north winds. The varied sweep of their massive, far-outreaching, and often strangely contorted branches, and the sober yet rich colouring of bole and limbs, endows them with a picturesqueness quite redeeming the flat country from its monotony. The Red Gum has almost undisputed possession of all the water-courses, often extending in that way right up on to the open plain. Isolated groups exist near Point Cook and on the Werribee Sewage Farm, and the trees, though small, appear to be of considerable age.

Associated with the Red Gum on the plains more often than the others is the Swamp Gum, *E. ovata*, which, in the moister places, frequently exists in little communities. Its shining, coarse foliage and generally scraggy appearance make it easily distinguishable. It rarely attains any great size, and its so often decrepid condition suggests decadence and the likeliness of its ultimate disappearance from this locality. One of the best of the few good examples of this tree occurs near Dixon's Lane, close to the Darebin Creek. The most extensive area dominated by the species lies between Darraweit Guim and Bolinda, where, with *Casuarina quadrivalvis* and *Poa cæspitosa*, it composes a well-marked association.

The Grey Box, *E. hemiphloia*, which is not found on the sands or Silurian, is next in importance to the Red Gum, and is somewhat exclusive. It is more sparingly distributed over the eastern parts, but on the other side, near Melton and Bulla and on the western slope of Gellibrand Hill, where some very fine trees can be seen, it forms open, pure forests of limited extent.

The Yellow Box, *E. melliodora*, is pretty common on the granite near Broadmeadows, and elsewhere is widely scattered in small groves, while a somewhat extensive forest of rather poor trees occurs to the east of Sunbury.

The Manna Gum, *E. viminalis*, and a very few specimens of the Yellow Gum, *E. leucoxylon*, intermingle with the others mentioned on the granite about Gellibrand Hill. The former is fairly common on the northern side, and has the appearance of the Sandringham rather than the riverside form. Both trees are not infrequent in certain places in the canyons, the Manna Gum standing on the terraces not far from the water, and the other climbing well up on the steep, rocky banks. Probably neither grows actually on the basalt, and certainly they have not been noticed on the plains.

A few Narrow-leaved Peppermints, *E. amygdalina*, are also in the canyons, and rare specimens of the Red Box, *E. polyanthemos*, and the Red Stringybark, *E. macrorrhyncha*, have intruded from the east, just as the Bull Mallee, *E. Behriana*, crosses the Djerriwarrh Creek from the west. In certain localities, as soon as the basalt is left, as in traversing the base of the tongue of Silurian projecting from the north, additional species, such as the Broad-leaved Peppermint, *E. dives*, Messmate, *E. obliqua*, the Long-leaf Box, *E. elæophora*, and the Candle-bark Gum, *E. rubida*, commence to make their appearance. These might be included in the list with almost as much reason as *E. leucoxylon* and others, and, strictly speaking, only the Red and the Swamp Gum and the Grey and the Yellow Box have really established themselves and naturally flourish on the basalt.

The Casuarinas were undoubtedly more numerous in the past, but, making good firewood, they have been freely cut down, and now are mostly seen about the low hills, occasionally in the gorges, and sparsely scattered over the plains. *C. quadrivalvis* is commoner than *C. suberosa*, and *C. Luehmannii* is confined to the western part of the area.

Of the tree-forms of Acacia, *A. pycnantha* is on the granite at Greenvale, *A. melanoxylon* and *A. implexa* in the same locality and also in the canyons. The latter is much the more frequent, and usually occurs on the steep, rocky banks. *A. dealbata* is not uncommon on some of the streams, and, strangely enough, affects a rather dry situation on many of the basalt "blows."

Exocarpos cupressiformis is a constituent of the forest invading the plains from the east and occasionally seeks the shelter of the river-banks. An isolated specimen of *Bursaria spinosa* has reached tree size, with a trunk diameter of nearly 18 inches, near Point Cook, and one of *Myoporum insulare* of about the same dimensions near Digger's Rest.

Plants of the Canyons and Water-courses.

As a consequence of shelter from sun and wind afforded by the steep banks, greater moisture and more varied substratum, the vegetation on the rivers and creeks is much more luxuriant and diversified. Trees and shrubs are numerous, and frequently dense patches of scrub clothe the banks. The Red Gum quite dominates the situation, never being out of sight. In many dry creeks it is the only plant taller than the grasses and low herbs, and no other tree disputes its right to the water's edge. On the terraces, and climbing the banks, are occasional eucalypts of other species, and trees of lesser growth, like *Casuarina stricta*, *Acacia melanoxylon*, *A. implexa*, and *Exocarpos cupressiformis*. Where water is permanent *Leptospermum lanigerum* and *Callistemon salignus* often grow together below the bank. The most assertive of the shrubs is undoubtedly *Hymenanthera Banksii*. It is never or rarely absent from any association, and frequently possesses long stretches of the waterside with an attendant growth now of *Nicotiana suaveolens* and *Dichondra repens*, and again merely of *Urtica incisa*. It climbs the steepest banks, and, although a lover of moisture, will venture some distance on the plains.

South of Keilor, on the right bank, it is absent, and here we have Dodonæa, *Myoporum deserti*, Cassia (up to 7 feet high), *Acacia retinodes*, and *Muehlenbeckia Cunninghami* (among rocks), the first perhaps predominating. Only occasionally *Acacia implexa*, *A. dealbata*, Bursaria, and Correa crop up in

this company, and a rather luxuriant carpet, especially about the roots of the shrubs, is made up of Enchylæna, *Rhagodia nutans*, *Calandrinia calyptrata*, and *Euphorbia Drummondi*. In another rocky situation we have *Myoporum viscosum*, *M. deserti*, Dodonæa, Bursaria, *Acacia acinacea*, Hymenanthera, Zygophyllum, and Nicotiana; and on some muddy flats *Muehlenbeckia Cunninghami* occupies the ground exclusively.

In addition to the plants already mentioned, *Clematis microphylla* (obviously preferring rocky places and making its tangle on any handy shrub), *Goodenia ovata*, Sambucus, Myrsine, and *Rhagodia Gaudichaudiana* are not uncommon.

Water plants are remarkable for their wide geographical distribution, so easily effected by the agency of birds, and in the canyons and water-courses of the basalt representatives of most kinds can be studied. In still water or in the stagnant pools of smaller creeks examples of the free-floating aquatic plants (*Pleuston*) are seen in Lemna, Wolffia, and Azolla. The fixed forms (*Benthos*), rooted in loose soil or gravel under fresh water (*Limnæa-formation*), are not far to seek. Some of these may be completely submerged, like *Ranunculus aquatilis* and *Vallisneria spiralis*; but the majority have floating leaves, and mostly blossom above the surface, as in the Potamogetons, *Triglochin procera*, *T. striata*, *Ottelia ovalifolia*, Myriophyllums, Callitriche, and often the Limnanthemums.

A still larger group are the marsh plants (*helophytes*), mostly amphibious, and capable, by their plasticity, of adapting themselves to very wet or to comparatively dry situations. They occupy the shallows at the edges of the water, having only a portion of their stems submerged, or are rooted in mud. Arundo, Typha, *Scirpus lacustris*, Heleocharis, some of the Polygonums, *Lythrum salicaria*, and *Alternanthera nodiflora* are among those which may be placed in one category, while the Gratiolas, *Mimulus repens*, *Utricularia dichotoma*, *Tillæa recurva*, *Ranunculus rivularis*, *Limosella aquatica*, *Cotula coronopifolia*, Alisma, Damasonium, Epilobium, Isotoma, and *Scirpus inundatus* can be referred to the other. Towards the mouths of the streams, or in salt swamps, *Ruppia maritima*, *Potamogeton pectinatus*, and *Lepilæna Preissii*, which would be placed in Warming's *Enhalid-formation*, have been noted submerged in the brackish water.

In the canyons ferns are only comparatively frequent. The Adiantum, Asplenium, and Grammitis are most easily found, the others being decidedly rare. Seeing its indifference to conditions, growing as it does in extremely dry and quite moist situations, one wonders why the latter is so impossible of cultivation.

Coastal Plant Associations.

Although in certain places the plain, with its own proper vegetation, ends abruptly at the sea in low cliffs, there is no belt of scrub clothing its edge as on the other side of the Bay. Mostly the western shores are very low-lying, and extensive areas are more or less affected by salt water. Salt plants, or halophytes, are consequently much more prominent, and the different conditions as regards moisture and salinity of the soil have led to very well defined associations. The first contains marine plants referred by Warming to "*Enhalid-formations*" among water plants (*hydrophytes*). Two of these—*Halophila ovata*, with delicate, transparent, elliptical leaves, and the more robust *Cymodocea zosterifolia*—are constantly submerged, and their existence in adjacent submarine meadows is inferred from the presence of their fragments in the wrack thrown up by the waves. Forming a considerable portion of this tangled mass of algæ are the ribbon-like leaves of the third member of this group, *Zostera nana*, which thickly occupies sand-banks exposed at low water, and termed a "*zosteretum*."

The next association, that of the sand-loving salt plants, "*psammophilous halophytes*," inhabits the strand and the occasional small dunes lying just behind. *Cakile maritima*, *Salsola kali*, and *Atriplex cinereum* are most typical of the former station. *Tetragonia expansa* and *Apium prostratum* are also common, but *Calocephalus Brownii* is only occasionally seen. A little away from the water, on the dunes, are mostly grasses and sedges. *Zoysia pungens* and *Distichlis maritima*, forming dense mats, and *Spinifex hirsutus* have a creeping habit; *Festuca littoralis* and *Stipa teretifolia* are tufted. *Glycina stricta*, the Lepturus, the introduced *Elymus arenarius*, with *Scirpus nodosus* and *Carex pumila*, are the other principal species. Dicotyledons are rare. *Statice australis* and *Scævola suaveolens* have been noted, but only *Spergularia rubra* and a number of aliens are in any way abundant.

(*To be continued.*)

"OUR WATTLES."—This is the title of an illustrated booklet of 76 pages by Mr. T. C. Wollaston, of Adelaide, in which he describes in chatty way the charms of many of our wattles. The publication is illustrated by ten plates in colour of various species, but, unfortunately, they do not do justice to the species depicted. The difficulties in the way of producing a true colour-print of a wattle are very great—the yellows seem to be hard to get; but perhaps it is the natural fluffiness of a wattle bloom which renders it so difficult to reproduce. The fact of having been printed in England, far from the natural examples, has perhaps militated against the success of the illustrations.

However, the author is an enthusiast, and desires all flower-lovers to be wattle-growers. He gives cultural directions for raising wattles from seeds and from cuttings, and concludes his little book with a list of the twelve species which he considers best suited for cultivation. These are :—*A. decurrens* (var. *normalis*), *Baileyana*, *dealbata*, *pycnantha*, *longifolia*, *prominens*, *linearis*, *rupicola*, *leiophylla*, *glaucescens*, *podalyriæfolia*, and *vestita*. A list of about forty common names will prove handy to the wattle-lover, and we trust the publication will have a stimulating effect upon the growers of our native trees and shrubs.

A Pest Destructor.—On the morning of 22nd November last a land breeze on the east side of Port Phillip brought myriads of the Rutherglen bug to the shore margin ; and after a severe storm had passed over the bay from the north-west the shores in the neighbourhood of Black Rock and for miles on either side were in places painted black with the bodies of this pest. The retreating tide left these and other insects, including many beetles and moths, in piles, often several inches thick. In the present case the storm, which sometimes damages the farmer's prospects, turned out to be other than an ill wind. From a small sample gathered, the following insects were determined at the National Museum, and the notes supplied by Mr. F. Spry :—

" Hemiptera.—Fam. Lygæidæ.—*Nysius vinitor*, Bergroth.

" An insect that occurs at times in Victoria in countless thousands. Commonly known as the Rutherglen bug, from the locality where it was first recorded, damaging grapes. At times it is a serious pest, attacking fruit and other trees, sucking the sap of both flowers and fruit.

" Lepidoptera.—Fam. Noctuidæ.—*Agrotis spina*, Guen.

" Called the Bogong Moth in Victoria, but there is some doubt whether this species or one closely allied, called *A. infusa*, should be so named. It occurs, however, abundantly enough to be the moth in question. All around the sea-coast it is found in immense numbers. The flowers of the tea-tree seem to greatly attract them, the trees towards evening being covered with them.

" Diptera.—*Syrphus* (?) *collatus*, Walker.

" One of the hovering flies, extremely abundant on the heath grounds.

" Coleoptera.—Fam. Carabidæ.—*Calosoma schayeri*, Hope.

" One of the predaceous beetles. Where abundant is most useful in keeping down injurious insects of the field, such as cut-worms. This year it has been very common at street lamps around Melbourne."—F. Chapman.

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 December, 1916.

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

The chairman referred to the absence of the hon. secretary, Mr. J. G. O'Donoghue, through serious illness, and moved that a letter conveying the sympathy of the members be forwarded to him. Seconded by Dr. Sutton, and carried unanimously.

From Mr. A. J. Gill, head teacher of Ferntree Gully State school, expressing his thanks for the visit of Mr. P. R. H. St. John, who, at the request of the committee, had visited Ferntree Gully and conducted a field excursion of the school children.

From Major K. Pearse, military secretary to His Excellency the Governor-General, thanking the Club for its offer to forward copies of the *Victorian Naturalist* to the Governor-General during his residence in Australia.

REPORTS.

In the absence of the leader, Mr. C. French, jun., Mr. T. S. Hart, M.A., read a report of the excursion from Mooroolbark to Evelyn on Saturday, 18th November, which, he stated, was rather poorly attended. Attention was given principally to scale-insects and galls, of which a fair number of specimens were collected for future examination.

It was reported by the leader, Mr. G. Coghill, that, owing to the flooded state of the country, it had been decided to abandon the excursion to Launching Place announced for Saturday, 25th November.

A report of the excursion to Upper Beaconsfield on Saturday, 9th December, was given by Mr. F. Pitcher, who said that an interesting day had been spent. More than fifty plants had been found in bloom. Butterflies of several of the commoner species were very numerous. The party had been hospitably entertained by Dr. and Mrs. Drake.

On the motion of Messrs. Pitcher and Daley, it was decided to forward a letter of thanks to Dr. and Mrs. Drake for their kindness on the occasion.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. J. Robinson, Ormond Plant

Farm, Ormond, and Mr. Chas. Vincent, "Ravello," Barkly-street, St. Kilda, were duly elected members of the Club.

PAPERS READ.

1. By Mr. P. R. H. St. John, entitled "Notes on the Growth of *Eucalyptus viminalis*."

The author stated that a tree in his garden at South Yarra, raised from seed sown in January, 1912, is now 25 feet in height and 9 inches in diameter at one foot from the ground. It had received no special care or treatment. The first sign of flower buds was noted in November, 1915, and these had matured and the tree blossomed last month. Though not five years old, it was now shedding its bark for the first time. He thought this fact had not received much attention from botanists, and hoped others with better opportunities would make some observations on the point.

An interesting discussion took place, in which Messrs. Sutton, Barnard, Beuhne, Hardy, and Gates joined.

2. By Mr. J. W. Audas, F.L.S., entitled "A Botanist in the Portland District."

The author described a week's rambling around Portland during which a number of interesting plants were met with, several of which—notably *Kunzea parvifolia*—would make excellent garden shrubs. On the Cashmere heath-lands the common *Epacris impressa* covered many acres, and was a beautiful sight in its varying tints of pink and crimson. At West Portland *Stypandra cæspitosa* and *Boronia filifolia* grew in abundance.

The chairman congratulated the author on the interesting nature of his remarks, which would be valuable to future visitors to the district.

NATURAL HISTORY NOTES.

Mr. J. Gabriel said that during the last few weeks the much-maligned sparrow had done an immense amount of good in his garden in clearing plants of aphis, and had also captured quantities of small moths.

Mr. A. D. Hardy, F.L.S., recorded some observations made on the habits of slugs during the recent showery weather, when he had noticed them, after the sun had risen, suspended by threads from branches on the shady sides of shrubs.

Mr. J. Searle drew attention to the extent of the irruption of the Caper butterfly this season. Mr. F. G. A. Barnard said the appearance of these butterflies is quite a month later than usual, and it was not recorded in Waterhouse and Lyell's "Butterflies of Australia" for Melbourne in December. The scientific name of the butterfly, which is one of the Pieridæ, is now given as *Anaphæis java teutonia*, Fab. He also men-

tioned that he had seen a rather rare butterfly, the Lesser Wanderer, *Danaida chrysippus petilia*, Stoll, flying in the main street in Kew a few days previously. This also had not been recorded for Melbourne in December.

EXHIBITS.

By Messrs. C. Daley, F.L.S., and F. Pitcher.—Specimens of *Cryptostylis longifolia*, R. Br., Long-leaved Duck Orchid; *Microtis porrifolia*, R. Br., Leek Microtis; *Thysanotus tuberosus*, R. Br., Bulbous Fringe-Lily, also white form of same; and *Drosera binata*, Labill., collected on Beaconsfield excursion, 9th December.

By Mr. C. J. Gabriel.—Marine shells, *Chione disjecta*, Perry (in series), from Victoria, and *Cypræa cervus*, Linn., adult and juvenile, from Gulf of Mexico.

By Mr. D. J. Paton.—Wild-flowers from Bendigo, including *Eriostemon Crowei* (new for district), *E. deformis*, *Brachyloma daphnoides*, *Pultenæa laxiflora*, *Melaleuca incrassata*, *Eucalyptus frutisicorum* (Mallee), and *Helichrysum obcordatum*.

By Mr. F. Pitcher.—Flowering branches of *Elæocarpus cyaneus*, Aiton, Blue Olive-berry, Victoria, New South Wales, Queensland, and Tasmania, grown at Melbourne Botanic Gardens; moths from Beaconsfield, on behalf of Mrs. C. M. Drake.

By Mr. C. Plumridge.—Flowering branches of *Elæocarpus cyaneus*, Blue Olive-berry, grown at Kew.

By Mr. P. R. H. St. John.—Herbarium specimens of *Clematis glycinoides*, De C., collected at Yarra Junction, 2nd December, 1916, probably first specimen recorded from within fifty miles of Melbourne; and a filmy fern, *Trichomanes parvulum*, Poiret, Small Bristle Fern, collected at Emerald, 30th November, and Yarra Junction 2nd December, not previously recorded for Victoria.

By Mr. A. L. Scott.—Aboriginal stone axe or tomahawk heads—one of a green stone (diorite ?) from Roseneath, near Casterton; the other, probably Victorian, apparently of basalt; also basalt from Corporation quarry, Brunswick.

After the usual conversazione the meeting terminated.

A VETERAN NATURALIST.—By the death last month of Dr. E. P. Ramsay, of Sydney, at the age of 74, the Field Naturalists' Club has lost another of its honorary members. Dr. Ramsay was best known as Curator for many years of the Australian Museum, Sydney, and his "Tabular List of Australian Birds" was long the standard index for Australian ornithologists. He was a good all-round naturalist; besides being a leading ornithologist, he had a good knowledge of botany and entomology.

A SKETCH OF THE KEILOR PLAINS FLORA.

By C. S. SUTTON, M.B., B.S.

(*Continued from page* 123.)

A small sand-plain near Point Cook, continuous with the beach, is tenanted almost exclusively by the Common Bracken, *Pteridium aquilinum*, which is decidedly rare elsewhere.

By far the greatest number of halophytes belongs to the mud-loving ("*pelophilous*") division, which Warming splits up into those of the æstuarium, salt-meadow, salt-bushland, salt-steppe, and salt-swamp, according to the condition of the ground occupied and the height of the plants. Instances of all these associations appear to be present. It is easy to refer some of the plants to their proper places in them; but with others growing indifferently in several situations some difficulty is felt.

In the *æstuarium* the soil is constantly saturated with salt water, all the plants are able to endure repeated submersion, and nearly all have the outstanding feature of succulence. Here we can safely place the Salicornias, Suæda, *Atriplex paludosa*, *Polycnemum pentandrum*. *Frankenia lævis*, and perhaps also *Samolus repens*, *Wilsonia rotundifolia*, *Mesembryanthemum tegens*, and *M. australe*.

Salicornia arbuscula, about 2 metres high, in swampy places as near the mouth of the Kororoit Creek, where it is associated with some of the plants just mentioned, and, again, bordering the banks of the Skeleton Water-holes, where it is very exclusive, may be said to constitute a *salt-bushland*, and, being always very dominant, is known as a "*salicornietum.*"

In the *salt-meadow* the ground is drier and the growth closer. The "salicornietum" in the Kororoit Creek is gradually becoming changed to a salt-meadow. Here we find *Cotula australis*, *C. filifolia*, *Angianthus Preissianus*, Hydrocotyles, *Triglochin mucronata*, and *Capsella elliptica*, with Samolus, Frankenia, and the Mesembryanthemums.

Further from the water, near the salt-flats, is salt-meadow of a different appearance and taller growth, containing such grasses as *Poa cæspitosa*, *Zoysia pungens*, *Cynodon dactylon*, *Agrostis Solandri*, *Sporobolus virginicus*, and *Scirpus maritimus*, *Juncus maritimus*, with small herbs like *Daucus brachiatus*, *Selliera radicans*, and *Cotula reptans*. *Plagianthus spicatus* may also be found in such a situation. In the depressions where brackish water, drying up in summer, leaves a white salt-pan, we have instances in miniature of *salt-steppe*, with *Salicornia australis* venturing out a little from the edge of the fringing meadow and a sparse growth of *Angianthus Preissianus* and

Wilsonias. The most interesting of all the salt plants, and named by Warming as a constituent of the *Littoral Swamp-Forest*, is the white mangrove, *Avicennia officinalis*, only found on the right bank of the Kororoit Creek, from near the race-course to its mouth. It stands in tidal water just beyond the bank, forming a thick, almost unbroken, hedge, and showing at low water its myriad curious pneumatophores.

Endemic Species.

Comparing the Keilor Plains flora with the plants of adjoining formations, it is found that more than eighty of its species are endemic as far as the Melbourne district is concerned, and most of these are known to occur more or less discontinuously from the Mallee, in the north-west. The comparison also reveals the facts that certain western plants, not recorded from the east of the basalt, stop just short of it, and, further, that very many flourish close to its borders on each side, but not on the plains themselves. This discontinuity of distribution lends special interest to these species, and calls for an explanation, which, indeed, on a little reflection, seems obvious enough.

Judging from the opinions of Hooker, Wallace, Tate, Diels, and others, it appears to be fairly certain that the vegetation covering the south-eastern corner of Australia has been composed of three or four elements. The first, perhaps, was *Antarctic* in origin, derived through Tasmania from the south, and now represented mainly by mountain and alpine forms. Its influence on the flora of the basalt is quite insignificant. With these mingled the *Indo-Malayan* from the north, and eventually from the west, from the opposite south-western corner of the continent—the home of the old original and peculiarly Australian flora—the *autochthonic* plants drifted in. This mixture of species from three main sources was also augmented by invasions from the desert interior of *eremian* plants, which, according to Professor Tate,* originate from Indo-Malayan as well as from autochthonic ancestors. Whatever the sequence of physiographic changes or order of arrival may have been however, it seems extremely probable that long before the era of volcanic action the western plants had already established themselves, and that some of them had distribution and range greater than is the case at the present time.

On the occurrence of the lava-flows, which the sketch map† shows having a general northerly trend, particularly along the Goulburn, Campaspe, and Loddon Rivers, and filling in the western part of the Great Valley of Victoria, large tracts of

* Pr. A. A. A. Sc., 1888. † *Vict. Nat.*, vol. xxxiii., p. 113.

country were overwhelmed, leaving many intervening areas of unsubmerged vegetation more or less widely isolated. These islands were originally more numerous and smaller than now, for, as the late Dr. T. S. Hall pointed out* in connection with the country about Ballarat, the lava sheets were much more extensive, and that particular surface of the bed-rock was probably almost completely covered. When the basalt became capable of supporting vegetation, the new surfaces began to be peopled with plants from all sides, and the eastern drift was resumed, the "endemic" species being evidently derived from the nearest sources in the islands formed by the You Yangs, Brisbane Ranges, the country between the Djerriwarrh and Coimadai Creeks, the Lerderderg, and the high ground running north-east to Macedon and beyond.

Many thousand years must have elapsed since the surface of the basalt became habitable to plants, yet *Aster pimeleoides*, *Pimelea elachantha*, *Brachyloma daphnoides*, and *Billardiera cymosa* in the vicinity of Bacchus Marsh, *Acacia aspera* in the Brisbane Ranges, *Helipterum exiguum* in the You Yangs—to give only a few examples—have not been noted further east. *Epacris impressa*, *Isopogon ceratophyllus*, *Tetratheca ciliata*, *Helichrysum obcordatum* (Lerderderg and Greensborough), *Eucalyptus camphora* (Brisbane Ranges and Doreen), *E. globulus* (You Yangs and Lower Yarra), and very many others occur immediately on both sides, but seem to shun the basalt. In none of these plants is the power of invasion so very deficient that it can be said for that reason to have failed to establish itself on the basalt, and it must be assumed that either the uncongenial nature of the substratum or the general unsuitability of the habitat has prevented an advance.

Whether the same species have failed to invade like basaltic surfaces from other neighbouring formations it would be interesting to know, and the matter might well engage the attention of our members whenever opportunity comes to them.

Very unequal progress has been made by those plants which have already gained a footing. *Eucalyptus Behriana* and *Melaleuca parviflora*, with the eremian Geococcus and Bassias flourishing in their shade, have only just advanced across the Djerriwarrh Creek. *Claytonia volubilis* and *Calotis lappulacea* have been found no nearer to us than Anthony's Cutting; *Templetonia Muelleri* and *Acacia montana* at Melton, and *Teucrium racemosum* at Little River. *Casuarina Luehmanni* is strung out from south of Parwan in a line running just east of Melton and north to near the upper part of the Kororoit

* "Victorian Hill and Dale," p. 151.

Creek. *Cryptandra amara* appears only between Diggers' Rest and Bulla. Other, and commoner, plants that have gone further, some to the eastern limits of the plains, are *Atriplex Muelleri*, *A. semibaccatum*, *Chenopodium microphyllum*, *Ptilotus macrocephalus*, *Pimelea serpillifolia*, *Eucalyptus hemiphloia*, and several composites, which, with superior powers of dispersal, might have been expected to cross over to the forest country and the sands. Some species, now infrequent and isolated, no doubt in earlier days were much more abundant. *Prostanthera nivea* is still near Station Peak, but has long since disappeared from Newport, where Mr. St. John had noted it many years ago. *Lasiopetalum Baueri* is recorded in the "Fragmenta" as from the You Yangs and neighbouring coast, but in recent years it has not been seen there, and, as far as we know, exists only at Red Bluff, and, according to Mr. Hart, also at Cheltenham. *Eutaxia empetrifolia*, a typical Mallee plant, appears to have made the passage across the plains, but probably, like all the western plants now occurring on the eastern side, was already there before the volcanic era.

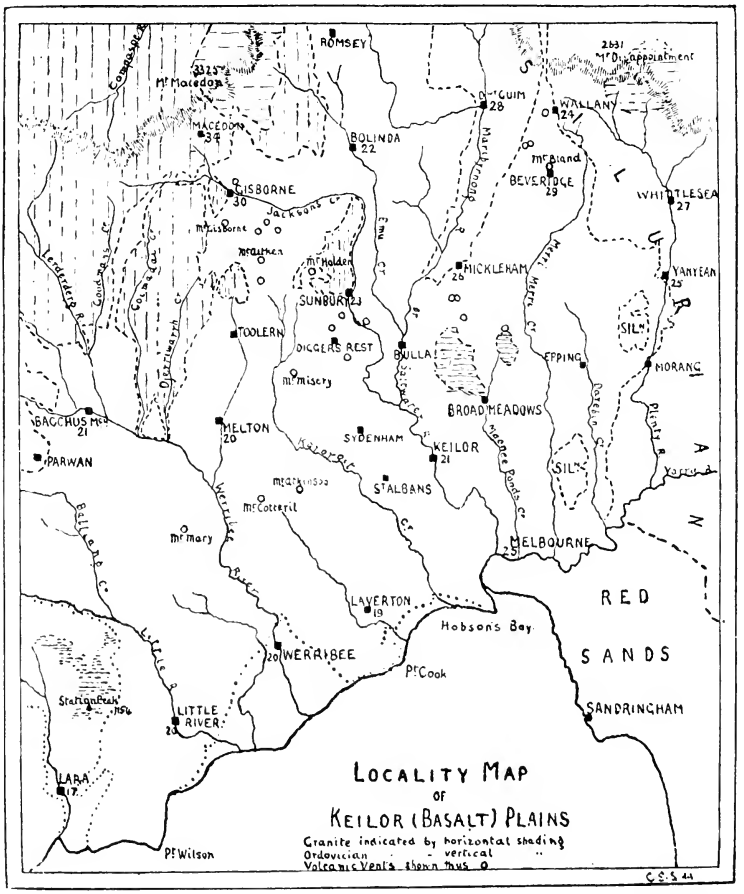
Of the species entering the area by way of the watercourses, *Olearia decurrens* has been noted at Bulla, *Callitris verrucosa* just beyond Keilor. The Cassia still holds its own here and there, and may be seen to best advantage on the west bank of the river south of Keilor. *Muehlenbeckia Cunninghamii*, recorded as growing at the Yarra mouth, is still to be found at Maribyrnong, and a patch of real "lignum" swamp occurs to the east of Rockbank. *Pelargonium Rodneyanum*, *Zygophyllum Billardieri*, *Myoporum deserti*, and *Acacia retinodes*, all still quite common in many of the creeks, are almost as accessible.

In compiling the appended census, totalling 444 plants, recourse has been had to the *Victorian Naturalist*, the "Flora Australiensis," and the "Fragmenta," but no other likely source of information has been neglected. Special thanks are due to Mr. P. R. H. St. John, who accompanied the author over many of the five hundred miles or so traversed in making the survey of the area, and placed at his disposal field-notes taken during the last fifteen years. For this and for much other assistance in efforts to better his acquaintance with our flora he begs to take this opportunity of expressing his indebtedness. Mr. T. S. Hart also has been kind enough to supply data, which have been gladly used.

Inasmuch as it comprises only flowering plants and ferns, the list is incomplete. Alien plants also, which, by reason of the wider disturbance of the surface and the "open" nature of the formation, are more in evidence here than on the "sands," have been ignored. Even as it is, it must, con-

sidering the amount of ground still uncovered, be greatly lacking, but it will at least serve as a basis for any future compilation that may be made.

The plan adopted in making up the Sandringham census * has been departed from in this case, and that of Mr. Maiden, in his recent "Census of New South Wales Plants," has been followed; so that the first name is the most recent and the one in brackets that of the "Key to the System of Victorian Plants." On the accompanying locality map the average annual rainfall is indicated in inches.



*Sutton, "Notes on the Sandringham Flora," *Vict. Nat.*, vol. xxviii., p. 5, and vol. xxix., p. 79.

CENSUS OF KEILOR PLAINS FLORA.

r indicates riparian and canyon plants ; *c* coastal ; *h* halophytes, and therefore also coastal ; *a* aquatic and semi-aquatic (other than halophytes) ; *e* endemic as regards the Melbourne district ; * rare, only in outskirts or very restricted in range. Where unlettered the species are of the grass-land, but not necessarily restricted to it. F.A., "Flora Australiensis" ; P.I.C.V., "Plants Indigenous to the Colony of Victoria" ; Frag., "Fragmenta Phytographiæ Australiæ."

PTERIDOPHYTA—

FILICALES—

Polypodiaceæ—

Asplenium flabellifolium, Cav.—Rat-tail Spleenwort.

r e Pleurosorus rutifolius (R. Br.), Fée. (Grammitis rutifolia, R. Br.)—Common Rue-fern.

r * Doodia aspera, R. Br. (Woodwardia aspera, Mett.)—Rasp-fern. *Somerton.*

r * ,, caudata (Cav.) R. Br. (W. caudata, Cav.)—Small Rasp-fern. *Broadmeadows.*

r * Pellæa falcata (R. Br.), Fée. (Pteris falcata, R. Br.)—Sickle-fern.

Cheilanthes tenuifolia (Burm.), Sw.—Common Rock-fern.

r Adiantum Æthiopicum, L.—Common Maidenhair.

* Pteridium aquilinum, L. (Pteris aquilina, L.)—Common Bracken.

Salviniaceæ—

a Azolla filiculoides, Lam., var. rubra, Diels. (A. rubra, R. Br.)—Red Azolla.

Marsileaceæ—

a * Marsilea Brownii, A. Br. (M. quadrifolia, Benth., non L.)—Nardoo.

Ophioglossaceæ—

Ophioglossum vulgatum, Benth.—Adder's Tongue.

LYCOPODIALES—

Lycopodiaceæ—

* Phylloglossum Drummondii, Kunze.—Drummond Club-moss.

GYMNOSPERMÆ—

CONIFERÆ—

Pinaceæ—

r e * Callitris verrucosa, R. Br.—Cypress or Turpentine Pine. *Sydenham.*

ANGIOSPERMÆ—

MONOCOTYLEDONEÆ—

Typhaceæ—

a r Typha angustifolia, L.—Bulrush.

Potamogetonaceæ—

h Zostera nana, Mertens.—Dwarf Grass Wrack.

a Potamogeton ochreatus, Raoul. (P. obtusifolius, M. and K.)—Blunt Pond Weed. *Werribee.*

a ,, tricarinatus, F. v. M. (P. natans, Benth., non L.)—Floating Pond Weed.

a ,, pectinatus, L.—Fennel Pond Weed.

h Ruppia maritima, L.—Sea Tassel.

h Cymodocea antarctica, Lab. (C. zosterifolia, F. v. M.)—Sea Nymph.

h e * Lepilæna Preissii, F. v. M.—Slender Water Mat. *Altona.*

Juncaginaceæ—

a Triglochin minutissima, F. v. M.—(T. centrocarpa, Hook.)—Dwarf Arrow Grass.

a ,, striata, R. and P.—Streaked Arrow Grass.

h e ,, mucronata, R. Br.—Prickly Arrow Grass.

a ,, procera, R. Br., var. dubia, Benth.—Giant Arrow Grass.

Alismataceæ—
a * Alisma plantago, L.—Greater Water Plantain.
a e * Damasonium minus, R. Br. (D. australe, Salisb.)—Star Fruit.

Hydrocharitaceæ—
a r Ottelia ovalifolia, Rich.—Ottelia.
a r Vallisneria spiralis, L.—Eel-grass.
h Halophila ovalis, Hook. f. (H. ovata, Gaud.)—Sea Wrack.

Gramineæ—
Anthistiria imberbis, Retz. (A. ciliata, Benth., non L.)—Kangaroo Grass.
c Zoysia pungens, Willd.—Prickly Couch Grass.
Paspalum distichum, L.
e Panicum effusum. R. Br.—Hairy Panic Grass. *Little River.*
a e ,, decompositum, R. Br.—Umbrella Grass.
c Spinifex hirsutus. Lab.—Hairy Spinifex.
Microlæna stipoides, R. Br. (Ehrharta stipoides, Lab.)—Weeping Grass.
Stipa setacea, R. Br.—Corkscrew Grass.
,, semibarbata, R. Br.—Fibrous Spear Grass.
r Echinopogon ovatus, Beauv.—Hedgehog Grass.
c Sporobolus virginicus, Kunth.—Virginian Rat-tail Grass.
Agrostis venusta, Trin.—Graceful Bent Grass.
c Calamagrostis æmula, Steud. (Agrostis Solandri, F. v. M.)—Toothed Bent Grass.
* ,, quadriseta, Spreng. (A. quadriseta, R. Br.)—Reed Bent Grass.
Dichelachne crinita, Hook.—Long-hair Plume Grass.
Danthonia penicillata, F. v. M.—Common Wallaby Grass.
Cynodon Dactylon, Rich.—Indian Couch Grass.
Chloris truncata, R. Br.—Windmill Grass.
a Phragmites communis, Trin. (Arundo phragmites, L.)—Common Reed.
Eragrostis Brownii, Nees.—Common Love Grass.
c Distichlis maritima, Raf.—Salt Grass.
Poa cæspitosa, G. Forst.—Tufted Meadow Grass.
c ,, Labillardieri, Steud.—Blue Meadow Grass.
c ,, syrtica, F. v. M.—Quicksand Grass.
a Glyceria fluitans, R. Br. (Poa fluitans, Scop.)—Manna Grass.
c Festuca littoralis, Lab.—Coast Fescue.
c Lepturus incurvatus, Trin.—Curved Snake-tail Grass.
c ,, cylindricus, Trin. Smaller Snake-tail Grass.
* Agropyrum scabrum, Beauv.—Common Wheat Grass.

Cyperaceæ—
a Cyperus tenellus, L.—Delicate Leaf Rush.
a Eleocharis sphacelata, R. Br.—Tall Spike Rush.
a ,, acuta, R. Br.—Common Spike Rush.
a Scirpus fluitans, L.—Floating Club Rush.
a ,, inundatus, Spreng.—Swamp Club Rush.
c ,, nodosus, Rottb.—Knotted Club Rush.
a ,, lacustris, L.—Lake Club Rush.
c a ,, maritimus, L.—Saltmarsh Club Rush.
a Schœnus capillaris, F. v. M.—Bristle Bog Rush.
a ,, apogon, R. and S.—Fluke Bog Rush. *Broadmeadows.*
c Cladium filum, R. Br.—Awned Twig Rush.
e * Lepidosperma laterale, R. Br.—Broad Sword Sedge. *Little River*, F. A.
r Carex inversa, R. Br.—Knob Sedge. *Broadmeadows.*
a ,, appressa, R. Br. (C. paniculata, F. v. M.)—Panicle Sedge. *Little River.*
a ,, pseudo-cyperus, L.—Galingale Sedge.
c ,, pumila, Thunb.—Spreading Sedge.

Lemnaceæ—
a Lemna minor, L.—Lesser Duckweed.
a Wolffia arrhiza, Wimm. (W. Michelii, Schl.)—Tiny Duckweed.

Centrolepidaceæ—
a Centrolepis polygyna, Hieron.—Mossy Centrolepis.
a ,, strigosa, R. and S.—Hairy Centrolepis. *Near You Yangs.*
Brizula gracilis, Hieron. (Aphelia gracilis, Sond.)—Slender Aphelia.
,, pumilio, Hieron. (Aphelia pumilio, F. v. M.)—Dwarf Aphelia.

Juncaceæ—
Luzula campestris, D. C.—Field Wood Rush.
a Juncus bufonius, L.—Toad Rush.
a ,, effusus, L. (J. communis, E. Mey.)—Common Rush.
c ,, maritimus, Lam., var. Australiensis, Buch.—Shore Rush.
a x ,, plebeius, R. Br. (J. homalocaulis, F. v. M.)—Wiry Rush.

Liliaceæ—
Burchardia umbellata, R. Br.—Milkmaids.
Anguillaria dioica, R. Br. (Wurmbea dioica, F. v. M.)—Early Nancy.
Bulbine bulbosa, Haw.—Common Yellow Lily.
Dichopogon strictus, Bak. (Arthropodium strictum, R. Br.)—Large Vanilla Lily.
Arthropodium paniculatum, R. Br.—Pale Vanilla Lily.
,, minus, R. Br.—Small Vanilla Lily.
* Chamæscilla corymbosa, F. v. M.—Blue Squill. *Gellibrand Hill.*
Tricoryne elatior, R. Br.—Yellow Autumn Lily.
Cæsia vittata, R. Br.—Banded Grass Lily.
,, parviflora, R. Br.—Small-flowered Grass Lily.
Dianella lævis, R. Br. (D. longifolia, R. Br.)—Long-leaved Flax Lily.
,, revoluta, R. Br.—Spreading Flax Lily.
Lomandra filiformis, J. Britt. (Xerotes Thunbergii, F. v. M.)—Wattle Mat Rush.

Amaryllidaceæ
Hypoxis glabella, R. Br.—Yellow Stars.

Orchidaceæ—
Thelymitra ixioides, Swartz.—Dotted Hood Orchid.
* ,, aristata, Lindl.—Tall Hood Orchid. *Werribee.*
,, longifolia, R. and G. Forst.—Long-leaved Hood Orchid.
Diuris punctata, Sm., var. alba, R. Br.—White Diuris.
,, palustris, Lindl.—Swamp Diuris. *Laverton.*
* ,, maculata, Sm.—Leopard Orchid. *Gellibrand Hill.*
,, pedunculata, R. Br.—Snake Orchid.
* ,, sulphurea, R. Br.—Tiger Orchid. *Little River.*
* Prasophyllum patens, R. Br.—Scented Leek Orchid.
* ,, fuscum, R. Br.—Tawny Leek Orchid.
Microtis porrifolia, R. Br.—Leek Microtis. *Sydenham.*
Pterostylis mutica, R. Br.—Small Green-hoods. *Broadmeadows, Melton.*
* ,, curta, R. Br.—Blunt Green-hoods. *S. Morang.*
* ,, pedunculata, R. Br.—Maroon-hoods. *S. Morang.*
Eriochilus autumnalis, R. Br.—Autumn Orchid. *Bulla.*
* Caladenia Patersoni, R. Br.—Spider Orchid. *S. Morang.*
* ,, carnea, R. Br.—Pink Fingers. *Somerton.*
* ,, cærulea, R. Br.—Blue Caladenia. *S. Morang.*
* ,, deformis, R. Br.—Blue Fairies. *Campbellfield.*
* Glossodia major, R. Br.—Large Glossodia. *S. Morang.*

DICOTYLEDONEÆ—

Casuarineæ—
Casuarina stricta, Ait. (C. quadrivalvis, Lab.)—Drooping Sheoak.
e * ,, Luehmanni, R. T. B.—Flat-fruited Buloke. *Parwan.*
,, suberosa, O. and D.—Black Sheoak.

Urticaceæ—
r Urtica incisa, Poir.—Scrub Nettle.
r Parietaria debilis, G. Forst.—Forest Pellitory.

Proteaceæ—
r * Persoonia juniperina, Lab.—Prickly Geebung.
r * Grevillea rosmarinifolia, Cunn.—Rosemary Grevillea. *Werribee.*
* Banksia marginata, Cav.—Silver Banksia. *Little River.*
* ,, integrifolia, L.—Coast Banksia. *Little River.*

Santalaceæ—
Exocarpus cupressiformis, Lab.—Cherry Ballart.
e * Thesium australe, R. Br.—Austral Thesium. *Braybrook.*

Loranthaceæ—
Loranthus celastroides, Sieb.—Common Mistletoe. *Greenvale.*
e ,, exocarpi, Behr.—Harlequin Mistletoe. *Bulla.*
e ,, linophyllus, Fenzl.—Slender Mistletoe. *Werribee.*
,, pendulus, Sieb.—Hanging Mistletoe. *S. Morang.*

Polygonaceæ—
a Rumex Brownii, Camp.—Swamp Dock.
a e ,, flexuosus, Sol.—Twisted Dock.
a ,, bidens, R. Br.—Mud Dock.
Polygonum plebejum, R. Br.—Small Knotweed.
,, prostratum, R. Br.—Trailing Knotweed.
a ,, hydropiper, L.—Pepper Knotweed.
a ,, minus, Huds.—Slender Knotweed.
a ,, subsessile, R. Br.—Hairy Knotweed.
c r Muehlenbeckia adpressa, Meissn., var. rotundifolium, Benth.—Climbing Lignum.
r e ,, Cunninghamii, F. v. M.—Tangled Lignum.
r e * Emex australis, Steinh.—Spiny Emex. *Jackson's Creek.*

Chenopodiaceæ—
h Hemichroa pentandra, R. Br. (Polycnemon pentandrum, F. v. M.)—Trailing Jointweed.
c Rhagodia Billardieri, R. Br.—Coast Saltbush.
r e ,, Gaudichaudiana, Moq.—Cottony Saltbush.
c ,, hastata, R. Br.—Saloop Saltbush.
,, nutans, R. Br.—Nodding Saltbush.
Chenopodium album, L.—Fat Hen.
,, murale, L.—Nettle-leaved Goosefoot.
e ,, triandrum, Forst. (C. microphyllum, F. v. M.)—Small-leaved Goosefoot.
,, glaucum, L.—Pale Goosefoot.
,, carinatum, R. Br.—Keeled Goosefoot.
c Atriplex cinereum, Poir.—Grey Saltbush.
e ,, semibaccatum, R. Br.—Berry Saltbush.
e ,, Muelleri, Benth.—Lagoon Saltbush.
h ,, paludosum, R. Br.—Marsh Saltbush.
h ,, crystallinum, J. Hook.—Glistening Saltbush.
e Kochia villosa, Lindl.—Silky Bluebush.
e * Bassia sclerolænoides, F. v. M.—Woolly-fruited Saltbush. *Djerriwarrh Cr.*
e * ,, diacantha, F. v. M.—Two-spined Saltbush. *Djerriwarrh Creek.*
Enchylæna tomentosa, R. Br.—Ruby Saltbush.
c e * Threlkeldia diffusa, R. Br.—Wallaby Saltbush.
h Arthrocnemum arbuscula, Moq. (Salicornia arbuscula, R. Br.)—Shrubby Glasswort.
h Salicornia australis, Sol.—Sea Glasswort.
h Suæda maritima, Dum.—Seablite.
h Salsola kali, L.—Prickly Saltwort.

Amarantaceæ—
e Ptilotus macrocephalus, Poir.—Featherhead.
e ,, spathulatus, Poir.—Pussytails.
Alternanthera triandra, Lam., var. nodiflora, F. v. M.—Joyweed.

Aizoaceæ—
c Mesembryanthemum æquilaterale, Haw.—Angular Pigface.
h ,, australe, Sol.—Rounded Pigface.
h ,, tegens, F. v. M.—Small Pigface.
h Tetragonia expansa, Murray—New Zealand Spinach.
h ,, implexicoma, Hook. f.—Bower Spinach.

Portulacaceæ—
Portulaca oleracea, L.—Common Purslane.
Calandrinia calyptrata, Hook. f. (Claytonia calyptrata, F. v. M.)—Pink Purslane.
e * ,, volubilis, Benth. (Claytonia volubilis, F. v. M.)—Twining Purslane. *Anthony's Cutting.*
a Claytonia australasica, Hook. f.—White Purslane.

Caryophyllaceæ—
r Stellaria pungens, Brong.—Prickly Starwort.
e r ,, palustris, Retz (S. glauca, With.)—Marsh Starwort.
Sagina apetala, L.—Small Pearlwort.
c Spergularia rubra, Camb.—Sand Spurrey.
Polycarpon tetraphyllum, Loefl.—Four-leaved Allseed.
e * Scleranthus diander, R. Br.—Tufted Knawel. *Werribee*, F. A.

Ranunculaceæ—
c r Clematis microphylla, D.C.—Smaller Clematis.
a r Ranunculus aquatilis, L.—Water Buttercup.
,, lappaceus, Sm.—Common Buttercup.
a r ,, rivularis, B. and S.—River Buttercup.

Lauraceæ—
* Cassytha melantha, R. Br.—Large Dodder-laurel. *Djerriwarrh Creek.*

Cruciferæ—
a Cardamine laciniata, F. v. M.—Jagged Bitter Cress.
e * Blennodia nasturtioides, Benth. (Sisymbrium nasturtioides, F. v. M.)—Yellow Blennodia. *Altona.*
e * Geococcus pusillus, Drum.—Earth-cress. *Djerriwarrh Creek.*
a c Capsella procumbens, Fries. (C. elliptica, C. A. Meyer).—Oval Shepherd's Purse.
Lepidium ruderale, L.—Rubble Pepper-cress.
h Cakile maritima, Scop.—Sea Rocket.

Droseraceæ—
Drosera glanduligera, Lehm.—Scarlet Sundew.
,, peltata, Sm.—Erect Sundew.
,, auriculata, Back.—Tall Sundew.
* ,, Planchoni, Hook. f. (D. Menziesii, R. Br., var. albiflora, Benth.)—Climbing Sundew. *Studley Park.*
,, Whittakeri, Planch.—Scented Sundew.

Crassulaceæ—
Tillæa verticillaris, D.C.—Austral Stonecrop.
,, purpurata, Hook. f.—Purple Stonecrop.
a ,, recurva, J. Hook.—Swamp Stonecrop.
,, macrantha, Hook. f.—Long-flowered Stonecrop.

Pittosporaceæ—
Bursaria spinosa, Cav.—Sweet Bursaria.

Rosaceæ—
Acæna ovina, Cunn.—Sheep's Burr.
,, sanguisorbe, Vahl.—Bidgee Widgee.

Leguminosæ—
r * Acacia diffusa, Edw.—Spreading Acacia. *S. Morang.*
,, armata, R. Br.—Hedge Acacia.
r ,, acinacea, Lindl.—Gold Dust Acacia.
* ,, montana, Benth.—Mountain Acacia. *Melton.*
r e ,, retinodes, Schl.—Wirilda.
,, pycnantha, Benth.—Golden Wattle.
,, melanoxylon, R. Br.—Blackwood.
,, implexa, Benth.—Lightwood.
r ,, verticillata, Willd.—Prickly Acacia.
,, decurrens, Willd.—Early Black Wattle.
r ,, dealbata, Link.—Silver Wattle.
r e * Cassia eremophila, Cunn.—Desert Cassia.
a Viminaria denudata, Sm.—Golden Spray.
* Daviesia latifolia, R. Br.—Broad-leaved Bitter-pea. *Epping.*
* ,, corymbosa, Sm.—Narrow-leaved Bitter-pea. *Epping.*
* Pultenæa daphnoides, Wendl.—Long-leaved Bush-pea. *S. Morang.*
Eutaxia empetrifolia, Schl.—Eutaxia.
* Dillwynia ericifolia, Sm.—Heathy Parrot-pea.
* ,, floribunda, Sm.—Crowded Parrot-pea. *Braybrook.*
* ,, cinerascens, R. Br.—Grey Parrot-pea. *Digger's Rest.*
Bossiæa prostrata, R. Br.—Prostrate Bossea.
e * Templetonia Muelleri, Benth.—Leafy Templetonia. "*Milton (sic), near Port Phillip,*" F.A.
e Lotus australis, Andr.—Austral Trefoil.
r Indigofera australis, Willd.—Austral Indigo.
e * Psoralea tenax, Lindl.—Tough Scurf-pea. *Braybrook and St. Albans.*
e * ,, adscendens, F. v. M.—Black Scurf-pea. *Altona.*
e * Swainsona lessertiifolia, D.C.—Purple Swainsona. *Braybrook.*
Glycine clandestina, Wendl.—Twining Glycine.
,, Latrobeana, Benth.—Purple Glycine.
e * ,, tabacina, Benth.—Variable Glycine.
Kennedya prostrata, R. Br.—Scarlet Coral-pea.
r * ,, monophylla, Vent.—Purple Coral-pea.

Geraniaceæ—
Geranium dissectum, L.—Cut-leaved Geranium.
,, pilosum, Forst.—Hairy Geranium.
Erodium cygnorum, Nees.—Blue Erodium.
Pelargonium australe, Willd.—Austral Pelargonium.
r e ,, Rodneyanum, Lindl.—Rosy Pelargonium.
Oxalis corniculata, L.—Yellow Wood-sorrel.

Linaceæ—
Linum marginale, Cunn.—Wild Flax.

Zygophyllaceæ—
e e r Zygophyllum Billardieri, D.C.—Coast Twinleaf.
Tribulus terrestris, L.—Caltrops.

Rutaceæ—
r Correa speciosa, Andr., var. glabra, Benth.—Smooth Correa.

Polygalaceæ—
Comesperma ericinum, D.C.—Heath Milkwort.
e * ,, polygaloides, F. v. M.—Small Milkwort. "*Near Station Peak,*" P.I.C.V.

Euphorbiaceæ—
e Euphorbia Drummondi, Boiss.—Flat Spurge.
Poranthera microphylla, Brong.—Small-leaved Poranthera.
* Beyeria opaca, F. v. M.—Small Wallaby-bush.

Stackhousiaceæ—
Stackhousia linariifolia, Cunn.—Creamy Stackhousia.
,, viminea, Sm.—Slender Stackhousia.

Sapindaceæ—
r Dodonæa viscosa, Jacq., var. spathulata, Benth.—Giant Hopbush.

Rhamnaceæ—
r * Pomaderris apetala, Lab.—Hazel Pomaderris. *Digger's Rest.*
* Cryptandra amara, Sm.—Prickly Cryptandra. *Digger's Rest. Bulla.*

Malvaceæ—
r e * Lavatera plebeja, Sims—Austral Hollyhock. *Werribee.*
r * Plagianthus pulchellus, A. Gray—Hemp Bush.
c e * ,, spicatus, Benth.—Salt Plagianth.

Sterculiaceæ—
Lasiopetalum Baueri, Steetz.—White Velvet Bush. "*Ad oras marinas haud procul a montibus You Yangs*" *(Fullagar), Frag. X.*

Dilleniaceæ—
* Hibbertia stricta, R. Br.—Erect Guinea-flower. *Once at Newport.*

Guttiferæ—
Hypericum japonicum, Thunb.—Small St. John's Wort.

Frankeniaceæ—
h Frankenia pauciflora, D.C. (F. lævis, L.)—Sea-heath.

Violaceæ—
* Viola hederacea, Lab. Common Violet. *Studley Park.*
r Hymenanthera dentata, R. Br. (H. Banksii, F. v. M.). Tree Violet.

Thymeleaceæ—
Pimelea glauca, R. Br.—Smooth Riceflower.
,, humilis, R. Br.—Dwarf Riceflower.
e ,, serpyllifolia, R. Br.—Thyme Riceflower.
,, curviflora, R. Br.—Curved Riceflower.
e * ,, stricta, Meissn.—Erect Riceflower. *Darebin Creek.*

Lythraceæ—
a r * Lythrum salicaria, L.—Purple Loosestrife. *Werribee.*
a ,, hyssopifolia, L.—Small Loosestrife.

Myrtaceæ—
r * Eucalyptus amygdalina, Lab.—Narrow-leaved Peppermint. *Bulla.*
r * ,, macrorrhyncha, F. v. M.—Red Stringybark.
,, melliodora, Cunn.—Yellow Box.
r ,, leucoxylon, F. v. M.—Yellow Gum. *Jackson's Creek.*
* ,, polyanthemos, Schau.—Red Box. *S. Morang.*
e ,, hemiphloia, F. v. M.—Grey Box.
r e * ,, Behriana, F. v. M.—Bull Mallee. *Djerriwarrh Creek*
,, ovata, Lab. (E. paludosa, R. T. B., E. acervula, Hook. f.)—Swamp Gum
,, viminalis, Lab.—Manna Gum.
,, rostrata, Schl.—Red Gum.
r Leptospermum lanigerum, Sm.—Woolly Tea-tree.
r Callistemon paludosus, F. v. M. (C. salignus, var. australis, Benth.)—Willow Bottlebrush.
e r * Melaleuca parviflora, Lindl.—Moonah. *Djerriwarrh Creek.*
e r * Calycothrix tetragona, Lab.—Common Fringe Myrtle. *Digger's Rest.*

Œnotheraceæ—
a Epilobium glabellum, G. Forst. (E. tetragonum, L.)—Smooth Willow-herb.

Halorrhagaceæ—

Halorrhagis tetragyna (Lab.), Hook. f.—Poverty Raspwort.
,, heterophylla, Brong.—Irregular Raspwort.
,, digyna, Lab. (H. mucronata, Benth.)—Prickly Raspwort. *Near You Yangs.*
a Myriophyllum propinquum, A. Cunn. (M. variæfolium, Hook. f.)—Red Water Milfoil.
a ,, verrucosum, Lindl.—Rough Water Milfoil.
a e ,, Muelleri, Sond.—Slender Water Milfoil. *Werribee.*

Umbelliferæ—

Hydrocotyle hirta, R. Br.—Hairy Pennywort.
,, tripartita, R. Br.—Slender Pennywort.
,, laxiflora, D.C.—Stinking Pennywort.
,, callicarpa, Bunge.—Small Pennywort.
e ,, capillaris, F. v. M.—Thread Pennywort.
* ,, Asiatica, L.—Indian Pennywort.
* Xanthosia dissecta, Hook. f.—Cut-leaved Xanthosia. *Somerton.*
Eryngium rostratum, Cav.—Blue Eryngo.
,, vesiculosum, Lab.—Trailing Eryngo.
Oreomyrrhis andicola, Endl.—Andean Carraway.
h Apium prostratum, Lab.—Sea Celery.
r e * ,, leptophyllum, F. v. M.—Slender Celery. *Darebin Creek.*
Daucus brachiatus, Sieb.—Austral Carrot.

Epacridaceæ—

r Styphelia humifusa, Pers.—Cranberry Heath. *Bulla.*
r * ,, strigosa, Sm.—Peach Heath. *Jackson's Creek.*

Myrsinaceæ—

r Rapanea variabilis, Mez. (Myrsine variabilis, R. Br.)—Mutton-wood.

Primulaceæ—

h Samolus repens, Pers.—Creeping Brookweed.

Plumbaginaceæ—

c * Statice australis, Spreng. (S. Taxanthema, R. and S.)—Yellow Sea-lavender.

Loganiaceæ—

* Mitrasacme distylis, F. v. M.—Tiny Mitrewort. *Beyond Little River.*

Gentianaceæ—

Sebæa ovata, R. Br.—Yellow Sebæa.
,, albidiflora, F. v. M.—White Sebæa.
Erythræa australis, R. Br.—Austral Centaury.

Convolvulaceæ—

Convolvulus erubescens, Sims.—Maiden's Blush.
Dichondra repens, R. G. Forst.—Kidney Weed.
c Wilsonia humilis, R Br.—Silky Wilsonia.
c ,, rotundifolia, Hook.—Round-leaved Wilsonia.
c ,, Backhousii, Hook. f.—Narrow-leaved Wilsonia.
c e Cuscuta australis, R. Br.—Austral Dodder.
c ,, tasmanica, Eng.—Tasman Dodder. *Altona.*

Borraginaceæ—

Cynoglossum suaveolens, R. Br.—Sweet Houndstongue.

Verbenaceæ—

r Verbena officinalis, L.—Common Vervain. *S. Morang. Deep Creek.*
h e * Avicennia officinalis, L.—White Mangrove. *Kororoit Creek.*

Labiatæ—

r Mentha australis, R. Br.—River Mint.
r ,, gracilis, R. Br.—Slender Mint. *Bulla.*
Brunella vulgaris, D. C.—Selfheal.

r * Scutellaria humilis, R. Br.—Dwarf Skullcap. *Jackson's Creek.*
e * Prostanthera nivea, Cunn.—Snowy Mint Bush. *Once at Newport.*
e Teucrium racemosum, R. Br.—Grey Germander. *Little River.*
,, corymbosum, R. Br.—Forest Germander. *S. Morang.*
Ajuga australis, R. Br.—Bugle.

Solanaceæ—
Solanum nigrum, L.—Black Nightshade.
r ,, aviculare, G. Forst.—Kangaroo Apple.
r Nicotiana suaveolens, Lehm.—Austral Tobacco.

Scrophulariaceæ—
e * Mimulus gracilis, R. Br.—Slender Monkeyflower. "*Extendit a Portu Phillipi*," *Frag. VI. Station Peak*, F.A.
a r ,, repens, R. Br.—Creeping Monkeyflower.
a Gratiola peruviana, L.—Brooklime Gratiola.
a * Limosella aquatica, L.—Common Mudwort.
Veronica gracilis, R. Br.—Slender Speedwell
,, calycina, R. Br.—Cup Speedwell. *Little River.*

Lentibulariaceæ—
a r Utricularia dichotoma, Lab.—Purple Bladderwort.

Myoporaceæ—
c r Myoporum insulare, R. Br.—Coast Boobialla.
c r ,, viscosum, R. Br.—Sticky Boobialla.
r e ,, deserti, Cunn.—Turkey Bush.
c * ,, humile, R. Br.—Creeping Myoporum. *Once at Newport.*

Plantaginaceæ—
Plantago varia, R. Br.—Variable Plantain.

Rubiaceæ—
r * Coprosma Billardieri, Hook. f.—Prickly Coprosma. *S. Morang.*
Asperula oligantha, F. v. M.—Common Woodruff.
r Galium umbrosum, Sol., var. Gaudichaudi, F. v. M.—Rough Bedstraw.
r ,, australe, D.C.—Tangled Bedstraw.

Caprifoliaceæ—
r Sambucus Gaudichaudiana, D.C.—White Elderberry.

Campanulaceæ—
a Lobelia anceps, Thunb.—Angled Lobelia.
c * ,, purpurascens, R. Br.—Purple Lobelia. *Altona.*
* ,, pratioides, Benth.—Poison Lobelia. *Little River.*
e * ,, platycalyx, F. v. M.—Fleshy Lobelia. *Yarra Mouth*
e ,, concolor, R. Br.
a Isotoma fluviatilis, F. v. M.—Swamp Isotoma.
Wahlenbergia gracilis, D.C.—Austral Bluebell.

Goodeniaceæ—
e Velleia paradoxa, R. Br. (Velleya).—Spurred Velleia.
r Goodenia ovata, Sm.—Hop Goodenia.
,, pinnatifida, Schl.—Cut-leaved Goodenia.
* ,, heteromera, F. v. M.—Spreading Goodenia. *Little River.*
e * ,, gracilis, R. Br.—Slender Goodenia. *Little River.*
c a Selliera radicans, Cav.—Swampweed.
c * Scævola suaveolens, R. Br.—Scented Fanflower. *Near Point Cook.*

Candolleaceæ—
Candollea serrulata, Lab.—Grass Trigger Plant.
,, despecta, F. v. M.—Small Trigger Plant. *Beyond Little River.*
Levenhookia dubia, Sond. (Leewenhoekia).—Hairy Stylewort.

Compositæ—

r * Olearia ramulosa, Benth. (Aster ramulosus, Lab.)—Twiggy Aster.
r * ,, myrsinoides, F. v. M. (A. myrsinoides, Lab.)—Myrsine Aster. *S. Morang.*
r * ,, decurrens, Benth. (A. decurrens, Cunn.)—Clammy Aster. *Bulla.*
r * ,, glutinosa, Benth. (A. glutescens, F. v. M.)—Sticky Aster.
Vittadinia australis, A. Rich.—New Holland Daisy.
e Minuria leptophylla, D.C.—Silky Minuria.
* Calotis scabiosifolia, S. and F. v. M.—Rough Bur Daisy. *Little River.*
e * ,, scapigera, Hook.—Tufted Bur Daisy. *Yarra Mouth.*
e * ,, anthemoides, F. v. M.—You Yangs Bur Daisy. "*Near Station Peak.*"
e * ,, lappulacea, Benth.—Common Bur Daisy. *Anthony's Cutting.*
Lagenophora emphysopus, Hook. f.—Dwarf Bottle-Daisy.
Brachycome diversifolia, F. v. M.—Tall Daisy.
a e ,, radicans, Steetz.—Marsh Daisy.
,, graminea, F. v. M.—Grass Daisy.
,, exilis, Sond.—Slender Daisy.
,, decipiens, Hook. f.—Common Daisy.
a ,, cardiocarpa, F. v. M.—Swamp Daisy.
,, ciliaris, Less.—Bushy Daisy.
e ,, calocarpa, F. v. M.—Desert Daisy.
e * ,, chrysoglossa, F. v. M.—Golden Daisy. *St. Albans.*
r ,, multifida, D.C.—Blue Daisy.
r Siegesbeckia orientalis, L.—Indian Weed.
e * Eclipta platyglossa, F. v. M.—Yellow Twinheads. *Werribee.*
h Cotula filifolia, Thunb.—Slender Cotula.
a ,, coronopifolia, L.—Swamp Cotula.
,, australis, Hook. f.—Common Cotula.
c ,, reptans, Benth.—Creeping Cotula.
Centipeda Cunninghamii, F. v. M.—Erect Sneezeweed.
e * Isoetopsis graminifolia, Turcz.—Grass Cushion.
e * Myriocephalus rhizocephalus, Benth.—Dwarf Thickheads.
e Angianthus Preissianus, Benth.—Flat Cupflower.
e * Calocephalus Brownii, F. v. M.—Coast Whitebush. *Werribee.*
,, lacteus, Less.—Milky Beauty Heads.
e ,, citreus, Less.—Lemon Beauty Heads.
Craspedia Richea, Cass.—Big Billybuttons.
e ,, chrysantha, Benth.—Golden Buttons.
r * Cassinia longifolia, R. Br.—Shining Cotton-wood. *S. Morang.*
r * ,, aculeata, R. Br.—Common Cotton-wood.
e * Rutidosis leptorrhynchoides, F. v. M.—Button Wrinklewort.
,, pumilo, Benth.—Small Wrinklewort.
Millotia tenuifolia, Cass.—Soft Millotia.
e * Ixiolæna leptolepis, Benth.—Stalked Ixiolæna.
e * Podotheca angustifolia, Less.—Narrow-leaved Podotheca. *Near Melbourne*, F. A.
Podolepis acuminata, R. Br.—Large Podolepis.
Leptorrhynchos squamatus, Less.—Scaly Buttons.
,, tenuifolius, F. v. M.—Slender Buttons.
e * ,, elongatus, D.C.—Lanky Buttons. *Near Melbourne*, F. A.
Helichrysum scorpioides, Lab.—Curling Everlasting.
,, rutidolepis, D.C.—Pale Everlasting.
,, apiculatum, D.C.—Pointed Everlasting.
,, semipapposum, D.C.—Downy Everlasting.
r e * Helipterum anthemoides, D.C.—Chamomile Sunray. *Sydenham.*
* ,, corymbiflorum, Schl.—White Sunray. *Sydenham.*
,, dimorpholepis, Benth.—Common Sunray.
Gnaphalium luteo-album, L.—Jersey Cudweed.

Gnaphalium Japonicum, Thunb.—Japanese Cudweed.
Stuartina Muelleri, Sm.—Spoon Cudweed.
Erechtites arguta, D.C.—Rough Fire-weed.
,, quadridentata, D.C.—Cotton Fire-weed.
* Senecio lautus, Sol.—Variable Senecio.
r * ,, vagus, F. v. M.—Saw Senecio.
r ,, dryadeus, Sieb.—Fire-weed Senecio.
* ,, brachyglossus, F. v. M.—Slender Senecio.
r e * ,, Cunninghamii, D.C.—Branching Senecio. *Digger's Rest.*
Arctotis australiensis, Beauv. (Cymbonotus Lawsonianus, Gaud.)
Microseris Fosteri, Hook. f.—Murrnong Yam.

THE EXHIBITION OF WILD-FLOWERS.

THE following, which will be of interest to members and other readers, is a copy of a letter sent to the Y.M.C.A. prior to the holidays:—

"12th December, 1916.

"C. F. Crosby, Esq.,

"President Young Men's Christian Association, Melbourne.

"Dear Sir,—We have very much pleasure, on behalf of the Field Naturalists' Club of Victoria, in enclosing herewith, for your acceptance, as a donation to your Association's National Fund for work among our soldiers, a cheque for the sum of £131 6s. 10d.

"The amount is the total net proceeds derived from the Club's annual wild-flower show, which was held in the Melbourne Town Hall on 3rd October last.

"The Club appreciates very highly your Association's work on behalf of the soldiers, and is also grateful to all who assisted to make the flower show such a success as to enable so satisfactory a donation to be made to the fund mentioned.

"We are, yours sincerely,

(Signed) "F. PITCHER, President.
"J. G. O'DONOGHUE, Secretary.
"GEO. COGHILL, Treasurer."

COMMONWEALTH MILITARY SURVEY.—For some years a military survey of the Commonwealth has been in progress, and recently some of the resulting maps have been published. Copies of some of these have been exhibited at recent Club meetings; but, as the maps are particularly useful to ramblers such as field naturalists and others, it may be of service to place a few particulars on record. The maps are on the generous scale of one mile to one inch, and thus allow for greater detail than has hitherto been attempted on the official maps of any of the States. In this they resemble the famous Ordnance maps of Great Britain. All existing roads are shown, with

indications as to whether fenced or not and whether metalled or not. Bridges, culverts, cuttings, embankments, water-holes, water-courses (non-perennial), and tracks are indicated, while in sparsely populated parts the position of every house is marked. All public buildings, such as churches, schools, post-offices, hotels, &c., have their special indications, so that with one of these maps in hand the tourist can have no fear of being "bushed." They are also contoured at every fifty feet, which in itself is a great boon. The maps measure about 27 by 17 inches, and thus represent about 460 square miles of country. Up to the present twelve have been issued—viz., two for New South Wales (Lake Macquarie and Morna Point), one for South Australia (Adelaide), and nine for Victoria (Sunbury, Melbourne, Ringwood, Cranbourne, Western Port, Sorrento, Portarlington, Geelong, and Anglesea). The maps take their names from some important place which they include. Thus Ringwood, the one of most use to members of the Field Naturalists' Club, covers the area from Northcote to Sandringham on the west to Seville and South Gembrook on the east, and from Lilydale in the north to Dandenong in the south. As the south-west corner of this map is the intersection of the 145th degree of longitude with the 38th degree of latitude, it will be easy to work out on a map of Victoria in which map any desired locality will occur. Unfortunately, a few errors appear here and there. The most serious occurs in the Ringwood map, in which the Mullum Mullum or Deep Creek is misnamed "Anderson's Creek." Most of the principal roads are named, but in several instances the names are wrongly spelled: this is a pity, for maps of such importance as these should be free from the slightest error. They are published at the low price of one shilling, and can be obtained at the Government Printing Office, Melbourne.

The National Park, Wilson's Promontory.—In the course of some remarks on the National Park in the *Argus* of 6th January, Professor Ewart remarks that the protection afforded to the Koalas, or Native Bears, by the enclosure of the park and the stopping of shooting has resulted in their favourite haunt, a Swamp Gum forest near Oberon Bay, becoming over-populated, with the consequence that the trees are being killed by the excessive destruction of their leaves, hence it may become necessary to occasionally thin out some of the animals. It is gratifying to learn that in parts where the timber had been destroyed by bush fires, often in the interests of former graziers, forest trees are again asserting themselves, and bid fair to completely restore the damage in a few years.

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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, the 15th January, 1917.

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

The president regretfully announced that the hon. secretary, Mr. J. G. O'Donoghue, was still in a precarious state of health. He had seen him the previous day, when he expressed his appreciation of the letter of sympathy sent to him by direction of the last monthly meeting, and desired to thank those members who had visited him and inquired after him during his illness.

CORRESPONDENCE.

From Mr. W. J. Stephen, suggesting that the Club should urge that the 137 acres of land near Burwood, recently acquired by the Hawthorn Tramways Trust for the purpose of a public park, should as far as possible be kept in its natural state, and if any replanting is required preference should be given to native trees and shrubs; also that, if possible, it be declared a sanctuary for native fauna.

The chairman said the area was large enough to provide both space for recreation and a sanctuary for native fauna and flora, and that it would not be advisable to ask for too much restriction in its use. This view was accepted by the meeting, and it was resolved, on the motion of Messrs. Coghill and Wisewould, to communicate with the Trust, and express the desires of the Club with regard to the future of the park.

GENERAL BUSINESS.

Mr. F. Wisewould referred to the splendid monetary result of the recent exhibition of wild-flowers, by which, as announced in the current *Naturalist*, the fine sum of £131 6s. 10d. was handed to the Y.M.C.A. as a donation to its National Appeal for funds to carry on its war work. The result, he said, was highly creditable to all concerned, and members should regard the efforts made in obtaining flowers as having been thoroughly appreciated.

REMARKS ON EXHIBITS.

Mr. H. B. Williamson drew attention to his exhibit of thirty-six species of Mallee plants found in bloom between

Ouyen and Murrayville during the last week of December. Usually these plants would have long passed their flowering season, but the abnormal quantity of rain which fell in the district in November and December had greatly prolonged their flowering period.

Mr. C. Daley, F.L.S., called attention to two birds recently obtained at Mallacoota Inlet—viz., a female Flinders Cuckoo (a Queensland bird), which had strayed far from its usual limits, and so far as he knew had not been previously recorded for Victoria, and the Topknot Pigeon (a fruit-eating pigeon), ranging from Queensland to Tasmania, but comparatively rare in southern latitudes.

Dr. C. S. Sutton called attention to dried specimens of *Eriostemon obovalis* and *Grevillea parviflora*, collected by Mr. St. John and himself in the Geelong Water Reserve, Durdidwarrah, at Christmas, being a new district for each of these plants.

Mr. P. R. H. St. John called attention to herbarium specimens exhibited of *Acacia leprosa*, Sieber, *A. leprosa*, var. *tenuifolia*, Benth., and *A. subporosa*, F. v. M., about which considerable confusion existed, and pointed out how they might be distinguished.

Mr. F. Wisewould remarked that the young Black-tailed Wallaby exhibited had been taken from the pouch on 31st December, two months after the close season terminated.

Mr. A. D. Hardy, F.L.S., called attention to his exhibit of a specimen of *Glyceria dives*, F. v. M., Giant Mountain Grass, 14 feet high, from Sherbrooke, Dandenong Ranges. He said this was not an exceptional growth, as hundreds of specimens equally tall were to be seen there this season.

PAPER READ.

By Mr. J. Searle, entitled "The Pond and its Inhabitants."

The author said that some time ago it had been proposed to publish a series of articles of a more elementary nature in the *Naturalist*, and with that view he had prepared a series of notes on pond-life, some of which he purposed bringing before the meeting. He then dealt with methods of investigation, aquatic insects, the whirligig beetles, moss animals (fresh-water polyzoa), and water-fleas, illustrating his remarks with blackboard sketches.

Some discussion ensued, in which Messrs. Hardy, Williamson, Sutton, Plumridge, and the chairman took part.

NATURAL HISTORY NOTE.

Miss G. Nethercote mentioned that when on a recent visit to the Buchan Caves district she had noticed the New South

Wales Spotted Gum, *Eucalyptus maculata*, Hook., near the Tarra Range.

EXHIBITS.

By Mr. C. Daley, F.L.S.—Skins of Flinders Cuckoo, *Eudynamis cyanocephala*, Latham (female) and Topknot Pigeon *Lopholæmus antarcticus*, Shaw, recently shot by Miss L. Donon, at Lake View, Mallacoota.

By Mr. A. D. Hardy, F.L.S.—Specimen of *Glyceria dives*, F. v. M., Giant Mountain Grass or "Wild Oats," measuring 14 feet in height, from Sherbrooke, Dandenong Ranges.

By Miss G. Nethercote.—Grey marble, from Government Quarries, near Buchan; black marble, from Fairy Cave, Buchan; dried specimen of *Smilax australis*, from Marlo, East Gippsland.

By Mr. F. Pitcher.—Foliage and flower of *Eucalyptus macrocarpa*, Large-fruited Eucalyptus (W.A.), grown at Sandringham; branch of *Acacia armata*, with singular gall formation, from Ringwood.

By Dr. C. S. Sutton.—Dried specimens of Cockatoo Orchid, *Caleya major*, Rusty-hoods (orchid), *Pterostylis rufa*, Diggers' Speedwell, *Veronica perfoliata*, and Shrubby Trachymene, *Trachymene Billardieri*, from Brisbane Range; Common Fringe-Myrtle, *Calythrix tetragona*, Velvet Aster, *Olearia* (*Aster*) *pannosa*, and Fringe-Wattle, *Acacia Mitchelli*, from Maud; Slender Goodenia, *Goodenia gracilis*, from Little River; *Eriostemon obovalis* and *Grevillea parviflora*, from Durdidwarrah.

By Mr. W. Scott.—Flowering plant (in pot) of *Isotoma axillaris*, Rock Isotoma.

By Mr. P. R. H. St. John.—Herbarium specimens of *Eucalyptus stricta*, Sieber (syn. *E. virgata*, Sieber; *E. virgata*, Sieb., var. *stricta*, J. H. Maiden), collected at Mount Wellington, Vict., 25th December, 1916, by Dr. W. H. Green; *Acacia leprosa*, Sieber (known erroneously as *A. leprosa*, var. *elongata*); *A. leprosa*, Sieb., var. *tenuifolia*, Benth. (known usually as *A. leprosa*, Sieb.); and *A. subporosa*, F. v. M. (known erroneously as *A. leprosa*, Sieb., var. *tenuifolia*, Benth.), Victoria.

By Mr. J. Wilcox.—Rotifer colony, *Lacinularia elliptica*.

By Mr. H. B. Williamson.—Dried specimens of 36 species of plants collected in bloom at Ouyen and Murrayville between 26th and 31st December, illustrating the unusual season in the northern Mallee.

By Mr. F. Wisewould.—Young of Black-tailed Wallaby, *Macropus ualabatus*, taken from pouch at Pakenham on 31st December, two months after termination of close season.

After the usual conversazione the meeting terminated.

EXCURSION FROM CROYDON TO BELGRAVE.

A PLEASANT morning greeted the excursion party, which quitted the Healesville train at Croydon on Saturday, 14th October. Owing to the distance to be traversed, the coaches were utilized to Montrose, at the foot of Mount Dandenong (about 4½ miles), where another member joined us, making a total of fifteen, including six ladies. Here the Swamp Paperbark, *Melaleuca ericifolia*, Woolly Tea-tree, *Leptospermum lanigerum*, and Golden Bush-Pea, *Pultenæa Gunnii*, were found in good flowering condition on the banks of a small creek. The road up the mountain, which rises about 800 feet in the first mile and a half to the "Devil's Elbow," was now taken. Along it various plants were blooming freely, such as the Pink-Eyes, *Tetratheca ciliata*, Twining Glycine, *Glycine clandestina*, Blue Pincushion, *Brunonia australis*, Alpine Grevillea, *Grevillea alpina*, Golden Goodia, *Goodia lotifolia*, Austral Indigo, *Indigofera australis*, and Wonga Tecoma, *Tecoma australis*, the latter twining about some sapling "Messmates," *Eucalyptus obliqua*—the prevailing gum on this part of the range. In addition to the plants, delightful views across the country towards the Yarra Valley and towards Melbourne can be obtained at every turn of the road. The pace was necessarily slow, which gave time to chat about the different objects of interest. At the "Devil's Elbow" some enjoyed a rest, while others secured specimens of the Ridge Snow-Bush, *Olearia* (*Aster*) *stellulata*, var. *lirata*, and the Myrsine Aster, *O. myrsinoides*, var. *crubescens*, and various other smaller flowers. Turning southerly, we soon reached "The Gap," from whence a fine view in an easterly direction was obtained, the Warburton hills being very prominent, with the Baw Baws further away. We were too late for the majority of the acacias, with their golden blooms, though it is quite possible that the continuous rains of September considerably shortened their flowering period. Following the road and track to Observatory Peak, we had still three or four hundred feet to ascend before we reached the "trig." station and shelter-shed on Mount Dandenong, 2,070 feet above sea-level. *Pimelea axiflora* was in evidence along our path in many places, and the common name for this plant, "Rice-flower," appealed to all as being very appropriate, the flowers hanging like rice-grains all over the plants. Several of the green-hood orchids (Pterostylis), the Bird Orchid, *Chiloglottis Gunnii*, and Spider Orchid, *Caladenia Patersoni*, were also collected. From the look-out fine views in various directions are obtainable, which, of course, depend somewhat on the state of the atmosphere. Hazy conditions prevailed towards Melbourne (twenty miles distant), and prevented us from picking out the more prominent land-

marks. Fine specimens of the Messmate, *Eucalyptus obliqua*, and Narrow-leaved Peppermint, *E. amygdalina*, are growing in the vicinity of the shelter-shed. After luncheon we started on the track to Olinda, distant about 2½ miles; this was comparatively easy—along the crest of the range. For the first few hundred yards we passed through a dense growth of the Common Musk-tree, *Olearia* (*Aster*) *argophylla*, several acres in extent, interspersed with which are specimens of the Blanket-wood, *Senecio Bedfordi*, Hazel, *Pomaderris apetala*, and Cotton-wood, *Cassinia aculeata*. Some very fine Blackwood trees, *Acacia melanoxylon*, up to 60 feet in height, are to be seen about here, also the Long-leaved Box, *Eucalyptus elæophora*, and the Giant Gum, *E. regnans*. In the broad depression between Mount Dandenong and Olinda there evidently existed in former days one of the finest forests of large timber trees in these ranges, now represented by huge dead trunks and stumps, though here and there a live specimen still exists upwards of 200 feet in height. Some fine patches of tall young saplings of the Giant Gum are coming on, stimulated by the deep chocolate soil, but, being on private property, it is doubtful if they will be allowed to reach the maturity of the former inhabitants of this locality. Under the shade of the saplings large numbers of the Prickly Shield Fern, *Aspidium aculeatum*, were just unfolding their hair of bronze-coloured young fronds. Near Olinda good views of Bayswater, far below us, were obtained. The Tall Rice-flower, *Pimelea ligustrina*, and the Cheese-wood, or Banyalla, *Pittosporum bicolor*, were now added to our collections. Olinda possesses a well-designed direction board, from which the tourist may learn the distances to various beauty spots. We now followed the newly-graded road towards Sassafras (2 miles), looking down into the valley of Perrins Creek on our left. This creek joins the Sassafras Creek near South Sassafras, and is considered one of the finest in the district. The head of Sassafras Creek, situated in a beautiful bower of foliage, was crossed just before reaching the township, and on the corner of the Mechanics' Institute is another direction board with distances to various places. Fine views are obtained almost anywhere along the road, especially at the junction of the Crescent road with the main road. The track to Sherbrooke Falls was entered not far from the Church of England. It was in parts very damp; but, as most of the party were traversing it for the first time, they did not mind the discomfort, and greatly enjoyed the scene as they passed along through groves of tree-ferns, shrubs, &c. It crosses and re-crosses the stream, which eventually becomes the Monbulk Creek, several times. One of the largest plants of the Silk-pod Creeper, *Lyonsia straminea*,

ever seen by any of the party had recently been blown down with its tree support, and lay alongside the path. Not far away was noted a plant, about 3 feet high, of the Victorian Laurel, *Pittosporum undulatum*. This species had not been noticed so near Melbourne before, and it is possible it may have resulted from seeds artificially introduced. The "Giant Tree," a fallen specimen of a former monarch of the forest, which was described in the *Naturalist* in connection with a former trip, claimed our attention for a few minutes. Then we crossed to the southern side of the creek in order to better view the falls. There was a good flow of water, and the falls, with their surrounding wealth of vegetation, were greatly admired. Time was passing, and we still had about two miles to go before reaching Belgrave station. However, a brief halt was made by the roadside, where the billy was boiled, and tea hastily partaken of. Belgrave was reached soon after 7 p.m., in ample time for the train to town. We estimated our walk to have covered about twelve miles, and the ladies of the party are to be congratulated on having done so well. During the day some 60 species of plants were noted in bloom. I am indebted to Mr. P. R. H. St. John for a list of the eucalypts observed, and also for one of the birds seen or heard during the day, while Mr. A. N. Burns has kindly given me some notes about the butterflies seen.

"The following eucalypts were seen during the excursion from Croydon to Belgrave:—Brown Stringy-bark, *E. capitellata*, White Stringy-bark, *E. eugenioides*, Red Stringy-bark, *E. macrorrhyncha*, Silver-leaved Stringy-bark, *E. cinerea*, var. *multiflora*, Narrow-leaved Peppermint, *E. amygdalina*, Giant Gum, *E. regnans*, Mountain Gum, *E. goniocalyx*, Manna Gum, *E. viminalis*, Messmate, *E. obliqua*, Long-leaved Box, *E. elæophora*, and Swamp Gum, *E. paludosa*. The birds seen and heard comprised the Brown Kingfisher, Bronze-Cuckoo, Lyre-bird, Flame-breasted Robin, Rose-breasted Robin, Yellow-breasted Shrike-Robin, White-shafted Flycatcher, Pilot-bird, Coachwhip-bird, Blue Wren-Warbler, Grey Shrike-Thrush, Brown Tree-creeper, Red-tipped Pardalote, Spotted Pardalote, Spinebill, White-eared Honey-eater, and Crescent Honey-eater.—P. R. H. St. John."

"The day being rather dull and cold, especially in the morning, the number of butterflies seen was very limited—in fact, not one was seen till after lunch on top of the range. The Australian Admiral, *Pyrameis itea*, was the first noticed, then here and there, taking advantage of the snatches of sunlight, specimens of the Painted Lady, *Pyrameis kershawii*, flitted across our path. Once during the afternoon a specimen of the rare *Argynnina hobartia cyrila* was seen flying about the

tops of some eucalypts, and, although October is the best month for this species, no other specimen was seen. While traversing the track to Sherbrooke Falls I noticed that some of the young leaves on the small Sassafras trees had been partially eaten, probably by the larvæ of the handsome *Papilio macleayanus*, which appears on the wing during December–February. Some of the young branches of the Native Musk-tree also bore partly-eaten leaves, which may have been done by the larvæ of *Miletus hecalius*, but, as this species is rather local in its occurrence, the damage may have been caused by the larvæ of some moth. Had the day been fine and warm, at least a dozen species of butterflies should have been met with.—A. N. BURNS."

Any member of the Club who desires to introduce a friend to the forest scenery of our State cannot do better than take this outing, but, if considered too arduous, take the shorter one from Belgrave to the Sherbrooke Falls, the gorge in which they are situated being a splendid example of a fern gully and its accompanying vegetation of huge gums, etc., concentrated in a limited area.—F. PITCHER.

UPSETTING THE BALANCE OF NATURE.

By H. W. DAVEY, F.E.S.

(Read before the Field Naturalists' Club of Victoria, 9th Oct., 1916.)

IT is a matter for regret that the native Blackfish is rapidly disappearing from our streams, where formerly it was so plentiful: and this in spite of the recent action taken by the Fisheries Department in again raising the size at which this fish may be taken. The extinction of the Blackfish in the near future seems certain, owing to the great mistake made in introducing to this country the Common Perch, *Perca fluviatilis*, which is one of the most voracious of fishes.

It appears to be a natural law that an introduced species displaces the indigenous kinds. In Australia we have numerous examples of this, among which we see the white man ousting the aboriginal. The fox and dingo are animals closely allied to each other, yet the latter is rapidly decreasing in numbers, while the fox becomes more numerous—this to an alarming extent. He destroys many of our birds, among which the Lyre-bird is a great sufferer. Other noteworthy examples of the adaptability of importations to their new environment are the rabbit and hare, while, on the other hand, our marsupials are disappearing rapidly. Starlings are increasing, and will become a serious menace to agriculture when they overtake

their food supply. They are destroying some of our native birds by nesting in hollows formerly occupied by them. Even the Laughing Kingfisher is menaced, and this in spite of its being protected by Act of Parliament. Several instances of this kind have come under my notice. This is strange, as the Kingfisher is a much more powerful bird than the Starling. The reason for its giving way to the Starling is, I think, owing to the fact that it never had to struggle and fight for a nesting-place in the same way as the old-world Starlings have had to do for many generations, and when the Kingfisher finds its favourite nesting-spout in a gum tree occupied by a pair of Starlings it merely looks for another hollow, and, on finding this also occupied, searches again, until finally the hen bird has to put up with a poor substitute, or possibly has to lay her eggs before she can find a suitable place. This struggle between the imported and the native fauna goes on right down the line even to the earthworms, the imported worm being now very common around Melbourne.

The introduction of the Common Perch was a very serious mistake, and one which it is now impossible to remedy. The introduction of trout of different species was bad enough as regards the Blackfish, but, fortunately for these, the trout has to be bred artificially, and when liberated finds many of our streams unsuitable owing to their muddy bottoms, and also that, during the warm months, the water rises in temperature to a degree that in many streams proves fatal to them. Although this fish will help to exterminate the Blackfish, I doubt if it can do any harm after the extermination of the former species.

The great menace by the Perch is, I am afraid, to the so-called Murray Cod. The Murray River and its tributaries now abound with the Common Perch, and, owing to the enormous food supply in these rivers, this fish will grow very rapidly. As a result of this rapid growth, the number of eggs laid by it will be enormously increased. This fish, where the food supply is abundant, seldom feeds on its own species. Consequently, there will be practically no check on its increase, and, as it is a faster swimming fish than the Cod, the latter, when young, will merely serve as food for it. Large Cod cannot capture it, owing to its greater swiftness in the water; therefore it may be only a question of time when the Cod that is too large to be swallowed by the perch will either be hooked, netted, or die of old age, and if in the meantime its young are devoured when small it is obvious that the extinction of this fine fish in Victorian waters is not very far distant. Even if the Perch never touched a Cod it would still be a menace to this and other native fish, owing to its great fecundity, as a fish half a pound

in weight has had upwards of 280,000 eggs taken from it, and the absence of enemies allows it to increase and consume the natural food of our native fish (shrimps, &c.), forcing them to become more cannibalistic than they are at present, as the food supply is, after all, the controlling factor.

The Cormorant is frequently accused of being one of the chief agents in destroying our native fish, and this in spite of the fact that in the early days of Victoria almost every stream teemed with fish. The Cormorant must then have been likewise abundant, so we see that, although the country was full of Cormorants, the streams were also well stocked with fish. This is where the balance of Nature comes in. Suppose, for instance, that Cormorants fed largely on "yabbies" at the time of the year when the fish were spawning, they would prevent the yabbies from feasting on the fish eggs, to which they are very partial. If left alone yabbies would undoubtedly consume thousands of eggs at one meal; then surely Cormorants are entitled to a percentage of the fish that, but for their help in destroying the yabbies, would never have been allowed to hatch.

The same thing applies to the sea fish. Some years ago the Melbourne Harbour Trust was blamed for the scarcity of fish in Port Phillip Bay. It was stated in the newspapers that the dumping of silt in the Bay from their barges was the cause. I do not believe this to have been the cause of the trouble, one reason being that the Bay is a very large place, and, in comparison, the amount of silt dumped was small; but the fisherman himself is, I think, a contributing cause to the scarcity. By destroying any fish he may capture that are not saleable species, or are regarded as vermin, he upsets the balance of Nature. Take, for example, the case of the Gummy Shark, *Mustelus antarcticus*. The fishermen sometimes use this fish as bait, but, if not wanted for this purpose, they are killed and thrown overboard. I look upon this shark as a fish that should be protected by fishermen as one of his best friends. It feeds chiefly on crustaceans: its mouth is specially adapted for the purpose. I have taken as many as 45 small crabs out of the stomach of one of these sharks. A great many species of fish in Port Phillip Bay spawn on the bottom, and legions of crabs crawling about search out and devour their eggs, and this fish, provided by Nature to keep these crabs in check, is destroyed. This goes on all the year round. Consequently, the crabs are enabled to breed and multiply in numbers out of all proportion to what they should be, owing to the destruction of this natural check to their increase in the shape of the Gummy Shark. I have often watched the fishing-boats arrive at Portarlington, and noticed the enormous damage caused by crabs having eaten

holes in the fish captured in gill-nets. When these nets are drawn from the sea most of the crabs fall back into the water; but should any of them fall into the boat, they are thrown back into the sea by the fishermen instead of being killed, as they should be. Should an unfortunate gummy be captured, it is at once killed. I am of the opinion that if fishermen made it a practice to return this fish alive to the water it would greatly assist in keeping in check the legions of crabs that now swarm at the bottom of the Bay, with a resultant improvement to the fish supply.

In the early days of Portland seals were extremely plentiful, and so also were fish: yet to-day, because the fisherman observes seals eating fish, he at once blames the seals for any shortage, yet when seals were much more numerous than they are at the present time fish were equally plentiful. The reason for this seeming paradox can, I think, be explained as follows:—The pelagic fish spawn on or near the surface of the water, at sufficient distance from land to allow the ova to hatch before wind or tide can cast it ashore. At this time numerous squid (Loliginidæ) are busily engaged in devouring the harvest of eggs and young fish, sweeping them up with their long tentacles into their mouths. Now, the seal is especially fond of a squid diet, and this animal also ranges far from land in quest of this food. Thus, the thinning down of the numerous squid by the seals allows most of the spawn to hatch comparatively untouched, and if later, when the fry has grown to larger proportions, the seals take a percentage of them, surely they are entitled to this as a reward for their good offices in affording protection to the ova when it was hatching, and which, without the help of the seals, would have been destroyed in millions by the squid.

Many other instances could be quoted. It has been demonstrated in England that the more numerous otters were, the more fish there were in the river.

Some time back I read that in South Australia the fishermen complained to the authorities about the growing scarcity of fish, and blamed the Pelicans, so these were destroyed: and since their destruction there are practically no fish at all at the place where the Pelicans formerly used to fish, proving conclusively that the Pelicans were not the cause of the trouble.

BLUE WRENS.—Mr. T. Tregellas writes to the *Argus* "Nature Notes" (26th January) that when photographing Blue Wrens, *Malurus cyaneus*, Ellis, during the Christmas holidays, he made the startling discovery that the four young in the nest were being fed by no fewer than four females and two males. The nest contained the third brood for the season.

ON THE GROWTH OF *EUCALYPTUS VIMINALIS*, F. v. M.

By P. R. H. St. John.

(*Read before the Field Naturalists' Club of Victoria, 11th Dec.*, 1916.)

THE following notes on the rate of growth of a young Manna Gum, *Eucalyptus viminalis*, Labill., together with records of the first shedding of the bark and the development of the flower buds from their first appearance to maturity, seem to be of sufficient importance to be placed on record.

During the Christmas and New Year holidays of 1910–11, when returning from a walking tour through East Gippsland, I found at Cunninghame some dwarf trees of *Eucalyptus viminalis*. Fruiting specimens were secured, and in due course placed in my herbarium. In January, 1912, when looking through my collection, it occurred to me to sow some of the seeds that had fallen out of the seed-vessels. This was done, and one of the seedlings raised was planted in my garden at South Yarra in August, 1912, the young plant being then ten inches high. Although not five years old till January, 1917, it is now 25 feet in height, and nine inches in diameter at one foot above the ground. The first signs of flower buds were noted on 9th November, 1915. These are now fully grown, and a number of them burst into bloom a fortnight ago (Saturday, 25th November, 1916). The next lot of young buds were noted earlier in the month (7th November).

It is also worthy of note that the tree is now shedding its bark for the first time. So far as I can recollect, this is the first occasion on which the age of a eucalypt, when the bark is first shed, has been recorded.

The tree, it may be added, has not received any special treatment or care, and is growing in a sandy formation similar to the trees at Cunninghame from which the seed was originally obtained.

I trust the recording of these facts will induce other members, especially those who live in country districts, to make similar observations regarding this and other species of the genus, and so enable comparisons to be made which may lead to important results.

[This tree was in full bloom on 25th January, 1917.—ED. *Vict. Nat.*]

BIRDS AT ELTHAM.—In the *Argus* "Nature Notes" (26th January) a correspondent records the appearance of the Dollar-bird, or Roller, *Eurystomus australis*, Swain., near Eltham, for the fourth year in succession. He also noted the Bee-eater, *Merops ornatus*, Lath., which is also rather rare.

Slugs and Snails.—Owing to the unprecedented number of rainy days during the last two or three months, slugs and snails (introduced) have ravaged suburban gardens as never before. Acting on Prof. Ewart's advice in the *Journal of Agriculture* to deprive the slimy pests of their favourite foods, I refrained from planting the dainties they usually prefer, with the result that geraniums, roses, broad beans, ferns, and even wattle trees were attacked. Some specimens of *Acacia decurrens*, var. *mollis*, were almost defoliated, the slugs ascending to a height of 15 to 20 feet. Incidentally, two items which may be of interest to nature students came under my notice. Firstly, while by sunrise all slugs and snails which had been feeding on lowly herbage were under cover, it was the rule, without exception, to see on the wattle trees slugs—rarely snails—homing as late as 8.30 a.m.—at least two hours after sunrise; these kept to the shady side of the tree-trunks. Near the base I had placed a band of rope soaked in phenyle. Here the pests accumulated, making vain excursions up and round the trunks to find a way home, but in vain, and were destroyed. Secondly, each morning during the past week slugs were to be seen suspended by threads of slime from the lower branches of one of the wattle trees. Some of these threads were four or five feet long, and lengthened, as though "paid out," as we watched, the slugs hanging always head downwards, fully extended, with tentacles protruded, and gyrating slightly when swayed by the light breeze. No slug was seen to reach the ground in this way, for either the suspending filament of slime snapped or was deliberately cut off by the animal when from six to nine inches from the ground. The slugs fell heavily, and after a few seconds hastened away to cover as rapidly as possible. This action on the part of slugs is, in my experience, unique, and it would be interesting to know if noticed elsewhere. It would seem that they had miscalculated the time necessary for the homeward journey, and, instinctively avoiding those branches on which the sun was shining, adopted this method of descent to their retreat in the base of a Coprosma hedge. Whether the suspensory filament failed through exposure to a fast drying atmosphere, or, becoming brittle, snapped on account of the tension, or whether the animal was able to stop the extrusion of the filament in order to hasten its retreat from increasing light and aridity, are questions I am unable to satisfactorily answer.—A. D. Hardy. Kew, 9th December, 1916.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 12th February, 1917.

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

CORRESPONDENCE.

From Hawthorn Tramways Trust, thanking the Club for the interest evinced in the land recently acquired near Burwood for the purposes of a park, and stating that the Trust will be pleased to consider any suggestions submitted by the Club.

From Mr. F. Lewis, Acting Chief Inspector of Fisheries and Game, questioning some of the statements contained in the paper, "Upsetting the Balance of Nature," by Mr. H. W. Davey, F.E.S., in the current (February) *Naturalist*, and giving the Department's experience with regard to the decrease in the number of Blackfish in certain streams.

Messrs. J. Gabriel, G. A. Keartland, E. Cox, and J. Hill contended that Mr. Davey's conclusions as regards the destructiveness of perch and trout were correct, Mr. Cox stating that the native perch was far superior to the English perch, both as an edible fish and a sporting fish.

REPORTS.

A report of the excursion to Altona Bay on Saturday, 20th January, was given by the leader, Mr. F. Chapman, A.L.S., who said that the party, which included some members of the Microscopical Society, was favoured by a fine day and a low tide. Gatherings from shallow pools yielded numbers of Foraminifera, but unfortunately all were dead; but the diatom, *Bacillaria paradoxa*, was greatly in evidence, and actively engaged in its remarkable movements. Some fifty species of molluscan shells were collected, but none of them was of any great rarity.

A report of the excursion to Launching Place on Monday, 29th January (Foundation Day), was given by the leader, Mr. P. R. H. St. John, who said that the outing was poorly attended, but proved very interesting. A fine day was experienced. About sixty species of plants were noted. A Blackwood, *Acacia melanoxylon*, had been noticed completely covered with Mistletoe, *Loranthus quandang*, Lindl. Some nice specimens of the Yellow Bladderwort, *Utricularia flexuosa*, were obtained in one of the lagoons visited. Mr. J. Wilcox referred

to the pond-life specimens obtained, which, on the whole, were very similar to those obtainable around Melbourne.

A report of the visit to the Botanical Gardens on Saturday, 10th February, was given by the president, Mr. F. Pitcher, who said that over fifty members and friends were present. The day was all that could be desired. A ramble round the Oak Lawn was followed by a visit to the nursery and plant-houses; then the water-lily lake was visited, and the Sacred Lotus Lily admired. The ramble was then continued towards the tea-house, where, about half-past four, the large party sat down to tea as the guests of the office-bearers of the Club. Before breaking up a photograph of the party was taken, which should prove an interesting reminder of a very pleasant afternoon.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. George G. Mercy, Trafalgar-street, Camberwell, and Mrs. F. A. Singleton, 126 Anderson-street, South Yarra, were duly elected as members of the Club.

REMARKS ON EXHIBITS.

Mr. C. J. Gabriel called attention to his exhibit of a large clump of the marine shell *Tenagodes australis*, Quoy and Gaimard, from near Gabo Island. He remarked that the representatives of this genus are tubular and more or less irregularly twisted, with a longitudinal fissure, radiating from the posterior extremity, this fissure proceeding through all the whorls of the shell. The genus was regarded by Linnæus as a serpula, from which, however, it is distinguished by the longitudinal slit. The genus is not numerically strong, and the various species are, as a rule, found embedded in spongy material.

Mr. P. R. H. St. John called attention to a specimen of the Yellow Bladderwort, *Utricularia flexuosa*, Vahl., collected at Launching Place during the Club excursion on 29th January. He made some remarks about its peculiarities, and read some notes from "Minnesota Plant Life" (M'Millan) regarding an allied species. He also stated that the exhibit of oil distilled from the leaves of Karri Gum, *Eucalyptus diversicolor*, F. v. M., of Western Australia was the first that had been made from this species.

PAPER READ.

By Mr. F. G. A. Barnard, entitled "Some Account of Dr. Neumayer's Journeys in Victoria, 1859–64."

The author said that some little time ago he became aware of the existence of a quarto volume—"Results of the Magnetic Survey of Victoria, 1858–64"—in which Dr. Neumayer, who was the head of the Survey, besides giving the scientific details of the survey, briefly described the journeys which it was

necessary to make to obtain the observations he desired. These notes here and there included matter which was interesting to naturalists at this date, as showing the condition of Victoria fifty years ago, and he had therefore briefly summarized them for the benefit of the members in the same way as he had done those of Baron von Mueller some twelve years ago. He read an extract from the account of the ascent of Mount Kosciusko, which showed Neumayer to have been a man of great energy and resource.

The chairman expressed his thanks to the author for having brought these interesting facts under the notice of the members, and agreed that such records were well worth being recalled.

Mr. F. Chapman, A.L.S., expressed the hope that more details could be given of the geological conditions of the site of the finding of the famous Cranbourne meteorite, so as to enable some conclusions to be deduced as to the probable period of its arrival on this planet.

Mr. F. Keep and Mr. J. H. Harvey confirmed Dr. Neumayer's testimony regarding the singular beauty of the landscape as seen from Glenrowan Gap.

EXHIBITS.

By Mr F. Chapman, A.L.S.—Type slide of Foraminifera from Altona Bay.

By Mr. C. J. Gabriel.—A large clump of the marine shell *Tenagodes australis*, Quoy and Gaim., from near Gabo Island.

By Mrs. Ernst.—Foundation of Magpie's nest blown down during heavy rains last year, which contained four dead young birds almost fully fledged.

By Miss A. Fuller.—Fruit of *Ochrosia Moorei* (Apocynaceæ), from North Coast, N.S.W.; specimens of "Five Corners," Persoonia, sp., from Mount York, Blue Mountains, N.S.W.; also water-colour sketches of Western Australian flowers—Red Leschenaultia, Stylidium, Hovea, &c.

By Mr. F. Pitcher.—Flowering specimens of *Tristania laurina*, R. Br., Kanooka, Vict., N.S.W.; *Backhousia citriodora*, F. v. M., Sweet Verbena Tree, Qld.; and *Acacia horrida*, Willd., Karoo Thorn, South Africa—all grown at Melbourne Botanic Gardens.

By Mr. P. R. H. St. John.—Herbarium specien of *Utricularia flexuosa*, Vahl., Yellow Bladderwort, from Launching Place; sample of crude oil distilled from *Eucalyptus diversicolor*, F. v. M., Karri Gum, Western Australia, at Melbourne Botanic Gardens.

By Mr. H. Whitmore.—Shells—*Cassis rufa*, Linn., Moluccas; *Murex ramosus*, Linn., West Indies; *M. nigritus*, Phil., California; Hermit Crab in shell of Periwinkle.

After the usual conversazione the meeting terminated.

A BOTANIST IN THE PORTLAND DISTRICT.

BY J. W. AUDAS, F.L.S., National Herbarium, Melbourne.

(*Read before the Field Naturalists' Club of Victoria, 11th Dec.*, 1916.)

BEING anxious to see the wild-flowers of the south-western corner of our garden State, and also to collect a few of the rarer species peculiar to the locality, I left Melbourne on the 11th September last by excursion train for Portland. From a botanical point of view there was little to attract my attention till Beaufort was passed. Here a fine display of wild-flowers was to be seen, comprising the Spider Orchid, *Caladenia Patersoni*, Snake Orchid, *Diuris pedunculata*, Tall Diuris, *D. longifolia*, Larger Glossodia, *Glossodia major*, Erect Guinea-flower, *Hibbertia stricta*, Grey Parrot-Pea, *Dillwynia cinerascens*, Gorse Bitter-Pea, *Daviesia ulicina*, Golden Bush-Pea, *Pultenæa stricta*, var. *Gunnii*, and the Scarlet Coral-Pea, *Kennedya prostrata*, which latter gracefully decorated the railway embankments with its bright red flowers.

Just beyond Buangor a fine view of mountain scenery is obtained, the railway passing quite close to Mount Misery, which is one of the peaks of the Pyrenees. After leaving Ararat the railway takes a south-westerly direction, and we were soon passing through the large wheat-producing areas of the Western District. Surrounding Maroona I noticed large tracts of land covered with the Cotton Fire-weed, *Erechtites quadridentata*; this is a native weed, but a serious pest, and is proclaimed for the whole of our State. Willaura, further on, gave the impression of a new and progressive country township, a noticeable feature here being the immense stacks of wheat at the railway station. From here, on the right, a splendid view for twenty-five miles can be obtained of the Serra Range, which terminates at Dunkeld. Further south, from Moutajup to Strathkellar, a pleasing feature is the immense shelter belts of trees which have been planted and fenced; many of these are miles in extent. In most cases native timber trees have been planted, the eucalypts chiefly favoured being the Blue Gum, *Eucalyptus globulus*, and Sugar Gum, *E. cladocalyx*, though there are a fair number of Acacias and Casuarinas interspersed. Leaving the open plain country, a fine forest, known as the Nine-Mile Forest, is passed through, bringing us to Gorae; its timbers chiefly comprise the Messmate, *Eucalyptus obliqua*, Brown Stringybark, *E. capitellata*, Red Stringybark, *E. macrorrhyncha*, Swamp Gum, *E. paludosa*, Manna Gum, *E. viminalis*, Yellow Box, *E. melliodora*, and Narrow-leaved Peppermint, *E. amygdalina*. From this forest many of the piles used in the construction of the new Portland pier were procured. On reaching my destination, after a journey

of just 250 miles, I was met by two local residents—Mr. Dillon, of the Education Department, and Mr. Stuchbery, of the Portland Botanic Gardens, who kindly assisted me in many ways during my stay.

Portland is not well known to the average tourist, though it can justly claim to be the oldest town in Victoria. As early as the year 1834 the brothers Edward and Stephen Henty landed there to establish a whaling station at Whalers' Point. Finding the land further inland to be of good arable and grazing quality, they, with others, brought live stock, &c., there, and formed the first little settlement that Major Mitchell saw on the occasion of his historic meeting with Edward Henty, after traversing Australia Felix from Botany Bay to Portland. At an earlier period, in 1832 or thereabouts, Captain Dutton landed on the shore of the Bay, a little north of the present town, intending to form a whaling station. He bought his land from the blacks, and built the first white home in Victoria, which can be seen to-day from the shore at Narrawong, about eight miles from Portland, and the remains of Dutton's jetty can be seen on the beach at low tide.

With the decline in whaling, and settlement in the rich Glenelg country, followed by the discovery of auriferous deposits, and the growth of the more centrally-placed Melbourne, Portland lost its significance as a port; but now the great development of the Mallee country has created a demand for a more direct port of shipment, and Portland will doubtless be much availed of when the Mount Gambier and the Cavendish–Toolondo railways are completed. Its advantages as a shipping port are many. It has a greater depth of water than Williamstown or Corio Bay, and is sheltered from the prevailing west and south-west gales and affords good anchorage. A fine new pier over half a mile in length is nearing completion, and will afford facilities for accommodating the largest vessels. An interesting feature of the harbour is the fleet of fishing boats and yachts, which look very picturesque with their white sails set. From the north the shore rises in white chalk cliffs to Whalers' Point, from which a fine view of the whole town and bay is obtained. On the parade surmounting these cliffs, in front of the hospital, can be seen the furrows left by the first plough ever used on Victorian soil.

Many of the early structures are built of bluestone, which is obtainable locally, noticeable among them being "Burswood," the home of Edward Henty, situated to the south of the town. Another bluestone building is the public library, where some interesting curios may be seen—namely, a harpoon of Hentys' recovered from a whale in the Behring Sea, and the lifeboat used at the historic *Admella* wreck. The public gardens are

prettily laid out with lawns and tennis courts, and contain some fine representative specimens from different parts of the world. At the main entrance stands a large specimen of *Ficus rubiginosa*, measuring twenty-five feet in circumference at its base. Further inward a specimen of *Cupressus macrocarpa*, var. *horizontalis*, measuring thirty feet in circumference, commands attention, and various species of *Pinus* are of splendid development. A remarkable feature was the flourishing growth of Cinerarias of many vivid shades of colour, growing in the open. These plants are usually under cover in Melbourne, but here they flourish like weeds.

Following the coast northerly beyond Whalers' Point, we come across some old whale skulls, partly buried in the sand, and the remains of boilers used for rendering down blubber in the early days. Further onward is the Surrey River, and some miles distant the Fitzroy; both these streams afford good fishing and shooting. Margining the shore are low-lying grass-flats with a background of higher timbered country, and just off shore are reminders of sterner days in the remains of wrecks.

Growing on the beach in pure sand were found *Suæda maritima* and *Cakile maritima*, with succulent leaves, *Senecio elegans* (an introduction from South Africa, with showy purple flowers), and *Salsola Kali*, an annual salsolaceous plant, which grows in the form of a large ball. The latter has very spiny leaves, and is sometimes known vernacularly as "Rolly-poley." In the vicinity of a swampy marsh considerable patches of ground were occupied by a number of creeping plants. The chief of these were *Samolus repens*, a white-flowered plant of the Primrose family; *Selliera radicans*, also white; and *Mimulus repens*, of a bright lilac marked with yellow in the centre.

Following the road from Portland towards Heywood, about nine miles of forest, composed chiefly of Messmate and Stringy-bark, is passed through, the undergrowth consisting of thickets of *Acacia stricta* and *A. myrtifolia*, very few of the smaller shrubs being in flower, as it was too early for this class of country; but it would be well worth investigating later on in the season. *En route* the Bolwarra State school, partly comprised of the remains of the Caledonia Hotel (a relic of the overlanding days), is passed, and just behind it rise the Caledonian Hills, from which a magnificent view of Portland and the Bay can be obtained. Leaving the road for a short distance, a newly-laid-out lavender farm is met with, about ten acres being under cultivation. Emerging from the forest, fine open country comes into view, with occasional belts of timber, consisting mainly of Swamp and Apple Gum, and an

undergrowth of Leptospermums, Melaleucas, Acacias, and *Helichrysum ferrugineum*, to which were hanging the large parasitical Dodder Laurel, *Cassytha melantha*. Of shrubs the most conspicuous were the Flame Heath, *Astroloma* (*Styphelia*) *conostephioides*, with its beautiful crimson tubular-shaped flowers; *Pimelea linifolia*, and *P. flava*, dressed in white and yellow respectively; *Logania ovata*, a slender shrub two to four feet in height, with clusters of whitish flowers at the tip of every branchlet; *Pultenæa villosa*, with numerous racemes of yellow blooms; *Daviesia ulicina*, with small leaves and brick-red flowers; and the ubiquitous *Bursaria spinosa*, which would soon be abloom with its large panicles of creamy-white flowers but very spiny branches. *Hakea rostrata*, known as Beaked Hakea, an elegant shrub, was in full bloom, and its perfumed white flowers enticed bees and many other insects. *Epacris microphylla* and *Sprengelia incarnata* grew robustly, and some specimens of the latter were observed to have double flowers, while *Olearia* (*Aster*) *stellulata* showed its variability of form here and at the sea-coast. The Stunted Sheoke, *Casuarina distyla*, and its variety *prostrata* were growing in company, and afforded an interesting opportunity of comparison. Usually each kind seemed confined to a small space, but where intermixed a variegated area of silky grey and green met the eye. It is often known as the Kerosene Bush, owing to the ready ignition of its leaves. One of the most beautiful shrubs found here is *Kunzea parvifolia*, with its numerous bright pinky heads of flowers. Blooming as it does for many weeks, it would be an ornament to any garden. Other plants deserving the attention of horticulturists were *Goodia lotifolia* (yellow), *Pimelea ligustrina* (cream), *Indigofera australis* (lilac), and *Correa speciosa* (red); the latter species is easily cultivated, and requires little attention. Grass-trees, *Xanthorrhœa australis*, adorned the landscape with their stately flower-spikes and strong bayonet-shaped leaves. Some specimens noted had grown into strange forms representing animals, one resembling an emu in form; another looked like a huge cat. Many were in bloom, the scape often reaching a height of twelve feet or more.

An interesting trip which can be accomplished in a day's outing is to the Cashmere Heath Settlement, about ten miles to the north-west of Portland. Following the old Mount Gambier road, Borthwick and Sons' freezing works at North Portland are passed. Here large numbers of carcasses of live stock are prepared for export. Last year, among others, 700,000 rabbits and 100,000 lambs were put through from the surrounding district. In a large swamp near by grew some handsome tufts of the Tassel Cordrush, *Restio tetraphyllus*, and

growing on the edge were fine tall shrubs of *Monotoca elliptica* and *Leptospermum lanigerum*, while *Veronica Derwentia*, with its dense spikes of white flowers, was just bursting into bloom. Proceeding further, the Portland North State school comes into view. Making a call on the head teacher, Mr. R. L. Miller, I was agreeably surprised to find that the children attending take a keen interest in wild-flowers, and several pupils have made collections of pressed flowers. As showing what can be done in beautiful furniture manufactured from our native timbers, I was interested in a desk owned by Mr. Miller made from the Blackwood, *Acacia melanoxylon*. The timber was obtained from the Otway Forest, and worked up by a friend, who evidently took much thoughtful interest in matching the numerous panels and turning out a very beautiful and artistic piece of furniture. The ornithological members of our Club may be interested to hear the following relative to the tameness of the Grey Shrike-Thrush, *Colluricincla harmonica*. Mr. Miller informed me that two birds first came near the back door, and on being given food returned daily for some time, becoming almost tame. Later on the nest containing the eggs was discovered, and the birds had become so accustomed to him that food, in the form of insect larvæ, &c., was readily taken from his hand. After hatching, the young birds were only fifteen days in the nest. Accompanied by Messrs. Miller and Dillon, I spent an interesting afternoon botanizing in the neighbourhood. The timber in the locality is chiefly the Yellow Box, *Eucalyptus melliodora*, and Narrow-leaved Peppermint, *E. amygdalina*, with an undergrowth composed principally of *Acacia stricta*, *Spyridium parvifolium*, *Daviesia latifolia*, and *Indigofera australis*—the latter with white flowers as well as lilac colour. In the open grass-land were thousands of the yellow flowers of *Hypoxis glabella*, the blue of *Wahlenbergia gracilis*, and the creamy-white of *Stackhousia linearifolia*, with its dense spikes of sweetly-perfumed flowers. Of Orchidaceæ the most abundant were *Diuris longifolia*, *D. pedunculata*, *Microtis porrifolia*, *M. atrata*, *Thelymitra flexuosa*, *T. longifolia*, *Prasophyllum elatum*, *Glossodia major*, and *Caladenia Patersoni*.

Further on is the Cashmere heath country. Here *Epacris impressa* grows to perfection. It was in gorgeous bloom, and well worth seeing, especially the red and pink varieties. There are thousands of acres of this heath country available for selection, and some is now under cultivation, giving excellent results. At the recent Portland Show samples of the Peach Blossom variety of potato, grown on this heath land, were exhibited and awarded first prize. The Government has spent a large sum of money in making this formerly despised land

available for settlement, and many blocks of fifty acres and upwards have been disposed of. Portions of the land are exceptionally good, being of a dark peaty quality, while other parts are much inferior.

Taking the road to the south-west, leading towards Cape Nelson, the picturesque lagoon which semicircles the town is passed. It showed an abundant crop of rushes and reeds, and among them many other aquatic plants. Some fine, shapely trees of the Boobialla, *Myoporum insulare*, and *Acacia longifolia*, var. *sophoræ*, lined the banks. Growing in the lagoon were great quantities of Giant Arrow-grass, *Triglochin procera*, and Streaked Arrow-grass, *T. striata*—the former, where growing in deep water, had ribbon-like leaves from two to three feet in length, and the dense flower-spikes were either covered with pollen or contorted fruitlets; also an abundance of the Floating Pond Weed, *Potamogeton natans*, was seen, with its floating leaves and peculiar flower-heads just protruding above the water. Near the edge *Villarsia reniformis* (*Limnanthemum exaltatum*, F. v. M.), a plant with handsome yellow-fringed blossoms and round leaves, and *Cotula coronopifolia*, with fleshy leaves and disc-like flowers, were equally numerous, while near by the tall, shining plumes of the Common Reed, *Phragmites communis*, waved in the breeze. An interesting feature here was the large mound-like nests constructed by the Black Swans, *Cygnus atrata*, from the surrounding reeds, &c., where many of the birds were nesting, and some clutches of young birds were seen.

Along the roadside, the introduced Large-flowered Wood Sorrel, *Oxalis variabilis*, Harlequin Flower, *Sparaxis grandiflora*, and Perennial Daisy, *Bellis perennis*, were growing by the thousand, and almost completely carpeted the ground. Although a good deal of the scrub land in this locality has been divided into small holdings, and the beautiful flowering plants destroyed by fire in the act of clearing, there yet remain some areas where the native flora may be seen in its original beauty. The soil here is of a dark peaty nature, and in some places of a sandy composition. Although it was somewhat early for collecting, there were sufficient plants in flower to enable one to form an opinion of what the display would be later in the season. At first sight the flora of this locality gave a similar impression to that of Sandringham, but here it was taller and of a deeper green in shade. The shrubs chiefly comprised *Grevillea aquifolium*, *Leucopogon Richei*, *Acacia Mitchelli*, *Olearia* (*Aster*) *ramulosa*, *Persoonia juniperina*, *Hakea nodosa*, *Leptospermum myrsinoides*, *Melaleuca squarrosa*, *M. gibbosa*, and *Bossiæa cinerea*. In the open scrub-lands an abundance of small flowers, such as *Spyridium vexilliferum*, *Hibbertia*

Billardieri, var. *parviflora*, *Brachycome scapigera*, *Leucopogon cricioides*, *L. glacialis* (peculiar to the south-west), *Stackhousia flava*, *Melaleuca squamea*, *Stypandra cæspitosa*, *Bossiæa prostrata*, and *Dianella revoluta*—a beautiful liliaceous plant with dark blue flowers and yellow stamens—made a gay scene. Proceeding through the scrub, my attention was arrested by what seemed at first glance to be a very handsome pine, but on closer examination it proved to be a leguminous shrub, *Psoralæa pinnata*—an introduction from South Africa. It is known locally as "Basby's pest." A gentleman named Basby is said to have introduced it to the district, and it has now become a troublesome plant and is spreading rapidly. *Pinus muricata*, introduced from California, is also spreading and occupying large patches of scrub-land. Terrestrial orchids were rather plentiful. I came upon large quantities of *Caladenia Menziesii*, *C. carnea*, *C. latifolia*, *C. congesta*, *C. deformis*, and *C. Patersoni*: the latter is a variable species, and no less than six well-marked varieties in colour and form were seen. *Lyperanthus nigricans*, one of our finest native orchids, with its large reddish-brown and whitish-striped flowers, was blooming. A peculiarity of this orchid is that a plant with a very large basal leaf seldom or rarely flowers. In shelter of small trees and shrubs, *Caleana major*, *Cyrtostylis reniformis*, *Calochilus Robertsoni*, *Pterostylis curta*, *P. nutans*, *P. nana*, *P. concinna*, and *P. longifolia* were met with, the labellum or lip of the latter being so sensitive that on the slightest touch it instantly closes. Here, in sandy soil, a host of interesting plants were seen, with their colours charmingly blended and vying with each other in beauty. The handsome *Euphrasia collina*, with beautiful purple blooms, *Hibbertia densiflora* and *H. stricta*, with large yellow blossoms, the blue flowers of *Patersonia glauca* and *Chamæscilla corymbosa*, the white-flowered *Helichrysum Baxteri*, and the sensitive *Stylidium graminifolium*, with tall spikes of pinkish flowers (attaining a height of twelve to eighteen inches), were the most conspicuous; while the runner *Kennedya prostrata*, which glories in the sunlight, carpeted the open heath ground with a blaze of brilliant scarlet.

Following the coast to the south and west of Portland, numerous little coves with secluded stretches of sand, greatly availed of by picnic parties, are passed. Here, in open situations, *Oxalis corniculata* covered many square yards of rock surface, and *Bulbine semibarbata*, the Smaller Yellow Lily, usually of rather spindly growth, developed into the proportion and appearance of a robust leek. Fine specimens were found far out on the exposed rocks, in company with *Mesembryanthemum australe*, Rounded Pig-face, which had also acquired an increased fleshy growth from the salt spray. Passing

Battery Point, the shore was decorated with many of the beautiful white flowers of *Helichrysum leucopsidium* and *Pimelea spathulata*, the blue of *Scævola suaveolens*, and the gorgeous orange-coloured blooms of *Senecio lautus* and *Helichrysum apiculatum*; while in sheltered situations *Calystegia* (*Convolvulus*) *soldanella*, with its lilac-striped flowers, was seen.

At the foot of Black Nose Point, and along the face of the cliffs wherever a holding offered, *Atriplex cinerea*, *Bursaria spinosa*, *Senecio odoratus*, *Olearia viscosa*, *Coprosma hirtella*, *Casuarina quadrivalvis*, *Leucopogon Richei*, *Acacia verticillata*, *Exocarpos cupressiformis*, and *Alyxia buxifolia* flourished. The latter is a tall shrub, and forms close thickets even on the incline of the shore. It has dark green, glabrous leaves (whitish-yellow when young) and white spiral flowers. *Mesembryanthemum æquilaterale* trailed down the cliffs, and made a fine show with its fleshy and angular-shaped green leaves and large rose-coloured flowers. Scrambling over the ground were masses of the Bower Spinach, *Tetragonia implexicoma*, the coastal salt-bush, *Rhagodia Billardieri*, and the wiry trailer *Muehlenbeckia adpressa*, known locally as Native Sarsaparilla, while the Bidgee-Widgee, *Acæna sanguisorbæ*, extended its prostrate stems over a considerable area. It is virtually a weed; its barbed fruits germinate readily, and adhere to feathers of birds, and are thus spread broadcast. Higher up, clumps of the Coastal Tea-tree, *Leptospermum lævigatum*, were passed through.

A little further on is situated the remarkable Pebbly Beach, with its mile and a half of pebbles, of which many hundred tons have been taken to Broken Hill, where they are used in the smelting works. Further on is Point Danger, connected by a reef with Lawrence Islands, distant about two miles; another reef connects them with Cape Grant—a bold headland—the whole formation making a great natural breakwater protecting Portland Bay. These islands are the home of hundreds of Penguins, Gannets, and Mutton-birds, and are worthy of a trip for a fishing excursion. From here onward the coast rises rapidly to about 300 feet at Cape Nelson. The lighthouse there is worthy of inspection, and from it Lady Julia Percy Island, off Port Fairy, can be clearly seen. Next comes Shelly Beach, where many beautiful shells can be obtained, and occasionally, after easterly winds, the much-prized so-called Nautilus shells are beached. Hanging over steep faces of the cliffs are large masses of *Pultenæa canaliculata*, mixed with small tufts of *Poa Billardieri*, and in crevices of the bare rock minute specimens of *Colobanthus Billardieri* are seen. The latter is only recorded from the south-west, but recently

specimens have been collected at Mount Hotham, a north-eastern locality.

Advancing, the rugged cliffs at Shelly Beach give place to great sand dunes, which front the coast-line for several miles towards Bridgewater Bay. Until recent years these dunes were almost destitute of vegetation, but now many are clothed with a dense growth of the beautiful, tall, graceful plumes of *Ammophila arundinacea*—the king of sand-stay plants. This grass has proved itself the most valuable of plants for reclaiming or fixing drifting sand, and was introduced from Europe to this State by the late Baron von Mueller in 1883. It thrives on these dunes, where large areas of plants are growing from two to six feet in height, and known under the different vernaculars as Sea Reed, Sand Reed, Marram Grass, and Mat Grass. Its habit of growth is similar to that of Mat or Couch grasses. The young plant extends a long, creeping root, from which, at intervals of from three to five inches, a tuft arises and forms a tussock. From this tussock smaller roots penetrate, and when drift sands rise the tuft forms roots higher and higher, thus preventing the complete destruction of the plant and forming a rise of fixed sand. When growing vigorously the tussocks combine, thus making a dense mass difficult to walk through. The leaf blades, when young, are of a pale green colour, which darken towards maturity. Large areas have recently been planted in this locality, under the supervision of the Lands Department, for reclamation purposes. The method of planting is usually in rows about six feet apart, the space between each plant being about two feet. During my ramble on the sand-hills I came upon several patches of other sand-binding grasses, both native and introduced. Among the native species the best was the Hairy Spinifex, *Spinifex hirsutus*, and Seaside Fescue, *Festuca littoralis*, a strong, good fodder plant.

From the summit of Cape Bridgewater, which is about 400 feet above sea-level, an unrivalled panoramic view is obtained. Here on the one hand is Cape Nelson, with the sea-mist of Portland Bay behind, and at our feet Bridgewater Bay, with its peculiar herring-bone reefs. On the other hand is the broad expanse of ocean sweeping into the low, rough, reef-bound coast, and beyond the golden-sanded shore of Discovery Bay curving away to Cape Northumberland in the blue distance. On the low-lying shore of Discovery Bay the chain of the Bridgewater lakes is discernible, and a remarkable fact in connection with the two largest is that one is salt while the other is quite fresh, although only a few feet of soil separate them. In the background rises Mount Kincaid to the west, and Mount Richmond and Mount Clay, to the north of Port-

land, on our east. Following the Batts Ridges in an easterly direction, the limestone caves and lime quarries are passed, and on the return journey grass-tree and tea-tree flats are passed through, backed by marram-grassed sand-dunes, and finally the clay country of West Portland is reached, with its orchards, farms, and timbered spaces where wild-flowers abound. Here the beautiful mazarine flowers of the liliaceous plant *Stypandra cæspitosa* arrest attention, and *Boronia filifolia*, with pale pink blossoms, delicately perfumed, grow in abundance, while the handsome pea-flowered shrubs, *Pultenæa mollis*, *P. humilis*, *Dillwynia patula*, *D. ericifolia*, *D. floribunda*, *Platylobium obtusangulum*, *Gompholobium Huegelii* (in colours yellow and red), were met with. Three insectivorous plants abound generally—viz., *Drosera peltata*, *D. auriculata*, and *D. Menziesii*. Insects are so frequently caught in the glandular hairs of their leaves that these plants are sometimes known as "fly-catchers." Where the scrub-land had been burnt the Bracken Fern, *Pteris aquilina*, had spread rapidly and occupied considerable spaces, thus hindering the growth of grasses which would be of value as fodder. Growing along the sides of the road, on the homeward route, the small introduced cruciferous plant *Eriophila vulgaris*, with white flowers, flourished. Here a dwarf form of the Brown Stringybark, *Eucalyptus capitellata*, is met with, and extends for a considerable distance. The Golden Wattle, *Acacia pycnantha*, although not an original habitant of this locality, grew luxuriantly, and was spreading in all directions. It was in full flower, and I was informed that quantities of the bloom are gathered and forwarded to Melbourne for sale on our annual "Wattle Day."

In conclusion, I may safely commend Portland and the surrounding district as an interesting field to a naturalist, be he entomologist, ornithologist, geologist, or botanist, and well worthy of a visit to those interested in these branches of science.

[A useful little guide to Portland has recently been issued by the local traders. Copies can be had from Mr. J. W Barcham, Portland.—ED. *Vict. Nat.*]

MALLACOOTA.—The *Argus* of Saturday, 17th February, contains an interesting sketch, but too short, by Mr. C. Daley, F.L.S., of a holiday spent at Mallacoota.

CAPER BUTTERFLY.—A nice specimen of the second brood of the Caper Butterfly, *Anaphæis java teutonia*, Fab., was noticed flying in the Botanical Gardens on Saturday, 10th February.—F. G. A. B.

CORRESPONDENCE.

"UPSETTING THE BALANCE OF NATURE."

To the Editor of the *Victorian Naturalist.*

SIR,—I was very interested to read in the current issue of the *Victorian Naturalist* an article on "Upsetting the Balance of Nature," by H. W. Davey, Esq., F.E.S.

Seeing that the subject is such an important one, and that some of the statements made by Mr. Davey are so emphatic and definite, I thought your Club would be interested to know the result of this Department's experience.

(1) *Re* Blackfish.—The statement is made in the article that "the extinction of the Blackfish in the near future . . . . will be due to the introduction into this country of the English Perch." It is also contended that the English Trout is another cause of the gradual disappearance of the Blackfish. Shall we examine some facts bearing on the question? In the great majority of our southern creeks, where Blackfish used to be so plentiful, but where now it is difficult to get an odd fish of even six inches in length, no trout or perch have ever been put, while in the tributaries of the Upper Yarra, where trout have been in existence for 30 years, splendid hauls of fine Blackfish are got by those who know where to go for them. Again, take the Deep Creek, from Keilor to Lancefield. This creek has been stocked with trout and perch for a great number of years. In spite of continued heavy stocking of the creek by this Department with trout, as good Blackfish have been obtained therein during the past few years as were ever taken in the early days. This does not look as if the Blackfish is exterminated by the trout and perch. Again, take such streams as the Cockatoo, Cardinia, and Woori Yallock Creeks, in which no trout or perch have ever been liberated, but *which used to be heavily fished.* Many years ago good Blackfish were to be got in these streams; but what is their condition now? It is hardly worth while wasting time putting a line into any of them. Two of our best Blackfish streams are undoubtedly the Bunyip and the Gellibrand Rivers, and in neither of these have trout or perch been liberated, and this Department intends to see that none are placed therein—at least, while there are Blackfish there. The reason for the failure of such streams as the Cockatoo and Cardinia Creeks is simply this: that they were fished by hundreds of campers and others on every week-end and holiday, while such streams as the Bunyip, Gellibrand, and the upper tributaries of the Yarra, because they are more remote and difficult of access, are only fished occasionally.

Now, turn to the experience of trout anglers who fish our southern streams and take many hundreds of fish, and consistently open every one of them and examine their stomachs. These men all admit that in not a single case have they ever found a Blackfish inside a trout. The wife of a hotelkeeper in a prominent trout-fishing district where Blackfish are also plentiful, and who cleans all the fish brought back to the hotel by anglers, also made the same statement to me.

The experiences of many others who have given this matter long and serious study could be quoted also in support of the above statements.

To what, then, may we attribute the gradual decline of the Blackfish? To my mind there are two reasons:—

(1) Overfishing. Blackfish are simply and easily caught. At holiday times hundreds of men and boys camp alongside the more easily accessible creeks, and in practically every case angling for Blackfish is indulged in, and 99 per cent. of the catch—irrespective of size—goes into the pan. All our native animals and fish readily respond to *efficient* protection: witness the increase in the number of Kangaroo, Wallaby, and Opossum of late years. It is possible to efficiently protect these animals: but in the case of the Blackfish it would take an army of inspectors to give them proper protection.

(2) The second reason for the decline of the Blackfish is the gradual clearing of the banks and beds of the streams to which they are native. The Blackfish loves the shelter and shade of the dark, heavily-timbered holes and the stumps and logs which, in a natural state, fill most of our creeks. As the shelter is gradually removed by the spread of cultivation, we find that the Blackfish also gradually diminish year by year, until finally they become extinct.

I can only briefly refer to one or two other matters in the article. It is stated that a great many species of "fish in Port Phillip spawn on the bottom." Of all the commoner varieties of fish found in Port Phillip Bay, such as the flounder, mullet, flathead, bream, schnapper, pike, and garfish, the last-named is the only fish that spawns at or near the bottom. All the other varieties have pelagic or floating eggs.

With many other statements of Mr. Davey I am quite in accord; but I think it advisable that the other side of the question regarding the Blackfish (which is not often heard) should be put before your members.—Yours truly,

F. LEWIS,

Acting Chief Inspector of Fisheries and Game.

Melbourne, 12th February, 1917.

To the Editor of the *Victorian Naturalist.*

SIR,—In regard to the statement of the Acting Chief Inspector of Fisheries, that there is no evidence of trout having destroyed our Blackfish, I was recently informed that, before trout were introduced into the Upper Yarra and Walsh's Creek, good hauls of Blackfish could always be made.

While there in January last, several attempts were made by the visitors to catch some, but there was no result but a few bites and an occasional undersized fish. I was also informed that trout had been caught there which contained Blackfish, one being six inches long. Expressions of regret were general at the threatened extermination of so good a table fish from those waters.

When recently discussing this subject with an experienced angler, he stated that he had proved that a small Blackfish is a deadly bait for a trout. This had occurred when fishing for Murray cod in a stream which was also stocked with trout.

Those anglers who are familiar with the merits of our inland Gippsland perch as well as those of the trout, as fish for sport, have feelings of great regret that our Fisheries Department has apparently made no use of this splendid fish, which is much superior, weight for weight, to any of the imported trout. It is also much to be preferred as a food fish, if we except those trout caught at the mouths of our rivers.

If the Fisheries Department would interview Mr. Arthur French, an angler of wide experience in our Victorian rivers, as well as those of other States, I am sure it would find that the above opinions would be strongly supported.—I am, etc.,

EDWIN COX.

Hawthorn, 24th February, 1917.

BUPRESTID BEETLES.—The recently issued *Transactions and Proceedings of the Royal Society of South Australia*, vol. xl. (1915-16), contains an extremely useful paper by Mr. H. J. Carter, M.A., F.E.S., of Sydney, in which he endeavours to straighten out the synonomy of the genus Stigmodera, the finest group of Australian beetles, and consequently the prey of the species maker. Mr. Carter groups the species into three sub-genera, and reduces the existing species from 522 to 318! and even 31 of these are new, and described in his article. One, *S. franca*, from North Queensland, is named in honour of Mr. C. French, sen., founder of the F. N. Club, while another, *S. argillacea*, was taken recently at Hattah, in the Mallee, by Mr. J. E. Dixon, of this club.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 12th March, 1917. The president, Mr. F. Pitcher, occupied the chair, and about forty-five members and visitors were present.

REPORTS.

A report of the excursion to the Richmond Quarries on Saturday, 24th February, was given by Mr. J. Stickland, one of the leaders, who said that there had been a good attendance of members. Before examining the contents of the pools for pond-life, the attention of the members was directed to the interesting geological features presented in the quarries. Regarding the pond-life, quite a number of interesting specimens were secured, comprising algæ, protozoa, crustacea, and insect larvæ.

A report of the excursion to the Burnley Horticultural Gardens on Saturday, 10th March, was given by Mr. J. P. M'Lennan, the director, who acted as leader. The attendance was very good, numbering nearly sixty. The objects of the institution and the new scheme of instruction were first of all pointed out; then the party was conducted round the grounds, and various matters of interest explained. Mr. F. Pitcher said that about twenty-five members and friends had proceeded to the Gardens by motor-boat, which added greatly to the enjoyment of the outing, and expressed the appreciation of the members for the hospitality extended to them by Mr. and Mrs. M'Lennan.

GENERAL BUSINESS.

The president reported that Mr. J. G. O'Donoghue's health was still very unsatisfactory, and that he was still in the hospital.

PAPER READ.

By Mr. C. A. Topp, M.A., LL.B., entitled "Impressions of the Wild-Flowers of South-Western Australia."

The author referred to the flora of an area of about fifty square miles in the vicinity of Bunbury as he observed it in mid-spring, and noted the principal points of difference between it and the flora of south-eastern Australia, remarking that, though the difference was striking, there were yet sufficient

familiar genera to remind any south-eastern visitor that he was still in Australia. It was noticeable that the dominant yellow colour of a large number of Victorian flowers was replaced by blue and red in the West.

Some discussion ensued, in which Messrs. Davidson, Barnard, J. Gabriel, Hardy, Hart, and the president took part.

NATURAL HISTORY NOTES.

Mr. A. D. Hardy, F.L.S., referred to the habits of a leaf-curling spider, *Phonognatha graeffei*, which has occurred in considerable numbers in suburban gardens recently, and described its methods of building a web and forming a retreat.

Mr. J. Searle drew attention to the unusual numbers of the large Wanderer Butterfly, *Danais erippus*, which had appeared in city and suburbs during the last few weeks.

EXHIBITS.

By Mr. E. Cox.—Fine specimens of asbestos from near Beaconsfield, Tasmania, taken from a seam varying from 4 to 12 inches in thickness.

By Mr. C. Daley, F.L.S.—Jawbones and scales of the Burnett River Salmon, belonging to the ganoid order Dipnoi, found only in the Burnett and Mary Rivers, Queensland.

By Mr. C. J. Gabriel.—Marine shell, *Larinopsis turbinata*, Gatliff and Gabriel, dredged at Western Port Bay, Victoria; also *Chlamys glaber*, Linn., and varieties from the Mediterranean.

By Mr. A. D. Hardy, F.L.S.—Specimen of leaf-curling spider, *Phonognatha graeffei*, with leaf of *Eucalyptus cladocalyx* for shelter, in illustration of note.

By Mr. F. Pitcher.—Dried specimens of flowers, *Nuytsia floribunda*, R. Br., "Christmas-tree" of Western Australia; flowers and foliage of *Crotolaria Cunninghami*, R. Br., Western Australian Bird-flower; also cut flowers and foliage of *Anigozanthus flavida*, and var. *purpurea*, F. v. M., Kangaroo-paw Flower of Western Australia, from plants growing in Melbourne Botanic Gardens.

By Mr. J. Stickland.—Photographs of portions of Burnley Quarries; piece of wood, probably portion of stem of a Casuarina, obtained in quarry beneath the basalt; specimens (under microscope) obtained at excursion to quarries.

By Mr. C. A. Topp, M.A., LL.B.—About sixty sheets of dried plants in illustration of paper on the flora of south-western Australia.

By H. Whitmore.—Eucalyptus leaves, species *E. elæophora*; piece of root ploughed up at Clyde, Vic., *fac-simile* of Australia.

After the usual conversazione the meeting terminated.

THE LATE MR. J. G. O'DONOGHUE.

ATTRACTED by the conversazione of September, 1908, the late Mr. James G. O'Donoghue sought nomination as a member of the Field Naturalists' Club, and was elected in November, He at once showed his love of the open, engendered by his upbringing in Gippsland, by taking part in the excursion to the You Yangs on Cup Day of that year, and furnishing for the report of the outing some notes on the birds met with—the first bird notes in connection with a You Yangs trip. Most of his holidays in earlier years had been spent with the gun in search of game of various kinds, and he had become very familiar with Bacchus Marsh and its neighbourhood; consequently, he was always ready to lead an excursion in that district. In January, 1910, in conjunction with Mr. P. R. H. St. John, he contributed his first paper to the Club's proceedings, entitled "Through the Brisbane Range" (*Vict. Nat.*, xxvi., p. 151). This was followed in December by "A Short Ramble along the Lerderderg" (*Vict. Nat.*, xxvii., p. 188). In November, 1912, along with Mr. St. John, he contributed "Further Notes on the Brisbane Range" (*Vict. Nat.*, xxix., p. 130). Then he revived some of his Gippsland experiences in "Some Notes on the Victorian Lyre-Bird" (*Vict. Nat.*, xxxi., p. 11). In 1914 and 1915 he made two extended visits with friends to the Northern Mallee, which he recorded in "Wanderings on the Murray Flood-Plain" (*Vict. Nat.*, xxxii., p. 2) and "Rambles in Raak" (*Vict. Nat.*, xxxiii., p. 7). Both of these are extremely interesting, and, though dealing with a portion of the State generally regarded as being devoid of interest, are good examples of his power of placing living descriptions of scenes visited and incidents met with before an audience of nature-lovers. He was also the author of several excursion reports which have appeared in the pages of the *Naturalist* from time to time. Being the possessor of keen eyesight, ornithology was his first love, but under the influence of his Club membership he rapidly accumulated a good knowledge of botany and geology. He was not a collector, preferring rather to hand over any novelties to some appreciative friend or institution. He was a capable photographer, and an invaluable man on excursions, as those who were members of the Baw Baw (January, 1914) and Wilson's Promontory (December, 1915) parties will readily grant. In fact, whatever he set his heart to do he did it willingly and to the best of his ability. To his energy may be attributed in some measure the success of the two recent exhibitions of wild-flowers in aid of patriotic purposes. In an official capacity he served the Club as assistant hon. secretary and librarian for the years 1912–13 and 1913–14. In June, 1914,

he became hon. secretary, and continued in that office, devoting much time to its duties, until stricken with severe illness in November last. An attack of pleurisy, accompanied by an extreme temperature, lasting for many weeks, appears to have so weakened his heart that his naturally fine constitution was undermined, and he had not the power of recovery when normal temperature returned. After several weeks of patient suffering he passed peacefully away at his residence, Thanet-street, Malvern, on Friday, 6th April, at the comparatively early age of 44, his remains being interred in the family grave at Traralgon. By his death the Field Naturalists' Club has lost one of its most enthusiastic workers, and one who never spared himself if he could be of service to it in any capacity.

EXCURSION TO BURNLEY QUARRIES.

ABOUT fifteen members of this Club or the Microscopical Society visited the Burnley Quarries on the afternoon of Saturday, 24th February, mainly in search of pond-life. As it is probable that many of those present have not visited the quarries, it may be as well, in the first place, to say a few words about them. They are situated on the north bank of the Yarra, and extend from Burnley-street, Richmond, in a westerly direction for about a quarter of a mile, covering an area of several acres. Like all quarries which are practically abandoned, the excavations contain numerous pools, some probably of great depth, while others are very shallow. Until recently the river had free access to some portions, and there the water is probably brackish. Judging by that now exposed to view, the bluestone obtained here was of a very dense type. The lava flow which covered this and adjacent districts to varying depths here filled an old river-bed. In places this layer of rock has been removed by the excavation, exposing the old river mud, and, buried in this, one or possibly more old tree-trunks have been found. A small portion of one, which apparently belonged to the genus Casuarina, is shown here to-night. How long it is since it was buried under its basaltic covering would be an interesting problem. The rock which has been exposed by the quarrying operations presents some features worthy of notice. A small isthmus between two pools at the western end is a nice example of columnar formation. Not far from this the way in which the basalt disintegrates may be seen, the outer portions of the separate pieces of rock flaking off like the coats of an onion, leaving rounded nodules. At the other or eastern end of the quarries a rock face is exposed in which the basalt is also columnar,

the innumerable small columns radiating from a centre like the ribs of an extended fan. After spending some little time in examining these interesting geological features, attention was turned to the business of pond-searching, with good results, as a very small pool, only a few feet across, yielded two very uncommon algæ, both belonging to the family Ulvaceæ. One was of a filamentous type, and covered practically the whole of the bottom of the pool as well as some of the surface of the water. On examination it proved to be an *Enteromorpha*, possibly *E. intestinalis*. In this alga the thallus is tubular, and is composed of a single stratum of cells, the tubes being extremely attenuated in the specimens collected. The second alga was a Monostroma, probably *M. membranacea*, West. Some years ago, on the occasion of a Club excursion, a remarkable alga was discovered in one of these quarry-holes. It resembled sheets of green tissue paper or lettuce leaves floating in the water. Specimens were submitted to Professor West, of Liverpool, by Mr. A. D. Hardy, F.L.S., with the result that it was pronounced new to science, and received the name *Monostroma expansa*. As far as we know, this plant has not been recorded from any other locality. The alga taken on the recent visit differs from *M. expansa* in some respects, the cells in the thallus being larger, and the thallus itself in every case long, narrow, and ribbon-like instead of being broadly expanded. The thallus of *M. membranacea*, as described by West, however, is very much shorter relatively than that of the one just collected ; the difference, however, may be the result of a more robust growth in the case of the Victorian type. After spending half an hour or so hereabouts, a move was made to the ponds at the western end of the excavations, where the best results are generally obtained. On arriving there a search was first made for the fresh-water crab, *Hymenosoma lacustris*, a few specimens being obtained. A fine Dragon-fly nymph was next taken, which gave Mr. J. Searle the opportunity of demonstrating the existence of the extraordinary organ known as the mask, a part of this insect's anatomy to which reference was made in his recent paper on "The Pond and its Inhabitants." Another very interesting capture was a larva of an Ephemera, or May-fly. This immature insect is furnished with three feather-like caudal appendages and a row of external breathing organs or gills on each side. Although the mature Ephemera has a life of a few hours only, the larva has an existence extending over two or three years. Caddis-fly larvæ were also in evidence. These queer creatures construct tube-like residences for themselves of various materials, which they drag about with them as they crawl or swim about. The fresh-water shrimp, Xiphocaris, sp., was secured in fair

numbers, and proved an object of interest to some of those present. Portions of the water plant Myriophyllum were next collected, as it generally proves to be the home of numerous Protozoa and Rotifera, and subsequent examination under the microscope proved it to be so in this case also. Casts with the net produced a fair number of Entomostraca, minute crustacean forms. A move was finally made to the excavation at the north-west end of the quarries, where free-swimming rotifers are generally fairly plentiful, but the reverse proved to be the case on this occasion. The green colour of the water, however, suggested the presence of minute vegetable organisms, which were later found in large numbers in the material collected, together with green Protozoa of the Euglena type. Of the Protozoa taken during the afternoon, two were worthy of special mention, both being allied to the common Vorticellæ. One of these was *Thuricola operculata*, a tiny creature which constructs a vase-like tube in which it lives. As a special defence against interlopers, it fits a door to its residence, which opens outward only, and which closes down immediately the animal retracts. The other protozoan referred to was a Pyxicola, which resembles *P. socialis* more nearly than any other; but as this is described as a marine form, and social in its habit, if the two be identical, that taken must have altered both its habit and its habitat. This particular speck of animated matter, about 1/250 inch in length only, also builds an urn-shaped residence. The animal is furnished with a sort of pad on one side at its outer end, which acts as a stopper to its tube when it retires within its abode for safety. Diatoms were found to be extraordinarily numerous, but not many species were represented, the most noteworthy being *Bacillaria paradoxa*, which exhibits most remarkable power of movement, and that of a most mysterious kind, making it an object of special interest to the microscopist. Although the weather was rather showery, it is hoped that some, at any rate, of those present were satisfied with their outing.

The following is a list of the captures:—

Algæ.—*Enteromorpha* (? *intestinalis*), *Monostroma* (? *membranacea*, West), *Bacillaria paradoxa*, Navicula, sp., Surirella, sp.

Protozoa.—*Arcella vulgaris*, *Actinophrys sol*, *Anthophysa vegetans*, *Euglena viridis* (?), Opercularia (?), *Thuricola operculata*, *Pyxicola* (? *socialis*), Vaginicola, sp., Stentor, sp., *Vorticella campanula*, *Stylonichia mytilus*.

Cœlenterata.—Cordylophora, sp.

Worms.—The rotifers Œcistes (Ptygura, Ehr.), sp., Anurœa (Keratella), sp.

Arthropoda.—Crustacea : *Daphnia lumholzi* (♂), *Simocephalus gibbosus*, Ceriodaphnia, sp., Chydorus, sp., Alonella, sp., Bosmina, sp., Xiphocaris, sp., *Hymenosoma lacustris*. Insecta : Larvæ of May-fly and Caddis-fly, nymph of Dragon-fly.

For the identification of several of above we are indebted to Mr. J. Searle.—J. Stickland, J. Wilcox.

CORRESPONDENCE.

UPSETTING THE BALANCE OF NATURE.

To the Editor of the *Victorian Naturalist.*

Sir,—I was interested to see in the March issue of the *Victorian Naturalist* a letter from Mr. F. Lewis, Acting Chief Inspector of Fisheries and Game, in which he takes exception to some of the statements in my paper with the above title in the February number (page 151). I regret, however, that I cannot agree with him as regards some of the reasons he advances for the disappearance of the Blackfish. In the first place, Mr. Lewis appears to doubt that the trout is destructive to Blackfish, yet in the higher reaches of the Barwon River it was a common practice for fishermen to use small Blackfish as a bait for trout, with often excellent results. Mr. Lewis further mentions that "two of our best Blackfish streams are undoubtedly the Bunyip and the Gellibrand Rivers, and in neither of these have trout or perch been liberated, and this Department intends to see that none are placed therein—at least, while there are Blackfish there." This appears to bear out my contention of their destructiveness; otherwise, why should the Fisheries Department hesitate in stocking these rivers? I know the Gellibrand River well, and cannot agree that it is remote, as Mr. Lewis contends. The narrow-gauge railway from Colac to Beech Forest makes this an especially popular resort for the Colac district fishermen and picnic parties, with the result that many large hauls are taken, including small fish, and the Fisheries Department has proceeded against offenders in the Colac Police Court for this offence. Unfortunately, the introduced trout is already in this river, although Mr. Lewis states that his Department does not intend to place trout there; and, as the imported perch is now practically everywhere, I have but little doubt that it is there also—or will be in the very near future. The latter fish has been placed in so many private dams that during floods they escape over the by-washes, and thus find their way into the rivers.

Another reason given for the decline of the Blackfish is the

gradual clearing of the banks and beds of the streams. If this were correct it would undoubtedly seriously affect the Blackfish, which loves shelter; but, as a matter of fact, the landowners adjoining rivers or streams seldom if ever snag the streams. But in most instances it is just the other way about, and it is the presence of logs and rubbish and blackberries, &c., hanging over and into the water that affords the unfortunate Blackfish some sanctuary from the imported fishes.

I quite agree with Mr. Lewis that our native animals respond well to efficient protection; but how is it possible to efficiently protect our native fish when ravenous, fast-swimming fish have been indiscriminately introduced into our rivers? And I am still of the opinion that even if not another Blackfish was taken by fishermen, the two fish mentioned would be able to exterminate the Blackfish in the near future.

It is only the presence of logs and rubbish that delays and makes its extinction less rapid by affording some cover for our native fish to retire to when hard pressed by the introduced species.—Yours faithfully,

H. W. DAVEY, F.E.S.

East Malvern, 12th March, 1917.

THE WOOD'S POINT DISTRICT.—The Mines Department has recently issued another of its memoirs, describing the topography, geology, and mines of the Wood's Point District. Its author, Mr. O. A. L. Whitelaw, field geologist, is to be complimented on the excellent work accomplished in some of the most difficult country in the State. The accompanying geological map, covering about 280 square miles (40 chains to 1 inch) is a monument of painstaking work, carried out at elevations varying from 2,000 to 4,700 ft. above sea-level.

"A CENSUS OF NEW SOUTH WALES PLANTS."—Notice of this very valuable contribution to Australian botanical literature has been held over for several issues owing to want of space. The volume is the work of Mr. J. H. Maiden, I.S.O., F.R.S., F.L.S., Government Botanist and Director of the Botanic Gardens, Sydney, and the late Ernst Betche, Chief Botanical Assistant, Botanic Gardens, Sydney. The latter, unfortunately, did not live to see much of the work in print. The volume is notable in one respect, in that it is the first Australian publication in which Engler's system has been to a great extent followed. As this system is likely to be generally adopted, the census is indispensable to every working botanist in Victoria. It is proposed to continue the publication by means of supplements dealing with the different divisions of the cellular cryptogams, and by annual supplements to include corrections and additions to the lists. The first of

the divisional supplements has already been issued, and contains the fresh-water algæ, compiled by Mr. G. I. Playfair, Hon. Curator of Fresh-water Algæ, National Herbarium, Sydney. Owing to the scarcity of books in English based on Engler's system, a brief sketch of its arrangement may be outlined here. The fundamental principle is the probable line of evolution of plant life; hence a commencement is made with the ferns, concluding with the composites, as being the most highly organized of the vegetable kingdom. The groups usually known as orders are here termed families, one or more of these being grouped together into series. The families are variously subdivided where required into sub-families, tribes, sub-tribes, sections, or under-sections. Under these headings the genera and sub-genera are grouped according to their affinities, so that plants with similar peculiarities are brought closely together in the list. The author—for doubtless Mr. Maiden will be generally regarded as the author — has not hesitated to introduce well-marked varieties, for, as he says in the preface, "the variety of to-day may be the species of to-morrow, and *vice versâ*, since the rank is usually a matter of individual judgment, and that may vary." The great value of the work lies in the excellence of the references, which are very complete, the principal reference being to the volume and page of Bentham's "Flora Australiensis," which, Mr. Maiden says, "is still and will long remain the standard work on our flora. The greater one's experience with it, the more sincere is one's admiration of it." The list of works quoted is almost a catalogue of existing botanical literature, and occupies nearly ten pages. The list extends to just over 200 pages, but there is no enumeration of the number of plants recorded. The volume has been well produced by the Government Printer, Sydney, but unfortunately no price is indicated.

"The Gum Tree."—The first number, for March, of a new quarterly, *The Gum Tree*, published as the official organ of the Australian Forest League, is to hand. An announcement on the cover states it to be "a journal devoted to the conservation, propagation, and utilization of Australian trees." The present issue consists of sixteen pages, 7 inches by 10, and includes two fine full-page illustrations which will serve to give the world an idea of our big timber. An inspiring foreword by His Excellency the Governor-General, Sir Ronald Munro-Ferguson, G.C.M.G., who is an authority on forestry, has been quite spoiled in the "making up," lines being misplaced and one or more dropped, so that its teaching is partly lost. The history and aims of the Forest League naturally occupy a prominent position, and an appeal for help takes the form of an imaginary dialogue. Some notes on the recent

conference only make one wish that one or two of the papers, which are spoken of as being so good, had been printed, rather than the disparaging remarks about the powers that be, and the mistakes that have been made, which now occupy prominent positions in the columns. A brief article on Victorian Forests, by Mr. A. D. Hardy, F.L.S., illustrated by a map showing the forest areas and a tabular list of Victorian eucalypts and their uses, grouped according to their general forest appearance, will be useful to the ordinary reader. We must confess to a feeling of disappointment in the number. The promise of a high-class journal has not been fulfilled; its appearance lacks dignity, and savours too much of the ordinary newspaper. This, however, is somewhat redeemed by the cover design, which is boldly executed in green and black.

A Hermit Spider.—During the last month or two a web-spinning, leaf-curling spider has been very much in evidence in suburban gardens. The creature, which has a greyish, hairless body with greenish-yellow markings on the abdomen and dark, shining legs, has been identified for me by Mr. J. A. Kershaw, F.E.S., as *Phonognatha graeffei*. From its habit of using a dead leaf as a home and "look-out," it provides the watcher with a most interesting subject. The way in which the leaf is hauled up from the ground, when the web consists of little more than the main cables and guy ropes, attached, and curled into a shelter when in position, is highly instructive. The leaf is often probably ten or twelve times the length of the spider, and generally stiff, such as that of a sugar-gum when dry. The chosen leaf, which is never broad, is usually suspended with the stalk upwards; the upper opening of the tube is partially closed by tension and partly by web, while the lower opening gapes widely. Here the spider, at the centre of its web, remains during the day, with just the ends of its legs exposed, ready to dash out for any insect caught in the web, when it is rapidly detached and conveyed to the hiding-place. When the spider gets back to its retreat it turns round and backs in like a flash, the insect being consumed, as it were, on the doorstep. It is interesting to note that sometimes an empty snail shell is used as a home. This has occurred three times in my garden. The shells are suspended with the opening downwards, when the protruding legs of the spider "at home" in a snail shell remind one of a Hermit Crab, and I would suggest the name "Hermit Spider" for the species if it has no other vernacular. As an instance of the strength of the creature, I may say that one snail shell has been raised to the height of nine feet in a web among the twigs of a wattle. By accident I left one of these spiders confined in a glass jar for nearly a fortnight, but it

remained plump and healthy. Released one evening at eight o'clock, it had by midnight spun a web and raised a dead bamboo leaf three feet from the ground, but owing to a slight unusual convexity it would not curl, so the spider bent it double. Evidently this was unsuitable as a shelter, for I found in the morning the leaf removed to where, three feet away, a new web had been spun and the leaf suspended under the sheltering green leaf of a Cape goosebery bush. In only one case did I note the use of a living leaf attached to the plant, and used as a shelter attached to the web centre at the same time.—A. D. HARDY. Kew, 12th March.

THE BITTER PIT IN APPLES.—Mr. D. M'Alpine has recently issued his fifth report on this question. For five years he has been patiently investigating the subject, and, theory after theory having been experimented upon and abandoned, he has now pretty well satisfied himself that the cause of the disease, if it can be so called, is over-pressure of water in the tissues, leading to local rupture and death of the parts. He thinks that greater attention to pruning will tend to reduce the losses of fruit from this cause.

THE PRICKLY PEAR.—Victorians have little idea of the vast extent of the Prickly Pear pest in Queensland. Mr. J. F. Bailey, who for some years has had the opportunity of seeing its extension, recently stated that at least 30,000,000 acres—an area larger than that of Scotland—has now been rendered useless by it. Various remedies have been tried without much success. The only one which seems to have any effect on it is spraying with an arsenical solution. Just consider what this means in expense to the country. Fortunately for Victoria, the Prickly Pear has not assumed so serious a position here, more by good luck than good management, for it has been allowed to get out of control in many of the older-settled districts round Melbourne.

THE MICE PLAGUE.—For the last month or two wheat-buyers have been at their wits' end to protect the immense wheat stacks at country stations, especially in the Wimmera district, from mice, which have increased to an incredible extent. Most of the stacks have now been enclosed by sheets of galvanized iron, in which openings are left to correspond with kerosene tins sunk in the ground and partly filled with water. It is no uncommon occurrence to capture 10,000 mice in this way in a single night. At Minyip recently the catch for two nights weighed rather more than a ton. Of course, in this case the mice were probably wet when weighed, but even so the number required to make up a ton must be considerable.

Field Naturalists' Club of Victoria.

THE GREAT WAR, 1914–1917.

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