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OF THE

Field Naturalists' Club of Victoria.

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

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

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ILLUSTRATIONS.

ERRATA.

Page 12—Note referring to errors in April (1922) *Naturalist.*

Page 38, line 25—"Collected by Mr. E. H. Hatfield" should follow "N.S.W." in line 28.

Page 60, line 14—"zoologist" should read "curator."

Page 97, line 7—For "*Conospermum*" read "*Comespermum*"

Page 98, line 20—For "*D. corymbosum*" read "*D. floribunda.*"

Page 130, line 8—For "lygosid" read "lycosid."

Page 148—Correction of statement on page 82.

Page 151, line 4 from bottom—For "markings" read "colour."

The Victorian Naturalist.

Vol. XXXIX.—No. 1. MAY 4, 1922. No. 461.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 10th April, 1922.

The president, Mr. F. Chapman, A.L.S., occupied the chair, and about 70 members and visitors were present.

REPORT.

A report of the visit to the Clifton Hill quarries on Saturday, 25th March, was given by the leader, Mr. F. Chapman, A.L.S., who said that the outing proved very pleasant, and that it provided a good opportunity for studying the geological features of the volcanic rocks of the Melbourne district.

ELECTION OF MEMBERS.

On a ballot being taken, Miss G. E. Davis, Elsternwick, Miss P. J. Griffiths, B.A., 27 Grosvenor-street, Middle Brighton; and Miss M. Guest, 245 Latrobe-street, Melbourne, were duly elected members of the Club.

PAPER READ.

By Dr. Geo. Horne, V.D., entitled "Aboriginal Scrapers."

The author gave an interesting account of the method of manufacture and the different kinds of scrapers used by the Australian aboriginals, comparing them with the flints of other parts of the world, of which he exhibited a very fine collection from various countries. The making of implements usually fell to the old men of the tribe, who exhibited considerable patience in their work; yet when made they were not treasured as one would expect after so much labour.

Some discussion ensued, in which the chairman, Dr. Sutton, Messrs. Kershaw, Keep, and Barnard took part.

The chairman, Mr. F. Chapman, said that the principal source of the basalt glass which the Victorian aboriginals valued so much, on account of its peculiar toughness and homogeneity, was probably at Bulla, where large deposits of this rock are to be found.

NATURAL HISTORY NOTES.

Mr. A. D. Hardy, F.L.S., contributed a note on an occurrence which he had witnessed at Evelyn one day in December. His attention was attracted to a scuffling on a patch of cleared ground screened by bracken fern. He thought the Kookaburra, which he could see attempting to fly with a load, was raising and dropping a snake or lizard, but, being in doubt, went over to investigate, when "Jack" flew off, leaving the victim at

about its last gasp on the ground. This proved to be a young rabbit, which he subsequently found at the local store to weigh half a pound. He had made inquiries of the Vermin Destruction Department and of several experienced ornithologists, but could hear of no case of a Kookaburra attacking a young rabbit.

Mr. F. Keep said that during a recent visit to Kalimna, Lakes' Entrance, he met with a variegated form of the Hop Goodenia, *G. ovata*, in considerable quantities. This had a pleasing appearance, and might be worth cultivating as a garden shrub. Specimens were on exhibition for the benefit of those interested.

EXHIBITS.

By Mr. C. Daley, F.L.S.—Scrapers, knives, &c., ochre, spear-polisher, from a kitchen midden at Elwood, near Brighton.

By Miss A. Fuller.—Zamia Palm nuts, W.A.; cotton seeds, &c.; seeds of Nuytsia, Western Australian Christmas-bush; seeds of *Eucalyptus macrocarpa*, *E. pyriformis*, *E. Preissiana*, and *E. tetraptera*; Black-boy flower-stems; Western Australian crabs.

By Mr. C. J. Gabriel.—Specimens of all the Victorian species of "Mutton-fish" or "Ear Shells"—viz., *Haliotis albicans*, G. and T., *H. nævosa*, Martyn, *H. emmæ*, Rve., *H. conicopora*, Péron, and *H. cyclobates*, Péron.

By Dr. G. Horne, V.D.—A large series of aboriginal scrapers from Victoria, Tasmania, and Central Australia, also similar implements from other parts of the world for comparison.

By Mr. F. Keep.—*Goodenia ovata*, Hop Goodenia, from Kalimna, with variegated leaves.

By Mr. J. A. Kershaw, F.E.S. (on behalf of Mr. A. J. Williamson, Dunolly).—Aboriginal stone axe, grooved, showing evidence of having been used as a hammer at both ends, found at M'Intyre's, near Rheola, Victoria; aboriginal stone axe, ground, with two V-shaped transverse grooves, from Eastville, near Loddon, Eddington, Victoria. For National Museum.—Cast of double-headed stone hammer, from New South Wales; large aboriginal stone axe, ground, measuring 12½ inches by 8½ inches, found in virgin scrub on bank of Liverpool Creek, 14 miles from Innisfail, North Queensland, by S. Fitzgerald.

By Mr. C. Oke.—Small beetles (under microscope) from Belgrave excursion.

By Mr. F. Pitcher.—Fasciated growth of *Tecoma mackenni*, from his garden at South Yarra; also sample of stone used in large quantities fifty years ago for producing lime from at Cave Hill, Lilydale.

By Mr. L. Thorn.—The larvæ and perfect insects of a Victorian moth, *Nataxa flavescens*; a rare Victorian Mountain Brown Butterfly, *Oreixenica correæ*, taken on the top of Mount

Donna Buang, 4,050 feet above sea-level, also two species of berries from Mount Donna Buang.

By Mr. H. W. Whitmore.—Piece of bluestone (basalt) covered with vivianite, from the Collingwood quarries.

After the usual conversazione the meeting terminated

EXCURSION TO THE CORPORATION AND COLLINGWOOD QUARRIES.

MEMBERS and friends who visited the above quarries on Saturday, 25th March, found the afternoon very pleasant, the weather being cool and genial. The lower part of the larger quarry showed many interesting features, and the bank of the old Merri Creek (of Pleistocene time) still showed the thick covering of river silt, with roots of Sheoak (*Casuarina*) and perhaps other vegetation *in situ*. The bedrock seemed only slightly hardened by contact where this occurred, but the effect of the cooling on the lower surface of the basalt had produced a thin seam of tachylyte or basalt glass. We had the advantage of the company of Mr. R. W. Armitage, who secured for the members some good examples of this glassy condition of the lava from the contact of the Silurian mudstone on the Merri Creek. The name tachylyte, given by Breithaupt, is derived from two Greek components, meaning rapid dissolution, and so named on account of the rapidity with which it undergoes fusion before the blow-pipe. The termination "lyte" is not to be confused with "lite," the latter being derived from *lithos*, stone. The common zeolites were gathered by members, and the minerals included aragonite, ferrocalcite, magnesite, vivianite, halloysitic clay, and possibly mesolite. In one instance a miniature cavern was noticed in the bluestone, which had a floor of ferrocalcite in process of building up, much as stalagmite occurs in the Buchan Caves. The cooled surfaces of the various lava streams, of which many are seen superposed in the quarry, were indicated by some very fine ropy structure. Bomboidal weathering of the massive blocks and the rough columnar structure, often radially arranged, were pointed out. In a pool in the floor of the quarry Mr. J. Stickland found a quantity of a very minute form of the protista (a link between plants and animals) of the genus *Chlamydomonas*, as well as the tubular thallus of the alga *Enteromorpha*, probably allied to the species discovered at Burnley under similar conditions. The adjacent Merri Creek was next visited, where we had the opportunity of examining some fine examples of radial columnar jointing, basaltic pavement, and stratified mudstone. This concluded the programme of an instructive and enjoyable afternoon amongst the volcanic rocks of Melbourne.—F. CHAPMAN.

WHERE THE MURRAY RISES.*

BY CHAS. DALEY, B.A., F.L.S., AND H. B. WILLIAMSON, F.L.S.

(Read before the Field Naturalists' Club of Victoria, 13th Mar., 1922.)

PART I.—PHYSIOGRAPHICAL AND GENERAL NOTES, BY C. DALEY, F.L.S.

FOR many years, from the nature of its geographical position and remoteness from large centres of population, the Omeo district was, of necessity, more isolated than almost any part of Victoria; but with the extension of the railway to Orbost reducing the distance from railway communication, the rapid development in motor travelling, and the practical outcome of the series of motor reliability tests in the Alpine regions of Victoria, the disadvantages mentioned have been greatly minimised. At pleasant Bruthen (bracken or ferns), on the foothills above the rich spreading fields of maize that delight the eye, there is plain evidence that "the old order changeth," for, even as horse-teams replaced the old bullock-teams in outback transport, so here in the main street is a recently-introduced motor lorry which plies regularly from Bruthen to Omeo and Benambra. If its service prove effective, such motors will in time banish the useful six or eight-horse teams from the road transport. The coach of a few years ago has already gone, and in its stead is the speedier and more prosaic rival installed, annihilating distance and facilitating intercourse.

Our party of four, Messrs. Williamson, Hughes, Allen, and the writer, started early by motor, and after a few miles' journey through the hills regained the picturesque valley of the Tambo, along which for many miles the Omeo road runs. It would at any time be an interesting journey, but the favourable season increased the impression of its fertility. We glided in and out, past maize fields on the flat, rich pastures where fat Hereford cattle grazed, over stony rises and steep pinches, past lonely steadings on river or creek.

The river course is usually fringed with high cliffs, often presenting in the bed the upturned edge of stratified or metamorphic rocks, with hard intrusive masses of stone. At Tambo Crossing a road goes off north-west to Stirling, a small gold-mining centre. The general geological formation of the Tambo Valley rocks is metamorphic in character, with varying granitic, Ordovician, and Silurian formations in contact or proximity. The western tributaries of the Tambo are mostly auriferous, and the formation Ordovician. Further up we come to Ensay, prettily situated in the fertile valley, with the

* A map detailing this part of Victoria will be found in the *Naturalist* for January, 1912 (vol. xxviii., p. 72).—ED. *Vict. Nat.*

mountains rising up on the eastern side. There is a quaint bridge and a ford over the stream; and from every side to a typical country race meeting settlers were hastening.

The Tambo Valley is fruitful in historical associations, being the original gateway into Gippsland, along which Angus M'Millan, nearly ninety years ago, and afterwards Count Strzlecki made their way to the Lakes, and ultimately to the coast—the latter at Western Port, the former at Port Albert. M'Millan's first cattle station was here, at Numblamunjie ("the place of blackfish"), afterwards called by M'Leod, a later occupant, Ensay, from an island home west of Scotland. From Ensay the valley opened out until Doctor's Flat was reached, named after Dr. Arbuckle, of M'Millan's party, who was here before taking up Mewburn Park, at Tinamba, a year or two later.

Passing over fertile pasture lands, we reached Swift's Creek, where dinner was served. The rich Ordovician measures of Cassilis are higher up on this creek. Here we left the Tambo Valley, after passing Mount Tongio on the left, through the little town of Tongiomunjie ("the place of high cliffs"), and on a rapidly-rising road, from which the view of mountain and valley was delightful, diverged north-west towards Omeo. Tongio was one of the first runs selected in Gippsland, probably in 1838, by E. Coady Buckley, afterwards of Prospect station, south of Longford. As we ascended towards the Tongio Gap, the play of sunshine and shadow on the ranges enclosing the valley we had left made a delightful scene. From the Gap (2,700 feet above sea-level), with a last look at the fair prospect behind us, we gradually descended over the bare hills, where we, however, caught sight of our first Snow Gums, to Omeo, 2,100 feet above the sea and 67 miles from Bruthen.

Omeo, at one time a bustling, prosperous mining town, is pleasantly and picturesquely situated along the sinuous course of the Livingstone River, which, with the neighbouring mountain, is named after one of the original district pioneers of 1835. It reminds one of Walhalla, but the river valley is wider, and the surrounding hills do not so obtrusively encroach upon the main highway. The hotel accommodation at Omeo leaves much to be desired. As the town is so favourably situated for the rapidly-expanding Alpine tourist traffic, this should be remedied.

While Messrs. Williamson and Allen journeyed towards Mount Livingstone and Cobungra, Mr. Hughes and I went down the river, and, crossing it, after a steep climb reached the summit of the Bingo Range, north of the town, from which a fine view of the surroundings is obtainable. On our way we were interested in the great number of cockchafers which

were on the young Peppermints near the river. Their number was legion, and in some places the tender leaves had been almost stripped off the young gums by their voracity. Young grasshoppers were also very numerous, our attention being attracted to them by the unusual gathering of Blue Wrens that were busily employed in improving the occasion. Insect life on the slopes of the hill was varied. Butterflies flew about the flowering gorse. We watched with interest a wasp that was laboriously flying to his cells with a beetle, the latter nearly as big as his captor. Only short flights were possible. Another wasp had as a prize a juicy Match-fly. This range had formerly been well timbered, but the present vegetation is all secondary growth, with very little scrub. We also made an excursion up the stream, where, near the ever-spreading blackberry thickets, we saw a snake, which eluded our observation before we could obtain a stick. In the Livingstone River there has been a great deal of alluvial mining, hydraulic appliances and sluicing being extensively used for the recovery of gold. The alluvial in river and terrace deposits has been of great extent. The surrounding ranges are metamorphic in character, the original stratified rocks, according to the late Mr. Howitt, having mostly been altered into silky micaceous schists, gneiss, gneissose and schistose granite, with dykes and intrusive rock masses. Around Omeo the micaceous character of the rock formation is very marked indeed. We were interested in the water-worn pebbles and stones, which show the very varied character of the rocks from which they came—igneous, metamorphic, sedimentary, with minerals connected therewith. Later, at Mr. Blackburn's, in Omeo, we examined a fine collection of district rocks and minerals of great variety and interest. Silicified wood is frequently found in the alluvial measures. Omeo has been noted more for the richness and extent of its alluvial wash than for its reef formations. Quartz outcrops through the micaceous rock-mass are noticeable in all the road cuttings.

Leaving Omeo by the kindly services of a motorist (the coach (!) being unable to take impedimenta, parcels, and ourselves), we went by a winding and ascending road giving vistas of distant valleys and mountains until we reached "The Sugarloaf," a few miles out on the Benambra road, where there burst upon our gaze one of the finest views obtainable in Victoria. At Omeo we had heard of "The Plains," but "the half was never told." They consist of bare or almost treeless low hills surrounding the basin of Lake Omeo, and stretches of flat pasture land. From this area rises up on each side, to the horizon, lofty mountains in ridge and peak. Just beyond are The Brothers, Mounts Leinster, Misery, and Tambo to the north-

east, The Sisters to the east, the Gibbo north-west, and, past the Knocker, Glen Wills, with Bogong in massive contour further west, the Omeo Ranges closing in southwards—a striking panorama, interesting in its beauty, its vivid contrast and variety. Far away beyond all is the summit of "Kossy," as the monarch of the Alps (Kosciusko, 7,200 feet) is familiarly called. "Lake" Omeo lies in the centre of this landscape, and insensibly there came to mind an oft-reiterated and implicitly believed tag of schooldays—"Omeo on Lake Omeo, north-east of Victoria." They *are* both north-east, but the town is separated by miles of hills from the lake, and the lake belies its name, for it is destitute of water. It is, however, still retained in the official list of Victorian lakes as possessing an area of 1,966 acres. Some years ago, at the deepest part, there was nine feet of water, and boats were used upon it; now it is a perfectly level expanse, an ideal spot for the landing of aeroplanes and a grazing area for cattle. In Strzlecki's map of his route into Gippsland the track is marked right through the *centre* of the lake from north to south, so that even in 1840 it was probably dry, and, according to old settlers, that is its usual condition, evaporation in such a shallow basin being very great, and apparently no stream of any volume flows into it, although the soakage from the hills surrounding it must be considerable in wet seasons.

From the Sugarloaf a quick run along the border of the lake, past splendid crops and rich cattle pastures, brought us to the little town of Benambra, pleasantly situated on rising ground at the northern extremity of the lake, the centre of the rich cattle country extending back to the Murray over uplands, river flats, and mountain heights. Having secured comfortable private accommodation, after a survey of our environment from surrounding hills of metamorphic formation, very sparsely or not at all timbered, we took the opportunity of attending a local sports gathering in a paddock bordering the other side of the lake, hack races being run on a portion of the level bed. Crossing to the sports, we noticed at the lower end of the lake, about seven miles away, a very distinct mirage, showing water and trees. The local gathering partook of the character of a pleasant, sociable picnic. An agent of the Immigration Bureau was engaged in taking features of the day, as well as of the district occupations and scenery, for reproduction abroad. It was pleasing, after city conditions, to see the fine show of horses, to the number of about 200, which were tethered around the paddock, whilst the presence of thirteen motor-cars gave evidence of the prevailing trend. One was struck by the appearance of material prosperity as well as of vigorous health and fine physique of the residents in this breezy locality. Benambra, of course, suffers from remoteness from a railway,

and, speaking with a good knowledge of the eastern part of the State, I know of no part that appears to offer better prospects for railway construction than from Bruthen to Benambra *via* the Tambo Valley, Tongio, and Omeo. Under such a stimulus production would be more varied and greatly increased, the mineral resources would be properly tested, and the district be capable of maintaining a much larger population. In addition, the Alpine regions would be efficiently opened up for tourists in search of the picturesque. From Benambra access can be made to Mount Kosciusko, 59 miles distant, through interesting country; but there is need of the track being clearly defined as far as Tom Groggin, the ford on the Murray.

Having been fortunate enough to engage the services of Mr. Fred. Jarvis, an excellent bushman, as guide, whilst waiting until he could make arrangements for horses suitable for four persons whose horsemanship was, through disuse for many years, somewhat uncertain, we decided to make the ascent of The Brothers, 4,667 feet in height, distant about four miles. Crossing the flood-plain and stream of Morass Creek, where we saw a number of wildfowl among the swamp vegetation, we made for the foot of the range through some well-grassed paddocks. Seeing a copperhead snake coiled up near a fence, I smashed its head in with a stick, to find that it was already dead, although there was no other bruise or mark upon its body. After lunch at a creek, we pursued our way, finding the ascent arduous, but persisted until we reached a central peak; then clouds and rain prevented a clear prospect. This range is of granite, somewhat like syenite in appearance. On the top are many huge masses or tors, and the slopes are generally well wooded. The range is part of the watershed of the Mitta Mitta. We found a dancing-mound, but saw no Lyre-birds, although on several occasions we heard their calls. Wonga Pigeons were numerous in this range. Want of time and adverse weather combined to prevent further exploration of this rugged granitic range, which is a dominant feature of the landscape at Benambra, presenting to view, no matter from what point it is observed, three peaks.

Next morning, our guide having made satisfactory arrangements in regard to our mounts, the cavalcade, with a pack-horse to carry supplies for four or five days, set off for Limestone Creek. The road leads generally north-east from Benambra, skirting the edge of an extensive plain through which Morass Creek sluggishly winds around the foot of The Brothers. Some five miles out, after passing a fine herd of about 200 cattle on the way to a muster yard, we came opposite a homestead some distance from the road, which marks the site of the old home of James M'Farlane, the discoverer of Omeo Plains, who settled

on these rich river flats about 1836. Ahead of us we had a clear though distant view of M'Farlane's Look-out, an abrupt and prominent peak, from which, tradition states, M'Farlane first beheld the plains country, with its fine pastures. Mounts Tambo and Little Tambo were in bold relief away to our right.

Our track, rising upwards over country of a metamorphic nature, passed through forest where Snow Gum, Silvertop, Peppermint, Black Sallee, and Candlebark were the chief timber trees, but one missed the luxuriance of growth which marks the Southern Gippsland district. Continuing along a ridge of the Bowen Range, we passed two or three sections which have been taken up by returned soldiers, who deserve every success for their enterprise in such a remote region. In Mac's Creek, which we crossed, stream tin has been obtained in moderate quantities. Near Maringo Creek, further on, flowing through a pleasant valley with fine clumps of Black Sallee, we were much interested in observing the eager and general response of the cattle grazing in the vicinity to the clear, musical call of someone desirous of assembling them, the cattle coming from every side towards the penetrating sound of the voice. This is explained from the fact that mountain cattle are accustomed to be called in this manner when, at regular periods, the salt-licks are replenished, and, recognizing the call, they associate it instinctively with the desire to satisfy the craving for salt.

From the Maringo we rose quickly through the thick forests of Snow Gum, obtaining occasionally glimpses of deep valleys and distant ranges, whilst Mount Misery loomed to the north, forest-clad to the summit. We crossed this divide at 4,800 feet, and then began to descend on a steep gradient, until, in a ride of about three miles, we dropped 1,200 feet into the Limestone Creek, the ultimate source of the Murray River, which, at first a trickling stream, gains volume from the numerous mountain springs, and soon flows—clear, sparkling, and swift—over a pebbly bottom past the limestone hills, until by the accession of tributaries, after a course of 18 miles, it becomes the Indi or Murray. There is a considerable area of the Devonian limestone in this district, with granite towards Mount Leinster, and with Silurian and trap rocks in contact in the surrounding ranges. An outcrop of serpentine is passed on the ridge, about a hundred yards from the track, just before descending into Limestone Creek. An auriferous gravel deposit making into the flat was at one time worked, and the evidence of extensive sluicing operations for gold recovery is seen.

We camped in a hut used in cattle musters, and belonging to Mr. L. Pender—a name associated with the earliest occupation of the district. Tired with our 25 miles' ride, we retired early, two of the party sleeping in the open. The drop in the

temperature after nightfall was considerable. Numerous bush-rats scampered about the hut, the howl of a dingo was heard, with the reiterated Boobook's call; and, before dawn, we could hear the noise made by twelve or fourteen kangaroos, seen just behind the hut, where it appeared to be their custom to come from the hills to lick the empty hollowed troughs in which salt is placed at certain times for the cattle which also frequented the spot. At the first glimpse of dawn, from the trees bordering the creek came, harmoniously blent, the songs and calls of countless birds in joyful chorus, the notes of some being unfamiliar, but not the less welcome to our ears. After breakfast we set out on foot to inspect the Limestone caves, which are a feature of this remote creek. The first cave, a small one, had the entrance blocked by the fall of rock; the others we entered had features similar to those of Buchan and other caves of like origin. Of course, comparison is out of the question, these caves as yet being undeveloped, and lacking the conveniences, protection, and effective lighting which render the Buchan Caves so attractive under inspection. The entrances are at present difficult to negotiate. There is evidence of thoughtless vandalism in the destruction of stalactites and stalagmites; but in course of time, with easier access to the district, and perhaps Government or local control and direction, it is certain that many caves will be opened up for inspection. The largest cave, on the left of the stream, is entered in a prone position over some saplings placed above the water beneath. About the middle of this cave is an intrusive deposit of water-worn pebbles, almost cemented together and several feet thick, marking a terrace or bed formed by water action at some remote period. At several places water was flowing out through the limestone of the hills.

In the afternoon a walk of about two or three miles to an adjacent creek brought us to the place where the marble quarries have been opened up, and from which Mr. Summers obtained marble of good quality and of variety in colouring, from white and somewhat slaty saccharoidal to grey, pinkish, and mottled. The sub-crystalline limestones of the creek contain corals and brachiopods and remains of other marine fauna. The quarries are now idle, awaiting future development, there being abundant scope for the production of marble from the hills. As at Buchan, in the vicinity and in connection with this Devonian limestone occur minerals such as galena, silver, iron, manganese, &c., but not in any definite formations or to great extent. The wolfram mines at Mount Murphy are to the north-west of this area.

Next day we were early in the saddle, and after crossing the Dividing Range over the rough country separating the head waters of the Tambo from those of the Murray, we made for

the Cobberas, the country being metamorphic schists, Silurian rocks, and felstone porphyries. The late Mr. A. W. Howitt said of this range, which is part of a system extending to near Buchan, that it is the "remains of a great volcanic sheet . . . The lowest portion approaches the quartz-porphyries in character. . . . The line of a meridional fissure on which a series of volcanoes were built up"; and the "quartz-porphyries were denuded stumps of volcanoes around which felstone, ash, agglomerate, and indefinite felsitic rocks are still grouped." After some hours' riding over these rocky hills, where the Native Hop-bush grew under the prevailing Snow Gums, we reached the Native Dog Creek, a tributary of the Buchan River. This alpine stream flows down the centre of a long grass-covered and treeless sloping plain or valley between the Cobberas and the ranges west of the Snowy River watershed. Following this up over the black, peaty soil, where soft tussocky Snow Grass and alpine flora grow profusely, we came to the foot of the most rugged part of the Cobberas Range, where, securing our horses, we prepared to climb to the summit. On entering this peaceful valley we had seen a group of four or five wild horses, and, coming higher, had again seen another group issuing from the timber on the opposite range. An attempt to secure a photograph was unsuccessful. A little later a mob of ten, with a white stallion as leader, was seen coming from the sheltering timber on to "The Play-ground," as this plain is appropriately called, for it is a favourite haunt of the brumbies, being open, well watered, well grassed with succulent feed, and forest cover and mountain retreat are close at hand. The ascent to the summit (6,030 feet above sea-level) was somewhat laborious, amid rough and often jagged rock-masses of felspar porphyry, over a prolific spring-fed growth of the soft Snow Grass, and amid the ever-present Snow Gums, whose bent and grotesque limbs bore testimony to the severity of winter snows, the force of driving winds, as well as to the ravages of occasional bush-fires. Among the rocks, Asters, Daisies, Violets, Shaggy Peas, Veronicas, Flax and Vanilla Lilies, Trigger-plants, and Euphrasias bloomed in great luxuriance, being of unusual size as well as of richness in colouring—a veritable alpine garden of delight. Baron von Mueller, visiting the Cobberas in 1853, speaks of Sphagnum Moss growing in the mountain valleys.

The Cobberas Range is in three main peaks, and from its commanding position gives a most extensive view of alpine summits and lofty ranges extending on all sides to the horizon. The day was fine, but a little hazy in the far distance. Nearly north, five miles distant, and marking the boundary-line of the State, was Forest Hill, 5,000 feet in height, yet dwarfed in apparent size, and seemingly merged in the lordly Pilot

(6,010 feet) just behind it. From its base springs the small stream called the Murray, which, uniting with the creek rising in the Cobberas, joins Limestone Creek, the main source and the longest of the contributory streams, whose waters form the Indi or Murray proper. Away behind the Pilot, over intervening lofty peaks and high plains, clearly rises Kosciusko, 25 miles distant, the culminating peak of the alpine system, the patches of snow on its slopes being distinctly visible. Slightly to the north-west the Gibbo Range is prominent, 5,764 feet in height. Nearly west Mount Misery is seen, and away beyond the ranges we had ridden over appeared Mount Wills, 5,758 feet, in front of the impressive Bogong Range (6,508 feet), which, although 40 miles away, shows where snowdrifts linger on its bosom. Eastward, across the Playground, stretch the ranges of the Snowy watershed, with the Monaro plateau beyond, whilst to the south-east are Black Mountain and the "Suggan Boggan" of Miss Marie Pitt's poem. Southwards, as everywhere, an endless succession of range upon range, peak on peak, to the bounds of vision. Silence and solitude brood over this vast panorama. A wild horse whinnies, a Lyre-bird calls, a Parrot shrieks, but in no direction is there sound or sign of human habitation. It is a singularly impressive scene of stern, rugged grandeur, but, under alternate sun and shadow, there is a shifting play of colour, while the deep purple of distant ranges, the light airiness and soft, fleecy whiteness of cloud masses drifting up from deep valleys, give ever-changing aspects. On a clear day the eye can discern the ocean at Twofold Bay, far to the east. There are few more widespread and imposing prospects of so wild and pristine a nature in Australia. Reluctantly we descended, and, resuming the saddle, rode down the eastern side of the Playground, diverging to obtain a nearer view of an imposing mountain escarpment known as Ram's Head; then, recrossing Native Dog Creek lower down, we passed over an outcrop of dark blue to black limestone or marble in contact with porphyry. Here our guide "called" the cattle at the creek until about a hundred had assembled from all sides, and a photograph was taken of the expectant herd. We reached camp safely, and, after tea, tried fishing for trout in the stream, but unsuccessfully.

(To be continued.)

PERSONAL.—Members will be pleased to know that Mr. H. B. Williamson, well known for his researches into Victorian botany, has been elected a fellow of the Linnean Society of London (F.L.S.)

CORRECTION.—In the April *Naturalist* the word "Farrangei" on page 135, and in index page v. and page vii. (errata), should read "Farragei."

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, 8th May, 1922.

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

REPORTS.

In the absence of Miss G. Nokes, who acted as leader, a report of the Easter excursion to Toolangi (13th–18th April) was given by Mr. A. E. Keep, who said that it had been a very enjoyable outing. Unfortunately, in the absence of recognized authorities in different branches of science, with the exception of lepidoptera, the results were not quite so definite as they might have been. The scenery, however, was of the best, the beauty of the ferns, beeches (myrtles), eucalypts, &c., being indescribable. A considerable amount of ground was covered during the four days, but owing to density of the vegetation the rambles had to be confined to tracks, more or less difficult to follow. The entomological member of the party was well satisfied with his captures, and proposed to say something about them at a later date.

A report of the excursion to Macedon on Saturday to Monday, 29th April to 1st May, was given by the leader, Mr. C. Daley, F.L.S., who reported an interesting outing. At the State Nursery the officer in charge, Mr. Stancliffe, had pointed out the many interesting trees, especially the exotic conifers, which, in many cases, form very fine specimens. He also gave a number of instructive details regarding them and the general working of the nursery. The party then proceeded to Messrs. Taylor and Sangster's nursery at Upper Macedon, where the rhododendrons, azaleas, hollies, and other trees and shrubs accustomed to higher elevations form such a feature of the collection. Lunch was then taken on the banks of Stony Creek, after which the tourist track was followed to the Camel's Hump. This was reached rather late in the afternoon, but just in time to get a view of the vast panorama visible from this well-known vantage point. Proceeding over the range for another mile, the farm-house at which accommodation had been arranged for was reached. Sunday was devoted to a visit to the Hanging Rock (Mount Diogenes), and later to the late Mr. M'Gregor's garden on the northern slope of Mount Macedon, where there is also a fine collection of trees suitable for high altitudes. Monday morning was spent in a ramble to the Divide near Hesket school, and in the afternoon walking, *via*

Braemar House, to Woodend, where the train was taken for home. Few flowers were noted, owing to the time of year, the physiography of the district forming the principal subject of interest.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Gwendoline Jones, Corowa, N.S.W., and Miss Ada Foster, Nareen, *via* Coleraine, were duly elected as country members of the Club.

GENERAL BUSINESS.

Messrs. G. Hooke and A. J. Tadgell were elected to audit the accounts for 1921–22.

Nominations of office-bearers for the year 1922–23 were then made.

Mr A. D. Hardy said that the Forests Commission had a number of surplus trees at the Macedon State Nursery which could be obtained at very moderate prices. A list had been prepared, and copies, giving the prices and other details, could be obtained from the secretary of the Forests Commission, Public Offices, Melbourne.

PAPER READ.

By Mr. H. W. Davey, F.E.S., entitled "The Introduction and Spread of Noxious Weeds."

The author pointed out the many ways by which weeds may be introduced and become dispersed through the country. He expressed himself as greatly averse to the introduction of fresh animals, birds, insects, or plants to a country, even as controls of pests already established, as nothing could be guaranteed as to what might become the habits of such introductions in new environments, instancing the Starling, which he considered one of the worst pests yet introduced.

The paper was attentively followed, and promoted considerable discussion, mostly in support of the author's contentions.

Mr H. B. Williamson, F.L.S., gave instances which had come under his notice at Geelong of the introduction of weeds by means of ships' ballast, and their subsequent spread over large areas.

Mr. E. E. Pescott, in the course of his remarks, supported the author's statement regarding the Starlings, which was combated by Miss R. Currie, who contended that the Starling is one of the farmer's best friends.

Mr. A. D. Hardy thought that Starlings preferred insect food, if available, to fruit, and believed that the Starling was often blamed for destruction which was really caused by the Blackbird—a bird he had found to be a greater nuisance. As an instance of the adaptability of introduced plants to circumstances, he mentioned the False Dandelion, *Hypochæris radicata*, which grows tender and juicy in the recesses of the Otway

Forest; short, stocky, and hard on the shores of Lake Colac; slender and wiry within the spray of the breakers on the south coast, in the Mallee, and on such heights as Macedon, St. Leonard, and Donna-buang.

Mr. J. Gabriel said that when the Club party visited the Kent Group, in Bass Strait, in November, 1890, he had been requested by the late Baron von Mueller to collect a specimen of every plant he could find. When the three hundred specimens were examined it was found that only 125 were endemic. He thought that Starlings generally were beneficial.

Mr. P. C. Morrison said that, when staying at Pakenham recently, there was a plague of grasshoppers, and, though many Starlings were about, they left the grasshoppers untouched and feasted on the fruit.

Mr. D. Best was afraid that members were apt to criticise without being sure of their facts. Had it been proved that some so-called pests—blackberries and St. John's Wort—were absolutely useless? Had any effort been made to turn them to some useful account, such as paper-making? The Broken Hill mines won their reputations as silver mines, but now the production of zinc far outweighed the silver mined. He thought that in course of time a use would be found for many of the things we now call "pests."

The author said he was glad to have the opportunity of replying, for he desired to emphasize what he had said about the Starling. This bird, while it did eat insects, also ate a good many other things, and in the Western District had developed a new taste—viz., a liking for wheat in the milk stage, and, in consequence of this, several hundred acres of crop had been destroyed this year. Near a certain country town they were wont to congregate in thousands for roosting purposes in some timber surrounding the town's water supply. He left it to the members to imagine what that water supply would become.

REMARKS ON EXHIBITS.

Mr. A. L. Scott drew attention to his exhibit of scoria, &c., from Mount Eden, which is one of a number of extinct volcanoes in the immediate neighbourhood of Auckland, N.Z. The cone and crater of this volcano are in excellent preservation. The cone is built up of scoria, and is about 300 feet high. The crater occupies practically the whole of the summit, and is of considerable diameter and depth. The rock is basanite, very similar to our common road-metal, bluestone or basalt, but is more basic—*i.e.*, less silica has been taken up in the minerals of which it is composed.

Mr. C. Oke drew attention to his exhibits of a dipterous fly and a mallophaga, Philapterus (sp. ?) under microscope. Both these insects were taken from a Laughing Jackass, *Dacelo gigas*,

which had been shot by some so-called "sports" and left to die. It was taken home by a gentleman and given a drink, but soon died, after which he had obtained it and examined it for parasites. He asked any members who might happen to come across dead or maimed birds to let either Mr. H. Clinton or himself have them to search for parasites. They wanted parasites, but would not kill birds to obtain them.

Mr F Chapman, A.L.S., drew attention to his exhibit of a fossil eucalyptus leaf, found by Mr. Wilfred Henty in the volcanic tuff of Mount Gambier, South Australia. The specimen was almost unique, as it belonged to a modern type of eucalypt—one with thin foliage and oblique venation The leaf probably became fossilized by being covered over by a wet volcanic dust shower that subsequently hardened into a cement, like the Roman trass. He referred in eulogistic terms to Dr. C. Fenner's paper on the locality, recently published in the *Proceedings of the Royal Society of South Australia*.

EXHIBITS.

By Mr F G. A. Barnard.—Living specimen of the Red-striped (poisonous) Spider, *Latrodectus scelio*. Some account of this spider will be found in the *Victorian Naturalist* for January, 1891 (vol. vii., p. 140).

By Mr. F. Chapman, A.L.S.—Photograph of a luminous fungus, photgraphed by its own light; fossil eucalyptus leaf in volcanic tuft, from Mount Gambier, on behalf of Wilfred Henty, Esq.

By Mr. C. Daley, B.A., F.L.S.—Dacite from Mount Macedon, solvsbergite from Hanging Rock, and limbergite from near Hesket.

By Mr. H. W. Davey, F.E.S.—Peripatus, from Kinglake, 4/5/22.

By Mr. C. Oke.—Mallophaga, Philapterus (sp. ?) and a dipterous fly, taken from a dead Laughing Jackass, *Dacelo gigas*.

By Mr. A. E. Rodda.—Growing specimens of Coral Fern and Screw Fern, from Moe Swamp; on behalf of Geological Survey of Victoria, crustacean fossils from Port Darwin, Northern Territory, and Moreton Bay, Queensland.

By Mr. A. L. Scott.—Scoria from Mount Eden, Auckland, New Zealand.

By Mr. L. Thorn.—Top and lower jaw of Bulldog Shark, *Cestracion phillipi*, commonly known as "Pig-fish", also two parasitic sea-leeches which were found attached to the under side of this Bulldog Shark, caught on 1st May, off Edith Vale, Port Phillip.

By Mr H. Whitmore.—Slate from Long Tunnel mine, Walhalla.

After the usual conversazione the meeting terminated.

WHERE THE MURRAY RISES.

By CHAS. DALEY, B.A., F.L.S., AND H. B. WILLIAMSON, F.L.S.

(*Read before the Field Naturalists' Club of Victoria, 13th Mar.*, 1922.)

(*Continued from page 12:*)

On the morrow we rode back to Benambra. Occasionally we had seen kangaroos in the forest, three dingoes had crossed our tracks, and we found rabbits widely distributed. On our way back we saw a Wedge-tailed Eagle carry off a rabbit to some distance, and we had an adventure with a large snake, which, placing itself in an aggressive attitude, disputed the right-of-way until disabled and killed. In the vicinity of Mount Pender our guide showed us an outcrop of mineralized stone containing traces of copper pyrites. These ranges may yet, when fully prospected, yield mineral wealth.

We rested at Benambra over the Sunday. Messrs. Williamson and Allen returned to Omeo on Monday. Mr. Hughes and I spent the day principally in examining the lake, on which we found evidences of three distinct beaches, one of them (on the eastern side) being marked by white nodular concretions. The lake gives evidence of having been dry for years, and water, if present in its shallow bed, would be the sport of the winds. A low range divides the lake from the Morass Creek valley on the north. Some years ago a project was favourably reported upon by which the water from Morass Creek, a permanent stream, could be diverted by channels and pass through a tunnel in the hills into Lake Omeo, in order to keep it permanently filled.

On Tuesday Mr. Hughes and I left Benambra, and, reaching Omeo, found that Messrs. Williamson and Allen had gone for the day to Cobungra in search of *Eucalyptus neglecta*. At 6 p.m. they returned in triumph with visible trophies of their success. They left for Bruthen early next day. Mr. Hughes and I left at 7 a.m. by coach on Thursday for Bright.* The road passes up the Livingstone towards the divergent track to Cassilis, then crosses the Livingstone at the Memorial Bridge. The great extent of the hydraulic workings in the past is very noticeable, the valley of the river being strewn with a mass of pebbles and boulders. The blackberry grows riotously luxuriant along the stream. Winding in and out, but always upward, the road leads over the slope of Mount Livingstone (4,007 feet). Quartz outcrops were noticed here and there in the country rock. At a little creek we passed the track connecting the Bright road with Cassilis, and were soon on the track to Cobungra, noted for the perennial richness of its

* [This portion of the trip is well illustrated in Mr. G. R. Broadbent's recent booklet, "Across the Alps."—ED. *Vict. Nat.*]

pastures. The old hotel is closed, and the only place with sign of residence is Riggall's fine cattle station. The cattle —Hereford, as usual—were fat and healthy. An Emu—the second we had seen—was grazing with the cattle.

Leaving the Victoria River, the road led upward through fairly thick timber, until a height of nearly 5,000 feet was reached. A stop was made for lunch at an improvised camp where horses are changed, near Mr. Sharp's homestead. Further on three separate parties were passed who were engaged in road mending or making on the area where the basaltic flow occurs which extends over the Cobungra and Dargo High Plains, a frequent though disconnected capping of the highest ranges, the residuum of the extensive lava-sheets of the Older Basalt era, in which probably, at the close of the Miocene period, the lava flowing down filled the ancient valleys, thus forming a great plateau of immense extent, which in the process of ages has by incessant and extensive denudation been resolved into the existing mountain and valley systems. Beneath this basalt on the Dargo High Plains fossil leaf-beds and impure lignites occur; and at the Cobungra mine auriferous river-gravels, conglomerates, clays, and sands have been worked successfully under the basalt. The soil is rich, springs and bogs are over-saturated with water, and the alpine vegetation under the Snow Gums is profuse and varied, Daisies and Asters, Everlastings, the Mountain Shaggy Peas, Euphrasias, Craspedias, Rice-flowers, and Stylidiums lending brightness and variety to larger plants forming the scrub vegetation of the higher altitudes. Coming near to the summit of Hotham an unequalled panorama is revealed on every side. Mount Hotham, or "Baldy," 6,100 feet in height, is a splendid vantage point, its deepest slope being towards the Dargo River. On the north side stretches the Kiewa River valley, north-east the Cobungra valley, and north-west is the Ovens valley. Seven miles distant is Mount Feathertop, whilst Mounts Loch and Fainter are prominent peaks, and about ten miles away are seen the lofty plains of mighty Begong. An interesting feature at the road-side near Mount Hotham is the presence of blocks of basalt, distinctly columnar in structure, pentagonal in form, and mostly about two feet long, concave at the one end and convex at the other. Some of these blocks are well preserved, others in various stages of decomposition towards the ultimate stage of clay. At one period these blocks, with others that have been disintegrated, were probably in their jointed structure one upon the other in organ-pipe formation, as in similar columnar basalt deposits seen elsewhere. Now, disjointed and overthrown, they are enriching the soil in their decay.

Just after passing round "Baldy," whilst looking at the

wonderful view past Razorback to Feathertop and down into the far depths of the valleys, around Feathertop swept fleecy cloud mists, which, filling the valley with their presence, rapidly rose before a rising wind, blotting out the landscape, and enveloping us so that we could see only about a dozen yards ahead. Then rain came, and our road around the south of Mount Smythe and along the western side of the fitly-named Mount Blowhard, where the road is narrow, and the descent on the valley side precipitously deep and dangerous, required in the circumstances our driver's most careful skill and attention. A pair of eagles perched on the edge of the road flew almost from under the horses' feet into the enveloping clouds. The view was completely obscured, and we were pleased indeed to see the Hospice nestling near the top of Mount St. Bernard. A hearty meal and a good fire warmed and cheered us. After tea, tempted by a fleeting glimpse of fine weather, we started out for further observation, but thick cloud and rain again came up and drove us back again. The rainfall at the Hospice is about 66 inches per annum.

In the morning we resumed our journey to Harrietville down the long, winding, but generally well-graded road. Although the weather was not propitious, we occasionally caught sight of the summit of Feathertop and other peaks whilst the mass of the mountain was invisible, and the timbered slopes and beautiful valleys were with us all the way. Approaching Harrietville, evidences of mining operations were seen in the tunnels in the sides of the mountains and the tailings heaps in some of the valleys. Harrietville is a pretty township on the Ovens. Beautiful trees grow in its streets and gardens. Here we found the devastation caused by dredging ever with us as we passed along the valley of the Ovens River, whose original beauty has been sadly marred by the operations. In addition, we soon noticed, all the way to Bright, the prevalence of that introduced curse, St. John's Wort, *Hypericum perforatum*, in full bloom, growing profusely everywhere—in good or bad soil, on valley or hill. Its eradication is a hopeless task. Another introduced plant growing with accelerated vigour is the Blackberry, *Rubus fruticosus*, choking the streams, strangling native vegetation, and harbouring rabbits and snakes. Nearing Bright, after passing mile after mile of the stone-strewn flats marking the dredges' destroying workings, we saw where, under the direction of the Forestry Department, laudable attempts were being made to hide, by tree-planting, the traces of the unsightly ravages which dredging has effected in this once beautiful valley. Quite a forest of healthy-looking conifers is growing over a considerable area. At another place the successful planting of Black Wattle on the denuded spaces

is observed. These are only oases in the desert of devastation, but worthy of repetition *ad infinitum* in the Ovens valley. In due course we reached Bright, in its picturesque and attractive surroundings. Here, as at Harrietville, lovely trees grow in the streets and gardens, walnut trees especially flourishing along the river flats.

Leaving Bright by train, we had a splendid view of the Buffalo Mountains, so popular a holiday resort, and we returned to the city carrying with us very pleasant recollections of the spaciousness, grandeur, and exhilaration of far-off mountain heights.

PART II.—BOTANICAL NOTES, BY H. B. WILLIAMSON, F.L.S.

Most of the shrubs along the picturesque Bruthen to Omeo road were past flowering. These would make a fine show about two months earlier. There were, however, a few, notably Long-leaf Lomatia, Kanooka, and Christmas Bush, which brightened the outlook with their white or yellow blooms. Occasionally, on the sides of the cuttings, the small-flowered Cockspur, *Plectranthus parviflorus*, displayed its pretty pale flowers. The Grey Mistletoe, *Loranthus quandang*, was frequent on the trees over the track, and the feathery fruits of Clematis decorated many bushes. The only Acacia seen in bloom was the Late Black Wattle, *A. mollissima*.

A ramble along the Livingstone Creek at Omeo soon showed the hopelessness of getting much of the original vegetation, owing to operations of the gold-seekers, who have repeatedly turned over the soil on both banks, and left little but clear gravel. Amongst this gravel, however, the rather rare Bush Clover, *Lespedeza cuneata*, was found, a plant reminding one of a whitish-flowered Cape Broom, dwarfed and unbranched. The curious, hard-spined Anchor Plant, *Discaria australis*, is common around Omeo, but fruit only was found. Variety *parviflora* of *Daviesia latifolia* is also plentiful, fruiting. This form has very small leaves, not undulate or reticulate as in the common form. A very luxuriant growth of Dusky Scurvy Pea, *Psoralea adscendens*, was noted in some of the small gullies. About a mile from Omeo, along the road to Bright, a patch of the Heraldic Scotch Thistle, *Onopordon acanthium*, with its white blankety tomentum, is a prominent feature. This has long been naturalized in Victoria, but apparently has not spread as other thistles have done. Tufted Knawell, *Scleranthus diander* can be seen on the edge of the old workings.

A walk along the Bright road for seven miles from Omeo, rising some 1,500 feet, was of interest, some fine views of the town and its surroundings being obtained. Growing in association were three leafless santalaceous plants—Pale-fruited

Ballart, *Exocarpus stricta*, Leafless Sour-bush, *Omphacomeria acerba*, and Dwarf Sour-bush, *Choretrum lateriflorum*, the two first-named being in fruit, and the last bearing small white flowers. The Rock Isotoma, *I. axillaris*, and flowering shrubs of Indigo, Showy Guinea-flower, and Curved Rice-flower, *Pimelea curviflora*, var. *alpina*, were frequent, the last-named being a much-branched shrub, up to three feet. Small-fruited Hakea, *H. microcarpa* was common, but I failed to find flat leaves on any of the bushes.

About seven miles from Omeo the poles of the electric line which once supplied Cassilis mine with current are still standing, and, along this, up some 500 yards, a patch of Woollybutt has been exploited for its excellent timber. This tree is *Eucalyptus Sieberiana*, the Silvertop of our "Census," which records *E. longifolia* as Woollybutt, a rare Victorian tree found only in the extreme south-east.

On the dry bed of Lake Omeo, at Benambra, little vegetation was to be seen, the only flower gathered being the Rosy Pelargonium, *P. Rodneyanum*, in a much-stunted state. On a dry sheep-grazed hill near the town were the Silverweed Lily, *Laxmannia gracilis*, and Variable Tic-trefoil, *Desmodium varians*.

Morass Creek, a strip of dark green, winds through the plateau, and consists of thickly-matted water-plants on which one could almost walk with a device like snow-shoes. Besides the common water-weeds—among which Purple Loosestrife and Pink Knotweed relieved the dark green—there grew the Floating Marshwort, *Limnanthemum geminatum*, with fringed yellow flowers. At the water's edge, also, two rare daisies were gathered—*Brachycome radicans* and *B. angustifolia*. In the Herbarium are specimens of both these, gathered in this locality by Baron von Mueller in 1853.

On "The Brothers," near Benambra, the only plants of interest found were the Mountain Gentian, *G. saxosa*, Mountain Cudweed, *Gnaphalium alpigenum*, Turquoise Berry, *Drymophila cyanocarpa*, and Pennywort Azorella, *A. Muelleri*. The last-named was in leaf only. On a creek seven miles north-east of Benambra, *Baeckea Gunniana*, in bloom, revealed itself by its strong perfume, and a few plants of *Epacris longiflora*, Fuchsia Heath, were noted without blooms.

From Benambra to Limestone Creek the forest consisted chiefly of Snow Gums, Black Sallee, *E. stellulata*, Broad-leaved Peppermint, *E. dives*, and Candlebark, *E. rubida*. There were patches of Swamp Gum and Narrow-leaved Peppermint and Woollybutt. The alluvial, rabbit-infested, grassy flats of Limestone Creek presented in some parts large patches of Alpine Didiscus, *D. humilis*, which appeared to be the only

plant that had successfully defied the rabbits, and which covered the flats with a carpet of white. Other plants peculiar to the North-East were *Pimelea pauciflora* and *Juncus falcatus*. At the Marble Quarries were seen some fine bushes of Alpine Aster, *Olearia alpicola*, and the Large-leaved Aster, *O. megalophylla*, was abundant along the stony track to the Cobberas. This track in places led through open grassy plains, and on the way many alpine plants, such as are common on the Buffalo Plateau, were gathered. A rare Pultenæa, *P. fasciculata*, was gathered here. Specimens of this plant have apparently not been sent to our Herbarium since Mueller brought it from the Cobberas in 1853. Austral Cord-rush, *Restio australis*, is common here, and was reported by our guide as causing much trouble to horses that nibbled it, by becoming fixed between their teeth.

After leaving our horses, the climb to the summit of the Cobberas was, from the botanist's point of view, the most interesting part of the trip. The way led up through weirdly gnarled and stunted Snow Gums, among beautiful bushes of Derwent Speedwell, *Veronica Derwentia*, Large-leaved Aster, Rosemary Everlasting, and Tasman Flax Lily, *Dianella Tasmanica*. Here and there were matted clumps of the alpine form of White Purslane, *Claytonia australasica*, which grew in the damp hollows, and on the rocky ledges Snow Daisies, *Brachycome nivalis*, and Silver Asters, *Celmisia*, attracted the attention. At the summit the Snow Gums presented some remarkably gnarled and deformed shapes, and attained a girth of 15 feet, though scarcely exceeding that in height. Under these stunted trees there was a thick growth of Tussock-grass, *Poa cæspitosa*, and Coarse Bent-grass, *Calamagrostis rudis*, interspersed with bushes of the lovely Alpine Mint-bush, *Prostanthera cuneata*, and an Alpine Aster, *Olearia subrepanda*, once considered as a form of *Aster stellulatus*. The curious alpine umbelliferous plants, *Aciphylla simplicicaulis* and *A. glacialis*, grew in abundance, especially the latter, the dense masses of which, with their heads of creamy flowers, were really beautiful. Sweet Holy-grass, *Hierachloë redolens*, with its panicles of shining golden spikelets, grew sparingly at the summit. Other alpine plants seen in bloom were Alpine Phebalium, *P. podocarpoides*, Violet Fleabane, *Erigeron pappochromus*, Mountain Shaggy-Pea, *Oxylobium alpestre*, Leafy Bossea, *Bossiæa foliosa* (many plants with ripe fruits, one only in full bloom), Alpine Rice-flower, *Pimelea alpina*, Pine Bottle-brush, *Callistemon pityoides*, Long Podolepis, *P. longipedata*, Mountain Mirbelia, *M. oxyloboides*, Thyme Heath, *Epacris serpyllifolia*, and Mountain Plum Pine, *Podocarpus alpina*. Many other plants which bloom near Melbourne in October

were here seen at their best—Fringe-lilies, Chocolate-lilies, Myosotis, Stackhousias, Indigo, Pimeleas, Buttercups, Violets, Flax, Trigger-plants, Billy Buttons, Bluebells, Veronicas—and one could not fail to be struck with the wonderful brightness of colouring these flowers display in high altitudes—so much so that one has sometimes failed to recognize an old friend when presented in a more showy dress.

Having a spare day at Omeo, I determined to try to reach the rare *Eucalyptus neglecta* of Maiden, which had been reported from the "head of the Livingstone Creek, 20 miles from Omeo." Hearing from a scrub-cutter I chanced to meet that a curious kind of gum-tree grew near his camp on the Cobungra estate, I arranged with a resident, who agreed to drive me to within a mile or two of the camp, about 18 miles out. Accompanied by the youngest of our party, Mr. Allen, who, by the way, is a keen observer of the plants, and helped materially in the collecting, I found the object of my inquiries growing on Spring Creek, Cobungra, and gathered a good supply—evidently the first specimens brought to Melbourne since Howitt sent a few scraps in 1882. It grows so densely along the creek that even a wallaby has difficulty in making its way through it. Our "Census" gives the vernacular "Neglected Gum," but I would suggest, as more appropriate, "Omeo Gum." At the same locality we gathered some very fine mushrooms about six inches across, which were remarkable for their regular and uniform shape.

Orchids.—Four only were met with—*Dipodium punctatum*, at Omeo; *Chiloglottis Gunnii*, at "The Brothers"; *Pterostylis alpina*, at Cobungra; and a Caladenia, probably an alpine form of *C. carnea*, on Cobberas.

Ferns.—Three only were seen—*Blechnum penna-marina* (*Lomaria alpina*), at Cobungra, under *Eucalyptus neglecta*: *Asplenium trichomanes*, among rocks at Limestone Creek; and the common *Aspidium aculeatum* at the summit of Cobberas.

Birds.—With the assistance of Mr. Hughes I am able to record 43 species. Wonga Pigeons were heard frequently, and three or four were seen, one of which allowed us to approach near enough to get a fine view of the bird. Of Honey-eaters, the White-naped, the White-plumed, the two Wattle-birds, and the Friar-bird were seen. On the high grassy plains Spur-wing Plover were numerous, and on Morass Creek, at Benambra, Coot, Black Duck, Teal, and Swan were noted. Bald Coot waded along the edge, and a few of the beautiful Sheldrake (Mountain Duck) rose from near by. On a road cutting 1,500 feet above the town of Omeo, early in the morning, we watched a pair of Gang-Gang Cockatoos at their morning meal

of Silver Wattle seeds. They fed unconcernedly 20 or 30 feet away from us. Eagles were very numerous, and one which I followed dropped the rabbit it was carrying, and watched me from a short distance as I examined its catch. A Satin Fly-catcher entertained us by an exhibition of fly-eating, its meal being apparently a dragon-fly, which it appeared to have deprived of its wings. It seemed a great meal for so small a bird. Grey Bell-Magpies and White-winged Choughs flew around us, uttering their harsh croaks or mournful whistles. Fantails (two), Cuckoo-Shrikes, Blue Wrens, and Wood-Swallows were frequently met with, while Crimson Parrots and Rosellas seemed anxious for us to notice them. The birds we heard but did not see were Bronze-wing Pigeons, Lyre-birds, Frogmouths, Boobook Owls, Bronze and Pallid Cuckoos, and the Oriole.

A.A.A.S.—The report of the fifteenth meeting of the Australasian Association for the Advancement of Science, held in Melbourne in January, 1921, has been issued. Unfortunately, the funds available only sufficed for printing the presidential addresses in the different sections, the papers read being listed under their titles, with references to where they have been or will be published. This curtailment is greatly to be regretted, but was inevitable owing to the high cost of printing.

"CRITICAL REVISION OF THE EUCALYPTS."—The recently-issued parts (52 and 53) of this valuable work by Mr. J. H. Maiden, I.S.O., F.R.S., Government Botanist of New South Wales, advance the total number of species of Eucalyptus described to 309. Among the latest is *E. Studleyensis*, described from a tree observed by Mr. A. D. Hardy in Studley Park, Kew. It is, however, regarded by Mr. Maiden as a hybrid, and is perhaps a unique specimen. The listing of species is now nearing completion, the author expecting to reach 350 with the final description. In recent parts considerable space has been devoted to comparisons of the growing tree, bark, timber, &c., and the vexed question of hybridization is now being considered, with the result that Mr. Maiden is of opinion that hybrid eucalypts have undoubtedly been found in various parts of Australia, while artificial hybrids have been raised by Mr. C. J. Weston, Afforestation Officer, Federal Territory, Canberra. Accidental hybrids have been recorded from Algerian plantations of eucalypts. Among those which have been named as species, but which may prove to be hybrids, are *E. calophylla*, *E. Considenana*, *E. Kitsoniana*, and *E. neglecta*. The last-named is referred to by Mr. Williamson on the preceding page.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The forty-second annual meeting of the Club was held at the Royal Society's Hall on Monday evening, 12th June, 1922.

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

CORRESPONDENCE.

From Mr. J. A. Kershaw, F.E.S., thanking members for again nominating him for office on the committee, and saying that, as he had held office for more than twenty-five years as secretary, vice-president, president, or member of committee, he considered it time he stood aside and made room for a younger member.

On the motion of Messrs. Oke and Hardy, it was resolved to ask Mr. Kershaw to allow his nomination to stand.

REPORTS.

In the absence of the leader, Mr. J. A. Kershaw, F.E.S., Mr. C. Daley, F.L.S., gave a short account of the visit to the National Museum on Saturday, 13th May, when there was a good attendance of members. Mr. Kershaw invited the party to follow him to the bird room, where a large number of bird-skins were displayed for examination. After some general remarks about birds, illustrated by references to the skins displayed, he explained the anatomy of a bird's wing by means of a mounted skeletal wing. Some time was then given to the "H. L. White Collection" of Australian bird-skins, after which a visit was paid to the insect room, where a number of drawers of butterflies and beetles were examined. Altogether, a very interesting two hours or so was spent at the Museum, which, considering the limited staff, is in a high state of efficiency.

A report of the excursion to Evelyn on Monday, 5th June (King's Birthday), was given by one of the leaders, Mr. C. Oke (his co-leader, Mr. C. L. Barrett, C.M.Z.S., being unable to be present at the excursion owing to ill-health). Considering the time of year (midwinter), the attendance was very satisfactory, nearly forty being present. The party walked along the now disused Lilydale water-race towards Wandin as far as the cascades on the Olinda Creek, returning to the station by the Wandin road. Though there is a wealth of shrubbery, &c., along the creek, flowers (excepting the native heath) were scarce. A number of insects, spiders, &c., were also collected,

and will form the basis of further remarks on a later date. Some of the party continued their walk to Lilydale, rejoining the train there.

ELECTION OF MEMBERS.

On a ballot being taken, Miss C. Morres, Thanet-street, Malvern, and Mr. Albert Bishop, 8 Dudley-street, East Caulfield, were elected ordinary members, and Mr. W. C. Tonge, Eltham, as a country member of the Club.

ANNUAL REPORT.

The hon. secretary, Mr. C. Oke, read the forty-second annual report for the year 1921–2, which was as follows:—

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

"Ladies and Gentlemen,—In presenting the forty-second annual report of the Club for the year ended 30th April, 1922, your committee desires to thank members for their hearty support, and to congratulate them on the successful results attained, during the past twelve months.

"Commencing the year with 259 members and associates on the rolls, there were elected 27 ordinary, 4 country, and 3 associate members. Deaths numbered 5, and resignations 6, leaving a membership of 282. It is with regret we have to record the deaths of several well-known members. In July there occurred the deaths of Mr. J. P. M'Lennan, of the Burnley Horticultural Gardens, and Mr. E. H. Lees, C.E., F.R.A.S., of Mallacoota. In October Dr. Drake, of Beaconsfield, died, and during January Mr. F. Smith, of Noorat, and Mr. H. Young, of Meredith, passed away. To the relatives and friends the Club offers its deepest sympathy in their loss.

"The monthly meetings have been held regularly, with an average attendance of between 60 and 70 members and friends. Fourteen papers have been read and one lecture given during the year, and these, together with the discussions that have followed, have proved very entertaining and instructive. Such diverse subjects as anthropology (2), botany (6), entomology (3), geology (1), and physiography (2) have been successfully treated. The following papers and lectures have been delivered:—In May—'Some Aboriginal Stone Implements,' by Dr. G. Horne, V.D.; in June—'A Description of a New Trymalium,' by Mr. J. W. Audas, F.L.S.; in July—'An Entomologist in Southern Queensland,' by Mr. F. E. Wilson; in August—'The Gippsland Lakes Country: the Physiographical Features,' by Mr. T. S. Hart, M.A., and 'A Day's Beetle-Hunting at the Lerderderg,' by Mr. C. Oke; in September—'Forestry,' by Mr Owen Jones. In October a Mueller Com-

memoration Night was held, it being the twenty-fifth anniversary of the death of Baron Sir F. von Mueller, K.C.M.G., when three papers were given dealing with the various aspects of his life and work. These were:—(*a*) 'A Sketch of Mueller's Life,' by Mr. C. Daley, B.A., F.L.S.; (*b*) 'Mueller's Published Works,' by Mr. E. E. Pescott, F.L.S.; (*c*) 'Mueller's Botanical Exploration of Victoria,' by Mr. F. G. A. Barnard. In November—'Notes from the Mallee: Botany,' by Mr. H. B. Williamson; in December—'A Further Contribution to the Alpine Flora of Victoria,' by Mr. A. J. Tadgell, and 'Notes on the Caper Butterfly,' by Mr. C. J. Cole; in January—'Notes on the Geology of the Mallee,' by Mr. F. Chapman, A.L.S.; in February—'Notes from the National Herbarium,' by Messrs. J. Tovey and F. P. Morris; in March—'A Trip to the Sources of the Murray River,' by Messrs. C. Daley, B.A., F.L.S., and H. B. Williamson; in April—'Aboriginal Scrapers,' by Dr. G. Horne, V.D. Most of the papers read have appeared in the Club's journal.

"The excursions of the Club have been well maintained during the year, the popularity of these outings being evident by the numbers who have attended them, and who, it is to be hoped, have derived both profit and pleasure, which combined constitute knowledge. Reports of excursions do not, as a rule, contain much, if any, evidence of actual observation done in the field, which is much to be regretted, for it is only by so doing that we can hope to live up to our name—field naturalists. A number of excursions have been made on Saturday afternoons to places of interest around the metropolis, while whole-day trips have been made to the following places:—Werribee Gorge, Paradise, Healesville, You Yangs, Frankston, Tooradin, Warragul, and Belgrave, and trips of longer duration to Bendigo, Walhalla, and Toolangi.

"In June last this Club, in conjunction with the Microscopical Society, held an exhibition of natural history specimens in the Melbourne Town Hall. This was opened by His Excellency the Earl of Stradbroke, who expressed his delight at finding that Melbourne had enough people with a scientific inclination to hold such a fine exhibition. The financial result of this exhibition was the addition of £23 to the Club's funds, the Microscopical Society receiving an equal amount. The committee desire to thank all those who gave of their time so freely and worked so well to make this exhibition the success it was, and would like to particularly thank Miss Gabriel and ladies for attending to the refreshments.

"The annual exhibition of wild-flowers was held in the Athenæum Hall on Tuesday, 27th September, and was opened by Her Excellency the Countess of Stradbroke. The Club

was again unfortunate in having to hold its flower show, for the second year in succession, in a small hall, but expects to be in a better position in future. To all those who helped so heartily in making this event the great success it was the committee extends its very best thanks, and more particularly to the ladies, who did such good work. By this exhibition £50 was added to the Club funds, which must be considered very good indeed.

"The Plant Names Committee is still pursuing its labours, and has nearly completed the work of revising the vernacular names. The task has been more difficult than the ordinary member would think, and the question of deciding what form the publication should take has required considerable thought. However, with £150 in hand for publishing, there should now be no difficulty in securing a publisher as soon as the final revision is completed.

"The thirty-eighth volume of the Club's journal, the *Victorian Naturalist*, has been published, and, under the able editorship of Mr. F. G. A. Barnard, still holds a prominent place among kindred publications. That it is favourably regarded in other countries is shown by the frequent requests that are received to exchange with kindred societies and institutions. Your Committee desires to place on record its appreciation of the untiring devotion to the work of producing the Club's journal displayed by its honorary editor for so many years.

"To Mr. P. R. H. St. John, who has had charge of the Club's library for some considerable time, the committee would extend its very best thanks for the capable way in which he has carried out the duties.

"Another office-bearer who has served the Club well is Mr. F. Pitcher, to whom all are deeply indebted for the very thorough and painstaking way in which he has kept the accounts.

"The finances of the Club are once more in a sound position, and this despite the high cost of printing, postage, &c. The treasurer's report shows that we have a credit balance of £219 4s. 11d. in our ordinary account, besides £150 set aside for the printing of the 'Plant Names List.'

"In conclusion, your committee desire to express their thanks to members generally for their loyalty and assistance in carrying on the work of the Club, and trust they will extend it to the incoming committee.

"On behalf of the Committee,

"F. CHAPMAN, *President.*

"CHARLES ORE, *Hon. Sec.*

"Melbourne, *12th June*, 1922."

The reception of the report having been carried, it was moved by Mr. E. E. Pescott, F.L.S., and seconded by Mr. G. Coghill, that the report be adopted, the latter remarking on the continued success of the Club and its growing popularity. The motion, on being put, was carried unanimously.

FINANCIAL STATEMENT.

The hon. treasurer (Mr. F. Pitcher) presented the financial statement for 1921–2, which was as follows:—

RECEIPTS.

To Balance, 30th April, 1921				£32 19 10
,, Subscriptions—				
Ordinary Members	£123 9 0			
Country Members	34 0 6			
Associate Members	3 2 6			
	£160 12 0*			
,, *Victorian Naturalist*—				
Subscriptions and Sales	10 9 6			
Advertisements	3 0 0			
Reprints	2 17 10			
	16 7 4			
,, Sales of Badges	1 6 3			
,, Donations—				
Publishing Fund	13 17 6			
,, Interest—Savings Bank and War Loan	7 12 8			
,, Discount	0 0 8			
			199 16 5	
,, June Exhibition—				
Admissions	67 19 0			
Donation	0 10 0			
Sales of Plants and Flowers	19 3 3			
Refreshments	14 0 0			
Refund by Microscopical Society	2 8 0			
			95 0 3	
,, Wild-flower Exhibition—				
Admissions	138 8 0			
Sales of Plants and Flowers	42 14 1			
Refreshments	14 8 0			
			195 10 1	
			£523 6 7	

* Subscriptions:—Arrears, £19; 1921–2, £132 17s.; advance, £8 15s.—total, £160 12s.

EXPENDITURE.

By *Victorian Naturalist*—			
Printing	£122 15 5		
Illustrating	7 10 11		
Free Reprints	8 2 8		
Reprints Charged	2 8 4		
	£140 17 4		
,, *Victorian Naturalist*—			
Wrapping and Posting	19 3 5		
,, Rooms—Rent and Attendance	13 10 0		
Carried forward	£173 10 9		

Brought forward			£173	10	9
By Library—					
Periodicals	£2	5 0			
Insurance	0	7 0			
			2	12	0
,, Hire of Lantern			3	0	0
,, Printing			16	5	6
,, Postages, &c.			7	0	6
					£202 8 9
,, June Exhibition—					
Hall and Attendance, &c.			17	10	4*
Printing and Advertising			7	10	6
Purchase Flowers and Plants			4	4	10
Microscopical Society—Part Proceeds ..			25	1	10
					54 7 6
,, Wild-flower Exhibition—					
Hall and Attendance, &c.			24	16	9
Printing and Advertising			8	2	0
Purchase of Flowers and Plants			12	4	8
					45 3 5
,, Deposit on Rent of Hall for June Exhibition, 1922					2 2 0
					304 1 8
,, Deposit in Savings Bank			175	0	0
,, Balance in Savings Bank			37	12	8
,, Balance in London Bank			6	12	3
					219 4 11
					£523 6 7

* Rent of hall, £18, included in previous balance-sheet.

F. PITCHER, *Hon. Treasurer.*

23rd May, 1922.

Audited and found correct.

ALFRED J. TADGELL,
A. G. HOOKE, } *Auditors.*

23rd May, 1922.

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

ASSETS.

Balance Savings Bank and London Bank ..	£219	4	11
War Loan Bond	20	0	0
Arrears of Subscriptions (£60), say	30	0	0
Badges on hand	1	17	6
Library and Furniture (Insurance Value) ..	150	0	0
Deposit in Savings Bank for Plant Names Publication	150	0	0
	£571	2	5

LIABILITIES.

Subscriptions paid in advance	£8	15	0
Donation to Char-a-banc Excursion Fund ..	10	0	0
Deposit for Plant Names Publication	150	0	0
	£168	15	0

On the motion of Messrs. E. E. Pescott, F.L.S., and G. Coghill, the statements were received and adopted.

ELECTION OF OFFICE-BEARERS.

On a ballot being taken for the position of president, Mr. C. Daley, B.A., F.L.S., was duly elected; for two vice-presidents, Messrs. F. Chapman, A.L.S., and E. E. Pescott, F.L.S., were elected. The following office-bearers, being the only nominations, were declared duly elected:—Hon. treasurer, Mr. F. Pitcher; hon. librarian, Mr. P. R. H. St. John; hon. editor, Mr. F. G. A. Barnard; hon. secretary, Mr. C. Oke; hon. assistant secretary and librarian, Mr. H. B. Williamson.

On a ballot being taken for five members of committee, Messrs. C. L. Barrett, C.M.Z.S., J. Gabriel, J. Searle, C. S. Sutton, M.B., and A. J. Tadgell were duly elected.

A vote of thanks to the auditors was carried by acclamation, on the motion of Messrs. Pescott and Daley.

On the motion of Messrs. G. Coghill and A. D. Hardy, a hearty vote of thanks was accorded to the past office-bearers.

The newly-elected president, Mr. C. Daley, B.A., F.L.S., returned thanks for the honour done him.

PRESIDENTIAL ADDRESS.

The retiring president, Mr. F. Chapman, then delivered a presidential address, which was as follows:—

DEAR FELLOW-MEMBERS,—

In addressing you to-night, at the close of this year's very pleasant association, I would like to congratulate you as a Club in having so many indefatigable workers among its members, helping so largely to keep the society in the forefront with similar institutions. My own personal debt to the Club is very great, especially in regard to the valuable insight into Australian outdoor life since when, twenty years ago, as a new chum, I first joined in the excursions.

Perhaps one of the hardest tasks the committee has to undertake is the framing of the excursions programme. But this work is always very much facilitated when members notify the secretary of any interesting observation grounds or spots newly opened that may afford something for study in any of the subjects which come within the scope of the Club. An important point to bear in mind in any field club is the endeavour to maintain the balance of the various branches. So that no one section should unduly predominate, it might be worth arranging for a quarterly programme—a method which works very well in other societies. Certainly things have improved since the time when our former president, Dr.

T. S. Hall, remarked that "Once the members were all for orchids; later on there was an attack of microscopic fever; and now the air is full of feathers."

In a club such as ours papers submitted for reading should not be too technical. It was a famous French mathematician and physicist who said that "no discovery was really important or properly understood by its author unless and until he could explain it to the first man he met in the street." The popularization of science works both ways. It helps the scientist to clarify his own knowledge, and at the same time enables the uninitiated to enjoy that which he has some right to. And moreover, when the movement begins to revolve in a virtuous circle, the man in the street may be so well informed as to vote for a political head which will respond to the demands for the proper recognition of science. To be popularly scientific does not imply the use of loose or inaccurate terms, nor does it allow any slipshod description. It is enough to quote the names of Professors J. Arthur Thomson, L. C. Miall, and Sir E. Ray Lankester, and of Drs. Alfred Russel Wallace and A. E. Shipley, to show that scientific accuracy and clear popular exposition can legitimately join hands; and so the uninitiated but interested followers of science can share in the wondrous secrets of earth, air, and sea.

On these lines the committee are now intending to introduce, periodically, descriptive papers on common Victorian natural history subjects, and one of these will shortly be given on "Marine Worms." Other subjects that suggest themselves might be on "Spiders and Their Webs," "Common Volcanic Rocks," "Shells in Shore Sand," "Environment of Caterpillars and their Choice of Food Plants," "Snakes and Lizards," "Stones of the Street," "Birds in Relation to the Farmer and Orchardist," "Plant Association."

One good result sometimes accruing from the work of a field club is the discovery of an occasional enthusiast who desires to take up some branch of nature study. Many of our older members would be only too pleased to put these young recruits in the way of future work and to further their studies, for they recognize the possibility of a latent Darwin coming to light in the natural history club.

Many of our common marine objects still require elucidation in the hands of workers who will devote themselves to steady observation and research. In this connection one might point out that the important groups of the Ostracoda, the Foraminifera, and the Polyzoa are still wanting some more earnest students, and in regard to the two first-named sections I would be only too glad to further their work in reference to literature and technique. When a request for special work

is made, one often hears the reply, "I am too busy." Yet I call to mind how my old friend Joseph Wright, of Belfast, in the midst of a busy life as a city grocer, found time to do a vast amount of work on the Irish Foraminifera, both fossil and recent. A waiter in a hotel at Deal, a fashionable watering-place in Kent, in the midst of a strenuous calling, excelled in the preparation and mounting of seaweeds as microscopic objects. W. H. Shrubsole, of Sheppey, England, was a high authority on the fossils of the London clay, and discovered the pyritized diatoms in the Eocene of his local clay beds. I remember calling upon him during business hours at his grocer's shop and enjoying a five minutes' chat upon microscopic fossils. As if the grocery line is conducive to nature study, let me cite another enthusiast, Benjamin Harrison, of Ightham, in Kent. He it was who discovered and explored the subject of the "Old Brownies," the eoliths of the South Downs, which are now accepted by nearly all anthropologists as veritable artefacts. Our late friend and fellow-member Mr. J. H. Young, whilst following the occupation of farmer and grazier, found time to do much good work in palæontological discovery, which will hand his name down to future generations as that of a particularly gifted collector of small and often obscure fossil forms.

As a corollary of this medley of observation of a domestic character, I would like to impress on members, and especially the younger ones, the value of taking notes. Time and again all of us have come upon certain phases of life—curious incidents and strange occurrences in the field—but they soon pass from mind. Once cultivate the advice of Captain Cuttle—"When found make a note of"—and the habit will prove of the greatest value as the years go on.

And now, may I give you some observations and musings written down this year whilst on holiday at Torquay, which I entitle

"'Twixt Bass Strait and Southern Ocean."

In the dimly remote past the shore-line which bounds sea and land was ordained to be the wrestling-ground for all living things, and so it has, in a measure, continued to the present time. Perhaps it is this ancestral relationship which exerts upon some of us a magnetic attraction towards our primeval dwelling-place of shore and cliff. Here we find the adjustment-line of crumbling crag and consolidating sea-bed. The rocky framework, conforming to natural laws, exhibits many lines of beauty, and no more entrancing picture can be imagined than a glimpse of the ocean,

"Purple with white crest blended."

through a naturally-formed rock-arch, or framed between cliff and jutting rock-stack. (See plate i.)

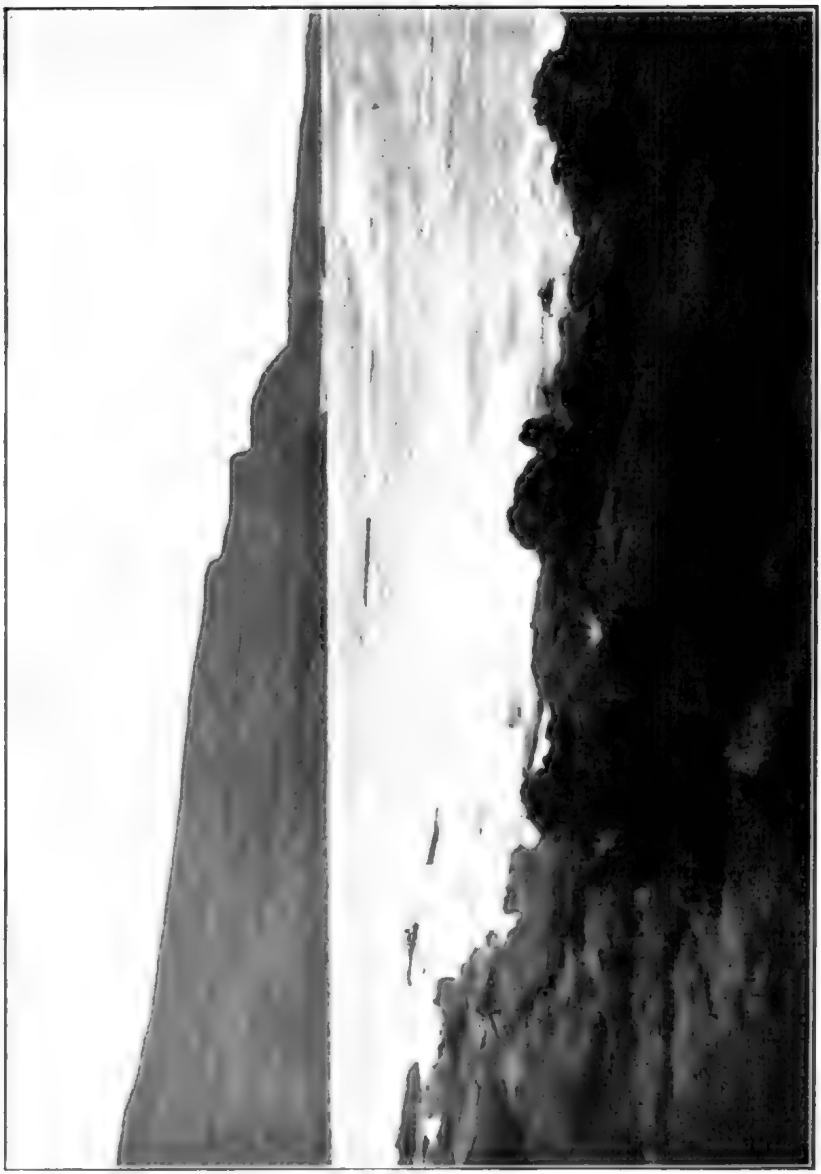
Chesterton says "the most beautiful part of every picture is the frame." The so-called "boundless sea," from the onlooker's point of view, seems to be held in by a partial framework of shore-line, and the picture of the ever-changeful ocean is certainly enhanced by its setting. The fringing sandy beaches, in turn, are followed by a line of frowning headlands and beetling cliffs, which are suggestive both of power and repose; and these by undulating dunes, which, with their graceful lines, form another part of this framework. Much of the beauty of this seaboard of the Southern Ocean lies in its diversity of sculpture and coloured inlays, which, like a well-chosen frame, sets off the picture it surrounds.

Alternations of Coastal Levels.

One of the contributing factors of the wonderful scenery of many parts of the Victorian coast-line is the instability of the coastal rock-formations, whether granite bluff, limestone headland, or marly cliff. But if Nature takes with one hand she liberally disburses with the other, and the see-saw principle of geological action—or, in other words, the compensatory movements of the heaving bosom of Mother Earth—is clear to all who have studied the rudiments of geology. Should a boring be put down in an estuarine country in order to test for a solid foundation, say for bridge-building, the chances are that one would encounter vast thicknesses of mud, sands, and pebbles which have been originally laid down near to sea-level. Why are these shallow-water muds and sands now found at such great depths?—such, for example, as the old river muds of the Mitchell and Nicholson Rivers, which, in the latter case, were penetrated when pile-driving for the railway bridges. The only possible explanation is supplied by the conception of a mobile earth-crust which will give way or sag down on being overloaded—in this case by river sediment. Such downward movement is often followed by periodic lava-flows until equilibrium is again established. Much the same thing takes place when the distracted cook allows the fruit-juice to boil over the pie-crust. In the geological event the weight and friction caused by the slipping of the earth's crust is the cause of the boiling-over of volcanic lavas. When one part of the coast subsides it is only natural to expect that other parts will be elevated, owing to earth waves induced by lateral pressure. And thus one portion of the coast-line, and sometimes the land-surface behind, will rise, whilst the adjacent part will sink, even below the sea-level. In one case we may have a submerged river delta on which the sea encroaches, as in Port

F. C. *Photo.* BIRD ROCK AND CLIFFS.—WHERE CLIFF AND DUNE MEET.

PLATE II.



S.W. OF BIRD ROCK.—AN UPRAISED SEA-BED.

F. C. Photo.

Phillip Bay, and in the other headlands, rolling downs, and high cliffs, such as we may notice along the eastern side of the Otway coast as far as Torquay—that particular part of Victoria which has suggested the remarks that follow.

Coastal Folds and Convulsions.

As we

"Saw the great rollers sunder,
Rainbow-wreathed, at our feet;
Heard, with a ceaseless thunder,
'Earth and the ocean meet,"

how few of us realized that the old sea-bed has risen along the coast-line like a huge leviathan from the vasty deep! From Cape Otway to the Bird Rock cliffs, south of Torquay, this emergence is seen in the beetling cliffs, some 150 to 200 feet high. That some of this upheaval, together with local faulting, has taken place within moderately recent times is proved by the following observations:—At Jan Juc Creek there is a sand-bar at the mouth, which in February, 1922, was 7 feet above high-water mark. Forty feet above this is found a covering over the beds higher up the creek, of late Pliocene ironstone gravel. This was probably laid down in the Kosciuskean period, when the land was undergoing peneplanation. Now, at Bird Rock cliffs, 50 or 60 chains to the south-west, the same ironstone gravel occurs at the summit, 150 feet above high-water mark, showing an uplift by both faulting and folding of over 100 feet. (See plate ii.)

At Airey's Inlet there is the old Miocene bed, formed of the remains of sea-urchins, sea-mats, and shells embedded in sandrock, and now elevated as an upraised deep-sea formation. The carbonaceous beds of Anglesea show how near to a lignite these sediments approach. Here the higher beds of the cliff contain some evidence of coast-line conditions, for they practically oscillate between a marine and a terrestrial series; some of the layers of chocolate clay contain branching, stem-like markings picked out in salts of iron, and often of a bright sulphur-yellow colour.

In the Mallee these basement beds have been found to be either of the nature of lignite or to consist of carbonaceous sands. The Moorlands lignite field in South Australia, near the Victorian border, is due to accumulated vegetation laid down at this stage. Extensive boring in the Mallee and the Riverina may yet reveal payable deposits, for there the conditions are similar. These beds would be younger than that of the coalfield of Coorabbin, New South Wales, which appears to belong to the same horizon as the Collie field in Western Australia.

Proceeding towards Point Addis, the beds, owing to an

arched fold, are succeeded by a polyzoal and sea-urchin-filled limestone. Towards Torquay a strong anticlinal or arch fold occurs, where these Miocene polyzoal rocks are bent over the top of the cliff, and so, gradually passing down to tide level, finally disappear. These are followed farther along by quite recent sand-dunes. And thus we reach this area of subsidence, a base-levelled and sinking country, which is in places

"A boggy Syrtis—neither sea
Nor good dry land."

At intervals it continues practically to the East Gippsland coast, with the exception of a few minor elevated areas, as at Cape Schanck, Flinders, Kilcunda, and Bairnsdale.

Sand Dunes, Old and New.

Among the most striking features of the Victorian coast are the lines of high sand dunes. So remarkable are these that a geologist from England stated that he had not noticed anything to compare with them except those of the Arabian coast. By watching the incessant sand-drift of the dunes on a breezy day one may learn a wonderful lesson in earth-sculpture. The grains of sand, borne on the wind to the highest point formed, end their contest against gravitation, and then precipitately fall; hence the long slope and the steep of a sand ripple. The formation of the ripples, of which the sand dune is a gigantic example, is an interesting phase of Nature's handiwork. At times man steps in and frustrates the ultimate removal of the dune as it travels with the varying winds by planting marram-grass to fix it to the spot. Were it not for systematic grass-planting the dune might cause wholesale destruction inland, overwhelming gardens and even houses.

All along the ages we find evidences of the existence of dunes, for the cross-bedded freestones of the Devonian and Jurassic formations were laid down precisely as were those of Barwon Heads to-day. This in itself is a crushing rejoinder to the "catastrophists," who would maintain that past episodes in earth-building were always spasmodic and phenomenal. Borings in the Mallee have already shown that many years ago dunes formed part of the landscape of the Murray Gulf Region, for fragments of dune-rock have been brought up by the drill from varying depths. The old drowned delta of the Port Phillip Basin has also rendered remarkable evidence through the boring at Sorrento, where it was proved that dune upon dune, alternating with mud-flats filled with the little bivalved *Spisula*, are piled up in that spot to the thickness of 800 feet.

Fossilized Coastal Scrub.

Where dunes are forming, we may notice trees and plants

being overwhelmed by the sand. Naturally, the remains of *Banksia*, or Native Honeysuckle, and Tea-tree, being the commonest forms of coastal vegetation of a stronger growth, will be found well represented in the old dune-rocks. Such is the case on the Brighton and Black Rock beaches, where the iron-sand is the old forerunner of the modern dunes. Here may be seen, as Braille characters standing out in relief on a cartridge page, the compressed, scaly stems of prehistoric Banksias, with their fruits; before now the latter have been taken for fossil cucumbers!

When Darwin, voyaging in the *Beagle*, came into King George's Sound, he noticed, at Bald Head, the sand-encrusted shrubs; but it was not until Moseley, of the *Challenger*, described the formation of the encrusted bushes of the Cape Town sand-dunes that a concise account of them was published. In all stages of their encrustation these gaunt stems of past vegetation stand out—from the sand-coated stem to those in which the enclosed stem is decayed and washed away and the interior solidified. The organic acid derived from the decay of the stem plays an important part in helping to dissolve the limy sand, which is afterward cemented by the mineral solution as a crust around the stem. The same process takes place in the Sorrento dunes, and this was fully described by Dr. T. S. Hall in this journal for 1901.

The Sorrento Peninsula is largely covered with the old dune-rock which was heaped up some thousands of years ago. The age of this rock is approximately fixed by the finding of marsupial remains embedded in this ancient dune; they are referred to the extinct giant kangaroo, Palorchestes, whose somewhat formidable name, although signifying "ancient dancer," is perhaps hardly applicable to such a heavily-built creature.

It was with some interest that we lately found a patch of similar ancient dune-rock to the south-west of Bream Creek, and, what was perhaps more interesting still, a lagoon deposit of travertin resting upon it, pointing to the former outflow of springs. Continuing along this part of the coast, not far from Spring Creek, Torquay, there is another remnant of this old dune-formation, left in spite of the gnawing action of the tides of ten thousand years. It is about fifty yards in extent, and shows also the banded travertin deposit laid down by springs and lagoons which have long since disappeared. At Point Roadknight there is a very extensive section of this old dune-rock, in places etched and corroded into the most fantastic fairy caverns. From the position of this sculptured and castellated dune-rock, as it lies exposed to the beat of the tide against the massive Anglesea cliffs, it is unquestionably

only a small remnant of what once formerly existed. We can thus picture how extensive was this coast to seaward in former times, dating back possibly as much as ten thousand years ago.

NATURAL HISTORY NOTE.

TERMITES AND ANTS.—Mr. J. A. Hill, of Golton South, *via* Lubeck (N.W. Victoria), contributed a note relating his experiences.

EXHIBITS.

By Mr. H. Clinton.—Coccidæ (scale insects)—*Eriococcus coriaceus*, Mask., Opisthoscelis, sp. (?), *Ascelis præmollis*, Schrader, from eucalyptus; *Dactylopius auritanatus*, Mask., from Native Cherry; Psyllidæ (lerp insects)—*Spondylaspis eucalypti*, from eucalyptus—collected on Evelyn excursion, under microscope. Mallophaga (bird parasites), collected by Mr. C. Oke from Edward Lyre-bird, *Menura novæ-hollandiæ edwardi*, Chisholm, at National Museum, Melbourne, 13/5/22—(*a*) *Degeeriella menuralyræ*, Boinde, (*b*) *Menopon menurø*, Le Souëf and Bullen; also larva of *Nolonomus phillipsi*, from Evelyn excursion, under the microscope.

By Mr. A. D. Hardy.—New species of eucalyptus, *E. studleyensis*, Maiden, from Studley Park, Melbourne, and photograph of same; photograph of Silver Wattle, 32 feet high, on summit of Blacks' Spur; sphagnum moss, from pool in Otway Ranges, collected by Mr. E. H. Hatfield.

By Mr. L. Hodgson.—Specimen of *Leptospermum scoparium*, var. *grandiflorum rosea*, grown from seed found at Berowa, N.S.W.; a rare variety, not recorded since 1817, when it was grown in England from seed found in New South Wales.

By Mr. C. Oke.—Twenty-five species of Coleoptera, including several undescribed species, collected on Evelyn excursion; also spiders and phlangids.

By Mr. E. E. Pescott, F.L.S.—Specimens of two blue-fruited Eugenias growing at Melbourne Botanic Gardens—*E. oleosa*, F. v. M. (Queensland), and *E. cyanicarpa*, F. v. M. (New South Wales).

By Mr. F. Pitcher.—Puff-balls, *Mitremyces fusca*, Berk.—beautiful crimson-coloured heads when growing, and with discharge of powder on pressure; collected on Easter excursion at Toolangi.

By Mr. A. E. Rodda (on behalf of Geological Survey of Victoria).—Slates, showing coloured markings due to oxidation, from Heathcote district.

By Mr. A. L. Scott.—Rocks from near Mount Cook Hermitage, New Zealand; water-worn pebbles from same locality; specimens of moraine collected from the surface of the Great

Tasman Glacier, near Mount Cook, New Zealand; photographs of same localities.

By Mr. A. J. Tadgell.—Seed-pod of a rare Victorian garden escapee, but also found in New South Wales and Queensland, native of valley of the Mississippi, U.S.A.—*Martynia proboscidea*, Elephant's Trunk.

By Mr. A. J. Tadgell (on behalf of Mrs. Coleman).—Fresh blooms of orchids, *Corysanthes fimbriata*, Fringed Red Helmet, and *Chiloglottis diphylla*, Twin-leaf Bird Orchid, collected at Healesville.

By Mr. L. Thorn.—Forty species of insects taken on Easter excursion to Toolangi, also photographs of same locality.

After the usual conversazione the meeting terminated.

NATURE STUDY EXHIBITION.—The second exhibition (in recent years) of specimens by members of the Field Naturalists' Club of Victoria was held in the Athenæum Hall on Tuesday, 20th June. A very fine display was made by members, but it has not been possible to prepare a detailed report in time for this *Naturalist*. It is hoped that this will be published next month. The exhibition was not quite so well attended by the general public as the previous one, but this had its advantages, for visitors could the more easily inspect the exhibits on this occasion. The exhibition was far from being a financial loss, and, besides the surplus which the Club will derive from it, the sales of flowers and plants brought in £7 7s., which has been handed over to the Children's Hospital.

THE EUCALYPTS OF VICTORIA.—In the recently-issued part (vol. xxxiv., new series, part 2) of the *Proceedings of the Royal Society of Victoria*, Mr. J. H. Maiden, I.S.O., F.R.S., F.L.S., Government Botanist of New South Wales, contributes a paper entitled "An Alphabetical List of Victorian Eucalypts." The author credits Victoria with having sixty-two indigenous species of eucalypts. He makes the statement that the tree originally described from Tasmanian specimens as *E. amygdalina*, Labill., has not been proved to occur in Victoria. This will be a surprise to most of our botanists. What we have regarded as *E. amygdalina* is really *E. radiata*, Sieber. or *E. numerosa*, Maiden.

THE LATE MRS. JOHN SIMSON.—It is with great regret that we announce the death, on the 30th ult. (her birthday), of Mrs. J. Simson, of "Trawalla," Toorak, at the ripe age of 92. Mrs. Simson was elected a member of the Club in July, 1884, and was therefore one of its oldest members. She always evinced great interest in the Club, and in 1885-6 had the distinction of being one of two lady members of the committee.

TERMITES AND ANTS.—Mr. James Hill, of Westell Farm, Kewell (Wimmera district), contributed a note on the action of some small black ants some time ago. On a close, muggy evening at the end of summer he had occasion to shift some sawn timber, which, on being moved, was found to be full of the so-called "white ants," termites. Knowing that the small black ants were deadly enemies of the termites, and that there was a track of them about five yards away, he went over, with the hope of being able to induce them to attack the termites. These, by the way, seemed to have a sort of sweet smell arising from them, while what air was moving was in the direction of the black ants from where the termites were. While standing thinking how a diversion in the proper direction could be induced, he saw the track of the black ants suddenly turn in the direction of the termites, and in a few seconds the ants were among the termites in thousands, soon putting an end to them by killing and cutting them up and carrying them off. The question to be answered is, Were the black ants attracted by the odour, or did some spy report the presence of the termites to the black ants?

AUSTRALIAN NATIONAL RESEARCH COUNCIL.—At the meeting held in Melbourne last year of the Australasian Association for the Advancement of Science, steps were taken to form a council of representative scientists under the above name, for the purpose of promoting research in Australia, publishing the results of scientific investigations, &c. A very representative council was appointed, and recently additional members were added, among them being Mr. F. Chapman, A.L.S., ex-president of the Field Naturalists' Club. The council has now decided to publish quarterly abstracts of all scientific work being carried on in Australia, whether by Governments or private individuals. This will be a great boon to all workers, no matter in what branch they are interested. At present such persons have to wait, in most cases, until the annual volumes of societies' proceedings are published in order to learn what is going on in the next State. It is hoped to issue the first number of this review early in August, previous to the meeting of the Council, which is to take place in Sydney in that month.

AUSTRALIAN ROTIFERS.—Mr. J. Shephard, in an article in the *Proceedings of the Royal Society of Victoria* (vol. xxxiv., part 2), records 230 species as the census of Australian rotifers, but acknowledges that, as most of the investigations of this group of animal life have been done in the neighbourhood of the large cities, probably the number of species to be found in Australia is very much larger.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 10th July, 1922.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about 50 members and visitors were present.

The president referred to the death since last meeting of Mrs. John Simson and Mr. William Stickland, both of whom had been members of the Club for long periods. The latter had contributed to the proceedings and acted as leader of excursions on several occasions. He also announced that Mr. A. J. Tadgell had suffered severe bereavement in the death of his brother.

A letter of condolence was ordered to be sent to the relatives of the deceased members and to Mr. Tadgell, members standing while the motion was put and carried.

REPORTS.

A report of the visit to the Technological Museum, Public Library, on Saturday afternoon, 24th June, was given by Mr. F. G. A. Barnard, who said that the party of about a dozen members had been met by the Curator, Mr. R. H. Walcott, who acted as guide for the afternoon and conducted them round the exhibits. The attention of the members was directed to the more notable objects, such as the specimens of Australian minerals, marbles, timbers, &c. The exhibit of grades of Australian wool, numbering nearly 900 examples, attracted some attention, as also the models of fruit suitable for export, &c. The collection of foodstuffs was found to be very complete, and manufacturing processes were well displayed. Altogether, the members spent a very interesting afternoon, and were well repaid for the time given to the visit.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Munro, Anzac Hostel, North-road, Brighton, and Mr. G. C. Hodgson, P.O., Mentone South, were duly elected as ordinary members; Miss Mary M'Intyre, "Laggan," Merino, and Mr. A. J. Williamson, Bank of Victoria, Dunolly, as country members; and Mr. R. E. Gray, Dresden-street, Heidelberg, as an associate member.

GENERAL BUSINESS.

Mr. C. L. Barrett, C.M.Z.S., said that a deputation was to wait on the Minister of Lands on the following day in order to

oppose the alienation of any portion of Wyperfield Park, an area in the Mallee recently set aside as a national park.

Messrs. G. Coghill and E. E. Pescott, F.E.S., were appointed to attend on behalf of the Club and urge that no alterations be made in the boundaries of the park.

[In reply to the deputation, the Minister promised that no curtailment of the reserve would be made without consulting the bodies interested.—Ed. *Vict. Nat.*]

Mr. F. Pitcher announced that the Melbourne Town Hall had been secured for the annual exhibition of wild-flowers on Tuesday, 3rd October next.

PAPER READ.

By Mr. P. C. Morrison, entitled "A Simple Study of Our Common Serpula."

Owing to the absence of the author, on account of ill-health, the paper was read by Mr. F. G. A. Barnard.

The author stated the position of the genus Serpula in the usual arrangement of the animal kingdom, where it is placed in the Annelida, or tube-building worms. He then described the main features of the animal, which may be found in great numbers in various places around our bay, encrusting the rocks, piles, &c., below low-water mark with its calcareous vermiform tubes. He mentioned that Serpulids and their allies had been found as fossils in Victoria, notably *S. ouyenensis*, found in borings made at Ouyen, in the Mallee, at a depth of about 600 feet. Such fossil forms may be as old as 60,000,000 years. The author remarked that very little work had been done on our Victorian forms—in fact, they had not received specific names—and recommended the group as well worthy of attention by someone who was at a loss for an object for investigation.

A number of specimens and parts prepared for microscopic examination were exhibited in illustration of the paper.

NATURAL HISTORY NOTES.

Mr. A. J. Tadgell forwarded a note regarding the recent finding of the rare Greenhood Orchid, *Pterostylis Toveyana* near Mordialloc, in which he remarked how easy it is to pass it by for the Common or Trim Greenhood, *Pterostylis concinna*, as it is, vegetatively, like a robust, dwarf form of that species. He had found it in only two neighbourhoods, about three miles apart, in 1909 and in 1910, and it is so elusive that he had not seen it again until this year, though he had vainly sought for it. Dr. Rogers, of Adelaide, told him that "this orchid would appear to be in a transitional stage towards specific rank, but as yet without sufficient stability of characters." It is recognized as a hybrid from *P. præcox* (*reflexa*) and *P. concinna*.

In previous years it looked like *præcox*, with full stem leaves and practically no basal leaves. Again, he found it actually deceiving him for *concinna* in external appearance. It is recognized principally by the notched labellum, but that varies, so that in five plants found this year all together one had the tip of the labellum rectangularly notched evenly, as in *concinna*; another looked as if a neat, tiny spoon had taken out a round notch; while two others had scarcely any nick at all. These variations, it may be stated, were not due to the age of the flower. In answer to a point he raised with Dr. Rogers as to why it is so rare, seeing that we might expect to find hybridized forms of *concinna* (which is so common) with *præcox* (*reflexa*), which is not uncommon, as both are found flowering freely together, the doctor takes the view that at one time, when they first began to establish themselves, this form was fairly numerous, and thinks there can be no doubt that hybrids may become independent of their original parents and capable of propagation in the same way as species.

Mr. L. Thorne contributed a note on his entomological observations during the Easter excursion at Toolangi. He said that the trip to Toolangi was very interesting, and fairly successful from an entomological point of view, though, had it been a month or two earlier, it would almost certainly have been better. There is an abundance of undergrowth everywhere, and in and on this numerous species of butterflies and moths are certain to be found breeding; but larvæ-hunting is not very profitable work at this time of the year. The Sassafras tree is plentiful in all the gullies, and on this the larva of our beautiful Swallow-tailed Butterfly, *Papilio macleayanus*, feeds, and is sure to be fairly plentiful. One chrysalis of this fine Papilio was found attached to the under surface of a Sassafras leaf. The chrysalis was attached to the leaf by a small silken pad at the tip of its abdomen and a silken band around the middle. The caterpillar had passed a silken thread around another leaf, just above the one to which it had attached itself, and brought them together to form a roof-like structure. In this manner it spends the winter, not emerging till November or December. Other butterflies taken were the Barred Brown, *Heteronympha banksii*, the Ringed Xenica, *Xenica acantha*, Klug's Xenica, *Xenica klugi*, and *Oreixenica kershawi*. Of the twenty-one species of moths taken, the one that caused most surprise, by the numbers taken, was *Porina australis*; of this, seventeen males and one female were successfully captured. Two other Hepialids taken were *Fraus palyspila* and *Oncoptera intricata*. Several species of Geometers were taken, including three Emeralds. A female of that interesting dipterous fly, *Borcoides subulatus*, was taken on a log at night

time by the aid of an electric torch. This "two-winged" fly has wingless females, though the male has wings as usual.

EXHIBITS.

By Mr. A. Allaway.—Atlas Moth, *Attacus atlas*, from Northern India.

By Mr. C. Oke.—A case of insects, principally Lepidoptera, from Belgrave, collected during Easter.

By Mr. F. Chapman, A.L.S., on behalf of National Museum.—Tube of Trachyderma, sp., from the Silurian in Punt-road, South Yarra, and gill-plumes of Trachyderma, sp., from the Silurian, Hawthorn Main Drain—both collected by Mr. F. P. Spry. These serve to illustrate Mr. Morrison's paper on Serpulids, being two very interesting fossil specimens of a tube-making worm, allied to the Sabellids—namely, Trachyderma, found rather abundantly in the bedrock of Melbourne. One of these consists of a tube, originally made of mud and organic slime, whilst in the piece of fine mudstone is shown to perfection the beautiful prostomial gills of the worm as they were laid out on the mud and now preserved in a carbonaceous film. This specimen is one of the few of which we know where the soft parts of the animal are so well preserved, and may date back about sixty millions of years.

By Mr. E. E. Pescott, F.L.S.—*Acrotriche fasciculiflora*, F. v. M., the "Bundled Ground-Berry," Mount Lofty, South Australia, showing the remarkable habit of bearing flowers in great bunches at ground level; found only in South Australia, and exhibited on behalf of Field Naturalists' Club of South Australia. Cultivated plant of *Dendrobium æmulum*, R. Br., native of New South Wales and Queensland. *Pisonia Brunoniana*, Endl., "Bird-catching Plant," native to New South Wales, Queensland, Norfolk Island, and New Zealand; grown at Melbourne Botanic Gardens; and *Eucalyptus torquata*, J. G. Luehmann, the "Coolgardie White Gum," showing decorative character of buds, grown at Melbourne Botanic Gardens.

By Master C. Ralph.—Egyptian Scarab, found in crypt of an Egyptian pyramid.

By Mr. A. E. Rodda, on behalf of Geological Survey of Victoria.—Talcose clay, from Gaffney's Creek; asterized or star quartz, from Coleraine; also photographs of birds—viz., White-shafted and Rufous Fantails, Mountain Thrush, Yellow-breasted Robin, and Lyre-bird, from Walhalla district.

By Mr. A. L. Scott.—Pebbles from beach of Lake Rotorua, N.Z.; sulphur-coated grit from hot spring on beach, Lake Rotorua.

By Mr. L. Thorn.—Seventy-two species of Victorian butterflies, with 19 kinds of empty chrysalid cases, from which perfect insects had emerged.

By Mr. H. B. Williamson, F.L.S.—Flowering specimens of Gippsland Heath Myrtle, *Thryptomene miquelíana*, F. v. M., and Pine Heath, *Astroloma pinifolia*, Benth., collected at Bairnsdale by Mr. T. S. Hart, M.A.

After the usual conversazione the meeting terminated.

EXCURSION TO TOOLANGI.

THE visit to the Toolangi district at Easter, 1922, was the third which the Club has made to that locality. Toolangi (about 45 miles from town) is situated at the foot of Mount St. Leonard, on the crest of the Dividing Range, about 14 miles north of Healesville. As a place for those who want to roam among big timber or struggle through dense undergrowth it cannot be excelled. Our party was small, but none the less enthusiastic in its desire to explore the land. We left town by the evening train on Thursday, 13th April, and in due course reached our quarters at "Laurel Grove" late the same evening. This we found to be on the northern side of the Divide, and not far from the ever-running Yea River. Here we were well cared for and cheerfully welcomed on our return from the various walks taken. Good Friday was devoted to a walk to the well-known Sylvia Falls, which we found somewhat difficult, as the tracks have been allowed to become almost impassable on account of fallen timber. The winter snows have also brought down the saplings and other shrubbery, so that progress was slow. However, we were compensated for our difficulties by the magnificent vegetation on every side. The next day we secured the services of a resident as guide, and made the longer trip to Myrtle Gully—a trip of surpassing loveliness so far as the vegetation is concerned. Huge eucalypts, myrtle-beeches, sassafras, &c., with tree-ferns *ad libitum*, made a picture not easily forgotten, while trampled under foot were scores of smaller ferns of many species. Coral Ferns and Star Ferns wreathed the bushes on either side of the track. Though the distance was not great, the difficulties of the way were such, and there was so much to admire, that darkness had closed in before we got back to "Laurel Grove." Sunday morning was spent quietly; in the afternoon we visited Blue Mountain, situated off the Myers' Creek (Healesville) road. This commands fine views of the Healesville and Warburton country, and on clear days Melbourne is within the range of vision. Easter is perhaps the worst time of year for wild-flowers in Victoria, so that it was with feelings of regret we noted that hereabouts seemed to be the best locality for wild-flowers that we had seen. A scrap of Tetratheca and

a flower of Correa (red variety) was all we could find. Monday was rather close and hot, and little was done. However, the pretty little Lawrence Falls were visited. These we found set in a framework of ferns, which made them particularly attractive. Our final day (Tuesday) was showery, and "the round trip," as it is known, had to be abandoned. Mr. A. E. Keep, who stayed a few days longer, and was joined by Mr. and Mrs. Pitcher, informs me that they accomplished "the round trip" on the next day, and had a most interesting outing. Birds were much more numerous than on other days. Near one of the mills they saw a flock of Crimson Lories, *Platycercus elegans*, numbering at least one hundred, making such a feast of colour in the bright sunlight as they had never seen before. The "round trip" encircles a hill locally known as "Mount Tanglefoot," which is so called from the quantity of *Prostanthera melissifolia* growing on its slopes, forming an almost impenetrable tangle. This, when in flower, is said to be a most delightful sight, the quantities of pale lilac flowers making a scene worth going miles to see. Our entomologist was well satisfied with his captures, and proposes to furnish his own account of the outing.—G. NOKES.

[Previous trips to Toolangi will be found recorded in the *Naturalist* for February, 1910 (xxvi., p. 144), and March, 1918 (xxxiv., p. 173). Mr. Thorne's notes *re* the entomology of the trip appear on page 43 of this issue.—ED. *Vict. Nat.*]

THE LATE MR. WILLIAM STICKLAND.—It is with great regret that we record the death, at the age of 72, of Mr. Wm. Stickland on the 5th ult. He was one of the early members of the Club, having been elected in July, 1885. His hobby was pond-life, and his only paper read before the Club (in September, 1894) was on that subject. It was entitled "The Rotifer in Melbourne," and described the results of a dip in the pond in the Treasury Gardens, now known as the Japanese Lake, during luncheon hour. His captures on that occasion were described in an entertaining manner in the *Naturalist* for October, 1894 (vol. xi., p. 100). He, with his brother, Mr. Jno. Stickland, led many excursions to various places for a like purpose. He was by profession a wood-engraver, and the *Naturalist* contains two or three specimens of his work in the earlier volumes, before process engraving was adopted for illustrations. For some years he acted as assistant librarian and secretary to the Royal Society, for which his knowledge of scientific books and other publications made him well suited.

CORRECTION.—In July *Naturalist* the words in line 25, page 38, should follow "N.S.W." in line 28.

NATURE STUDY EXHIBITION.

THE exhibition of specimens by members of the Club in June, 1921, having proved so attractive, it was decided to hold a similar exhibition this year, and the Athenæum, Collins-street, was engaged for the afternoon and evening of Tuesday, 20th June, for the purpose. On this occasion the Microscopical Society did not share in the venture, but several members of the Club undertook the exhibition of specimens under microscopes.

The president of the Club, Mr. Chas. Daley, F.L.S., in asking Sir Baldwin Spencer, K.C.M.G., to declare the exhibition open, said that Sir Baldwin was not unacquainted with the history of the Club and its work, for he was a past president of the Club, and had taken part in three or four of its notable expeditions.

Sir Baldwin Spencer, in declaring the exhibition open, thanked the Club for giving him the opportunity of assisting in one of its functions again, and said how much he was indebted to the Club and its members for helpful information when he arrived as a novice from England some thirty-five years before. He referred to the attitude the Club had taken up in securing the protection of both animal and vegetable life, for which it was to be commended. At the same time, he often wondered whether the right birds or animals were being protected, and instanced the Laughing Jackass. This bird he had watched a good deal, and considered it an absolute "smoodger." So far as its habits were concerned, it was not worth protecting, but it had got into their good graces by now and again killing a snake, and so being considered useful; but how many young birds and eggs did it take from other birds' nests? Again, he had never hesitated to capture an insect and put it in a killing bottle; yet he did not know whether some of these were not useful, and should be protected. He pointed out how investigation was still required with regard to our rapidly-disappearing fauna and flora, and urged workers to take up certain lines of study and endeavour to learn all they could regarding the various forms before it was too late.

The attendance of the public was not quite so large as had been expected, but it had its compensations, for the exhibits could be examined in greater comfort than had the hall been crowded, as on the previous occasion.

The range of exhibits was very wide, and details given must not be considered by any means complete, as many of the exhibitors failed to hand in particulars of their specimens.

BOTANY.—Midwinter is not the best time for a display of wild-flowers; yet, owing to the organization of Mr. H. B. Williamson, F.L.S., they made quite a feature in the hall.

About seventy-five species (not including orchids) were on exhibition, about three-fourths of which were forwarded from Bairnsdale and Bendigo by Messrs T. S. Hart, M.A., and D. J. Paton. The former collection included *Rubus rosifolius*, *R. parvifolius*, *Isopogon anemonifolius*, *Bossiæa heterophylla*, *Correa alba*, *C. speciosa* (red variety), the Sunshine Wattle, *A. discolor*, and early flowers of the Sweet Bursaria, *B. spinosa*. Among Mr. Paton's flowers were the Blue Mallee, *Eucalyptus fruticetorum*, Green Mallee, *E. viridis*, Shrub Violet, *Hybanthus floribundus*, Fairy Waxflower, *Boronia polygalifolia*, and six species of Acacias—viz., *lanigera*, *lincata*, *armata*, *diffusa*, *pycnantha*, and *vomeriformis*. From Miss Mackenzie, of Boronia, came about a dozen species, among which were *Acacia myrtifolia* and *Epacris microphylla*. Miss Dyall, of Garfield, forwarded some fine dark crimson Epacris, as also did Mr. Fairnie, of Moyston, from Mount William (Grampians). The acting director of the Botanic Gardens furnished some fine pot plants, &c., for platform decoration. A large quantity of "Crimson Berry," *Cyathodes acerosa* (*Styphelia oxycedrus*) (Epacridæ), had been promised by the Tasmanian Tourist Department, but, unfortunately, owing to a strike, the steamer's sailing was delayed, and only some brought over by an earlier steamer was available. This was very much admired, and sold readily. Mr. Ising, of the South Australian Field Naturalists' Society, and Mrs. Page, of Myponga, S.A., also forwarded flowers, but unfortunately they were delayed on the railways, and did not reach Melbourne till next day. A tastefully-arranged display of orchids was made by Mrs. Coleman, who exhibited about twenty species, including the rare Banded Greenhood, *Pterostylis vittata*, which had been collected at Point Lonsdale by Mr. G. Ampt, sen. A collection of mounted specimens of common weeds was exhibited by Mr. A. J. Tadgell, while Mr. T. Green exhibited a number of splendid photographs of orchids and other flowers as stereoscopic objects, and a large case of seed-vessels of Western Australian shrubs and leaves was shown by Miss Amy Fuller.

Conchology.—Mr. C. J. Gabriel had an extensive display of shells, both Australian and foreign, also several educative exhibits, such as the common shells of our sea beaches, the largest and smallest Victorian shells, the way in which the animal repairs its home, &c.

Entomology.—Mr. H. Clinton, bird parasites (Mallophaga), under microscopes; Mr. J. E. Dixon, four cases of buprestid or jewel beetles, Mr. C. French, jun., four cases of injurious insects; Mr. C. Oke, case each of scarabid and buprestid beetles, also aberrant wingless fly, parasitic on bat (under microscope); Mr. F. P. Spry, three cases of ants; Mr. L. Thorn, two cases of moths and butterflies and case of cicadas; Mr.

F. E. Wilson, cases of longicorn and ladybird beetles, also small pselaphid beetles (under microscope); National Museum, two cases of wasps and nests and two cases of foreign beetles.

ETHNOLOGY.—Mr. C. Daley, F.L.S., aboriginal stone implements; Mr. E. E. Pescott, F.L.S., case of stone implements and spear-heads.

GEOLOGY AND PALÆONTOLOGY.—Mr. F. Chapman, A.L.S., Cambrian fossils, showing anatomical structure, from British Columbia; fossil and recent Foraminifera from the Antarctic. Mr. S. R. Mitchell, minerals and crystals; Mr. A. E. Rodda, banded Silurian rocks, from Heathcote; Mr. F. A. Singleton, M.Sc., evidence of radio-activity in rocks, and quartz crystals with included bubbles. Miss I. Crespin, B.A., moulds and casts of fossils in ironstone and chert, with method of reproducing originals in wax; fossiliferous limestones with foraminifera, &c. Miss K. M. M'Inerny, M.Sc., minerals under microscope with polarized light. Mr. F. Cudmore, 13 cases of fossil shells from Mornington-Frankston district; three of fossil shells from rocks at Torquay; case of Victorian Trigoniæ (five fossil species, one living); four cases of fern impressions in Palæozoic rocks; two cases of teeth (mostly sharks) from Beaumaris, &c.; three cases illustrating formation of casts, moulds, and petrifactions; also petrified wood, fossil bone, oysters, &c. Mr. C. Daley, F.L.S., minerals associated with gold, also photographs of Victorian and Tasmanian scenery, lent by respective Tourist Bureaux.

ORNITHOLOGY.—Director of National Museum, mounted specimens of some of the larger Victorian birds.

POND AND SHORE LIFE.—Mr. J. Searle and Miss J. Raff, M.Sc., and friends had interesting displays under microscopes.

ZOOLOGY.—Director of National Museum, mounted specimens of kangaroos, platypus, &c.

MICROSCOPY.—Mr. A. D. Hardy, F.R.M.S., botanical sections, including autoparasitism of *Cassytha melantha*; intercalation of cork layer between stem and leaf-stock of a deciduous plant preceding fall of leaf; defensive armory of stellate and branched cellulose hairs on cells of floating water-lily leaf, presumably a protection against water-snails, &c.; pollen grains of eucalypts and other Myrtaceæ, Epacris, Acacias, &c.; cuticle specimens showing stomata in various arrangements, usually on under sides of leaves, but on both sides in eucalyptus, and in grooves in leafless stem and branches of Casuarina.

The sale of pot plants (native shrubs) and flowers, under the direction of Miss A. Fuller, realized £7 7s., which was forwarded to the Children's Hospital.

The final result of the exhibition, to which a charge was made, is not complete, but there will be a credit balance of several pounds.

to control controls. Nature does not exterminate species, and therefore the very most that could be hoped for would possibly be a lessened seed production on the part of St. John's Wort.

The most important thing in weed-control is first to prevent weed seeds entering a country, and secondly, to prevent seed-production by those weeds already in the country. Once pest plants are introduced they spread themselves over the country by several means. As is well known, the seeds of many plants are furnished with a special adaptation that enables them to be carried long distances through the air by the wind. Familiar examples of wind-borne seeds are Dandelion, *Taraxacum officinale*, Prickly Lettuce, *Lactuca scariola*, Thistles (Carduus), and Stinkwort, *Inula graveolens*. Owing to the sticky nature of the latter plant it not only arrests an enormous number of its own seeds, but also that of many other species, and especially those of thistles. Other seeds often distributed by wind are those of a dust-like nature, such as those of Poppies (Papaver). These, on account of their small size, are caught up by the wind and scattered over wide areas.

Seeds Carried by Farm Produce.

Hay and chaff are the media by which many bad weeds are disseminated, and the spread of St. John's Wort has been in very many instances due to the seeds of this plant having been included in hay or chaff that was fed to horses. This can readily be seen by the way in which St. John's Wort has followed railway construction. In fact, any place that has been used for any length of time as a camping-ground for horses in the North-East of Victoria, there this plant can usually be found growing. In some notable instances these camping-grounds have been the starting-places for the further spread of this weed over very large tracts of country.

Seeds Carried by Water.

Flood waters distribute seeds of plants over wide areas, and are one of Nature's methods for the dispersal of species, both animal and vegetable. The seeds of many bad weeds are spread in this manner, as also by rivers and streams. Probably irrigation channels are the worst of all offenders with water-borne seeds. These channels run through many miles of country, carrying seeds of many species of weeds on the surface of the water, some of which find lodgment on the banks, where they usually find congenial conditions for their growth. These plants later on shed seeds into the water, so that when water is taken from these channels for irrigation purposes these seeds are distributed over the irrigable lands, and are a menace to all land-owners in the areas served by these channels. Seed-

dispersion by irrigating water would be considerably reduced if the weeds were destroyed on the banks of these channels or not allowed to produce seeds, as usually they now are unchecked.

SEEDS CARRIED BY STOCK.

Stock are famous weed-carriers. Many seed-vessels are specially provided with hooked processes that enable them to cling tightly to the coats of animals. The Bathurst Burr, *Xanthium spinosum*, is a common example of this class of seed. These may be carried long distances before the seeds are shed from their hooked receptacles.

Stock spread the seeds of many plants by feeding on weeds that are carrying ripe seeds, which pass through the digestive tract and remain viable. Dodder (Cuscuta), is often spread to clean areas in this manner. Many bad weeds, carrying ripe seeds, become entangled in the fleeces of travelling sheep. These seeds often are not shed until very long afterwards. The great spread of St. John's Wort is undoubtedly largely due to stock movements, and it is probably owing to the facility with which this seed is carried by travelling sheep that this plant has become so widely spread, both here and in New South Wales. Rabbits also spread this and other small seeds by dashing through masses of weeds, so causing the ripe seeds to shower down on their fur, the seeds later on to fall or be scratched out, this often at long distances away from where the plants were growing.

The seeds of Boxthorn, *Lycium horridum*, and Blackberry, *Rubus fruticosus*, are being widely spread by birds, the imported Starling being a great offender in this respect, thus adding to its already long list of offences.

STABLE MANURE.

Stable manure, unless composted and well rotted before being applied to the land, is often the means of establishing many undesirable plants.

FARM MACHINERY.

Threshing machines carry weed seeds from one farm to another to such an extent that it should be made compulsory for the owners of these machines to clean them after threshing, and this before the machine was taken off the farm where it had been employed.

Farm implements, such as ploughs, harrows, and cultivators, often greatly assist in the spread of those plants that have running roots or rhizomes. Take, for example, the Perennial Thistle, *Carduus arvensis*. This plant is easily spread if the cultural methods carried out for its suppression are not carefully done. Ploughing operations break up the underground

rhizomes of this plant into small pieces, most of which are capable of forming themselves into new plants. The harrows or cultivators still further spread these small sections of roots, so that from a small patch of this thistle whole paddocks may become smothered by this most troublesome weed.

The same trouble occurs with Bindweed, *Convolvulus arvensis*, which is often such a source of trouble to many orchardists. The same can also be said of Hoary Cress, *Lepidium draba*, that pest of the Wimmera farmer.

Root-stocks.

Underground stems, commonly known as root-stocks or rhizomes, enable a plant to travel long distances beneath the surface of the ground. Johnson Grass, *Sorghum halepense*, sends out roots many feet in length that enable it to rapidly spread itself away from the parent plant.

Throwing Seeds.

Many plants, such as the common Tare, *Vicia sativa*, and Furze, *Ulex europæus*, throw their seeds for considerable distances. The pods of these plants dry in such a way as to produce a strong tension, which causes them to split apart violently, scattering the seeds in all directions, especially during the heat of the day.

Seeds Distributed by Animals.

Large seeds, such as nuts and acorns, are carried away from where they have fallen by rodents (chiefly squirrels, rats, and mice) for food purposes, some of which may become overlooked. This often enables these trees to become widely spread. Animals, and especially squirrels, are of benefit to the trees by carrying the nuts and acorns often to long distances, where usually a number of the seeds are buried by them for later requirements. Possibly this seed-burying habit is payment in return for nuts consumed by these animals.

Some species of ants collect seeds over wide areas and convey them to their nests. This trait must also assist in seed-dispersal.

"The Austral Avian Record."—The March issue of this journal (vol. iv., No. 7) is to hand. As usual, there are a number of additions and corrections to be made to Mr. Gregory Mathews's Check-list of 1920. A notable alteration is the name of the Naretha Parrot, *Psephotus narethæ*, H. L. White, figured in *The Emu* of October last from specimens obtained near Naretha (East-West Railway), Western Australia. This becomes *Northiella hæmatogaster narethæ*. Notes on some forgotten bird books make up the remainder of the part.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 8th August, 1922.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about sixty members and visitors were present.

The president said that since the last meeting one of the oldest members of the Club, Mr. F. P. Spry, had passed away after a short but severe illness. Mr. Spry was a member the Club could ill afford to lose, for, though he had not contributed any paper to the meetings, he was a keen observer both in entomology and geology, and was always willing to give any information in his power to inquiring naturalists regarding any specimens submitted to him. He moved that a letter of sympathy be forwarded to his widow and family. The motion was seconded by Mr. J. A. Kershaw, F.E.S., and supported by Messrs. F. G. A. Barnard and D. Best, and carried in silence, all standing.

CORRESPONDENCE.

From the Secretary of the Australasian Association for the Advancement of Science, Sydney, stating that the next session of the Association would be held at Wellington, N.Z., in January, 1923, and asking the Club to appoint delegates on the general council. The appointment of delegates was referred to the committee.

REPORTS.

Mr. C. Daley, F.L.S., reported that the visit to the Biology School, University, on Saturday afternoon, 15th July, had been well attended, over thirty members availing themselves of the opportunity of seeing the zoological department of the school. Professor Agar, M.A., gave a short lecture on Mendel's law of heredity, using specimens and diagrams to illustrate his remarks, which were confined principally to the results of cross-breeding in rabbits. Many interesting exhibits had been laid out on the benches for inspection, while the assistant demonstrator, Miss J. Raff, M.Sc., had given an interesting exhibition of section-cutting, staining, and mounting preparations for microscopic examination. Through a camera lucida members had been invited to try sketching the mouth-parts of a fly. Altogether, a most interesting and instructive afternoon had been spent.

A report of the excursion to Sherbrooke, Dandenong Ranges, on Saturday, 5th August, was given by the leader, Mr. C. Oke,

who said that, owing to the short notice, the party was rather small. The excursion had been arranged in order that the Lyre-birds might be seen in the nesting season, but owing to the dampness of the gullies it was found impossible to remain perfectly quiet amongst the scrub, consequently little was seen of the birds.

GENERAL BUSINESS.

Mr. H. B. Williamson, F.L.S., said that he had heard that it is proposed to introduce stoats and weasels into the State for the purpose of destroying rabbits. This, he thought, would be a serious mistake, and said that if this was likely to be done a protest should be entered by the Club.

Mr. J. A. Kershaw said that it was not likely that any such action would be allowed.

Mr. F. Pitcher said that the committee had suggested that one-half of the net proceeds of the forthcoming exhibition of wild-flowers be handed over to the Children's Hospital. He moved accordingly, and, being seconded by Mr. H. B. Williamson, it was carried unanimously.

PAPER READ.

By Mr. J. W. Audas, F.L.S., entitled "A Circuit of the Grampians."

The author described the notable plants met with during a drive of about 180 miles made in December last in company with Mr. C. W D'Alton. During the drive the group of ranges known as the Grampians was completely encircled as close to the foot-hills as possible. Several new records of plants for the south-western division were made, and a most enjoyable trip resulted.

REMARKS ON EXHIBITS.

Mr. P. C. Morrison called attention to a series of exhibits in illustration of his paper read at the previous meeting, when he was, unfortunately, absent. These included living Serpula; Nereis, with jaws and pharynx extended and retracted; Aphrodite, "Sea-mouse," resembling a mammal rather than a worm; Polynoë, a polychæte worm, protected with dorsal plates like an armadillo; Sabellid, a tube-building worm with very prominent plumose gills; Serpula tubes, round and ridged forms; examples of commensalism, or "table-sharing"—(*a*) periwinkle completely encrusted by Serpula, (*b*) Spirorbis (fam Serpulidæ) on eye-stalk of crayfish. Some of these were exhibited through the kindness of Professor Agar, of the zoological department, University.

Mr. A. L. Scott drew attention to some geological specimens,

being ejecta from Fryingpan Flat, in the neighbourhood of the eruptive area of Rotorua and Tarawera, New Zealand. These were mostly mud, dried and hardened, though in some there are fragments of rock somewhat decomposed. The locality gets its name from the fact that it is always sizzling. The flat covers an area of about 40 acres in the bottom of a rift which opened in 1886, at the time of the Tarawera eruption. It had for its neighbour the famous Waimangu geyser, which was born in 1900 and was apparently extinct in 1904. On 1st April, 1917, early in the morning, Fryingpan Flat blew up with a great noise, and remained in eruption for some hours. The ridge forming the lip of the rift at that point is covered with what looks like light-coloured shingle, together with occasional pieces of rock. The shingle proves to be hardened mud, and the guide stated that the ejecta completely covered the neighbourhood from which the specimens were collected.

EXHIBITS.

By Mr. J. E. Dixon.—Unique aboriginal flint knife from Portland, Victoria; aboriginal bone needles from kitchen midden at Altona Bay, Vic.; and stone tomahawk found in the Alexandra-avenue extension, South Yarra.

By Mr. P. C. Morrison.—Serpula and specimens in illustration of paper.

By Mr. C. Oke.—A small wingless fly (Diptera), under microscope.

By Geological Survey of Victoria (per Mr. A. E. Rodda).—Four specimens of serpentine from Mount Wellington, Gippsland, and Waratah Bay.

By Mr. A. E. Rodda.—Six photographs of nests and eggs of following birds, taken in Walhalla district, viz.:—Blue Wren, Coachwhip-bird, Mountain Thrush, White-eye, Rufous Whistler, and Striated Tit-Warbler.

By Mr. A. L. Scott.—Ejecta from near Rotorua, N.Z., mostly dried mud, in illustration of note.

By Mr. L. Thorn.—Larvæ, pupæ, and imagines of the large Victoria Moth, *Chelepteryx collesi*.

After the usual conversazione the meeting terminated.

We desire to congratulate our fellow-member, Mr. A. E. Kitson, O.B.E., F.G.S., on the recent honour of C.M.G. bestowed upon him by the King, in recognition of his services to the Empire as Director of the Geological Survey of Nigeria, West Africa. Mr. Kitson served for many years on the Geological Survey of Victoria before taking up work in Africa.

EXCURSION TO MOUNT EVELYN.

DESPITE the rain that had fallen overnight, and the dull, cloudy morning, a party of over thirty members and friends assembled at Mount Evelyn on Monday, 5th June (King's Birthday), for this excursion. Unfortunately, through illness, my co-leader, Mr. C. L. Barrett, C.M.Z.S., was unable to attend, and, as a consequence, very little observation of the bird-life was done. We decided to take the track along the old Lilydale water-race to the Cascades, on the Olinda Creek. We were told it was only two miles to the Cascades, but everyone in the party agreed that the distance was greatly underestimated. The track is very narrow, and is being gradually overgrown by the vegetation on either side; and, as everything was very wet, those in front soon had wet legs. While those in the rear did not have this trouble to contend with, they found the track much more slippery, in consequence of the many feet passing along it. The crimson form of the Native Heath, *Epacris impressa*, was out to perfection most of the way along this track, but, on account of the moisture—in fact, it amounted to water—clinging to the vegetation, very little was picked. Also, due to the same cause, very little collecting or observation could be carried out. However, on turning over a log I was rewarded with a specimen of one of our weevil-like longicorns, *Athemistes athiopsis*, Pasc., and several Adeliums. Hanging to the bushes were numerous "houses" of our common leaf-rolling spider, *Arachnura wagneri*, but I did not notice one with its web spread; they were simply suspended by their guy ropes. On the side of the race, near a culvert, in a dark spot, several beautiful webs of an Argiopid spider, *Araneus bradleyi*, were seen and admired, looking very beautiful with their iridescent beads of moisture shining in the pale sunlight. Flowers, other than the red heath, were very scarce, though a few spikes of the white heath were occasionally seen. The common green "Native Fuchsia," *Correa speciosa*, was occasionally seen, and at least one nice piece of the Star-shaped Fuchsia was obtained. *Grevillea alpina* was just showing a few flowers. There were several rather awkward places to negotiate, and in crossing one steep-banked creek some amusement was caused by the slipperiness of the mud on the banks. At last we reached the Cascades, and decided to have lunch. While we waited for the "billy" to boil the more energetic members of the party decided to hunt around for interesting specimens. Here, as along some parts of the track already traversed, numerous species of fungi were to be found. Some of these were bright red, others were of a beautiful shade of blue; but yellows and browns predominated. In some Mela-

leuca growing over the creek several nesting-places of the Ring-tailed Possum were observed. They were all old nests, it being too early for this season's nests. In an ants' nest three specimens of Eupines (sp. ?) were secured, and under a stick a male of *Tyromorphos speciosus*, King, was taken. This is the largest Pselaphid beetle found near Melbourne; it is 8 mm. long. Under a piece of rotting bark, on the ground, I took what is almost certainly a new species of Staphylinidæ, and about the smallest recorded from Australia; it is under the half millimetre, or approximately one-sixtieth of an inch. Hours might have been profitably spent here by any entomologist, but the party seemed to think we had had enough, so, as soon as lunch was over, we started off again, going further up the creek, then on to a track that led to the Wandin road, and then followed that road back to the station. On the way out the leader was kindly allowed to lead—that is to say, he was always somewhere near the front; but, once we got near the road, the majority apparently decided the leader was an unnecessary appendage, and dispensed with his services entirely, and rushed off along the road to the station, arriving there about three hours and a half before the train was due to leave. They then decided to walk on to Lilydale, and thus passed out of my ken. While this party was thus rushing off to Lilydale, the leader was bringing up the rear with a party that had dwindled down to four, who made a determined effort to bring home something worth while to show for the day's outing. Cutting tussocks of grass and sifting over paper proved very instructive and entertaining. Numbers of small spiders, representing many families, were obtained, also some large Wolf Spiders, Lycosidæ. Most people seem terrified at spiders—I know not why; and the way one lady member of the party put her hand on the ground in front of these large wolf spiders, and allowed them to run over her hand, would have given most people the "creeps" for days after. After searching diligently through this grass, several beetles were obtained, the best being an undescribed species of Narcodes. Under a stick a fairly rare Staphylinid, *Œdichirus geniculatus*, Lea, was obtained, while we obtained a specimen of *Chlamydopsis setipennis*, Oke (MS.), in an ants' nest. Two surprises in flowers were a small spray of *Tetratheca ciliata* and two small bushes of *Leptospermum scoparium*, out in flower. Were they late or early? Mr. A. D. Hardy had kindly invited members to his country residence, adjacent to the station, to have tea, and a few availed themselves of his offer, returning to town by the last train, well satisfied with the pleasant day spent.—Chas. Oke.

THE LATE MR. FRANK P. SPRY.

VICTORIAN entomologists will deeply regret the death at South Melbourne, on 8th August, of Mr. Frank Palmer Spry, entomologist at the National Museum, Melbourne. He was one of the early members of the Field Naturalists' Club of Victoria, having been elected in February, 1882. He was a regular attendant at the meetings of the Club, where he will be greatly missed, and generally had some interesting exhibit, but un-

THE LATE MR. F. P. SPRY.

fortunately could never be induced to commit any of his extensive knowledge to paper.

Mr. J. A. Kershaw, F.E.S., zoologist, National Museum, Melbourne, pays the following tribute to Mr. Spry for his entomological work:—

"Mr. Spry was one of the most enthusiastic of our entomological members, and retained a very keen interest in his favourite subject up to the time of his death. Born at St. Kilda on 18th June, 1858, he developed at an early age an interest in entomology, devoting his attention to Victorian butterflies. Prior to the formation of the Club he was in close association with the late W. and D. Kershaw, of the National Museum, and Messrs. D. Best, C. French, sen., and others who later took a prominent part in the formation of the Club, and with them collected in Studley Park, Brighton Beach, and other localities, at that time favourite collecting-grounds.

"In 1893, in conjunction with Mr. Ernest Anderson, he published the 'Victorian Butterflies,' a most useful publication, which has long since run out of print.

"In 1904 he joined the staff of the National Museum as museum assistant, and in 1920, in view of his excellent work in connection with entomology, was promoted to the position of entomologist. It was in entomology that he did his best work, and throughout his eighteen years' association with the Museum took the keenest pride in the preservation and arrangement of the collections, which deservedly earned for him the praise of entomologists both in Australia and abroad.

"His knowledge of Australian Coleoptera, Diptera, and Hymenoptera was probably unsurpassed, in the study of which he devoted all his spare time. Every week-end and all his holidays were devoted to field work, the bulk of his gatherings being added to the Museum collections.

"His name is frequently mentioned in the publications of Dr. E. W. Ferguson, H. J. Carter, A. M. Lea, Dr. R. J. Tillyard, and others in acknowledgment of advice and assistance Although always ready to help others, and especially beginners, he could not be persuaded to put his knowledge into print. Much valuable information which he accumulated, and which took considerable time and effort to obtain, has thus to a large extent been lost.

"Apart from entomology, Mr. Spry was a well-known student and collector of coins, prints, &c., relating to the early history of Australia, and for some time was a member of the Historical Society of Victoria.

"His loss will be keenly felt among the large circle of friends and co-workers with whom he was so long and closely associated, but by none so much as his colleagues at the Museum."

Mr. F. Chapman, A.L.S., palæontologist, National Museum, Melbourne, writing in appreciation of Mr. Spry's geological investigations, says:—

"I well remember attending the first meeting, after my arrival in Melbourne, of the Field Naturalists' Club, and being introduced to Mr. Spry by the late Dr. T. S. Hall. He remarked, 'Here is a man you must know, for he discovered Bather's new crinoid.' The fossil crinoid referred to, which Mr. Spry had found near the old pumping station outside the Botanical Gardens, was only one of many hundreds of wonderful discoveries he made in working over the mudstone of the Yarra improvements. For instance, nearly all the graptolites found there were revealed by his hammer, and these, with many distinct types of Orthoceras now in the National Museum, would certainly have been lost to science but for his timely collecting.

"Like the author of 'The Old Red Sandstone,' Mr. Spry's

earlier occupation as a stonemason led him to take particular notice of the fossils in the stones upon which he worked: and later, as contractor's foreman in the sewerage works round Melbourne, he had ample opportunity, of which he availed himself to the full, of collecting the various fossils found both in the bedrock and in the Pleistocene. In the latter formation he came across some interesting clay nodules containing plant remains, that had been formed in the bywash of the old Yarra at South Melbourne more than ten thousand years ago. These I described in the *Geological Magazine* for 1906, and the type example is exhibited in the National Museum. Of the more notable finds of Mr. Spry in the Melbournian mudstone we may particularly mention the wonderful brittle-star, *Gregoriura spryi*, lying, in all its perfection, with slender, flexuous, and spiny arms, on the fine, hardened mud of the South Yarra Silurian.* These specimens, type and counterpart, now repose in the collection of the National Museum. Just prior to 1902 Mr. Spry had found several curious fossil impressions like the helical uncoiling of a fern tip, and which were then provisionally placed with the convenient group of the 'fucoids.' After seventeen years slightly better examples of these forms were found at Keilor by Mr. A. James, B.A., and it gave one much satisfaction to find them to be an almost unique occurrence of the gill impressions of Silurian worms (Trachyderma), closely related to the living Sabella and Serpula.

"Although his later years were well occupied with entomological studies, Mr. Spry found time to take several geological trips, in which it was sometimes my privilege to join; and the keen eye and skilful hand that he showed in this work was worth witnessing. In his reading he spread himself so widely that it was astonishing to find he was conversant not only with general geological works, but more especially with those bearing on entomology in regard to travels and distribution. Fabre's works he revelled in, though not always agreeing with Fabre's conclusions. Mr. Spry was especially fond of historical literature, and at times one would find him reading such works in the original French. Of a philosophic bent, we would show by his reasoning a deep insight into the wonderful economy of the insect world, and it is to be regretted that he did not place his knowledge on record. His monument is in the memory of his colleagues and in the practical achievements he has left behind."

His remains were interred in the Melbourne General Cemetery on Wednesday, 9th August, in the presence of quite a number of his fellow-members who desired to show their respect for their old friend.

* Illustrated in "Australasian Fossils," Chapman, p. 143.—Ed. *Vict. Nat.*

ABORIGINAL IMPLEMENTS.

ABSTRACT OF A PAPER READ BY DR. GEO. HORNE, V.D.

(*Read before the Field Naturalists' Club of Victoria, 10th April*, 1922.)

THERE are in Australasia four areas, at any rate, which have marked differences, as well as marked resemblances, in their stone implements—

1. The first is the East Coast, extending from beyond Brisbane to Cape Otway in Victoria. This was inhabited by natives who traced their descent through their fathers.

2. The second is the eastern inland district, which stretches from the coastal range to about the Queensland border and Lakes Eyre and Torrens. These trace their descent through their mothers. (I am dealing particularly with those near Lake Eyre.)

3. The third extends west and north from Lake Eyre. The natives of this district are paternal in tracing their descent.

4. The fourth area is Tasmania.

Taking first the stones that are universally present, we have the hand scrapers. These have an oval chipped end, and a handle which is twice as long as its breadth, or even more, but sometimes it is only a little longer than it is broad. They have this peculiarity: there is a flat side and a keeled side. This keeled side has in many cases a piece of the keel chipped off, to make a place on which to put the finger. For these stones I have adopted the name of "kálără" by which the natives east of Lake Eyre call them. The kalara as found in Tasmania is absolutely undistinguishable from the Lake Eyre variety, as are also the East coast specimens. It is world-wide in its distribution, being found in England and France, as well as America, South Africa, and Japan.

Turning, then, to the scrapers which are used in one district and not in all, one finds the "thumb-nail" (fig. 1), which is

Fig. 1.

a small, very well chipped example of the kalara. These are found in great profusion near Melbourne, but there are none

amongst the maternal aboriginals of Lake Eyre. To the west of Lake Eyre, amongst the paternal natives, they appear again.

Another example may be found in the long, flaked knife. Amongst the central maternal folk this is made of a chert which chips with a sharp edge. The specially coveted one is as long as possible, and is slightly hooked at the end. They are covered at the blunt end with mindrie gum. The smaller knives are, however, marked for gripping, and are used in boys' fights or for general service. The East Coast had many similar knives (fig. 2), but they were throughout of a lighter

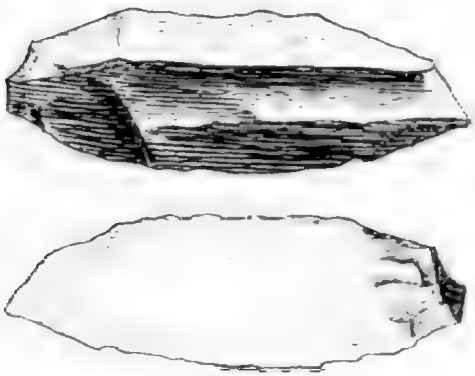


Fig. 2.

character; sometimes they have a chipped edge, which may be serrated.

The Tasmanian knife is a long blade, almost always with a chipped edge, though a few flake knives are found.

The chipped-back knives of Etheridge are a peculiar East Coast trait. They are found in two shapes, and have several minor differences. These are shown in fig. 3 and fig. 4. The former are found all along the coast; the latter

Fig. 3.

Fig. 4.

abound in Victoria, and some few are found to the west of Lake Eyre, where the Arunda men know them well. To the east of Lake Eyre they may be found, but the present inhabitants do not know them. It is significant that the East Coast and also the Arunda are paternal natives. Only the double-pointed ones (fig. 5) are found among these folk. None

Fig. 5.

of them are found in Tasmania. All the small chipped-back knives and thumb-nail scrapers are classed by Breuil as Tardenoisian.

Another form of knife, the leaf-shaped flake, is one that is specially used for the circumcision operation in the Lake Eyre district. It may also be used for general surgical purposes, such as making tribal marks, &c. A similar knife (fig. 6) was in use among the East Coast natives, and on both

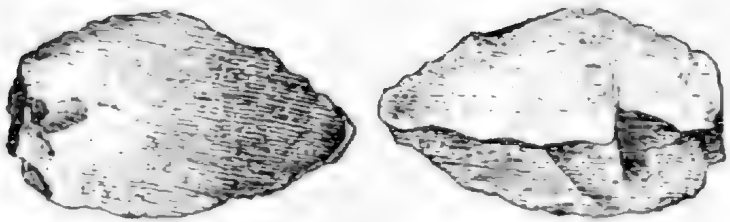


Fig. 6.

the mark for the finger or thumb was made. The East Coast natives differ from the others in the vast numbers of minute copies of larger implements to be found there. These seem to have been made for the children to practise with. Children are carefully considered amongst the Lake Eyre tribes, small implements being specially made for them.

When one takes into consideration the polished axes and knives, the rough workmanship of most of the implements, and the carefully made Tardenoisian forms, one cannot help thinking that in France these would be called Campigian, or certainly pre-Neolithic in age.

FLORA OF SOUTH AUSTRALIA.—The South Australian Branch of the British Science Guild, in pursuance of its policy to issue handbooks on the flora and fauna of the State, has issued the first part of the "Flora of South Australia." This has been written by Mr. J. M. Black, author of that excellent work on "The Naturalized Flora of South Australia." He has done his work well, but we fear it is far too scientific to become a popular handbook such as we presume was the idea of the Guild. Of course, it is difficult to determine what should be included and what should be left out in such a work, and

perhaps it is better to err on the side of including too much detail. The part under notice, being arranged on the system of Engler, commences with the ferns and extends to and includes the orchids, barely perhaps one-fourth of the plants of the State. The orchids have been dealt with by Dr. R. S. Rogers, the well-known authority on that group, and are treated very minutely, with some excellent drawings by Miss R. C. Fiveash. Following recent botanical publications of a country the introduced plants are included in their systematic positions. The author's introduction explains the scope of the work and other points. Then an excellent sketch of the workers on South Australian plants and previous publications is followed by a very complete glossary of botanic terms. As the dimensions of the plants dealt with are given in terms of centimetres, a very handy measurement scale is included, which should prove of great service. Altogether the publication, which has been produced by the Government printer, is a valuable addition to the State floras of Australasia. Its price is three shillings, and Victorian botanists will find it a useful investment, for many of the plants described are found also in this State.

"Journal of the Royal Society of Western Australia."—The volume of this publication (vol. vii., 1920–21) recently issued contains several interesting and important papers, notably two by Mr. D. A. Herbert, M.Sc., Economic Botanist and Plant Pathologist, Analytical Department, Western Australia, on parasitism of the Quandong and on parasitism of the Sandalwood. The Quandong, *Fusanus acuminatus*, R. Br., was found to be parasitic on *Acacia acuminata*, *Eucalyptus laxophleba*, and *Daviesia euphorbioides*. The Sandalwood, which is a valuable tree commercially, was also found to have *Acacia acuminata*, the Raspberry-jam Acacia, as its favourite host. Efforts to raise young Sandalwoods seemed to prove that a host plant is essential to it.

"Half-Hours in the Bush-House." — Many field naturalists who do a little in the way of pot-culture of plants they find, or of others they are interested in, will find in Mr. A. E. Cole's little volume a great deal that will both interest and instruct them. It is clearly written, in simple language, with many figures in illustration of the author's remarks and ideas. All types of plants are dealt with in his notes, such as bulbs, ferns, palms, foliage plants, creepers, orchids, ornamental grasses, and shrubs, so, whatever may be the favourite group, the reader is sure to find something applicable to his fancy. The author has been good enough to insert the derivations of most of the names of genera used, which helps considerably in remembering the proper names of the various plants. The work is published by Messrs. Angus and Robertson, at the price of five shillings.

The Victorian Naturalist.

Vol. XXXIX.—No. 6. OCTOBER 5, 1922. No. 466.

FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 11th September, 1922.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about fifty members and visitors were present.

REPORTS.

A report of the excursion to Warrandyte on Saturday, 19th August, was, in the absence of the leader, Dr. C. S. Sutton, given by Mr F. G. A. Barnard, who said that a party of about forty members and friends had proceeded to Warrandyte by char-a-banc and had had an enjoyable afternoon, though soon after starting a severe hailstorm had been encountered. On arrival at the "Pound Bend" members alighted from the vehicles and walked along to the river-bank in order to see the Silver Wattles, *Acacia dealbata*, in bloom. These were found to be at their best, and occasional beams of sunshine lighting them up made the sight very beautiful. A few other flowers were collected, and after afternoon tea the party returned to town.

A report of the excursion to Bayswater on Saturday, 2nd September, was given by the leader, Mr. E. E. Pescott, F.L.S., who said that quite a large party assembled at the "Basin" in order to view the nursery of Mr. Bert. Chandler, where a number of native shrubs are being cultivated in quantity for the cut-flower trade. One of the greatest favourites with the public is the Western Australian Boronia, *B. megastigma*, which, under treatment here, grows to greater perfection than in its native state, while the flowering period has been so extended that flowers are obtainable during nearly six months of the year. Other favourites grown are *Thryptomene Mitchelliana*, *Lhotzkya genetylloides*, and *Boronia pinnata*, while others are being tried. Several acacias were in full bloom, and added to the colour scheme of the nursery. Mr. Chandler kindly allowed the visitors to help themselves to his flowers, which privilege was much appreciated.

A report of the excursion to Bendigo on Saturday, 9th September, was given by one of the leaders, Mr. C. Daley, F.L.S., who said that the Melbourne contingent of the party numbered five, but his local co-leader, Mr. D. J. Paton, brought three more with him, so that nine altogether participated in the outing. The first direction taken was towards Ironstone Hill, to the north of Bendigo, where it was found that the

country was suffering from a dry winter, consequently flowers were scarce, but several acacias, such as *A. pycnantha*, *A. calamifolia*, and *A. leprosa*, made a fine show. The following day the party went in the opposite direction, to South Mandurang, where they found an abundance of flowers, Eriostemons, Grevilleas, and Acacias being very conspicuous. Orchids, though numerous, were confined to a few species. The entomologists were very pleased with the result of their efforts, several very interesting species and larvæ being taken.

ELECTION OF MEMBERS.

On a ballot being taken, Mrs. E. Coleman, "Walsham," Blackburn-road, Blackburn; Miss E. Hewitt, "Strathroy," Barker's-road, Hawthorn; Mr. A. Brown, B.A., LL.B., 27 Wattletree-road, Malvern; and Mr. C. Wilkinson, Grove-road, Hawthorn, were duly elected as ordinary members, and Master H. Wentworth, Wellington-street, Kew, as an associate member of the Club.

GENERAL BUSINESS.

Mr A. E. Keep referred to the alarming increase in the export of live Australian birds to foreign countries, and the great losses by death resulting from the practice. Some discussion ensued, which was unanimously in favour of some steps being taken to regulate or abolish the export of live specimens of the Australian fauna, and the matter was left in the hands of the committee to confer with other bodies, and make representations to the Government on the matter.

PAPERS READ.

1. By Mrs. E. Coleman, entitled "Some Autumn Orchids." The author, in a chatty paper, dealt with the various species of terrestrial orchids found during the autumn months. The first to claim attention was the sweetly-scented *Eriochilus autumnalis*, which often occurs in great quantities in April and May. In March may be found representatives of the genus Prasophyllum, mainly the smaller forms. Some of the "Greenhoods" (Pterostylis) commence their flowering period in the autumn. Another autumn orchid, *Chiloglottis diphylla*, flowers during May. Altogether, the paper proved most interesting, and considerably enlarged members' ideas as to the variety of orchids to be found during April and May.

Some little discussion ensued, in which Mrs. Coleman was congratulated on her paper.

2. By Mr. C. Oke, entitled "An Entomologist in the Dandenongs in Winter."

Owing to the lateness of the hour only a portion of this paper was read, but the author gave sufficient of his notes to prove

that winter is not such a blank for insects as is usually supposed, and that in a district like the Dandenong Ranges, by careful search, species of nearly every order may be found.

EXHIBITS.

By Mr F. G. A. Barnard.—Pot-grown orchid, *Pterostylis nutans*, in bloom.

By Mr. F. Cudmore.—Aboriginal spear-head from Oodnadatta, Lake Eyre district, South Australia.

By Mr. C. Daley, B.A.—Flowers of *Eriostemon obovalis*, *Grevillea aquifolia*, and *Tetratheca ciliata*, collected at Bendigo excursion; also flowers of *Thryptomene Mitchelliana* and *Baeckea plicata*, grown at Caulfield.

By Mr. J. E. Dixon.—Cabinet drawer of Victorian Paropsis beetles (Ladybirds), comprising 76 species.

By Mr. E. R. Hammet.—Aboriginal chisel from Upper Goulburn, Victoria; sulphur from Tikitere, Rotorua, N.Z.; and stone axe from Fiji.

By Mr. E. E. Pescott, F.L.S.—Orchid, *Caladenia pumila*, Rogers, new to science, collected at Bannockburn, Victoria, by Miss B. Pittard, September, 1916; flowers of *Acacia elongata* and *A. Howittii*, species suitable for hedge purposes; flowers of *Thryptomene Mitchelliana*, gathered six weeks previously; also an aboriginal stone implement used as an axe, a rubbing and chipping stone, and also a hammer.

By Geological Survey of Victoria (per Mr. A. E. Rodda).—Pseudomorphic crystals of limonite after pyrite, from Dunolly.

By Mr. A. E. Rodda.—Photographs of nests and eggs of following birds—viz., Flame-breasted Robin, Brown Tit-Warbler, White-shafted Fantail, White-browed Scrub-Wren, Crescent Honey-eater, and Pilot-bird, from Walhalla district.

By Mr. A. L. Scott.—Rock specimens from Tarawera, New Zealand.

By Mr. H. B. Williamson, F.L.S.—Orchids, *Lyperanthus nigricans*, Red-beak Orchid, and *Caladenia cærulea*, Blue Caladenia, from Cheltenham.

After the usual conversazione the meeting terminated.

CORRECTION.—In the September *Naturalist*, page 60, line 14 from bottom, Mr J. A. Kershaw, F.E.S., was referred to as "zoologist" of the National Museum; his official position is Curator.

PERSONAL.—Mr. C. French, jun., Government Entomologist, has been appointed lecturer on agricultural entomology in the course for the degree of Bachelor of Agriculture in the University of Melbourne.

A SIMPLE STUDY OF OUR COMMON SERPULID.

BY P. C. MORRISON.

(*Read before the Field Naturalists' Club of Victoria, 10th July, 1922.*)

IN order that students of the natural history of any object, whether it be animal or vegetable, may be able to base their remarks on some recognizable foundation, such objects have been classified by investigators into groups—at first very comprehensive—based on general structural features. These are gradually narrowed down by the separation of the objects under consideration into smaller groups possessing distinctive features, and so on till we reach a group containing few differing features, which, for convenience, is termed a genus.

Now, the animal about which I propose to give some notes to-night belongs to the family Serpulidæ. This is an important group of the sub-kingdom or phylum known as the Annelida —the segmented worms—which includes nearly all worms except parasitic ones. The members of this phylum are characterized externally by the division of the body into rings or segments, as in the common earthworm. This characteristic alone would not be a sufficiently important one upon which to form a phylum were it not for the fact that the rings are only an outward indication of a very important and typical internal structure. In all the worms belonging to this phylum we find the body divided into a number of chambers or somites by transverse walls or septa, corresponding to one or more of the external rings, each somite being a repetition of the last, bearing a more or less complete set of organs.

Phylum : ANNELIDA.
Class 1.—HIRUDINEA : Leeches.
Class 2.—CHÆTOPODA : Worms provided with bristles for locomotion.
Order 1.—Oligochæta.—Bristles few in number : Earthworms.
Order 2.—Polychæta.—Bristles numerous : Marine worms.

The Polychæta include seven sub-orders, which are collected under two branches—
Branch 1.—Phanerocephala : free-living or burrowing forms (contains five sub-orders).
Branch 2.—Cryptocephala : tube-building forms.
Sub-order 1.—Hermelliformia—a small, unimportant group containing only two species.
Sub-order 2.—Sabelliformia—containing the remainder of the tube-building polychætes.

There are four families of Sabelliformia, of which we need to mention only one—Serpulidæ, to which the serpula belongs. It is worth noting that it is impossible to give the species of

any of our Victorian serpulæ, as no work has yet been done upon them, the genus, Serpula, being the furthest we can go up to the present in classifying them. This is just one of many lines of investigation open to workers in a Club such as our own who care to delve deeper than ordinary superficial interest in natural history.

Now that we have got over the least interesting, although by no means the least important, part of our subject, and have seen just what place the object of our studies occupies in the general scheme of things, let us go back and briefly examine the group of polychætes as a whole. Both free and tube-building forms are common objects on our seashores, living for the most part between tide-marks in rock pools.

The commonest of the free-living forms is perhaps Nereis, the common sand-worm of the angler, to be found among the rocks and sand all round the Bay here. This, in common with many other free-living forms, has horny jaws and teeth which can be protruded from the mouth or withdrawn a considerable distance down the "throat" at will. These jaws in the retracted condition can be well made out in the specimen exhibited.

A curious form sometimes found about here is the sea-mouse, Aphrodite, in which the bristles are long and fine and cover the whole of the back, giving the animal the appearance of a small mammal rather than of a worm.

Another similar form is protected by dorsal plates, giving it much the appearance of a tiny armadillo. It belongs to the genus Polynoë, and is sometimes found round our shores.

The two latter are not so often found by the shore collector, as they prefer to live in a moderate depth of water, where they walk along the sea-bottom in search of prey. Only a few of the polychætes are pelagic and swim in the open ocean. One of these is Tomopteris, which zoologists have had brought before them a good deal lately as a favourable object for research in certain branches of cytology, owing to the brilliant work of A. and K. E. Schreiner.

The tube-building forms are all more or less profoundly modified for their mode of existence. Respiration can, of course, be carried on only by exposed parts of the body—*i.e.*, the head end—and so, instead of having a row of small gills down each side, as do most of the free-living forms, they have a tuft of enormously-developed gills at the head, sometimes in the form of long unbranched threads, as in Terebella, but more often as a pair of large, brightly-coloured, much-branched structures, each primary branch being pinnate. The latter condition holds in Serpula, to which we will confine our remaining remarks.

Perhaps one of the commonest objects round our coast is the white incrustation of twisted, worm-like tubes so often found covering rocks and piles up to low-water mark, and sometimes between tide marks. These tubes are secreted by the Serpula, and, even if they are uninhabited, they are worth examining. They are more or less rough outside, but always very smooth within for the reception of the body of the inhabitant. With a little care specimens may be obtained from round our coast, in different parts, showing a regular gradation from a perfectly round exterior to a form with five or six longitudinal ribs, as can be seen also in an extinct form, *S. ouyenensis*, found in Victoria. In every case, however, horizontal rings are well marked, each (like the annual rings in the trunk of a tree) denoting a period of growth of the tube. If we have the good fortune to find the animal at home, as we are certain to do if the specimen has been under water when collected, we have much more to see. At first it appears that each tube is blind at its outer end, for it is blocked up by a perfectly-fitting white disc; but if the specimen be placed in sea water for a few minutes and allowed to remain undisturbed, the disc at the end of each tube will be seen to move outwards, allowing two beautiful variegated plumes to emerge. These plumes are the breathing apparatus of the animal inhabiting the tube, and have on them eyes, which, while unable to form a definite image, are able to perceive differences of light and shade, thus giving the animal warning of the approach of danger. The delicate plume-like gills are also apparently endowed with a very delicate sense of touch, for they can detect the presence of even very slight currents in the water. This the writer has proved by producing slight currents by means of a fountain-pen filler drawn out to a very fine point. Very slight disturbances were found to cause the animal to place itself with its gills across the direction of the current, exposing as large a surface as possible to it, probably with a view to obtaining food, for the gills serve the additional purpose of food capture. If, however, the intensity of the disturbance was increased, the animal would retract sharply into its abode, the disc, which is really the base of an inverted cone or operculum of horny material, effectively closing the mouth of the tube against possible enemies. This is interesting in view of the fact that each animal in the colony is continually producing a current while the gills are expanded by means of fine hairs or cilia covering the whole of the gill branches and pinnæ, and, while the cumulative action of all the members of a colony must produce a very noticeable disturbance, each individual seems easily capable of discriminating between this and a current produced by some external agency. The purpose of

the current produced by the colony seems to be to waft the prey to the tentacles, as the animal is incapable of protruding far out of its tube.

If the tube be carefully chipped away, leaving the body of the animal exposed, we are able to learn much more of our friend's anatomy. He has a body not unlike that of an ordinary thin earthworm, and the bristles on the hinder part cannot be seen with the naked eye. The front part, however, is typical of nothing but the group under consideration, as it is an adaptation to a peculiar mode of existence. A shield-like expansion, the thorax, covers the front part of the animal, and possesses at its free edges tufts of setæ or bristles, which, by gripping against the sides of the tube, enable the animal to get a purchase, and so advance and retract easily and quickly in the tube.

The thorax is more robust than the hinder part of the body, which, under normal conditions, is never exposed outside the tube. It is the thorax, too, which secretes the shell, and which smooths the inner surface for the comfort of the tender, vulnerable tail portion. The mouth is very inconspicuous, and is situated as a small hole between the bases of the gills, which act as lips.

At the tail end the tube is usually closed, and so there must be some mechanism provided for the disposal of poisonous excretory products, which are discharged from the anus at the tail and also from a pair of excretory pores in each of the numerous segments of the animal. For the attainment of this end a ventral groove runs from the tail to the mouth of the tube, and into this the excretory pores open. Along each side of this "gutter" is a row of fine hairs or cilia which continually waft a stream of water from tail to head, thus sweeping away all harmful products as they are discharged from the body, while pure sea-water flows in from the gills and down the back to keep the gutter supplied with water. This channel also serves to liberate the eggs, which are fertilized after leaving the tube by spermatozoa liberated in the same way. The action of this ciliated gutter can sometimes be beautifully seen in a specimen removed from its tube and placed in a watch glass containing some sea water into which a little carmine has been dropped. Streaks of carmine are quickly formed along the lines of the currents, showing them up very distinctly. This is a standard method in work with living animals under the microscope, as the carmine, although it is in a very fine powder, is yet insoluble, and so cannot harm the animal or produce abnormal actions. One specimen the writer was examining thus *in nudo* laid a number of eggs while under observation, and, although there was no tube present, yet

these were carefully wafted along this channel for the full length of the animal, and then cast away from the head end, the slow procession of little white spheres along the undulating contour of the animal presenting a really beautiful spectacle.

The internal anatomy of the animal, except in so far as has been already mentioned, depends for its study so much upon microscopical technique and trained observation as to be, in the opinion of the writer, beyond the scope of an elementary study such as the present one, and so any attempt at describing it has been omitted.

I have hitherto spoken of the Serpula as an animal of absolute stationary abode; but this is not in all cases strictly correct, as among these tube-building worms, and especially among the serpulids, as being the commonest of the type, we find many examples of commensalism. This is a mode of life in which two or more animals, often of widely differing natures, live constantly together, usually for mutual benefit, and at least never to the detriment of either, "sharing the same table," as the term denotes. One has seen serpulids growing on living crayfish and crabs, sea-urchins, and shell-fish of various kinds, all of which enable the worm to obtain food more easily, as they move from place to place, and so take their passengers continually to fresh fields and pastures new, instead of leaving them wholly dependent upon the whim of the ocean currents to bring their food to them; and, of course, the larger animals often drop "crumbs" of their meals, which are usually carried to the expectant gill tentacles of the waiting serpulid. In return for these kindly offices of its host the Serpula endows upon it the magic cloak of invisibility, for at the approach of danger the larger animal has only to remain still and it is indistinguishable from the surrounding serpula-covered rocks among which it makes its home. One such specimen as this—a periwinkle, completely encrusted with Serpulæ—it was the writer's good fortune to obtain at Brighton recently, and it was a worth-while entertainment to sit and watch the evolutions of the little family in a small glass aquarium, the periwinkle crawling along the glass and rocks like a snail housed, apparently, in a living mass of brightly-coloured waving plumes. Unfortunately, a saltwater aquarium is a difficult thing to keep in order at any considerable distance from the sea, and soon the host and his precious burden, no doubt affected by the discharge of poisonous matter into the water by all the inhabitants, became lethargic and died.

Serpulids and their allies have been found as fossils in Victoria, *S. onyxensis* being found fairly freely in a bore at Ouyen at a depth of up to 600 feet, and members of other genera have also been described by Mr. F. Chapman, to whom

I am indebted for any information I possess regarding these fossil forms. The oldest of these representatives of a bygone age are perhaps 60,000,000 years old.

In conclusion, a few words about general zoological research methods for those desirous of taking up such work might not be amiss. From the point of view of the systematist, the most important work to be done on any new animal is a minute and exhaustive study of its structure, and a comparison of it with that of other related forms. Each part should be minutely examined, described, and drawn, no detail being too small to merit attention. In the polychæta, for example, among the free-living forms particularly, there are a number of species very similar externally which are identified by the various forms of their bristles, which are very constant in any one species, but which differ considerably in shape in different species otherwise similar. Of course, each species will differ from others in more particulars than this one, but this is the most trustworthy for purposes of identification.

In addition to outside appearance, internal structure has often to be examined. In the case of most animals this can be done by ordinary dissection, but in small forms such as these worms more can be learned by cutting the whole animal into sections and studying these under the microscope. In many cases, however, this work, which is rather tedious and exacting, may be omitted unless a whole group is being examined and classified. The structure being known, the habits of the animal and its relation to its environment are the next things to be determined, and usually the last thing to be done is to study the development from egg to adult.

And now, as a final word, I would commend to all workers or intending workers along the field of zoology in this Club the remarks of Sir Baldwin Spencer at our recent exhibition anent the need for work to be done on our Australian fauna, and would emphasize the fact that, at least among our tube-building polychætes, we are uncertain in many cases even of the genera to which they belong.

EXHIBITION OF WILD-FLOWERS.—Members will be pleased to learn that the annual exhibition of wild-flowers, held on Tuesday, 3rd October, while this number was being prepared for issue, was again an unqualified success. The attendance of the general public was good, while the variety in the exhibits has seldom been exceeded. Full details of the exhibition will be given in the next *Naturalist*. The committee desires to thank members and friends of the Club for their kindly co-operation in what has become a "looked-for" fixture in the social life of Melbourne, and with this, as in previous

exhibitions, a way of raising money for a deserving charity. It is expected that the Children's Hospital will receive at least £50 through the effort.

"Australian Nature Studies."—Just as we go to press copies of this long-expected work by Dr. J. A. Leach are available. The volume, which extends to over 500 pages, should be a valuable addition to the libraries of nature study teachers, being well illustrated with about 2,000 black and white drawings, besides six three-colour plates. A review of the work will appear in the next *Naturalist*.

"The Honey Flora of Victoria."—This is a reprint of a series of articles which appeared in the *Journal of Agriculture* during 1914-18. The author, Mr. F. R. Beuhne, Government Apiculturist, says in his foreword that the matter in the earlier articles has been brought up to date, but there is still much information wanted with regard to the apicultural value of our native vegetation, and it is partly with that view that the articles have been brought together and issued at the popular price of one shilling. It is hoped that those interested in bee culture will study what has been written, and will communicate with the author as to revision or extension of the statements. The work is illustrated with seventy figures, mostly eucalypts, and, in fact, with its excellent indices and lists of species, might almost be recommended as a handbook to the commoner species of our gum-trees. Notes on the Banksias, Tea-trees, Callistemons, and Grass-trees complete the work, which has been issued by the Government Printer.

Australian Bird Maps.—A bird-book of more than usual interest to bird-lovers is "Australian Bird Maps," by Robert Hall, C.M.Z.S., of Hobart, well known some years ago as a member of the Field Naturalists' Club of Victoria. In it, by the use of one hundred and one miniature maps or graphs representing Australia and the adjacent islands, &c., the author illustrates the distribution and seasonal movements of many of our notable birds, tells their mode of life, &c. The maps might have been on a rather larger scale without increasing the size of the pages, thus allowing the details to be clearer, while, had they been placed in close proximity to the reading matter referring to them, much turning over of pages would have been avoided. However, the volume, which has been published for the benefit of the boy and girl scouts of Tasmania, will be welcomed by students of bird-life; it reveals a deal of research and note-taking on the part of the author. Three plates of figures of birds illustrate the species referred to in the various maps. The work has been published at four shillings and sixpence, and we hope will have a ready sale.

The Victorian Naturalist.

Vol. XXXIX.—No. 7. NOVEMBER 9, 1922. No. 467.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 9th October, 1922.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about fifty members and visitors were present.

A report of the excursion to Cheltenham on Saturday, 16th September, was given by Mr. A. J. Tadgell, who acted as leader in the unavoidable absence of Mr. H. B. Williamson, F.L.S., stating that, notwithstanding threatening weather, a good party of members and friends had taken part in the outing. Quite a number of the early spring flowers were at their best; about seventy species were collected and named during the afternoon, and, in addition, twenty-two species of exotics were noted. Nine species of orchids were collected, of which the "Tall Diuris," *D. longifolia*, and the "Blue Fairies," *Caladenia deformis*, were the most admired. Other notable plants were the "Showy Bossiæa," *B. cinerea*, the "Hairy Aotus," *A. villosa*, and the "Scarlet Sundew," *Drosera glanduligera*.

A report of the excursion to Alphington on Saturday, 23rd September, was forwarded by the leader, Mr. J. Searle, who said that there was a fair attendance of pond-life enthusiasts, but there was nothing striking in the captures, the results being much the same as reported on previous excursions to the district.

A short report of the visit to Natya, *via* Piangil, on the Murray (below Swan Hill), from Saturday, 23rd September, to 2nd October was given by Mr. C. Oke, who said that the small party had worked enthusiastically and made a number of interesting captures, especially in entomology, which would be detailed at a later date.

The excursion set down for Toorourrong for Thursday, 28th September (Show Day), was not held, owing to the poor response by members.

A report of the excursion to Blackburn on Saturday, 30th September, was given by the leader, Mr. A. J. Tadgell, who said that again threatening weather had not damped the enthusiasm of a number of members in meeting for a ramble at Blackburn. However, at four o'clock rain put an end to work in the open, and the friendly shelter of a tea-room was sought, where the finds were discussed and suggestions were made for extending the usefulness of the Club and its objects. About seventy species of plants were noted and named, as well as

fifteen aliens. Of these, the "Golden Bush-Pea," *Pultenæa Gunnii*, the "Hop Bitter-Pea," *Daviesia latifolia*, and the "Narrow Bitter-Pea," *D. corymbosa*, were the most noticeable. Seven orchids were collected, all common species. Among the aliens noted was the "Wild Onion," *Nothoscordum fragrans*.

A report of the excursion to Langwarrin on Saturday, 7th October, was given by the leader, Mr. H. B. Williamson, who stated that an interesting day had been spent, mostly in quest of orchids, of which a dozen species were noted. Following the railway line, a turn was made towards Baxter State school, where, on a springy hillside, the Caladenias *deformis*, *Menziesii*, *carnea*, and *dilatata*, together with *Glossodia major*, *Thelymitra antennifera*, *Diuris longifolia*, *D. maculata*, *D. pedunculata*, and *D. palochila*, were gathered. Some were very much more plentiful than others. *Thelymitra luteo-ciliata* had been recorded from this neighbourhood, but diligent search failed to reveal a specimen; perhaps it was too early. After lunch a tract of "Sandringham country" was passed through, and *Caladenia Patersoni* added to the list. Further on the most important find of the day was made in *Burnettia cuneata*, of which three specimens were seen. Further search did not add to the list of species, and the evening train was taken for home.

ELECTION OF MEMBERS.

On a ballot being taken, Miss D. King, 23 Locke-street, Essendon; Miss Marjorie Warner, Hampton-street, Hampton; and Mr. J. S. Anderson, 17 Chrystobel-crescent, Hawthorn, were duly elected members of the Club.

GENERAL BUSINESS.

The hon. treasurer, Mr. F. Pitcher, reported that there would be a good credit balance as the result of the recent exhibition of wild-flowers, but as neither sales of tickets nor items of expenditure were all in yet he could not definitely state what amount would be available for division between the Club and the Children's Hospital.

The merits and management of the recent exhibition were freely discussed by several members, and from their remarks it is hoped some suggestions may be secured which will be of use on future occasions. It should be borne in mind, however, when offering criticism, that there is no comparison between the displaying of flowers in an ordinary horticultural show, where it is known beforehand what will be exhibited, and a wild-flower exhibition, where everything is an unknown quantity until the last moment. On this occasion the exhibition suffered considerably through exhibits being delayed on the railways and by carriers.

The chairman reported, with regard to the traffic in Australian birds and animals mentioned at the last meeting, that a representative deputation had waited on the Federal Minister of Customs on the matter, and had been received sympathetically, and a promise had been given that regulations would be framed to meet the wishes of the deputation and submitted to the interested societies for their approval.

PAPER READ.

By Mr. C. Oke, entitled "An Entomologist in the Dandenongs in Winter" (continued).

The author continued his remarks proving that entomology can be successfully followed, even in winter, in such varied country as the Dandenong Ranges, mainly owing to the amount of shelter provided by the dense vegetation.

The reading of the paper led to a discussion as to whether the red-striped spider or centipedes are really poisonous and dangerous to human beings. Mr. C. Cox said that he had "cured" a bite from a centipede by means of nicotine from a tobacco pipe. The chairman remarked that he had been bitten by a large centipede, but did nothing, and no untoward results happened. Mr. Oke said he doubted whether the red-striped spider was really dangerous, and thought that if any unpleasant results ensued it was due to the effects of fear or of the person bitten being in indifferent health. He had known of two persons being bitten who had not suffered more than if stung by a bee or an ant. Mr. J. A. Kershaw, F.E.S., said that Dr. W. Macgillivray, of Broken Hill, had told him that he had known of very painful results following the bite of this spider, and that he had treated several cases.

EXHIBITS.

By Mr. G. Coghill.—*Grevillea rosmarinifolia*, grown in his garden at Canterbury.

By Mrs. Coleman.—Orchids from Healesville.

By Mr. C. Daley, F.L.S.—Turquoise from King River, North-East Victoria.

By Mr. J. E. Dixon.—Forty-four species of Coleoptera; a rare fungus, *Battarrea phalloides*; scorpion from near the River Murray—all collected during the excursion to the Natya district.

By Mr. C. French, jun.—Orchid in bloom, *Dendrobium striolatum*, from Bairnsdale.

By Mr. C. Oke.—Arachnids, Myriapods, and insects in illustration of his paper.

By Geological Survey of Victoria (per Mr. A. E. Rodda).—Fossil plant impressions from coal bore, Mirboo.

By Mr. A. E. Rodda.—Photographs of native animals, as follows:—Wombat, Echidna, Koala, Ring-tailed Possum, taken at Walhalla.

By Mr. A. L. Scott.—Tarawera ejecta, collected from Frying-pan Flat side of Lake Rotomahana, New Zealand.

By Mr. H. B. Williamson.—Orchids, including *Burnettia cuneata*, from Langwarrin: specimen of Pink Bladderwort, *Polypompholyx tenella*, showing under the microscope the vesicles on the roots for the absorption of nutrient matter.

After the usual conversazione the meeting terminated.

EXHIBITION OF WILD-FLOWERS.

For this year's exhibition the Club was successful in securing the Melbourne Town Hall, and on Tuesday, 3rd October, it again presented a gay and animated appearance owing to the fine display of flowers and the large attendance of the public.

In the unavoidable absence of His Excellency the Governor-General, Lord Forster, the exhibition was opened by Sir Robert Best, M.H.R., who congratulated the Club on the excellent display and the good work it was doing in encouraging the growing of native flowers, and by means of these exhibitions bringing the attractiveness of our native flora under the notice of the general public. The president of the Club, Mr. Chas. Daley, B.A., F.L.S., in thanking Sir Robert Best for his kindly remarks, said that the Club had a members' roll of about 300 persons, but all were not interested in plants, such hobbies as butterflies, beetles, shells, or rocks each having its circle of votaries. The Mayor of Geelong (Alderman Hitchcock) spoke of the interest and pleasure to be derived from the cultivation of native plants in one's garden, saying that, as all our garden plants were derived from wild types, there was no knowing what results might be obtained by persistent cultivation.

On the platform was a fine display of cut flowers and foliage, forwarded by Mr. J. Cronin, Director of the Botanic Gardens. The flowers were all Australian natives, which have been growing in the Gardens for years, and included some very choice examples. Among these were *Olearia panosus* (Vic.), *Anopteris glandulosus*, the Tasmanian Laurel, *Chamælaucium uncinatum*, the Geraldton (W.A.) Wax-flower, also Chorizemas, Grevilleas, eucalypts, &c., from Western Australia—that land of wonderful flowers.

From the gardens of Mr. J. M. Watson, Balwyn; Mr. Geo. Coghill, Mr. F. Keep, and Mr. F. B. Sutherland, Canterbury; Mr. Alister Clark, Bulla; and Mr. S. Blake, Ivanhoe, came a large variety of cultivated Australian flowers, showing the

decorative value of many of our wild-flowers, while Mr. Russell Grimwade, of Toorak, showed blooms of *Eucalyptus Preissiana*, a Western Australian gum, grown from seed planted only four years ago. The blooms were very large and showy, being of a deep lemon shade. Mr. A. C. Chandler, of Croydon, exhibited an improved strain of Western Australian Everlastings, while Mr. B. Chandler, of Bayswater, forwarded some greatly-improved Boronia.

An interesting display of orchids was made by Mrs. Coleman (of Blackburn), Mrs. C. French, jun., and others, some forty or fifty species, collected at Healesville, Ringwood, Blackburn, &c., being staged; among these were *Caleya major*, the Flying Duck Orchid, and *Sarcochilus falcatus* (epiphytal). Orchids were also exhibited by Mrs. Best (Heyfield), Masters J. and N. Pescott, C. Resch, G. H. Jones, J. Hill, and others. The lady students of the Burnley Horticultural Gardens exhibited a fine collection of wild-flowers from Ringwood.

A number of willing hands, under the direction of Mr. H. B. Williamson, F.L.S., arranged the flowers as quickly as possible, mainly as to localities, but species of some of the more important orders were grouped together on special tables. As far as possible the flowers from other States were kept together.

Flowers came from all parts of Victoria, and the Club is deeply indebted to those members and friends who interested themselves in collecting and forwarding the many beautiful specimens. Mr. J. H. Maiden, F.L.S., Director of the Botanic Gardens, Sydney, sent a nice selection of New South Wales flowers. Mr. E. Ising, hon. secretary of the South Australian Naturalists' Society, forwarded a collection of South Australian flowers. From Western Australia a fine representative collection of about forty species was received, through Miss Fuller, from Miss A. Morgan, of Darlington. Some of these had been exhibited in Perth the previous week.

The usual difficulty was experienced in compiling a complete list of exhibitors, owing to the fact that many persons forward boxes without any indication of the sender's name or the locality where gathered.

As nearly as could be ascertained, about three hundred species of wild-flowers were exhibited. Mr. H. B. Williamson, F.L.S., contributes the following notes regarding some of the exhibits:—From Lorne the Rev. A. C. F. Gates, M.A., sent about fifty species, including *Phyllanthus Gunnii* and *Thomasia petalocalyx*, flowers not often seen. Bairnsdale was well represented by a nice lot sent by Mr. T. S. Hart, M.A., including *Pterostylis falcata* and *Eriostemon trachyphyllus*. From the Otway Forest some very fine blooms of *Prostanthera melissifolia*, *Phebalium* (*Eriostemon*) *Billardieri* (Satinwood), and

some serviceable fern roots were sent by Miss Lily Watson, of Laver's Hill. Miss Isobel Hislop, in conjunction with Willie, Millie, and Tommy Lucas, also sent from Carlisle River ferns as well as forest blooms, among which was a fine supply of a new species of Pultenæa I had lately described, but the description has not yet been published. The North-Eastern district was represented by Blue Peas, *Swainsona procumbens*, from Mrs. Read, of Springhurst, and orchids, Grass-Lilies, and Grevilleas from Mrs. J. W. Boucher, of Chiltern. Mr. T. A. Robinson, of Dutson, Sale, sent Sprengelia, *Dampiera stricta*, and the pretty pink *Sowerbæa juncea*. The Mallee district was in evidence mainly through the efforts of Mr. C. Oke, the hon. secretary, and the camping party at Natya, Mr. F. Holt, of the Water Commission, Bolton, pupils of the State school, Bolton, Miss Violet Hickey, Pinnaroo, S.A. (Murrayville plants), Mrs. A. M. Howard, of Golton South, near Lubeck, and Mr. J. P. Flynn, of Diapur. Mr. Oke had spent a week in the northern Mallee, and his contribution of plants from Natya contained the interesting Three-winged Blue-bush, *Kochia triptera*, the fruits of which rival in beauty the more common *K. villosa*. The Ming or Bitter Quandong (in fruit), several Cassias, including the rarer *C. phyllodinea*, and the Splendid Aster, *Olearia magniflora*, were among these plants. Mr. Bolton's contribution included the beautiful Orange Immortelle, *Waitzia corymbosa*, and the showy *Cassia Sturtii*. The well-known Fairy Wax-flower, the Anemone Boronia, together with six species of Acacia and seven species of eucalypts, and about a dozen other species, were sent from Bendigo by Mr. D. J. Paton. Among the eucalypts was the Blue Mallee, *E. fruticetorum* (*polybractea*), so famed for its oil of special quality. By the good offices of Mr. C. W. D'Alton, of Hall's Gap, a splendid show of Grampian plants was made, the favourites, Thryptomene, Lhotzkya, Bauera, and Calytrix, being in abundance. A welcome contribution was a large quantity of *Boronia pinnata*, obtained through the agency of the Misses Currie, of Lardner, and gathered by May Bingham, Betty Hardie, and Alice Maddock, of Jindivick. "Queen Bee" of the *Farmers' Advocate* was instrumental in obtaining contributions from several country "bees," among whom were the three girls mentioned above, Edna Samuel, of Lang Lang, and some whose "hum" has not reached us, though the honey has.

The following is a fairly complete list of localities from which flowers were received:—

North-West.—Natya, C. Oke and party; Hall's Gap, W. E. Warren, A. T. and C. W. D'Alton; Diapur, J. P. Flynn; Wedderburn, Miss E. Gray; St. Arnaud, Miss E. Edwards; Bolton, F. Holt; Golton South, *via* Lubeck, Mrs. Howard.

South-West.—Laver's Hill, Miss L. Watson; Carlisle River, Miss I. Hislop, Miss M. Lucas, Masters W. and T. Lucas; Lorne, Miss Anderson, Rev. A. C. Gates; Coleraine, A. M'Caskill.

North.—Taradale, Misses V. and E. Hansford, G. Coghill; Castlemaine, F. Shugg; Bendigo, D. J. Paton, H. C. James; Rushworth, F. Rich; Fryerstown, Miss G. Nokes.

South.—Hurst's Bridge, Miss Moffat, Miss Downing; Eltham, A. Tonge; Greensborough, — Ford; Digger's Rest, Miss J. M'Kenzie; Clayton, D. Morgan; Pakenham, F. Wisewould; Seville, — Mezger; Boronia, Miss E. Mackenzie; Lang Lang, Miss E. Samuel; Red Hill, Dromana, G. Higgins; Sandringham, Misses H. and L. Kenvig, Miss G. Nokes; Black Rock, Miss Fordyce; Keilor, A. J. Tadgell.

North-East.—Lima East, Mrs. A. J. Evans; Chiltern, Mrs. J. W. Boucher; Springhurst, Mrs. J. D. Read.

East.—Jindivick, Misses Lyall, M. Bingham, B. Hardie, and A. Maddock; Drouin, Mrs. F. Dyall; Lardner, Miss C. C. Currie; Warragul, Miss V. F. Pratt; Heyfield, Mrs. Best; Dutson, T. A. Robinson, Bairnsdale, T. S. Hart; Gormandale, Rev. A. J. Maher.

New South Wales.—Mosman, L. Cameron; Rose Bay, A. N. Burns; Corowa, S. Singleton; Mulwala, Mrs. J. White; Terrigal, Mrs. T. G. Harris, H. C. Butler; and Hilltop, J. Chalker.

Under about a dozen microscopes, exhibited by Miss M. Harvie, Miss M. Gordon, B.Sc., Miss E. M. Derrick, B.A., Messrs F. Chapman, A.L.S., G. Berthon, J. Strickland, P. C. Morrison, A. L. Scott, and F. H. Baker, were a number of interesting objects, such as sections of plant tissues, pond flora, common seeds, wood sections (fossil and living), pollen, and leaf hairs. These were much appreciated, judging by the numbers of persons always waiting their opportunity to see the slides; and thanks are due to the exhibitors for giving up so much of their time in the interests of micro-natural history.

A party of lady friends, under the direction of Miss Gabriel, conducted an afternoon tea stall, which resulted in £14 being added to the takings.

The sales of flowers and pot plants (native shrubs) were in the hands of Miss A. Fuller and a number of ladies, who were kept busy both afternoon and evening.

The thanks of the Club are due to the *Argus* for occasional paragraphs inserted previous to the day of the exhibition, and for an appreciative report the next day. The *Age* also published a good report, and was good enough to supply a large quantity of paper for covering the tables.

Decorative material for the hall was kindly supplied by the

Director of the Botanic Gardens, and by Mr. F. Pitcher, from Belgrave.

The financial result is not quite complete, but it is expected that at least £75 will be the Children's Hospital share of the profits.

EXCURSION TO BENDIGO.

Advantage was again taken of the Railways excursion to Bendigo on Saturday, 9th September, to make a fourth trip to that district and add a few more names to the list of plants recorded in previous *Naturalists* (Nov., 1919, December, 1920, and January, 1922). Splendid weather favoured us on this occasion, and an interesting time was spent, although, as the bush was suffering from a prolonged dry spell, the botanical results were not so good as usual. Our Saturday trip was to Ironstone Hill, about four miles due north from Bendigo. At many places in this part the soil has been repeatedly turned over; nevertheless fair botany is still available. The flora partakes something of the Whipstick formation, though only one isolated patch of *Eucalyptus viridis* was seen. Amongst Acacias, *A. acinacea*, *A. calamifolia*, *A. leprosa*, and *A. pycnantha* made the best show. Other notable plants were *Hybanthus floribundus*, *Baeckea diffusa*, *Westringia rigida*, *Lissanthe strigosa*, and the orchids *Pterostylis nana* and *mutica*. On Sunday we went by cab to South Mandurang, about eleven miles to the south, where we found a wealth of flowers. *Eriostemon obovalis* and *Tetratheca ciliata* were fine, and the three local Grevilleas—*G. lanigera*, *G. rosmarinifolia*, and *G. aquifolium*—were all found in quantity. Hardenbergia made a good display, and the wattles, especially *A. pycnantha* and *A. dealbata*, were at their best. Orchids were not common, with the exception of *Diuris maculata* and *D. pedunculata*. Others seen were *Pterostylis curta*, *P. nutans*, *P. nana*, and *P. longifolia*, and *Caladenia deformis*. Twenty-four species of flowers were found on Saturday, and forty-five on Sunday. Birds were not numerous. The Pallid and the Bronze Cuckoos were reiterant with their mournful notes, whilst the Crested Bell-birds at Mandurang were in full song. The Magpie-Lark, White-fronted Heron, Scarlet-breasted Robin, Wattle-birds, and Rosella Parrots were also seen.

Messrs. Thorn and Burns devoted themselves to entomology, and report as follows:—"Our main object at Ironstone Hill was to secure the larvæ of *Neolucia agricola*, a small butterfly of the order Lycænidæ. To obtain these the bushes on which they feed, *Daviesia ulicina*, had to be beaten. We were successful from the beginning, the first bush yielding six larvæ.

We had only to beat about a dozen bushes to secure all we desired. These were sent away at once by post to our fellow-member, Mr. G. A. Waterhouse, F.E.S., of Sydney, to be figured in his forthcoming work on the life-histories of Australian Rhopalocera. Another species which we were very anxious to secure was the form *simplexa* of *Candalides hyacinthina*, which occurs only in the Mallee and in South Australia. We were rewarded by capturing a female specimen in fine condition, near a patch of its food-plant, *Cassytha glabella*. This butterfly was first recorded for Victoria in October, 1921. We also secured a female of *Neolucia serpentata*, and saw specimens of *Pyrameis itea* and *Pyrameis cardui Kershawi*, both common Victorian species. Moths were not plentiful, but several small species belonging to the genus Philobata and a fine Tortrix were secured whilst beating a bush of *Daviesia ulicina*. A large number of species of looper caterpillars—Geometrid larvæ—were also obtained whilst beating bushes. Beetles were scarce, only a few 'click' beetles, Elateridæ, being obtained under loose bark, while one species of ground beetle, Carab, was found beneath a stone. Hymenoptera (ants, wasps, &c.) were also scarce, one species of Thynnid (flower wasp), two species of native bees, and one species of Ichneumon (parasitic wasp) being taken. Diptera (flies) were also poorly represented, three species of Syrphidæ (hover flies) and the common blow-fly, Musca, being all that were noticed. Representatives of the remaining orders were absent. Sunday was fine and warm, with very little wind; our expectations at Mandurang were high. Two additional species of butterflies were captured—namely, *Nacaduba biocellata*, a small Lycænid, and *Candalides acasta*, also a Lycænid. More moths were also taken, including several more species of Œcophoridæ, while one fine Geometrid was taken on a small dead sapling. More larvæ were found whilst beating bushes. No more new beetles were taken. The warmth of the day greatly increased the number of species of Hymenoptera; four species of native bees were taken, three Thynnids, and about a dozen Ichneumonidæ. The ants noticed were the common red meat-ant, *Iridomyrmex detectus*, and one species of jumper, Myrmecia; one species of spined ant, Polyrhachis, the metallic ant, *Ectatomma metallicum*, and two species of small black ants, Cremastogaster. Representatives of several more groups of flies were also observed, including one Asilid (robber fly), three species of mosquito (Culicidæ), and representatives of the Muscidæ and Sarcophagidæ. Two species of dragon-flies were the only representatives of the order Neuroptera taken. A fine large scorpion was secured beneath a stone whilst searching for larvæ. As it was early in the season these results may be

considered fairly good; the district should, however, prove very productive in the mid-season."

The following plants have not been recorded on previous excursions to this district:—

LEGUMINOSÆ—
Glycine clandestina.
Acacia dealbata.
LORANTHACEÆ—
Loranthus pendulus (fruit).
GOODENIACEÆ—
Goodenia geniculata.
EPACRIDEÆ—
Leucopogon virgatus.
Lissanthe (Styphelia) strigosa.
ORCHIDEÆ—
Caladenia deformis.

D. J. PATON.
CHAS. DALEY.

ETHNOLOGY.—The trustees of the Melbourne Public Library and Museums have issued a third edition of the "Guide to the Australian Ethnological Collection Exhibited in the National Museum, Melbourne." It is from the pen of Sir Baldwin Spencer, K.C.M.G., F.R.S., D.Litt., M.A., D.Sc., Hon. Director of the Museum. It extends to one hundred and forty-two pages, and is illustrated by 33 plates. The guide is far more than a list of exhibits. Each case is taken separately and its contents described, so that it becomes almost a handbook to the subject, and, as a large number of the objects were collected by the author, we may rest assured that the descriptions given of the uses of the various articles are correct, and not mere supposition. The museum possesses many more specimens than those on exhibition, limitations of space preventing many interesting items being placed on view.

THE MOLE AND FIELD CRICKETS.—The following extract from Dr. Leach's "Australian Nature Studies" may be taken as an example of the style in which the book is written:—"The burrowing mole-cricket is perfectly adapted for his burrowing life. His fore-legs are shovels and shears. They are supported on the large, well-developed fore-chest. Though ferocious-looking, the mole-cricket is a harmless, interesting animal. The burrowing may loosen and destroy some plants, but the ploughing and burrowing must do much good. The food is disputed; possibly the animal is partly carnivorous. The black field-cricket is active and difficult to capture. Like the mole-cricket, it is musical, and produces sound in the same way—by rubbing the scraper of one wing over the file of the other. The overlapping fore-wings are large and turned down at the side to fit the body. The under-wings fold fanwise, projecting beyond the body. The cerci are long and pointed. The egg-placer is long also. A female field-cricket has, therefore, five long structures projecting past the body—two wings, two cerci, and an egg-placer. Mole-crickets have no egg-placer."

A CIRCUIT OF THE GRAMPIANS.*

BY J. W. AUDAS, F.L.S., F.R.M.S., National Herbarium, Melbourne.

(Read before the Field Naturalists' Club of Victoria, 14th August, 1922.)

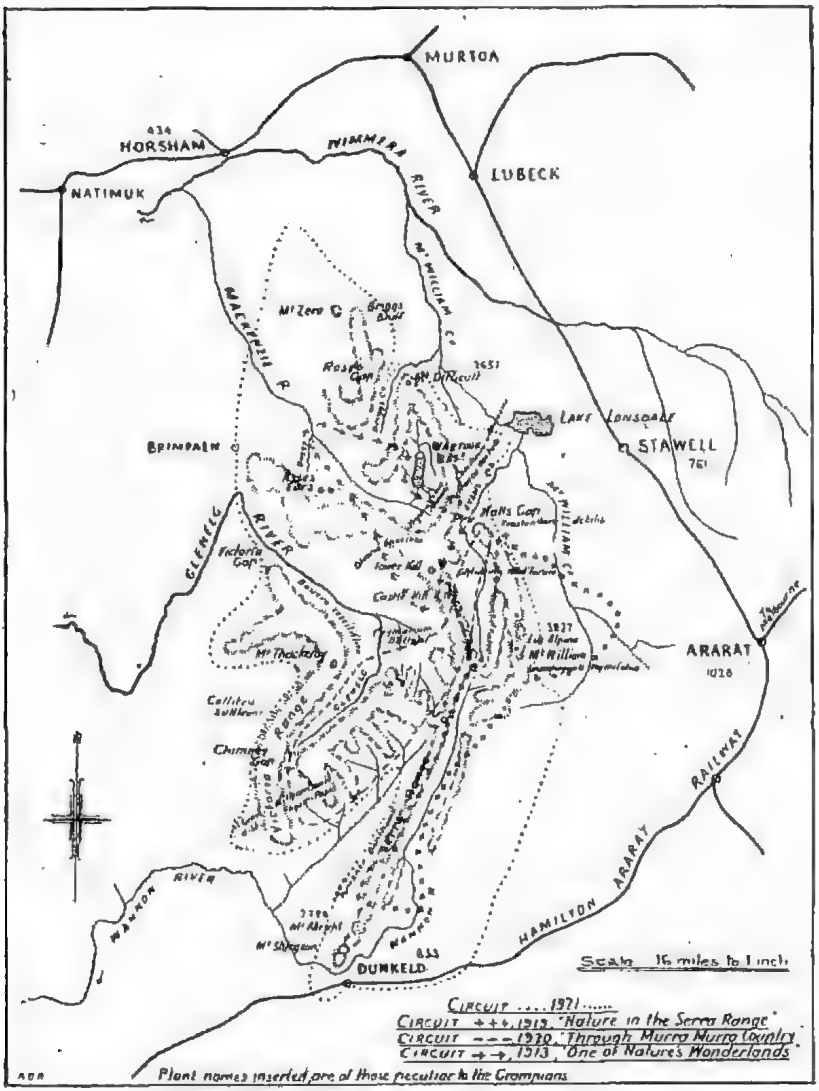
FOR the past ten years I have made an annual visit to the Grampians in the spring time, and have now completed a botanical survey of the entire area, which comprises about 450 square miles. On many of these trips I have been accompanied by my friend, the enthusiastic and experienced Mr. C. W. D'Alton, but on this latter occasion, when I purposed to encompass the whole district, I was fortunate in also having the company of Mr. A. T. D'Alton.

Having made so many trips to special parts during these ten years, there was really no particular locality in which we could hope to discover anything new or rare, and this fact confirmed my desire to make the round trip. Accordingly, we started from Hall's Gap in a comfortable waggonette drawn by two sturdy horses on Tuesday, 29th November, 1921. We found the roads rather cut up by heavy timber waggons for the first few miles, but as we passed Fyans Creek, and began to travel more elevated ground towards Mount Dryden, they improved. This hill differs in composition from the usual sandstone of the Grampians, for it is composed of basaltic rock. A circulating view from the summit reveals Lake Lonsdale, the Serra and Mount William Ranges, and the town of Stawell. Travelling northwards, we crossed the Little Wimmera River and rested for lunch. Profuse growths of sedges, grasses, and rushes along the river-bank here proved interesting, and we noted the prominence of the "Tall Spear-grass," *Stipa pubescens*, "Branching Rush," *Juncus prismatocarpus*, "Short-stemmed Sedge," *Carex breviculmis*, and "Common Bulrush," *Typha angustifolia*. It was a very pretty sight to watch a Black Duck sporting her young brood on a near-by pool, while a large flock of White Cockatoos circled, screeching, overhead.

Proceeding, we passed the homestead of Ledcourt station, and, the condition of the roads having greatly improved, we made rapid progress. Nearing Dadswell's, we entered heathy country, and beautiful flowering shrubs became much in evidence. There were many fine specimens of the "Cross Honey Myrtle," *Melaleuca decussata*. This is a very ornamental

* Previous papers by Mr. Audas are:—"One of Nature's Wonderlands—the Victorian Grampians," *Vict. Nat.*, February, 1913 (xxix., p. 146); "The Grampians Revisited," *Vict. Nat.*, June, 1914 (xxxi., p. 24); "Nature in the Serra Range," *Vict. Nat.*, April, 1919 (xxxv., p. 171); "Through the Murra Murra Country (Western Grampians)," *Vict. Nat.*, September, 1920 (xxxvii., p. 59); "Through the Balangum Ranges and at Rose's Gap," *Vict. Nat.*, May, 1921 (xxxviii., p. 4).

shrub, having pale pink flowers, which bears transplanting well, and flourishes in gardens. The "Common Fringe Myrtle," *Calytrix tetragona*, has flowers of much brighter shade of pink, and there were great clumps of the bushes, with an occasional



patch of the "Common Bottle-Brush," *Callistemon rugulosus*, interspersed. The latter made a gorgeous display with its crimson flowers and yellow-tipped stamens against the dark green foliage. Continuing into the sandy country towards

Rose's Gap, we soon sighted Briggs's Bluff towering magnificently above us. Hereabouts the undergrowth was very dense, and the various shrubs had reached a height not often met with in other parts, owing, no doubt, to this locality having escaped bush fires for many years. The "Sallow Acacia," *A. longifolia*, in places twenty feet high, drooped its heavy-laden clusters of dark brown seed-pods. The "Desert Banksia," *B. ornata*, was abundant, and its cone-shaped flower-heads and serrated foliage showed up well among the numerous other shrubs. Among the latter the brown, hairy-covered leaves and flowers of the "Shrubby Velvet-bush," *Lasiopetalum dasyphyllum*, compelled attention. The well-known "Bush Heath Myrtle," *Thryptomene Mitchelliana*, was of extraordinary proportions, and the growth was almost equally luxuriant in many of the following:—"Prickly Grevillea," *G. Aquifolium*, "Yellow Hakea," *H. nodosa*, "Coffee Coprosma," *C. hirtella*, "Giant Hop-Bush," *Dodonæa viscosa*, "Heathy Parrot Pea," *Dillwynia ericifolia*, "Large-leaf Bush Pea," *Pultenæa daphnoides*, "Yellow Rice-flower," *Pimelea flava*, "Small-leaf Pomaderris," *P. elachophylla*, and "Mountain Conosperm," *Conospermum Mitchellii*. Just as the sun dipped behind the range, leaving a roseate glow which foretold a fine day to follow, we arrived at a prosperous bee farm owned by Mr. Edson, and that hospitable gentleman invited us to spend the night at his residence. We gladly accepted, and, after a hearty meal, spent an enjoyable hour before bedtime listening with interest to the weird bush tales of our host, who has lived so many years in that locality.

Next morning we were early alert, and, after a hearty breakfast, and with many good wishes for our genial host, we started again on our journey. The country was still heathy, and countless varieties of wild-flowers flourished in the sandy soil, amongst which was that peculiar little plant, *Eriostemon diffoymis*, which has pretty waxy-white flowers and small leaves covered with little oil-bearing knobs. Very graceful was *Bauera rubioides*, with its trailing stems and pale pink flowers, which greatly resembled miniature single roses. Still more beautiful was the interesting liliaceous shrub, *Calectasia cyanea*, whose lovely blue flowers will keep for a considerable time after being gathered. Two more quite worthy of notice were the tufted plant with grassy leaves and pale yellow flowers, *Stypandra cæspitosa*, and the little myrtaceous shrub, *Bæckia diffusa*.

By mid-day we were rounding Mount Zero, and early in the afternoon had reached Rosebrook station, on the Mackenzie Creek. This lovely stream, with its crystal clear water, babbling noisily over its rocky bed and reflecting, with enhanced

beauty, the luxuriant foliage along its banks, might well form the subject of such another poem as Tennyson's "Brook," and brought back to mind the well-known lines, "I chatter, chatter as I flow to join the brimming river." Drooping their graceful heads as though to admire the reflection in the clear water were fine specimens of the "Tassel Cord Rush," *Restio tetraphyllus*, and the "King Fern," *Todea barbata*, besides many others, as Blechnum, Aspidium, Gleichenia, Pteris, Adiantum, Lomaria, Asplenium, and Dicksonia. Above, the stream was almost canopied by overhanging foliage. The "Slender Honey Myrtle," *Melaleuca gibbosa*, and the "Golden Spray," *Viminaria denudata*, intertwined their pink and yellowish blossoms, forming a veritable Eden for the numerous birds which inhabited the bed of the creek. We noticed the Blue Kingfisher, Fantail, Blue Wren, Yellow-breasted Robin, and the introduced Goldfinch.

Nothing botanically interesting was met with in the next few miles, so we spared a little attention to a spot known as "Geranium Springs," where *Pelargonium graveolens* (a garden escape) grew profusely. Many years ago Mr. Carter, the original owner of Rosebrook station, experimented in pig-farming at this spot. It is thought that some of the animals must have escaped, as wild pigs are occasionally met with in the district. The surrounding hills appeared to be ideal collecting ground, so we spent a few hours roaming about. Shrubs and climbing plants displayed their floriferous beauty in entrancing variety. *Correa speciosa*, sometimes known as "Native Fuchsia," usually seen in red or green colouring, here showed in lemon tipped with jade, and the flower stems were very long and slender. Many plants attained a height of ten feet, and, with their slender, graceful growth and uncommon flowers, merited all our admiration. Further on we came upon plants of the better known colours—red and green—on the hills sloping to Mackenzie Creek. The occurrence of so many forms in such close proximity would lead one to suggest a revision of classification, if only in relation to species varieties. Grevilleas, Prostantheras, Olearias, Calytrixes, Hoveas, Acacias, Conospermums, and Brachyloinas here vied with each other for pride of place; but their flamboyance did not overwhelm, but rather seemed to enhance, the modest beauty of *Pimelea ligustrina*, with its elegant foliage and pretty, drooping, green-coloured flowers. *Olearia viscosa*, locally known as "Kerosene Bush," on account of its easy ignition, grew profusely. *Kunzea parvifolia*, a beautiful shrub with small, pink, globe-shaped flowers, flourished exceedingly. It has an extended blooming period, and would therefore prove very ornamental in gardens. The "Orange Bell Climber," *Marianthus bignoniaceus*, twined itself

artistically among the Acacias, and near by were some splendid specimens of its congener, *Billardiera scandens*, laden with cylindrical fruits of livid colouring. This area proved a happy hunting ground; we were able to add to our vasculums *Phebalium pungens*, *Pseudanthus ovalifolius*, *Grevillea parviflora*, *Phyllota pleurandroides*, *Olearia ciliata*, *Dillwynia hispida*, *Brachyloma ericoides*, *Prostanthera debilis*, *Leucopogon ericoides*, *Conospermum patens*, *Sphærolobium daviesioides*, *Bossiæa riparia*, *Templetonia Muelleri*, *Correa Lawrenciana*, *C. æmula*, *Dodonæa boronifolia*, *Hovea heterophylla*, and *Acacia Mitchelli*; also the following, not previously recorded by us for the Grampians:—*Cryptandra leucophracta*, *Xanthosia dissecta*, *Senecio Cunninghamii*, *Pultenæa tenuifolia*, var. *mollis*, *Millotia tenuifolia*, *Stuartina Muelleri*, *Mitrasacme paradoxa*, *Spyridium subochreatum*, *Grevillea ilicifolia*, var. *angustiloba*, *Leucopogon rufus*, *Brachycome collina*, *Prostanthera spinosa*, *Logania linifolia*, *Olearia teretifolia*, *Lomandra leucocephala*, and *Acacia rupicola*.

All the country passed on the way to Brim Springs and Cherrypool showed stretches of the "Curly Chaff Rush," *Lepidobolus drapetocoleus*, and of "Porcupine Grass," *Triodia irritans*, and most conspicuous among the other grasses were the "Nigger Heads," *Pappophorum nigricans*, "Bearded Heads," *Amphipogon strictus*, and "Swamp Wallaby Grass," *Amphibromus nervosus*. We were now many miles from habitation, and with the falling night shades we turned our tired horses towards an unoccupied house by the roadside, where we decided to camp for the night. Surrounded by a neat picket fence, enclosing what had once been a well-kept garden, where long, rank grass now grew as high as the fence, it had evidently been long unoccupied. We put the horses in the garden, where they relished the grass, and rested in security after the strain of a fifty-mile day, while we had some supper, spread our blankets on the floor, and slept soundly.

Next morning we decided to give the horses a spell, and went on foot to examine the northern end of the Victoria Range. Crossing the lower country on the way, we discovered a grass-tree not previously collected; it proved to be *Xanthorrhœa hastilis*, a new record for the north-west of Victoria. It attains a height of eight feet, and can be readily recognized by the dense rusty tomentum covering the ends of the bracts and outer perianth segments, which is very conspicuous before the flowers expand. This grass-tree was in bloom, and the massed flower-covered spikes emitted a strong odour and also yielded abundant quantities of nectar, which caused the vicinity to be infested with numerous hymenopterous insects. Climbing the range, we came upon the "Coast Rice-

Flower," *Pimelea clachantha*, a plant we had not previously collected. It is a low, rigid shrub, with slender branches, and minute yellow flowers in small sessile heads. We also observed a very luxuriant form of *Spyridium parvifolium*, var. *hirsutissimum*, with very hairy leaves, fully an inch long, and cymes loose and many-headed. We were now doing some stiff climbing, and as we passed along the rock crevices were covered with flowers of glowing colours, quite comparable to, and almost rivalling, the famous flower-decked terraces on the slopes of Mount William. In evidence were *Gompholobium minus* (red), *Hibbertia acicularis* (yellow), *Prostanthera denticulata* (purple), *Leptospermum lanigerum*, var. *grandifolium* (white), and *Stypandra glauca* (blue). Helichrysums, or Everlastings, were innumerable, *H. Baxteri* being the most abundant. Two Grevilleas, *G. oleoides* and *G. alpina*, grew luxuriantly. The former is a handsome shrub with olive-green leaves, having a soft silk down underneath, and it bears red blossoms, while the latter has linear-elliptical leaves with revolute margins beset with velvety tomentum on the under side; its racemes of flowers have a corolla of deep orange to red. We greatly admired the pretty four-petalled blossoms of *Tetratheca ciliata*. It is often erroneously called "Wild Boronia," but it belongs to the Tremandraceæ or Milkwort family. The lovely colours of the "Rough Mint Bush," *Prostanthera denticulata*, shading from pink to purple, blended beautifully with the starry white blossoms of the "Grampian Fringe Myrtle," *Calytrix Sullivani*, which is peculiar to these parts, and here grew to a height of eight feet. Being late in the season, orchids were mostly in seed, but a few still flowered in the sheltered sandstone crevices, which they resembled so closely in colouring that they were difficult to find; We were, however, successful in collecting three, as follows:—*Thelymitra carnea*, *T. Macmillani*, and *Caleana major*. The latter were exceptionally fine specimens, some bearing four flower-heads.

The summit of this mountain rises in steep perpendicular cliffs, which we were unable to climb, so we continued along the slopes for some distance, and were able to add several others we had not previously collected—viz., *Pterostylis rufa*, *Prasophyllum fimbriatum*, *Spiranthes australis*, *Calochilus campestre*, and *Caladenia cordiformis*. The mountain sides exhibit many interesting rock-formations, one group consisting of several chambers supported by pillars and connected by natural passages in the rock. Through the openings magnificent views of the Dundas and Black Ranges could be seen. Just after leaving the chambers we discovered that beautiful little shrub, "Rosemary Grevillea," *G. rosmarinifolia*, covered with pretty rose-coloured flowers. The "Narrow-leaf Trymalium," *Try-*

malium Dalloni, was seen here also, but its blooming period had passed. Proceeding, we passed through a large area of "Southern Grass-tree," *Xanthorrhœa australis*, in full bloom, some of the flower-spikes rising to a height of twelve feet.

Reaching flat country again, swamp-frequenting plants abounded, such as *Sprengelia incarnata*, *Pultenæa Luehmanni*, *Xyris gracilis*, *Epacris obtusifolia*, *Melaleuca squamea*, *Viminaria denudata*, *Sphærolobium vimineum*, *Grevillea parviflora*, *Pultenæa laxiflora*, *Veronica Derwentia*, and *Patersonia longiscapa*—the latter being particularly numerous and beautiful. It is, however, of such a fugacious nature that one's admiration must be limited to viewing it unpicked. It was late afternoon before we reached camp after this strenuous walk, so we prepared a late luncheon and started onward again. The marshes were a glorious medley of myrtaceous plants, and the perfumes of Honey Myrtle, Bottle-brush, and Tea-tree wafted to us on the spring breeze were delightful. After crossing the Glenelg River we soon reached the Horsham to Hamilton road, on which we made rapid progress through Glenisla East, and passed the Lambruk Bee Farm, arriving towards evening at Woolphur station, which is about fifteen miles from Cavendish. Here we received a most hospitable welcome from Mr. Silcock, the owner of "Woolphur," and stayed the night. A very good class of sheep are raised on this estate, and very valuable red gum timber grows on the flat country about the district. Passing through the paddocks, we were surprised to see an old man kangaroo grazing contentedly with the horses. We learned later that he was a much-valued pet belonging to Miss Silcock.

Our progress at this stage was held up for half a day by heavy rain, but we spent an interesting morning acquiring a knowledge of the locality from our host, who has lived forty years there. Towards noon the clouds dispersed, and we started again in the direction of Dunkeld. After passing the settlement known as Victoria Lagoon, we decided to follow the bush track, which would take us nearer the ranges, and were soon deep in a labyrinth of heathy country, where, as usual, wild-flowers abounded, prominent among which were the beautiful mauve flowers of the "Spreading Flax Lily," *Dianella revoluta*, and the gorgeous red and yellow of the "Parrot Peas," *Dillwynia hispida* and *D. floribunda*. *Leptospermum myrsinoides* showed fine, large, peach-blossom-like flowers, and *Bursaria spinosa* pure white flowers; the latter plant is rather a distinct variety, growing only about two feet high. *Boronia polygalifolia*, with delicately-perfumed flowers of white and very pale pink, abounded. Here the three grass-trees recorded for Victoria were seen together; they are *Xanthorrhœa australis*, *X. minor*,

and *X. hastilis*, the latter being the one we had observed for the first time near the northern end of Victoria Range. It appears to confine itself to the flat country between the Black and the Victoria Ranges. There was much to attract our attention as we passed slowly through this scrubby country, and we noted the following in full bloom:—*Conospermum Mitchellii, Lhotzkya genetylloides, Leucopogon virgatus, Acrotricha ledifolia, Stackhousia viminea, Pimelea curviflora, Euphrasia collina, Brachyloma daphnoides, Correa æmula*, and *Cryptandra amara*; the latter is a thorny, sub-erect shrub, which bears a profusion of small, white, bell-shaped flowers. "Victoria Park," the estate of Mr. Alexander Robertson, lies at the extreme end of Victoria Range, and here we spent our next night. After an enjoyable evening we slept soundly till awakened by the clanging of the cook's bell, which announced breakfast. We next decided to examine the hills around about, but our tour proved very uninteresting botanically; but, had our subject been zoology, it would certainly have proved more interesting, for wild animals were very numerous. We saw wallaby, foxes, hares, kangaroos, and rabbits innumerable. Birds also commanded attention, and our list of feathered friends ran into scores.

Leaving Victoria Park, we crossed through marshy ground in the direction of Mounts Sturgeon and Abrupt. The lagoons revealed a wealth of water-loving plants, such as *Myriophyllum variifolium, M. elatinoides, Potamogeton natans, Triglochin procera, T. striata*, and *Ranunculus aquatilis*. Near the margins the principal plants were *Cyperus lucidus, Villarsia reniformis, Phragmites communis, Cotula coronopifolia, Gratiola peruviana*, and *Glyceria fluitans*; the latter is one of the best fodder grasses for damp localities. It often grows two feet high, and its seeds are sweet and palatable, being eaten by fish and all graminivorous birds. There is fine fertile country around Dunkeld, and the crops were well forward in the paddocks. We noted that some crops of oats were badly infested by caterpillar, which, unfortunately, is much in evidence at this season. Two weeds flourished in the grazing paddocks. They were the "Blue Eryngo," *Eryngium rostratum*, and "Chicory," *Cichorium intybus*. Both were in bloom, and their pretty blue flowers were distinctly attractive. The former is a native member of the Umbelliferæ, often called "Blue Devil." It has a perennial root stock, and is hard to eradicate. The latter is a well-known perennial belonging to the Compositæ. When growing wild it spreads rapidly, but loses its value as a surrogate for coffee.

Before reaching the township of Dunkeld we had to pass through forest country in the gap between Mounts Sturgeon

and Abrupt. The hillsides were masses of yellow blooms. There were *Acacia Mitchelli, Goodia latifolia, Dillwynia floribunda, Pultenæa humilis, P. Gunnii, Hibbertia stricta, H. densiflora, Gompholobium Huegelii*, and *Platylobium obtusangulum*, while in many places a delightful contrast was introduced by the trailing blue flowers of the pretty "Love Creeper," *Comesperma volubile*, which festooned itself on all the bracken fern and undergrowth, upon which it depends for support.

We had now crossed the saddle, and, after passing the Wannon River, entered the prettily-situated township. Our attention was soon attracted to a monument of Major Mitchell, who was supposed to have ascended Mount Abrupt when he traversed the district in 1836. A twenty-mile run from here took us through the Yarram estate to Watgania, where we stayed at "Lakeview," the home of Mr. Slattery, which overlooks Lake Muirhead.

Mistaking the road delayed us greatly on our way to Moyston next day. This once thriving goldfields township is now but a mere village. Working onward towards Hall's Gap, we passed the Pomonal orchards *en route*, and arrived back at our starting-point about 7.30 that evening. This six days' tour completed a circuit of 182 miles, averaging about thirty miles per day. From a botanical point of view, however, we were not altogether satisfied, the roads being, in many places, too far from the ranges to permit of our making an examination in the time available. We would have liked to go over the Dundas and Black Ranges and other outlying hills, where, doubtless, many forms of interesting flora are yet to be found.

The trip proved very enjoyable. For the scenery alone it was well worth the journey. We viewed scenes of rugged grandeur on the mountain ranges, and on the lower stretches red gum forests of great age; peaceful cultivated valleys, with their orchards, smiling wheat-fields, and cosy homesteads; noisy, babbling mountain streams, and broad, lazy rivers. Everywhere the local people treated us most hospitably, which greatly added to the enjoyment.

For the plan accompanying this paper I am indebted to Mr. A. D. Hardy, of the Forests Department. Though on a rather small scale, readers should be able to follow the routes I have taken in my several Grampian trips.

THE AUSTRALIAN MUSEUM MAGAZINE.—The sixth number, for October, 1922, of this journal is to hand. It contains an excellent series of illustrated articles on various phases of natural history written in a popular manner so as to engage the attention of the ordinary reader, and is a very good shillingsworth.

BOOK NOTICE.

AUSTRALIAN NATURE STUDIES. By J. A. Leach, D.Sc., C.M.B.O.U., Organizing Inspector of Nature Study and Senior Inspector of Schools, Victoria. 512 pp. (8¼ x 5⅝), with six plates in colour and 2,000 black-and-white drawings. Melbourne: Critchley Parker, 1922. Price 12s. 6d.

NEARLY twelve years ago we had the pleasure of reviewing in these columns the author's well-known volume, "An Australian Bird Book," which has stood the test of time and become a household necessity amongst bird-lovers. The present volume is perhaps more ambitious, covering the whole range of animal and vegetable life, besides a dozen chapters under the heading of "General Studies," in which the effects of the physical forces of Nature are pointed out. "Australian Nature Studies" is primarily a book written by a teacher for teachers, but that does not lessen its value to the ordinary nature-lover, who, however, must not expect to find in it a "text-book" in the usual acceptation of the term. Dr. Leach's effort has been mainly to draw attention to the methods of life in various groups of the animal and vegetable kingdoms. The chapters are written in simple, terse language, every point being illustrated in the line drawings, which are particularly numerous. The colour plates are perfect representations of six of our prominent Australian birds—viz., Crimson Parrot, Blue Wren, Golden Bower-bird, Yellow-banded Parrot, Shrike-Robin, and Blue-faced Finch. The work is well indexed, but this is rather difficult to use, there not being sufficient difference between the type of figures used for text and illustrations; again, the volume is paged at the bottom of the pages—an awkward place for a book where the index will be so much in use—while the numbering of the figures is poor. In an appendix the author points out the value of nature study both in the school and home, and for the benefit of teachers a table of "suggested topics" has been drawn up, covering an eight years' course of graduated steps for children from five to thirteen years of age. Dr. Leach is to be congratulated on the completion of his great task, which, we feel sure, will be appreciated by a very large number of teachers and others, not only in Victoria, but throughout Australia. It clears up a great many points on which there was no readily available literature, and by its simple language and absence of technical terms should do a great deal in advancing the love of Nature, in its many phases always around us in our daily life.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 13th November, 1922.

The president, Mr. C. Daley, F.L.S., occupied the chair, and about sixty members and visitors were present.

A report of the excursion to the You Yangs on Saturday, 14th October, was given by the leader, Mr. C. Daley, F.L.S., who said that the party had a pleasant walk from Little River to the range. As usual, the country was somewhat dry. The characteristic shrub of the district, *Prostanthera nivea*, Snowy Prostanthera, was almost at its best, while the perfume of *Acacia decurrens*, var *mollis*, filled the air. The view from Station Peak was almost perfect in every direction.

A report of the excursion to Ringwood on Saturday, 21st October, was given by the leader, Mr. C. Oke, who said that a party of fourteen met at Ringwood station. It was decided to take a northerly direction, towards "Pinemont." Though planned for entomology, many of the excursionists were quite as interested in plants, and soon secured trophies in the shape of fine spikes of *Conospermum ericinum*. Just before reaching the creek several species of orchids were met with, among them being *Thelymitra carnea*, *T. longifolia*, and *Caladenia carnea*, and along the creek bank, amongst the undergrowth, *Chiloglottis Gunnii* was found in fair numbers. With the exception of ants, insects were scarce but of these interesting little creatures several species were numerous, and some time was spent in examining their nests. The nests of *Aphanœgaster longiceps* were very numerous, and, as the ants were mating, no difficulty was experienced in obtaining specimens of males, females, and workers, the differences between which were pointed out. A nest of *Ectatomma aciculatum* (?) was carefully examined for *inquilines*, and two species of Pselapidæ were obtained, as also specimens of a blind Rodwayei. The afternoon turned out warm, and several preferred to take advantage of available shade to searching for natural history specimens, while orchid-hunting claimed the attention of most of the others. Altogether, fifteen species were obtained during the afternoon, some beautiful spikes of *Thelymitra ixioides* being among those gathered. By careful search on the ground several small beetles were secured, the best of which was *Rybaxis longipilosus*, Wilson (MS.)

A report of the excursion to Yarra Junction on Saturday, 28th October, was given by the leader, Mr. F. G. A. Barnard,

who said that, favoured by a beautiful day, the members who went so far afield (forty miles) enjoyed the outing thoroughly. Many attractive flowers were seen along the railway line, while the colour of the gum-tips was in many instances very brilliant. On arrival at Yarra Junction it was decided to transfer to the steam tram which goes to Powelltown (11 miles), but, as time would not permit of the whole journey, to go as far as Three Bridges (seven miles) and walk back to the starting place. This proved a very good plan, as flowers of many kinds were plentiful. Our first find, on the bank of the Little Yarra, was *Oxylobium ellipticum*, one of our handsomest flowering shrubs, the flowers of which last well in water. Its flowering season was nearly over, but enough remained to indicate what a fine show it makes when in bloom. Walking back along the tram-line, numerous flowering shrubs were noted, such as *Grevillea alpina*, *Eriostemon correifolius*, *Baucra rubioides*, *Pultenæa Muelleri*, *Billardiera scandens*, *Dampiera stricta*, and *Zieria Smithii*. Presently, following the main road, a patch of *Epacris impressa* was found to be in splendid order, with *Dillwynia ericifolia* and *D. corymbosa* making a brilliant show. Altogether, the locality should be productive of a large variety of flowering plants if thoroughly searched.

A report of the excursion to Frankston on Saturday, 4th November, was forwarded by the leader, Mr. J. G. Mann, who reported a good attendance of members and an interesting outing. The Purple Orchid, *Diuris punctata*, was found in fair quantity near the Langwarrin station. A visit was paid to the Frankston golf links, where a large variety of Australian trees and shrubs have been planted for decorative purposes, the majority of which are doing well. The ramble was then directed towards the coast south of Frankston and the beach road followed back to the station.

A report of the excursion to Pakenham on Tuesday, 7th November (Cup Day), was forwarded by the leader, Mr. F. Wisewould, who reported a good attendance and a very enjoyable day. Owing to the late season, flowers of many kinds were still numerous, and the country was looking at its best. Rambles were taken in a couple of directions from Pakenham Upper, where the leader entertained the party at his country cottage.

ELECTION OF MEMBERS.

On a ballot being taken, Miss W. G. Graham, Spring-street, Melbourne; Mr. E. J. Ingram, 133 Barkly-street, North Fitzroy; Mr. R. T. Patton, Botanical Department, University; and Dr. S. F. Ridley, 1 Blyth-street, Brunswick, were duly elected as ordinary members; Miss Helen D. Elder, "Karuc-a-ruc," Rokewood, and Mr. L. D. Cameron, "Coonara," 34 Prince

Albert-road, Mosman, N.S.W., as country members; and Mr. Ernest H. Thiele, Victoria-street, Doncaster, as an associate member of the Club. Miss Graham, being present, was heartily welcomed, especially from the fact that she is a visitor from Canada who is staying for some time in the State.

GENERAL BUSINESS.

The president announced that since last meeting the Club had lost another of its members in the person of Mr. Alexander Borthwick, of Longueville, Sydney, a country member of the Club, and moved that a letter of sympathy be forwarded to his relatives. The motion was carried in silence, all standing.

Mr. F. G. A. Barnard said that a few days before he had received a letter from Mr. C. D'Alton, a member of the Club, residing near Hall's Gap, Grampians, calling attention to the fact that an area of land, locally known as the "Wild-Flower Garden," was about to be thrown open for selection and urging that the Club should take action and endeavour to have the area permanently reserved from settlement. He moved that representations be made by deputation to the Minister for Lands asking for the permanent reservation of the blocks in question. This was seconded by Mr. E. E. Pescott, F.L.S., supported by Mr. G. Coghill and others, and carried unanimously.

Mr. A. E. Keep asked what was the position with regard to the export of Australian birds, and read an advertisement appearing in the *Sunraysia Daily* in which a dealer offers to buy any number of Major Mitchell Cockatoos and Shell Parrots. Mr. J. A. Kershaw, F.E.S., said that as the result of the recent deputation to the Minister of Customs a list of birds which may be exported had been drawn up and submitted to various authorities for approval. This would shortly be placed before interested societies, and if agreed to would be gazetted. Both the birds mentioned would be in the protected list.

Mr. H. B. Williamson, F.L.S., said that considerable disappointment was being experienced by plant-lovers at the non-appearance of the long-promised "List of Vernacular Names for Victorian Plants." He moved—"That the committee of the Club be asked to take steps to at once carry into effect the purpose for which the Plant Names Committee was appointed—namely, to publish a 'List of Vernacular Names of Victorian Plants,' and to add such information, not descriptive, as will enable the list to be used in conjunction with Mueller's 'Key.'"

This was seconded by Mr. G. Coghill, and carried unanimously.

PAPER READ.

By Dr. W. Macgillivray, entitled "A Trip to the North and North-West of Broken Hill (N.S.W.)"

The author gave a most interesting account of a trip made by motor-car in the spring of 1921, covering several hundreds of miles, on the borders of New South Wales, Queensland, and South Australia. The principal birds and plants met with were mentioned, and the paper created a very different impression in the minds of many of those present than had previously existed, for a district which had been regarded as almost desert was shown to be, in a favourable season, a veritable flower-garden, while bird-life, particularly parrots and cockatoos, was abundant

Messrs. E. E. Pescott, F.L.S., H. B. Williamson, F.L.S., and F. G. A. Barnard expressed their appreciation of the paper.

EXHIBITS.

By Mr. A. N. Burns.—A large series of butterflies, with pupa cases in some instances, also Hymenoptera (wasps, &c.), collected near Ballina, Richmond River, N.S.W., Brisbane and Palmwoods, Queensland, during October, 1922.

By Mrs. E. Coleman.—Sections of roots of Native Cherry-tree, *Exocarpos cupressiformis*, showing attachment and root of a eucalypt, ? parasitism; orchids, *Caladenia congesta* and a Dimis, apparently a hybrid, from Bayswater; jaws of a Port Jackson shark.

By Mr. P. C. Morrison.—Species of recent (Echinocardium, sp.) and fossil (Lovenia) sea urchins, from Cheltenham.

By Mr. C. Oke.—Insects from Pakenham excursion, including a rare beetle, *Myrmecholema acutifrons*, Lea, from the nest of the Greenhead Ant, *Ectatomma metallicum*.

By Mr. A. E. Rodda.—The barbed spine of a Stingray, from Brighton Beach.

By Mr. A. L. Scott.—Pitchstone and associated rock, from Mount Ngongataka, near Rotorua, N.Z.

By Mr. A. J. Tadgell.—*Prasophyllum fuscum*, Tawny Leek-Orchid, from near Braybrook; the colour of the plant was yellowish-green, as often found in South Australia (Dr. Rogers); an unusual locality for this orchid. *Caladenia dilatata*, Spider Orchid; colour of flower, canary yellow; an unusual colour for this orchid; found at Woori Yallock, November, 1922. *Tradescantia fluminensis*, Vel., Water Spiderwort, on waste ground at Sandringham, October, 1922; first record as a garden escape; *Echium plantagineum*, Patterson's Curse, dwarf form, from Mitcham and Ringwood; *Gentiana saxosa*, Mountain Gentian, and *Brachycome stricta*, Erect Daisy, shady places from Croydon towards Warrandyte; rare plants near Melbourne.

By Mr. L. Thorn.—Larva, pupa, and imago of a large Mistletoe Butterfly, *Ogyris zozine*, from One-Tree Hill (Mount Cootha), Brisbane, Queensland; forty-five species of butterflies and

sixty species of moths from Ballina, Richmond River, N.S.W., and Blackall Ranges, Queensland, October, 1922.

By Mr. H. B. Williamson, F.L.S.—Orchid, *Diuris punctata*, Lilac Diuris, from Dandenong; *Melaleuca Wilsoni*, *Bæckea behrii*, and *Loudonia behrii*, from Nhill. All these flowers had kept fresh in water for a fortnight.

By Mr F. E. Wilson.—Tiger Beetles, *Megacephala australis*, Cland., from Pink Lakes, North-West Victoria.

After the usual conversazione the meeting terminated.

THE LATE MR. JOSEPH GABRIEL.

It will come as a great shock to a great many members of the Field Naturalists' Club to learn that one of the "fathers" of the Club, and one of its best-known members, Mr. Joseph Gabriel, entered his long rest on 24th November at the ripe age of 75 years. He had not been himself for the past twelve months, but only his intimate friends were aware of the seriousness of his illness. He was almost a foundation member of the Club, having been elected in July, 1883. He became associated with the committee in July, 1895, and for more than twenty-five years held office, being on many occasions elected at the head of the poll, thus showing the esteem in which he was held by the members. During his presidentship, 1920–21, the Club celebrated its fortieth anniversary. He took part in two of the memorable trips of the Club to the islands of Bass Strait, made about thirty years ago—viz., the Kent Group in November, 1890, and the Furneaux Group in November, 1893; and, loving the sea and its surroundings, he made a further trip to Albatross Island, a tiny speck in the ocean off the north-west point of Tasmania, in company with the late Mr. H. P. C. Ashworth, in October, 1895 (*Vict. Nat.*, April, 1896, xiii., p. 3). He was a pharmaceutical chemist by profession, but his hobbies were many. He was an excellent cabinetmaker, and constructed much of his own furniture, cabinets for specimens, &c., besides building a small yacht at his own home. His natural history tastes were also many. He was a good ornithologist, and had a fine collection of eggs. His love for the sea led him to take up dredging for seaweeds and polyzoa, especially in Western Port Bay, the waters of which became his play-ground for many years, and of which he knew every inch. The shells incidentally obtained during these trips he handed over to his son, Mr. Charles J. Gabriel, also a well-known member of the Club, who in course of time became a recognized authority on the marine conchology of Victoria, and whose collection of the shells of the world is very

extensive, in a great measure the result of exchanges made for shells dredged by his father in Western Port. Mr. Gabriel contributed several papers to the Club's proceedings, more especially regarding the nesting and life of the Mutton-birds at Phillip Island. In his more active days he acted as leader of several dredging excursions in Hobson's Bay, and was ever willing to give advice on that and kindred subjects to inquiring enthusiasts—in fact, he was one of those men who never could do enough to help his fellow-men, no matter what the help sought. When, during the war period, the Club entered into the project of larger wild-flower exhibitions, he was always to the fore in planning details and seeing that tables, &c., were ready long before other helpers arrived at the hall. To him the Club is indebted for the actual making of tables, &c., his latest donation in that way being the reading stand used at the monthly meetings. In fact, he was so generous with his time and talents that it almost became a stereotyped phrase—"Oh, leave it to Gabriel; he will fix it up!" His attendance was most regular at the monthly meetings of the Club, and he was, at the time of his death, a member of the committee. To his widow and family is extended the whole-hearted sympathy of the members of the Club in their loss, which, it will be seen from these notes, is no light one. His remains were borne to their last resting-place in the Boroondara Cemetery, Kew, on Monday morning, the 27th ult., in the presence of a representative gathering of fellow-members and friends.

The Late Mr. A. Borthwick.—It is with regret we record the death of Mr. Alexander Borthwick, of Longueville, Sydney, who was elected a member of the Club in May, 1917. Mr. Borthwick was an old Victorian, who had removed to Sydney for business reasons. He had been a member of the Club in its earlier years, when he was a keen ornithologist. Latterly we believe he had been taking some interest in fish and kindred forms of life.

Exhibition of Wild-Flowers.—It is expected that the Children's Hospital will receive nearly £75 as its share of the net proceeds of the recent exhibition of wild-flowers. In connection with the report of the exhibition in the last *Naturalist*, the names of Mr. C. French, jun., and Mr. E. E. Pescott, F.L.S., were inadvertently omitted when giving credit to the contributors to the orchid table.

Personal.—Members will be pleased to learn that a fellow-member, Mr. C. L. Plumridge, has been appointed Curator of the Parks and Reserves of the City of Kew.

SOME AUTUMN ORCHIDS.

BY (MRS.) E. COLEMAN.

(*Read before the Field Naturalists' Club of Victoria, 11th Sept.*, 1922.)

"Autumn is here—like Spring returned to us,
Won from her girlishness."—Browning.

SURELY there is no more fascinating hobby than the study of orchids, and there are two delightful ways of pursuing it: where expense is no object one may tread the primrose path by means of glass houses; but to know the real charm of orchid-collecting one must be a lover of the open and walk the forest ways in search of them.

With me the love of these shy blooms is not an isolated attachment. It is closely associated with the songs of birds, the scent of heath, blue hills, cool gullies, and the whip-bird's call, and the many other delights which each season brings.

To the true lover of orchids there is no "orchid season." To him it is ever "the time of tender opening things," and, though his prizes now are small and insignificant in comparison with ones to be found later,

"When the fields catch flower,
And the underwood is green,"

they are not less beautiful in his eyes. He smiles when he hears the "off season" mentioned, for that is the time when his hope is highest. He continues his rambles through autumn and winter, climbing hills and searching gullies in the sure expectation that he will one day find an orchid new to him—perhaps new to science! This is the one thing he would add to Hazlitt's sum of a perfect day. Who would grudge him his moment of exultation? And is there any finer time for walking than the autumn, when Nature speaks to us of so many remembrable things? We may walk the forest ways for many days without capturing our blue bird; but we shall surely garner a little of Nature's gold by the wayside.

It is surprising how soon one acquires the "orchid eye," and one needs it now, for many of our autumn forms are so small as to escape the notice of all but ardent seekers. In colouring, too, they are very subdued, in strong contrast with the "flaunting flowers our gardens yield" at this time of the year; but, seen under the magnifying glass, their beauty would convert the most indifferent observer into an enthusiast. Let us, then, set out on our autumn rambles, hugging a great "Perhaps."

Although orchids bloom more strictly in accordance with Nature's time-table than many wild-flowers, let us ignore her calendar and agree, as Wilde said when asked his advice con-

cerning the arrangement of some Japanese fans, that "they should not be arranged, they should occur." Having decided to commence our autumn season when we will, our "firstlin' o' the year" shall be the sweetly-scented *Eriochilus autumnalis*. This is to be found on almost any uncultivated lands. This was the first bright orchid we had seen for some time, and it was cheering to meet again a member of the more conspicuous families. Commencing as early as the middle of February, its season extended into the middle of June. April, however, was its best month, and we found it then in large numbers, pushing its way through the driest and most formidable-looking soil "as effortless as woodland nooks send violets up and paint them blue." At the time of flowering the leaf of this little orchid is a mere sheathing bract at the base of the flower-stem. It gradually matures, and in less than three months is similar in size and shape to the full-grown leaf of *Caladenia Menziesii*. Sometimes the withered flower may still be attached to the root to help in identification, but usually it has died off, and one is rather puzzled by these leaves, especially as they are frequently to be found in pairs, suggesting an orchid of the twin-leaved series.

The month of May brought its one-time sister, *Leptoceras fimbriata*, with its fringed labellum, horn-like petals, and autumn shades of green, yellow, and reddish-brown. The leaf, green above with red veinings, is reddish below, and, like that of *Eriochilus autumnalis*, it, too, matures after flowering time. We frequently found this plant with two fully-grown leaves, though in those cases there were no flowers. In no instance did we find two leaves when the flower was present.

The beginning of March saw our first prizes of the tiny Prasophyllum family. These call for unlimited devotion and patience in identifying. To the unseeing eye they are small and insignificant. Certainly "radiance and odour" are not their dower; but under the magnifying glass they are among the glories of the orchid world. With us at Blackburn *P. Archeri* comes first, followed soon by *P. fimbriatum* and more rarely by *P. intricatum*. The labella of these three are all more or less fringed, and tremble prettily in the sunshine. In the first two the dorsal sepal and lateral petals are also ciliated. Roughly, we may look for tiny reddish-brown flowers, though they vary considerably in colour, from yellowish-reddish (to quote Baron von Mueller) to dull or dark red or reddish-purple.

I might remark here that some people have such baffling ideas of colour that I am forced to the conclusion that people may actually *see* colour differently. We found many of these small orchids all through March and April, and a few "last roses" were noted at the end of May.

March also brought two other tiny members of this family —*P. despectans* and *P. brachystachyum*. The petals and sepals of these are not fringed, and each has a long, narrow labellum, which also is not fringed. Thus, though they are quite easily confused with each other, they are readily distinguished from the former group. The labellum of *P. despectans*, however, is pointed, and the appendages to its column are falcate, while the labellum of *P. brachystachyum* is blunt and the appendages of the column distinctly bifid. On a stem from three to nine inches high these carry as many as twenty-five reddish-green flowers, all crowded within the space of an inch at the top. Some other species, *Dixoni*, *fusco-viride*, *nigricans*, *ciliatum*, and *rufum*, we missed this season.

We now come to the Pterostylis family. *P. parviflora* is one of the smallest of the Greenhoods. Being only a few inches high, it is not easily seen, and one is amazed to find the "tiny horns of miraculous green" pushing up through the driest and poorest soil, though the better class land produces more robust specimens. The basal leaves are sometimes present at flowering time. We did not find blooms until early in April, though flower-stalks were showing by the middle of March. There are two quite distinct varieties of this species. The earlier and more robust form carries as many as ten flowers, and is quite frequently more red than green. It has fruited by the time the later variety is well established. This is smaller, has only one, two, or three flowers usually, and is consistently all green.

Some of the most graceful of the Greenhoods occur during the months of April, May, and June, and we now come to a group having stem leaves only at the time of flowering. By the beginning of March at Ferntree Gully we found *P. obtusa* on the stony hillsides it loves, and it lingered until 16th June. May brought the somewhat similar *P. præcox*, and June its robust brother, *P. præcox*, var. *robusta*. Though *P. obtusa* and *P. præcox* are outwardly similar, one notes at once the blunt labellum of *P. obtusa* and the sharp-pointed one of *P. præcox*. Then we notice that the lower sepals of *P. obtusa*, before elongating into its characteristic "points," protrude in a decided "nose." The striæ of *P. præcox* are very clearly defined, and vary from dark green to grey, and often red.

April brought specimens of *P. reflexa* from Maldon. I have not found this near Melbourne, and should be interested to learn of anyone having done so. Broadly, it is a larger edition of *P. præcox* with the "beaky" hood of *P. obtusa*, and it, too, possesses a "sharp tongue." Its close relation, *P. revoluta*, another autumn prize, was found at Ashburton in May. This may be said to be a sturdy copy of *P. falcata*. It has a long,

narrow, strap-like labellum, without the point of *P. reflexa*, and its flowers are considerably larger. The beautiful *P. grandiflora*, with its club-pointed labellum, did not fall to our lot this season, but we were compensated for this by finding the rather rare *P. vittata* at Black Rock in May, although the blooms were poor by comparison with specimens received from Point Lonsdale. Like *P. longifolia*, this orchid has only stem leaves at the time of flowering. The colour of its flowers varies from grey-green, purplish-green, to vivid red, and, as an instance of how little the colour of an orchid may sometimes count in determining the species, I may mention that some all-yellow flowers and one all-green specimen were found this season. The extremely sensitive labellum was chloroformed into submission to the photographer's art.

The month of May brought buds of *P. longifolia*, though this is one of our late winter and early spring treasures. This month, too, came two small members of the Pterostylis family which have basal rosettes of small leaves at the time of flowering. There is no mistaking the bifid tongue of *P. concinna*. By the middle of June this was numerous in many places. A few blooms of *P. pedaloglossa* were found at Black Rock in April, and later we noted many more. This quaint little orchid, with its tailed sepals, has a short, blunt labellum. Leaves and buds of *P. curta* and *P. nutans* appeared by the middle of May, and fine blooms of the latter were gathered at Mount Eliza on 10th June. However, one swallow does not make a summer, and this orchid best loves the month of August. In May also the neat rosettes of *P. barbata* were numerous at Ringwood and Sandringham, though we must wait until late August and early September for blooms of this "Greenbeard" As early as April we noted many well-advanced leaves of *Cryptostylis longifolia*, one of our hot-weather beauties, and during May we saw hundreds of fine leaves of *Lyperanthus nigricans*. We are chary of counting the chickens of this orchid, as we have so frequently been very disappointed in the small number of blooms seen among large areas of leaves, and have gathered some really fine blooms where we found only isolated leaves. Leaves and buds of *P. nana* were also found this month.

Those who love the country should spend some time in Healesville during the autumn. The waysides are then famous for the russet and golden tints of the brambles, and one follows with keenest delight the colour gradation, when the poplars stand like golden spires in their green beds, the willow "trails its amber," and the winds—for which, alas! Healesville is also famous—are for a time stilled. Then

> "O'er my windless soft autumnal weather
> The peace that passes understanding broods."

In addition to these pleasures, each week is certain to bring grist to the mill of the orchid-lover.

In April we found many leaves and buds of *Acianthus exsertus*, and they were blooming freely early in May. We may expect to find blooms of this until the close of July. Several all-green forms were collected—even the under side of the leaf being green—another instance of many colour vagaries.

The third week in April brought a delightful member of the twin-leaved group—*Chiloglottis diphylla*, the Autumn Bird-Orchid. Its rich claret and green-coloured flowers are not quite so bird-like as those of its hot-weather relations, *C. Gunnii* and *C. Muelleri*; but it is a really beautiful little orchid, and its development from bud to fully-opened flower is full of surprises. It loves the cool mountainous districts, where it is at its best during the month of May and early part of June. At a Canterbury flower show, held on the 6th September last year, we exhibited a plant which had been blooming for five weeks. This orchid I find to be a shy bloomer in Healesville. In quite large patches of leaves one may only find one bloom —rarely more. I conclude, therefore, that it multiplies below ground rather than by means of seed.

In early April we found leaves and buds of one of the quaintest of the helmet orchids—*Corysanthes bicalcarata*—and by June they were quite numerous among decayed leaves and twigs. They look like a host of reddish-grey slugs, each resting on its single green leaf, which is red on the under side. The hollow spurs are its most salient feature.

The end of May brought buds of *Corysanthes unguiculata* in similar situations. These will be numerous all through July, and those flowers which, with the shelter Nature provides in the shape of fallen logs, dense undergrowth, &c., escape the frosts of July will last until the middle of August. The leaf of this small orchid is also reddish on the under side, and its embryo spurs are plainly visible. Fine blooms of *C. fimbriata* were found at Mount Eliza on 10th June, but Healesville flowers are considerably later. The red and white flowers of this species are almost transparent, and its labellum is deeply fimbriated. Its leaf is grey-green on the under side, not red, as in *C. bicalcarata* and *C. unguiculata*.

Buds of *C. pruinosa* are showing now. The flowers of this are red all over, not streaked, as in *C. fimbriata*. The hood is smaller and more erect, besides being transparent. The flower-stem is shorter—indeed, the flower rests on the leaf. The labellum is only slightly fimbriated, and its edge is curled in, forming a cup. August is its best month, but it will last until the hot winds dry its delicate flowers. Our Healesville specimens do not, however, wholly conform to all the characters

accepted by some botanists as pertaining to *P. pruinosa*. Though I have frequently seen seeded flowers of Corysanthes, in some instances on stalks which have grown to eight or nine inches, these are few in comparison with the numerous cases in which the flower dies and remains a mere blob on the leaf. As in the case of *Chiloglottis diphylla*, this points to a method of reproduction by the increase of tubers rather than with the aid of seed.

This virtually completes a rather elastic list of autumn orchids, for I have included buds of some winter and spring species. There are some which I have not collected—among them a few which appear to be very local. There are doubtless also new species to locate. I should be unhappy to know there were not, for, after all, "to travel hopefully is a better thing than to arrive." By July our winter orchids are with us, coming not as single spies but in battalions. Indeed, we have only travelled a little way along the orchid road. Perhaps you are disappointed—the flowers may not be so brilliant as you expected; but do not be discouraged in your search. Wait until winter creeps "aged from the earth," and spring's first breath blows "soft from the moist hills," and you shall find others quite as beautiful as the curled darlings of a suburban garden.

AUSTRALIAN ABORIGINAL FOLK LORE.—The vast shoals of mullet which swarm, northerly, up the east coast of Australia in the autumn and winter, as if in search of warmer waters, and pour into every bay and river as well, are well known. Strange to say, the aboriginals found out centuries ago that many weeks before a real good mullet season, in June, the Blue Mountain Parrot, in March, is also unusually plentiful. This parrot has about as much apparent connection with the mullet fish as Tenterden Steeple has with the Goodwin Sands. Yet the omen never fails, for scanty parrots are followed inevitably by scarce fish; similarly the Black Magpie, Crow-Shrike, or the Butcher-bird is the sign for the blackfish; if no "churwung," then no "dimgala"—if plentiful the one, then plentiful the other. If the tailor fish is to be in full supply, then the wattle tree must be in extra full bloom beforehand; if the blossoms be scanty, this fish will be conspicuous by its absence for that season. The Crow-Shrike in May heralds the bream in June. These rules are rigid, hard and fast, and for seven years at a stretch, sometimes, the absence of the one fully guarantees the absence of the other. And, hey! presto! the next season gives us a return of both, in plenty, but always concurrent, and never divorced. —From "Opals and Agates," by N. Bartley, 1892.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 11th December, 1922.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about sixty members and visitors were present.

The chairman referred to the death, since last meeting, of Mr. Joseph Gabriel, one of the oldest members of the Club, and one who always had the interest of the Club at heart. He endorsed the words of the notice in the current *Naturalist* regarding Mr. Gabriel, and moved a motion of sympathy with his relatives, which was carried in silence, all standing.

Mr. G. Coghill moved—"That a minute recording the late Mr. Gabriel's services to the Club be drawn up and inserted in the minutes of the meeting." The motion was seconded by Miss Bage, supported by Messrs. J. L. Robertson, F. Pitcher, J. H. Harvey, and G. A. Keartland, and carried unanimously.

[The following minute has been drawn up and inserted in the minutes of the meeting:—"That this meeting of members of the Field Naturalists' Club of Victoria desires to place on record its appreciation of the many valuable services rendered, both as an office-bearer and an ordinary member, by the late Mr. Joseph Gabriel during his long membership of the Club, in which he exhibited an unselfish interest in its work and a deep love of natural history."]

CORRESPONDENCE.

From Miss Gabriel, expressing the thanks of her mother and family for the letter of sympathy in their bereavement forwarded by the committee at its last meeting.

REPORTS.

A report of the excursion to Nar Nar Goon on Saturday, 18th November, was forwarded by the leader, Mr. J. W. Audas, F.L.S., who reported that, owing to the favourable weather, flowers were fairly abundant, some eighty species being noted in bloom, many of them in considerable quantities. In places *Banera rubioides* and *Dampiera stricta* and *Lobelia gibbosa* made pleasing contrasts of colour. The simple white flowers of Woolly Tea-tree, *Leptospermum lanigerum*, were much admired, and many other shrubs added to the blaze of colour.

A report of the excursion for pond-life on Saturday, 25th November, was given by the leader, Mr. J. Stickland, who said that, owing to the ponds in the Fitzroy Gardens not being in

good condition, the locality of the excursion had been altered to the Botanical Gardens, with excellent results. The members, who were joined by several members of the Microscopical Society, were fortunate in finding a number of uncommon and interesting forms in the material collected. Several specimens of a Hydrozoon, Cordilophera, sp., were among the captures. This genus, unlike its near relative, the common Hydra, occurs in colonies instead of being solitary, and differs mainly in having more numerous tentacles irregularly distributed over the whole body in place of being arranged in a circle around the hypostome. A beautiful representative of the Heliozoa, *Clathrulina elegans*, was found, in unusually good condition and in great numbers. The Porifera was represented by a fresh-water sponge, probably a species of Spongilla, and the Polyzoa by a Plumatella. Many species of Protozoa and Rotifera, with several algæ, were also noted.

A report of the excursion to Panton's Gap, *via* Healesville, on Saturday, 2nd December, was given by the leader, Mr. F. Pitcher, who said that the party drove out on the Don road for about four miles and then ascended the range to Malleson's Look-out, a climb of nearly 2,000 feet. From this position one of the finest panoramas near Melbourne is laid out before the tourist. The road was then followed to the top of the range, where a sign indicated the turn off to Ben Cairn and Donna Buang. This track was followed for about a mile and a half, but, seeing no indication of the promised fern gullies at the head of the Don River, the members returned by the way they had come and took the track to the Badger or Coranderrk Weir. Here they found a delightful mass of greenery, consisting of tree-ferns and shrubs of many kinds, though containing nothing of special rarity. During the day many wild-flowers, especially of blue and purple hues, were noted. Though the day turned out somewhat warm, none regretted the time spent amid the tree-covered hills of the district.

ELECTION OF MEMBERS.

On a ballot being taken, Miss M. Gwen Evans, Y.W.C.A. Rooms, Russell-street, Melbourne, and Miss E. Hart, "Fassifern," Barkly-street, St. Kilda, were duly elected members of the Club.

GENERAL BUSINESS.

The chairman said it was necessary to elect some member to fill the place of the late Mr. J. Gabriel on the committee. He desired, as a compliment to their late member, to nominate his son, Mr. Charles J. Gabriel, who, he hoped, would accept the position, for the vacancy. This was seconded by Mr. F. G. A. Barnard, and carried unanimously.

The hon. treasurer, Mr. F. Pitcher, read a statement of accounts of the recent exhibition of wild-flowers, which showed a credit balance of £152. Half of this (£76) had, in accordance with the previous determination, been forwarded to the Children's Hospital as a donation to its funds. He read an acknowledgment of the donation from the hospital, and an invitation to nominate three persons as life-members of the hospital in recognition of the Club's effort. It was resolved that the names of Messrs. C. Daley, F. Pitcher, and F. G. A. Barnard be submitted for life-membership.

The chairman expressed the pleasure of the members at seeing their fellow-member, Mr. G. A. Keartland, among them again after a long and serious illness. Mr. Keartland, in thanking the meeting for its good wishes, spoke of the comradeship he had found among the members, and specially referred to the good-heartedness of the late Mr. Gabriel.

PAPERS READ.

1. By Mr. A. D. Hardy, F.R.M.S., entitled "Notes on the Measurement of Trees."

The author said that his paper had been prompted by a letter from an American correspondent, who asked his opinion regarding certain heights of eucalypts quoted in a recent American publication. He had to confess that many of the heights announced years ago for our tallest eucalypts were doubtful, owing to the fact that the method of measurement was not given in conjunction with the record. He contended that the theodolite and steel tape was the surest plan, and, by means of blackboard drawings, pointed out the numerous pitfalls which occur when attempting to measure the height of trees in rangy country, where it is often quite impossible to get a proper "sight" of the tree to be measured, and, as the tallest trees are generally found in steep gullies, errors in determination are difficult to guard against.

2. By Dr. G. M'Callum, entitled "Common Salt: its Manufacture and Relation to Animal Life."

The author, in an exhaustive paper, dealt first of all with the many references to salt and its uses in literature from the earliest times, and then gave a description of the process of manufacture from sea-water at the Cheetham salt works, near Geelong, where, contrary to the usual idea that the salt is produced by simple evaporation, it was shown that the production of salt from sea-water is a long process, during which it goes through several stages, the nature of which are at present somewhat difficult to explain scientifically. At one stage the Brine

Shrimp, Pararteмia, appears in countless numbers in the partly concentrated liquor, and seems in some way to influence the success of the process.

Some discussion followed, in which Messrs. P. C. Morrison, A. D. Hardy, F. Chapman, G. A. Keartland, J. L. Robertson, and F. G. A. Barnard took part, the general opinion being that an investigation of the process from a bacteriological point of view is desirable.

EXHIBITS.

By Mr. C. L. Barrett, C.M.Z.S.—Photograph of a young Major Mitchell Cockatoo, *Cacatua leadbeateri*. This bird has recently been added to the list of birds protected for the whole year in Victoria.

By Mr. F. Pitcher.—Flowering branches of Cotton-bush, *Cassinia aculeata*, with distinctively bright pink flowers, and fruiting twigs of Native Cherry, *Exocarpus cupressiformis*, collected on Panton's Gap excursion.

By Mr. C. Oke.—Pair of Legless Lizards, *Delma Fraseri* (alive), from Natya, in the Northern Mallee, Victoria.

By Mr. A. E. Rodda.—Photographs of several Victorian snakes; shells of edible oysters found alive in Port Phillip Bay, off Brighton.

By Mr. A. L. Scott.—Foliated schist, from Skipper's Gorge, near Queenstown, South Island, New Zealand.

By Mr. L. Thorne.—Larvæ, pupæ, and perfect insects of a common Victorian moth, *Anthela nicothæ*; also empty pupa case and perfect insect of *Papilio macleayanus*—the pupa was taken during the Toolangi excursion on 15th April last, and emerged on 27th November.

By Mr. H. B. Williamson, F.L.S.—Dried specimen of *Helichrysum Gatesii*, Wmson., described in Proc. Roy. Soc. Viet., xxxv. (n.s.), part 1, Dec., 1922, collected by Rev. A. C. F. Gates, M.A., at Lorne, Dec., 1921. This plant is fairly common, and must have been collected before, but confused with other species. Also a number of species of the genus Pultenæa, described in the same publication.

After the usual conversazione the meeting terminated.

CORRECTIONS.—In December *Naturalist*, page 97, in report of Ringwood excursion, line 7, for "*Conospermum*" read "*Comespermum*"; and on page 98, line 20, for "*D. corymbosa*" read "*D. floribunda*."

EXCURSION TO FRANKSTON.

TEN members and friends put in an appearance on the Frankston train on Saturday, the 4th November, but, instead of disembarking at Frankston, they proceeded, by arrangement, to the Langwarrin siding from which to begin the day's walk. Almost immediately, and within the railway enclosure, a prolific crop of the orchid *Diuris punctata* was discovered, and some very fine specimens collected. Through well-wooded, park-like paddocks, in which *Eucalyptus cinerea*, var. *multiflora*, *E. amygdalina*, *E. ovata*, and *E. viminalis* were about equally distributed, the route led us to the Frankston Golf Club's property. Although all the acacias were finished flowering—except the Black Wattle, *A. decurrens*, var. *mollis*, the scent from which greeted us everywhere—the undergrowth was very bright with Leptospermum, Ricinocarpus, *Daviesia latifolia*, Hibbertia (of which were seen the varieties *stricta*, *acicularis*, *fasciculata*, and *densiflora*), *Dillwynia floribunda*, *D. cinerascens*, and *D. normalis*. The committee of the golf club, entrusted with the beautification of the course, has restricted its operations entirely to Australian flora, and some thousands of trees and shrubs from all parts of Anstralia have been raised from seed and planted out upon the links. Of eucalypts we saw some fine young growths of the following :—*Robusta*, *alpina*, *botryoides*, *diversicolor*, *dives*, *calophylla*, *tetragona*, *tetraptera*, *Risdoni*, *megacarpa*, *fastigata*, *globulus*, var. *St. John*, *sideroxylon*, *torquata*, *macrocarpa*, and others. Some young Murray Pines, *Callitris robusta*, made a fine contrast in colour with a row of *Acacia podalyriæfolia*, and a few well-grown young *Casuarina Fraseriana* and *C. Huegelii* added to the variety. Luncheon was partaken of in a shady part of the course, where a bush of Geraldton Wax-flower, *Chamælaucium uncinatum*, was in good bloom. After refreshment a walk of a mile—the ladies said a very long mile !—through heathy country and sandy rises brought us to the Sweetwater Creek, near which, in the damp ground, a great number of blue Utricularia, Patersonias, Dianellas, *Thysanotus tuberosus*, Polypompholyx, and *Stylidium graminifolium* were discovered. Here, too, there was much bird-life. The Grey Harmonious Thrush, White-eared Honey-eater, Rufous-breasted Whistler, Yellow-breasted Whistler, Pallid and Fantail Cuckoos, Wood-Swallow, Pardalotes, Black-faced Cuckoo-Shrike, Magpies, and Magpie-Larks were all in evidence. A little further up the creek we came to the large new waterworks for the Mornington Peninsula. This is a fine sheet of water, created by a large dam and earthworks, and supplied by pipes from the creek above Beaconsfield, forty miles away. In some places it must be nearly 100 feet deep. The necessary excavations and quarrying that have been carried on here have revealed

some curious geological formations, in which members of our party were much interested. From this reservoir we then turned westerly for three miles through more undulating heath country, with extensive views over the Bay in front of us, and the intervening country to the Dandenong Ranges behind us, until we came out on the Frankston Heights, at the foot of Oliver's Hill.—J. G. MANN.

EXCURSION TO PAKENHAM.

WITH the leader, who was at Pakenham Upper, Cup Day (7th November, 1922) broke with squalls of wind and drifting rain so heavy that it seemed doubtful whether any members would venture to leave Melbourne to fulfil their promises to take part in the excursion. However, by the time the train arrived (9.15 a.m.) the weather had cleared, and a dozen members met on the platform to greet their host for the day. Vehicles had been provided to cover part of the way to the leader's cottage, which was to be the headquarters for the day. After crossing the old Gippsland road, now known as the Prince's Highway, a fine specimen of *Loranthus pendulus*, fully ten feet in length, was seen growing on a peppermint gum near the roadside. Further on fine bushes of *Daviesia latifolia* in full bloom were seen, also quantities of *Melaleuca squarrosa* and *M. ericifolia* were passed. The Common Broom Tea-tree, *Leptospermum scoparium*, was present everywhere, and its pure white blossoms formed a pleasant contrast with the gayer flowers provided by the thick undergrowth of shrubs and herbaceous plants. On nearing the Deep Creek, about three miles from the station, Bell Minahs were both seen and heard in the valley, where a small swamp was situated. At Deep Creek fine specimens of the Native Cherry, *Exocarpos cupressiformis*, in full fruit were seen, and in the bed and banks of the creek were many fine specimens of Olearia, besides numerous ferns. Here, also, along the creek banks and valley were many fine specimens of Mountain Ash, *Eucalyptus regnans*, towering a hundred feet or more above us. At the spot where the party left the vehicles to walk up the last hill to a further altitude of about 400 feet the roadside provided many fine shrubs of *Pultenæa scabra* and *P. Gunnii*, as well as beautiful plants of *Dampiera stricta*, the colour and size of which were perfection, some of them being between two and three feet high; the season having been so cool had favoured a more luxuriant growth than usual, while the colouring of the young gum-tops provoked considerable attention. Having reached the cottage, a cup of tea and a scone were partaken of, and a start made for a further walk while the weather, which was then favourable, kept fine. We walked over the hill towards Nar Nar Goon for about two miles, and

on the way the beautiful star-like flowers of *Clematis aristata* were gathered, also a number of showy orchids, including *Caladenia Patersoni, C. dilatata, C. carnea, Glossodia major, Diuris sulphurea,* Thelymitra (three sps.), the Flying Duck, *Caleana major,* and two species of Calochilus. About half-past one a return was made for lunch at the cottage, and, after a short rest, a further stroll through a rough paddock, past a deep fern gully, in the hope of seeing kangaroos or wallabies, which frequent this part, was taken, but in this the party was disappointed, and a return made for an early tea. Many more flowers were seen in the afternoon, and several of the party secured rooted specimens of native plants for growing in their gardens. Our secretary was very energetic in collecting beetles, and secured one or two rare specimens, regarding which he may have something further to say. No rain fell during the day, and the excursion appeared to the leader to be an unqualified success. The view from the hill above the cottage being unique, and, though the weather was dull, was wonderfully extensive, and greatly admired.—F. Wisewould.

The Late Mr. James R Tovey.—It is with regret that we record the passing of another member of the Field Naturalists' Club in the person of Mr. J. R. Tovey, chief assistant at the National Herbarium, South Yarra. He was elected a member of the Club in August, 1907, and contributed several papers on botanical subjects to its proceedings. He also acted as hon. secretary during the year 1913–14. His life was devoted to botany. Entering the State service at the age of sixteen, he was appointed as a junior at the Herbarium under the late Baron von Mueller, Government Botanist. Here he applied himself assiduously to his duties, and at the time of his death, after thirty-three years' service, had a very complete knowledge of Australian plants, and, in fact, of those of the whole world, as represented at the Herbarium. In 1907 he collaborated with Prof. A. J. Ewart, late Government Botanist, in the production of a work on the weeds, poisonous plants, and naturalized alien plants of Victoria. He also contributed several papers to the Proceedings of the Royal Society of Victoria. For many years he had been paralyzed, but his brain remained clear, and he preferred to work to the last, being wheeled in his chair to his duties every day by his daughter, who helped him in every way. He practically died in harness on the 30th of December, and on New Year's morning was laid to rest in the Cheltenham Cemetery, which is situated amidst a tract of heath land he had often wandered over in searching for specimens, and where, some years before, he had watched for several seasons an orchid which was eventually named by Professor Ewart as *Pterostylis Toveyana,* in his honour.

AN ENTOMOLOGIST IN THE DANDENONGS IN WINTER.

By Chas. Oke.

(*Read before the Field Naturalists' Club of Victoria, 11th Sept.*, 1922.)

As so many people, fellow-members included, have expressed surprise at my going out collecting during the winter months, I have thought that a few notes on what is to be seen in the Dandenongs at that time of year may not be out of place. To most people the bush in wet weather is a place to be avoided. They say everything is so horribly wet and depressing, the tracks so muddy, and the hills so slippery, in fact everything is decidedly unpleasant.

How short-sighted is their vision! For to the person who loves the bush it appears otherwise. I do not mean that even the most ardent bush-lover likes to be caught unprepared by a sudden heavy downpour of rain; but even this, if one has only a few miles to go, and can change into dry clothes, is not an experience without its pleasures—pleasures that appeal to our sense of sight and smell; but if one has on a waterproof, strong boots, and old clothes, plenty of enjoyment can be obtained from a shower of rain, be it heavy or light. If it is a fine, misty rain, it gradually envelops everything with a thin film of moisture, which soon forms into large drops, and falls from trees and bushes. The mists seem to cling in patches to the hilltops and to parts of the gullies; or, if there is a breeze blowing, it comes and goes in waves. Should it be a sudden downpour, and you are at the top of one of the gullies, among the tall gums and ferns, your first feeling will be one of disgust at being caught so far from home. But as you listen to the big drops hitting the trees round you, and forcing their way through the leafy canopy overhead, and falling with a crackling sound on the dried leaves, that are so thickly strewn around, your first feeling of fear and disgust gives way to one of pleasure and admiration.

I have been caught in a heavy storm in the Sherbrooke Gully, near the Giant Tree, and came right down the gully to the town, a distance of about 3½ miles, in a heavy rain all the way. Though I did not like the "ducking" I got, this was more than compensated for by the sight of the rain coming down in large drops, gradually making everything sopping wet, till water came trickling down the trees and undergrowth, forming little streamlets, which went rushing down the slopes, by many a devious track, to the creek below; the different smells of damp leaves, mosses, shrubs, and trees mingling together and forming a fragrance unknown elsewhere. Some of the inhabitants of these gullies do not care for the rain, and when rain comes after a dry or a comparatively dry spell,

sundry moths may be seen darting around, looking for a safe, dry spot to shelter in. Beetles which were on the foliage soon disappear, but others, which habitually live in cracks in the ground and other obscure places, now come out and hide under stones, sticks, &c., on the ground, and are more easily caught. Snails, slugs, planarians, and land-leeches soon become more active and evident as the vegetation and ground become thoroughly wet. Should the rain continue, and everything become very wet, numerous Arachnids, Myriapods, and insects run up the trees and take shelter under the loose bark, where they may be very easily captured.

But what I like best is a good rain overnight, with a fine morning following. How fresh and beautiful everything is! Beads of moisture scintillate in the morning sun, making a veritable fairyland of the bush. Spiders' webs stand out and show the beauty of their weaving in a manner not discernible at other times. Such a morning as this is ideal for a brisk walk before starting to collect, and suits the collector who wants small beetles, such as Staphs, Pselaphs, and other interesting small fry, as the rain has brought them out of their little crevices and hiding-places, and they will now be found under stones, logs, dead leaves on the ground, and in mosses and grass tussocks. On such a morning as I have just described I turned over a log on the side of the hill, at Ferntree Gully, and saw a specimen of *Siagonyx Blackburni*. This is a fairly common black Carab, or ground beetle. It is about three-quarters of an inch long, with a rather narrow prothorax, having a slightly turned up margin, prominent eyes, long antennæ, and striated wing cases. I had caught, on previous occasions, quite a number of this beetle without noticing what I was now going to witness. Seeing something small move near the Siagonyx, I bent down to see what it was, and in doing so alarmed the Siagonyx, which immediately bombarded me. Several species of Carabidæ and Paussidæ do this, but I was not aware that members of this genus did so. The noise it made was almost imperceptible, and I would never have heard it if I had not seen the little puffs of "smoke." Of course, it is only a vapour, and that is why it was so visible in the heavy, damp air. It fired little puffs of acrid vapour the size of a pea, about three inches in a direct line with the body; then they floated up two or three inches, opened out, and disappeared. Of three individuals tried, two fired eight times and one nine times. Whether this is the full capacity of their magazine I do not know, but it would seem probable. On the sides of the hills numerous Arthropods (articulated invertebrates) live, some of which will seldom, if ever, be found in the gullies, while others rarely leave the gullies.

Let us take a walk up one of the hills at Ferntree Gully or Belgrave, and then down through the gully. One of the first objects that will attract the eye are dried eucalypt leaves suspended in spiders' webs. These are the homes of our common leaf-rolling spider, *Araneus wagneri*, Rainb., a pretty little spider, varying very much in colour and markings, but may generally be said to be a mixture of buff and lemon. It is surprising how such a frail-legged little creature as this is can curl up these leaves. It is very common in these hills, or, at least, the females are, but, though I have searched very carefully and examined hundreds of webs and rolls, I have not succeeded in finding the male. Perhaps the females have eaten them all, for spiders have an easy way of settling their matrimonial differences. There is no divorce or judicial separation with them, and, though there is strong evidence of incompatibility on the part of the female, it is probably due to hunger, not temper, as in some other females. The males seem to be more peaceful, and more contented to live and let live. After a brief courtship and a shorter married life, the females eat their consorts. I have several times seen female spiders eating males, and have seen strong evidence, such as *débris* containing a male pedipalp, around the female retreat, that this often takes place, but have never seen any sign of a male eating a female, and doubt if it ever takes place. *Araneus wagneri* seems to have completely taken the place on these hills of *Gastrocantha minax*, the Thorn-backed Spider of the flats around Lower Ferntree Gully and Ringwood. The ordinary form of this latter spider does not seem to be on these hills, though I have taken its black form near the station at Belgrave.

Turn over a log. What a hurry-scurry takes place! Two Staphylinids disappear almost before we have time to see them. One, the first to disappear, was certainly a Conurus. These beetles run very quickly, with an undulating motion, and have a distinctive look about them, even when running, well known to the collector, but difficult to describe. The other was probably either a Quedius or a Philonthus. When collecting Staphs, quickness is essential, and care must be taken, as they are so easily damaged. Crustaceans of the sand-hopper type hop about in all directions, and often prevent one from catching some much-desired little insect. Small white Myriapods are plentiful, but are probably only immature forms. A cockroach rushes along and sticks its head into a hole, and raises the tip of its abdomen as high as possible into the air. It is *Platyzosteri analis*, Sauss., a common cockroach, about an inch in length, black, or nearly black, with a dull reddish margin and a polished surface. If you want to catch him, gently tap him two or three times with a stick. He will

squirt out a water-white fluid, after which it is safe to handle him. I once caught one without taking this precaution, and, on receiving the fluid on my hand, smelt it. I raised the hand to within three or four inches of my nose. Both smell and sensation resembled glacial acetic acid. The inside of both nostrils felt as though they had been burnt, and it made the eyes water. By the time you have caught your cockroach nothing will be left but a few Adeliums. These beetles are so slow that they will remain for some time before leisurely walking off. Having seen what was of interest under your log, please put it back, where it will act as a cover to be turned over on another occasion, and, as so many insects pupate just below the surface under cover like this, it gives them a chance to breed.

It would be as well to turn over a few more logs and find out what lives under them. On turning over logs and stones it is quite a common occurrence to see underneath what looks like a greyish animal, with a multiplicity of legs, rush off. A common name for these creatures is forty-legged scorpions; but as they are not related to scorpions, and only have twenty legs, the name is not at all suitable. They belong to the family Scutigeridæ, of the Myriapoda, in which they are peculiar on account of their faceted eyes, long antennæ, possession of lungs, and a remarkable sense organ under the head. The poison claws are well developed, but whether they are capable of inflicting a really poisonous injection is a moot point. Alive or freshly killed they are very pretty little creatures, of a pale blue-green, with some pink markings, and brown antennæ and feet. What sense is situated in the organ under the head is not known. Other Myriapods that abound under logs are millipedes and centipedes. Millipedes are harmless, inoffensive vegetable feeders, and without poison claws, but generally have well-developed glandulæ odoriferæ — "stink glands." These do not seem to develop any strong smell in the species in these hills. Centipedes are a more numerous class, and show a greater diversity in colour, size, and number of feet. The colours range from blue-green, green, red, brown, yellow, and white. The number of legs differs. The common greens and reds have twenty-one pairs, some of the browns and yellows thirty-eight pairs, while some of the thin, paler ones have as many as seventy-two pairs. These latter ones are very thin, and are only as thick as a bit of knitting silk. One thing that may be of interest is the way they poison. I have heard it asserted that they sting with the appendages on the tail, also that they bite with their mouths. Neither is really correct, as the poison claws are not, strictly speaking, a part of the mouth. Just behind the mouth, on the under surface, is a

transverse plate, having at either end a sharp, curved fang or claw. It is with these that they inject their poison. To a casual observer this plate will appear to be a part of the mouth, especially as on its upper edge it bears two small projections, having a dentated edge, which are used in crushing its food; but it is easily detached, and when removed leaves all the mouth parts exposed.

Spiders are well represented, and members of several families are to be met with, the most numerous kind being Lycosids, or Wolf Spiders, and some large black Dictynids. Phalangids are found under logs, and are mostly of the short-legged type; but these and scorpions, which are also met with, are more numerous in the gullies.

Cockroaches are represented by several species, and their egg-capsules are very common objects. They are well worth a close scrutiny. Cockroaches carry their eggs about with them in the capsules, sometimes till they are ready to hatch. Along its upper edge are a number of serrations; these are probably of use to the insect in holding it, but each serration is the top of an egg. *Panesthia australis*, Brunn., the largest cockroach in this district, is very common under logs and in rotting wood.

Rather a rarity is that peculiar, grotesque-looking, wingless mantis, *Paroxypilus tasmaniensis*, Sauss., which, unlike other mantids, lives under stones and logs.

Beetles belonging to several families are to be found, the greatest number of species belonging to the Carabidæ. One very interesting member of this family is the common *Notonomus phillipsi*, Cast.; this is a black, shining beetle with greenish (sometimes purple) reflections, about three-quarters of an inch long. During the winter they will often be found under logs, and less often under stones, in a little chamber 1½ inches across and half an inch deep. This is their breeding chamber. Do the beetles make it themselves, or do they select some suitable depression? As they are usually so much alike, one would think they must be made by the beetles; but as I have never seen any sign of the dug-out earth having been deposited around, and as the beetles are not provided with any pronounced digging apparatus like that possessed by the Onthophagi and other digging Scarabs, I am inclined to the former view. In this chamber thirty or forty little elongate eggs are deposited. They are almost white at first, but turn to a pale yellow before hatching. The little grubs are white when first hatched, but in a day or two turn yellow, and then gradually into a light brown. On turning back the cover, after the eggs have been laid, and until the grubs have left this nest, the mother will almost invariably be found standing over the eggs or larvæ

(as the case may be), and showing every sign of fear and anxiety for the safety of her offspring. She generally turns round and round or makes little runs backward and forward, and but seldom running away. It would be very interesting to know if the mother feeds the young during the time they remain in the breeding chamber. If so, it must be with regurgitated juices, as I have never found any sign of *débris* in or near this breeding chamber. This, of course, is very unusual in the insect world, as very few insects, with the exception of the social Hymenoptera, ever see their offspring. I do not know how long the grubs remain in the maternal home, but I believe it to be about three weeks after hatching.

Numerous ants have their homes under logs, but the one most frequently met with is *Amblypone australis*, a light brown ant with a sneaky way of walking and a nasty sting. Bull ants, Myrmecia, sps., are also partial to logs. Stones harbour a similar kind of animal life. Some species seem to prefer the stones, others the logs. Few, if any, are absolutely restricted to either. Ants are certainly more numerous under the stones than the logs, and provide an interesting subject for study, as also do their inquilines. As these inquilines are usually so scarce and take so long to find, we will leave them undisturbed to-day, for, though this is the best time of the year to look for them, it needs such careful looking in the nests that we would not see the other interesting items. The commonest ant in these hills is *Ectatomma aciculatum*, Sm., while the ant having the largest colonies is *Aphanagester longiceps*. This ant is not very active during the winter, and seems to keep underground as much as possible. It is a perfectly harmless ant. Not so the Jumping Ant, *Myrmecia pyriformis* (?), which has a most severe sting, and always seems to be seeking a "*casus belli*." Winter is the only time when it is possible to spend more than a few seconds at a time looking in their nests, as during the cold, wet weather they are not so energetically militant as during the warmer months; but should they get on you they lose no time in bringing their stings into action. One of our larger Staphs., *Xantholinus phœnicopterus*, Er., seems to me to exhibit a queer taste in often pupating in the sides of these nests, which is a place I would not think of tarrying in; yet this beetle could not be called an inquiline, as it is found in a number of situations in no way connected with ants. Under these stones are to be found what are known as vegetable caterpillars, because they resemble little toadstools, having a caterpillar for a root. This is due to a peculiar fungus called Cordyceps. This genus of fungus attacks caterpillars that live in the ground, killing them and then growing out of one end of them. I have found it growing

out of Scarab (Dynastid) grubs, and the Swift Moth caterpillars, Porina (? sp.—probably *fusco-maculata*).

Under the bark of trees many insects and spiders live, and so let us strip off a little from some smooth-barked gums. It is surprising the number of spiders that come tumbling down from some trees. They belong to several families, Drassids, Clubionids, Thomisides, Argiopids, Dictynids, and Attids being very common. Spiders have very few enthusiasts; and yet they are very interesting in their habits, and show such a diversity of structure in their anatomy that to study them properly would prove very interesting. In studying the classification of a spider so much has to be thought of; the number of lung-books, the disposition of the spinnarets, presence or absence of a cribellum, and the number and arrangement of the eyes being the more important items. Numerous Carabs are very common on these trees, as also are some weevils and Tenebrios. Longicorns are very scarce; practically the only one to be taken is *Tessaromma undatum*, Newm., but a nice fresh specimen of this is very pretty. It is about three-quarters of an inch in length, of a pretty cinnamon-brown, with a bluish blush on the shoulders and along the sides, with a pretty design of gold and dark brown markings. Several species of Hymenoptera appear to be hibernating under the bark. Bugs are plentiful, and in every stage of development. One curious species is the Hairy-legged Bug, Ptilocnemus. This bug is half an inch long, and has a tuft of hairs on its hind tibiæ, and on stripping off the piece of bark that shelters one it appears to be very agitated, and keeps on tapping with its hind legs, using alternately its right and left leg; probably its idea is to frighten other insects, which might easily find it an alarming spectacle. Under the loose bark one may often come across a creature of interest. At first glance it resembles a small crab, or a scorpion without a tail. It is an Arachnid, and therefore related to the scorpions. It belongs to the Chernetidæ, and is commonly called a "false scorpion," or Chelifer, after a typical genus. The jar of pulling off the bark generally makes them run under any bit of cover handy, such as, say, a piece of cobweb. Wait a while, and out it comes, very carefully sensing its way by waving its pedipalps in front of it. Having no eyes, it must feel its way carefully, and as it advances it seems to be all on the *qui vive*. It rarely walks straight ahead, but meanders along, pausing frequently, as though to consider what is in the air. Touch the bark just behind it, and away it runs with every sign of hesitancy gone. They nearly always run an inch or two and then turn around to face the danger, and run away backwards. This may be for two reasons, one being that they look more fearsome from the front view, and it allows

them to protect themselves from attack with their pedipalps; the second is that they can run much quicker backwards than forwards. Under the claws, on the ends of the legs, they have a peculiar trumpet-shaped membranous organ. These are spoken of as suckers in text-books, but it is highly probable that they receive sound waves with them. Make the faintest scratch with a piece of grass several inches behind one, and it immediately jumps around to face whence the noise comes, thus proving that they can hear or feel very much finer vibrations than we can. Chelifers do not spin snares for catching their prey, though they are provided with spinning organs. These open out on the digit of the chelicera, and are only used for making a small web at breeding time. The possibilities of bark-stripping, even in winter, are practically inexhaustible, and it is often that small piece which does not look as though it were worth bothering about that harbours some precious little specimen. But it would only tire you were I to go into more detail. Suffice it to say that representatives of every order of insects are to be taken.

In shady nooks, and sometimes out in the open, occur little plots of moss. Bags of this should be taken home for sifting over white paper. Sometimes it will be found to be teeming with animal life. Certainly most of it is small, but none the less interesting for that. Beetles are the most numerous inhabitants of moss, and the families that are most numerously represented are Staphylinidæ, Pselaphidæ, Carabidæ, and Curculionidæ. Some individual species are very common; others you might only come across once in a lifetime.

Having had a look at a few of the small inhabitants on the hills, let us go down into the gully. There is no sharp distinction in the Arthropod fauna, as might have been expected. Certainly a few species live exclusively in the gullies, but their numbers are small, and, as a rule, they exhibit no structural peculiarities to differentiate them from those that live on the hills. It is the dampness that attracts so much life here, and that is why some forms are quite common here and are comparatively scarce on the hills. When hunting down here one cannot fail to notice the remarkable numbers of hopping crustaceans that abound everywhere; under or in cover of any sort they will be found. Many species of Arachnids are common; scorpions, spiders, chelifers, phalangids, and mites are all to be found in numbers. Scorpionidæ is represented by one species only; it is very common, and may often be found, especially in early winter, under a log or stone, covered with its young. The young are a pale cream when first born, and cling to the mother's back; gradually they become mottled with brown, and then leave their mother's care to fend for

themselves. This scorpion is a contradiction to the statement, often seen in books, that they are inhabitants of dry, arid parts, for it is only to be found in damp situations. There are many points of interest that suggest themselves in connection with the biology and bionomics of these little creatures. Two in particular are. What is the function of the pectines, and to what extent are they poisonous? The pectines are situated on the under surface of the second abdominal segment, and are comb-like in appearance. Various suggestions have been made as to their function, but it is probable they are connected with sex, as they are more developed in the male. No doubt it would be easy to ascertain the effect of their sting, but one hesitates to try it. Spiders (Araneæ) are very numerous, both in regard to species and individuals, perhaps the most interesting kind being one about three-quarters of an inch long, and much heavier in build than is usual with the ordinary or true spiders. I have said "true spiders," for, while it certainly is a spider, it has four lung-books, and its chelicera (erroneously called jaws) work up and down. These are the characters of the Aviculariidæ, or trap-door spiders. Other spiders have two lung-books, and their chelicera work sideways. This spider is not uncommon amongst rotten wood, but does not, as far as I am aware, have a door to its tunnel. Chelifers (Chernetidæ) are much less common, and few in species; but they are to be found in moss and amongst decaying leaves on the ground. Phalangids are fairly numerous, and at least one species very common. These Arachnids are generally dubbed "spiders," but may easily be distinguished from spiders by the absence of a "waist," there being no constricted pedicle between the cephalothorax and the abdomen. Phalangids also have only two eyes, situated in a little turret-like protuberance on the caput. There is one very curious form that may be found clinging to the "hairy" part of the tree-ferns, the body of which is only one-sixth of an inch in diameter (it is practically a flat circle), with very long legs. The chelicera are chelate, and nearly three-quarters of an inch long. The legs are thin, but slightly swollen at the joints, and at their ends are very thin and prehensile. The length of the four pairs of legs is approximately 1, 2, 1¼, and 1½ inches. Altogether, it is a remarkable looking creature.

By far the commonest Phalangid is one that may be found under logs, &c., and in moss. A mature specimen measures under half an inch, and is a dark red-brown, the front appendages being more reddish. The chelicera are heavily built and chelate (formed like the large claws of a crab). The pedipalps are also thick, with a row of teeth on the upper and lower edge of its inner surface for crushing its prey. With the exception

of these appendages the whole upper surface is coriaceous and opaque, and the upper surface beyond the caput is armed with transverse rows of obtuse tubercles. Phalangids are provided with stink glands, and in this species they must be well developed, for their presence is readily detected by their peculiar pungent odour. The only other thing that I know of that smells like them is certain species of Ichneumon flies when they are emerging from their pupæ. These two smells have a great resemblance to one another.

Mites (Acarina) abound everywhere. Their numbers are legion, and a handful of moss or rotting leaves, taken at random, is sure to contain several different species. Brilliant red with white spots is the colour of one of the largest. Others are dull red, brown, yellow, and black, while others are mottled. One of the prettiest is a mixture of red and brown, with white spots.

Centipedes are plentiful, and towards spring will often be found under any sort of cover rolled around their egg-masses. The prevailing large blue-green species lays very pale yellow eggs, while those of the thin yellow species are a pretty heliotrope or mauve colour.

Insects of every order live in these gullies, and may be taken in some stage of their development at this time of the year. Springtails (Collembola) are in every moist spot. On being disturbed they spring in any direction that chance may take them, without regard to whether danger or safety lies that way. What a pity they are so frail! It does not give us much of a chance to examine them properly, or to see how they really spring. It is easy enough to see the spring extended after it has been used, but to see how it is held by its catch, or by what mechanism it is released, is very difficult. Orthoptera are scarce. An earwig or two, three species of crickets, and a few cockroaches are about all. Hymenoptera are better represented. An occasional parasitical fly (Ichneumonidæ, &c.) may be seen. Wasps' mud nests can be obtained for breeding at home; while ants can be obtained in great numbers, with one species, at least, peculiar to the gullies. Coleoptera are, as usual, the most numerous in species. They are to be found in all kinds of places—in fact, it is almost impossible to imagine a spot where some kind or other will not be found. Lepidoptera are scarce in the winged stage, but a few larvæ and pupæ are to be found. A fair number of Hemiptera (bugs) will be found in moss, under cover on the ground, and under bark. In the latter place one queer little wraith exists; it is long and thin, and when disturbed raises itself up as high as possible on its legs and rocks itself up and down and sideways. It moves slowly at first, then, either gradually or suddenly, quicker and quicker, till it is impossible to follow its movements, no doubt

thereby often frightening its enemies. Diptera (two-winged flies) are fairly plentiful, though mostly small. A few mosquitos (Culicidæ) and "Daddy Long-legs" (Tipulidæ) persist through the winter, as also does a small wingless fly and various other forms.

Now for a short note on a three days' stay at Belgrave on the 1st, 2nd, and 3rd of July, 1921. This was arranged with the idea of collecting beetles, and particularly to try to obtain another specimen of a species of Chlamydopsis, of which I had previously obtained a single specimen. In this I was unsuccessful, but by dint of much searching I obtained three specimens of two species belonging to this genus new to science, and by bringing bags of moss back to the boarding-house, and sitting up till the small hours of the morning, I secured many fine (in more ways than one) beetles. What pleasure it is teasing moss over paper and seeing all sorts of small animal life come tumbling out! What fascinating little things I saw! But time will not permit of mentioning even the barest details now. For the three days I brought home 156 species of beetles. Several others were seen, but passed over as being too common to take, the families supplying the greatest numbers being:—Curculionidæ (34), Carabidæ (32), Staphylinidæ (25), Tenebrionidæ (21), Pselaphidæ (19).

Having given some slight account of what is to be seen in the Dandenongs during the winter, I think you will agree with me that there is plenty to see, and still more to learn about its Arthropods.

"SOME WILD-FLOWERS OF TASMANIA."—The issue of a second edition of a botanical work of this description indicates that some notice must be taken of the native flowers of the island State. The author, Mr. L. Rodway, Government Botanist, has introduced a considerable amount of interesting matter into his descriptive notes, which, while not being too technical, should afford his readers a great deal of the "why and wherefore" regarding the floral organs of the various plants dealt with. Only the more noticeable flowers are described. These are grouped into seventeen chapters, such as "The Rose Family," "Purple Heather, also Blue Love," "Sheoke and Beech," &c. A couple of pages of vernacular names are given. Unfortunately, many are very different to ours for the same plants. The work is illustrated by reproductions of photographs, which in some cases hardly do justice to the subject. Seeing that many Tasmanian flowers, or very closely allied species, occur also in Victoria, flower-lovers in this State should find its 145 pages very useful. It is published by the Government Printer, and costs three shillings and sixpence.

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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, 15th January, 1923.

In the absence of the president (Mr. C. Daley, B.A., F.L.S.) through illness, Mr. E. E. Pescott, F.L.S., one of the vice-presidents, occupied the chair, and about fifty members and visitors were present.

The chairman referred to the loss the Club had sustained since the last meeting by the death of Mr. J. R. Tovey. He moved that a letter of sympathy be forwarded to his widow and family. The motion was seconded by Mr. F. G. A. Barnard and supported by Messrs. C. French, jun., H. B. Williamson, F.L.S., A. J. Tadgell, F. Pitcher, and Dr. C. S. Sutton, and carried in silence, all standing.

REPORT.

A report of the excursion to Upwey on Saturday, 16th December, was given by the leader, Mr. C. Oke, who said that a small party left town by the morning train. On arrival at Upwey they investigated the country on the northern side of the line and found many insects and plants to interest them. This portion of the ranges was found to be almost in its primitive state, and contains much of interest to nature-lovers.

ELECTION OF MEMBER.

On a ballot being taken, Mr. Harold Bailey, Albury, N.S.W., was duly elected as a country member.

ELECTION OF HON. MEMBER.

The chairman said that the committee had decided to recommend to the Club that on account of his many services to the Club in its earlier years, Mr. C. French, sen., one of the founders of the Club in 1880, and formerly Government Entomologist, be elected an honorary member of the Club. He had much pleasure in moving to that effect. The motion was seconded by Mr. D. Best, who was co-founder with Mr. French, and supported by Messrs. F. G. A. Barnard and F. Pitcher, two of the few remaining original members, and on being put to the meeting was carried unanimously.

PAPER READ.

By Mr. F. Chapman, A.L.S., F.R.M.S., entitled "On a Cast of a Sea Urchin from the Red Sands of Studley Park, Kew."

The author said that the finding of this cast of a Kalimnan sea urchin, apparently allied to the Lovenia of the Beaumaris

cliffs, conclusively decided the age of the Red Sands to be Lower Pliocene, and belonging to the same series as the Brighton Ironstone beds. The cast was found some years ago, during a University geology excursion, and he was indebted to Professor Skeats, D.Sc., for the opportunity of examining and describing it.

HOLIDAY EXPERIENCES.

In place of a second paper, members were asked to give any experiences during outings taken in the Christmas holidays.

Mr. C. Oke said that he had visited Wright (Emerald line) on Christmas Day, and, though the day was very showery, he had managed to collect a few interesting insects. He had also found a specimen of a Peripatus, a rare Arthropod, found in damp spots under logs, &c., and a live specimen of the large black land snail, *Paraphanta atramentaria*. On New Year's Day he had visited Pakenham, under different conditions, as the day turned out very hot. Here he had found several nests of an interesting ant, *Iridiomyrmex nitidus*, in which several species of minute beetles, which live associated with ants, were taken. One of those taken was *Glymptoma kingi*, a bright reddish-brown Staphylinid, hitherto unrecorded for southern Victoria.

Mr. H. B. Williamson, F.L.S., gave an outline of a trip to the Bogong High Plains *via* Tallangatta, Mitta Mitta, and Glen Wills. He spent two nights on "the top," and with two companions—Mr. Downes and Mr. S. Clinton—traversed "the plains," covering about 30 miles of the country above the 5,000-feet level. Mr. Downes provided horses, including one for the pack. Mr. Clinton, formerly teacher at Mitta Mitta school, who is an enthusiastic mountain rover and plant observer, did the journey (nearly fifty miles) on foot. He reported that many interesting alpine plants were collected, one of which appears to be an undescribed Brachycome, and promised to present a fuller account, illustrated, of the trip at a later date.

Mr. E. E. Pescott, F.L.S., said that he had spent a fortnight at Belgrave, in the Dandenong Ranges, and was quite satisfied that our "hill" country is among the finest in the Commonwealth. The scenery is glorious, and the fern glens and gullies are grand. He went to Sherbrooke Gully and Falls one day. This is the finest piece of nature near to Melbourne, and is well worth visiting over and over again. Here he met a visitor who complained of the rigid regulation that he could not take away two or three ferns. He was told that if every visitor did that there would soon be no Sherbrooke Gully. He saw in a private gully a very fine specimen of the Tasmanian "Leather-wood," *Eucryphia Billardieri*; it was about ten feet

in height, and in full flower, and was one of the finest flowering shrubs he had ever seen. The clusters of dainty white flowers, not unlike plum blossom, were very beautiful. Orchids were scarce. It was rather early for the "Hyacinth" Orchid, *Dipodium punctatum*, but one or two good spikes were found. The "Potato" Orchid, *Gastrodia sesamoides*, was found in one of the gullies, its flowering evidently having been retarded by the secluded position. One fruiting specimen was found, nearly four feet in height, crowned with thirty-nine seed-heads.

Mr. A. Brown said that members who desired to see virgin country, untouched by bush fires, should visit the Latrobe Valley, *via* Noojee, where some of the finest forest scenery in Victoria existed.

NATURAL HISTORY NOTES.

Mr. D. Best said that during a recent walk through the Asylum grounds at Kew he had noticed that the English elms planted along the main drive were being attacked by a well-known wood-boring beetle, *Uracanthus acuta*. This beetle, in its larval state, tunnels the branches of the trees, and finally, when about to complete its larval life, cuts the branches almost off, so that they are easily broken by the wind, and thus seriously disfigures the trees. He thought that the beetle had taken to the elms on account of their natural food tree, the Silver Wattle, having become so scarce.

Mr. F. E. Wilson mentioned that during a recent visit to Bayswater he had found a specimen of the parasitic fungus, Cordyceps, known as the vegetable caterpillar, growing on the larva of a beetle, probably an Elaterid. It was about three-quarters of an inch in length, but he was keeping it in cool and moist conditions to see if it would develop further.

Mr. F. G. A. Barnard said that about eighteen months before he had planted a number of eucalypts and acacias in his garden at Kew. These were now five or six feet high and doing well, but he had found they were not immune to insect attacks. In the spring the leaf-eating larvæ of a small moth had done much damage to the foliage by spinning the young leaves and shoots together, and so disfiguring the trees. Then, during the warm summer evenings they had been visited by quantities of a small brown Scarabid beetle, resembling the ordinary cockchafer, but only about three-quarters of an inch in length. These arrived on the wing all at once just about sunset, and, though not settling on the trees for more than a few seconds at a time, managed to bite the young leaves, serrating the edges and quite spoiling the appearance of the trees. The visitation lasted only about a quarter of an hour, when the beetles departed just as suddenly as they

arrived. At first the gums seemed the favoured food, but latterly two or three of the acacias had proved the attraction.

Several members said they had noticed similar occurrences but to a lesser extent than Mr. Barnard.

Mr. C. Oke said that when collecting recently in the Caulfield district he noticed a number of holes in the ground similar to those made by trap-door spiders. On digging up several of the holes he found them to be inhabited by a lygosid spider, a form which he had never before found occupying such a habitation.

EXHIBITS.

By Mr. F. G. A. Barnard.—Live specimen of the Red-striped (poisonous) Spider, *Latrodectus scelio*, taken at Kew.

By Mr. A. S. Blake.—Blooms of *Eucalyptus macrocarpa*, a native of Western Australia, grown at Ivanhoe. These were very fine, measuring at least three inches across.

By Mr. F. Chapman, A.L.S.—Cast of fossil sea urchin, Lovenia (sp.?), from the Kalimnan Red Sands of Studley Park, Kew; examples of *Lovenia forbesi*, a common Kalimnan sea urchin, from the Beaumaris cliffs; a collection of seaweeds, from Torquay.

By Mrs. Coleman.—Bark of the Lace-bark tree (N.O. Thymeleaceæ) of Jamaica.

By Gelogical Survey of Victoria (per Mr. A. E. Rodda).—Aboriginal scrapers and chippings, from Coward Springs, South Australia.

By Mr. C. Oke.—Insects from Upwey excursion; Lycosid spiders living in tunnels with trap-doors, from Caulfield.

By Mr. F. Pitcher.—Flowering specimens and plants for distribution of *Clematis glycinoides*, D.C., Erect Clematis, grown at South Yarra.

By Mr. A. E. Rodda.—Live Carp fry from Yarra billabongs, East Kew.

By Mr. J. Searle.—Rare rotifer from Queensland, *Trochosphæra æquatorialis*, Semper.

After the usual conversazione the meeting terminated.

A RARE ROTIFER.—The rotifer exhibited at the January meeting of the Club was originally found in ditches in the rice-fields of the Philippine Islands, and was named and described as *Trochosphæra æquatorialis* by Professor Semper in 1872. It has a transparent, spherical body, with the principal ciliary wreath round the middle of the sphere. It has since been discovered in Queensland by Mr. W. R. Colledge, of Brisbane, to whom I am indebted for the specimens, and its occurrence described by him in the journal of the Queensland Field Naturalists' Club.—J. SEARLE.

A TRIP TO NORTH AND NORTH-WEST FROM BROKEN HILL.

BY DR. W. MACGILLIVRAY.

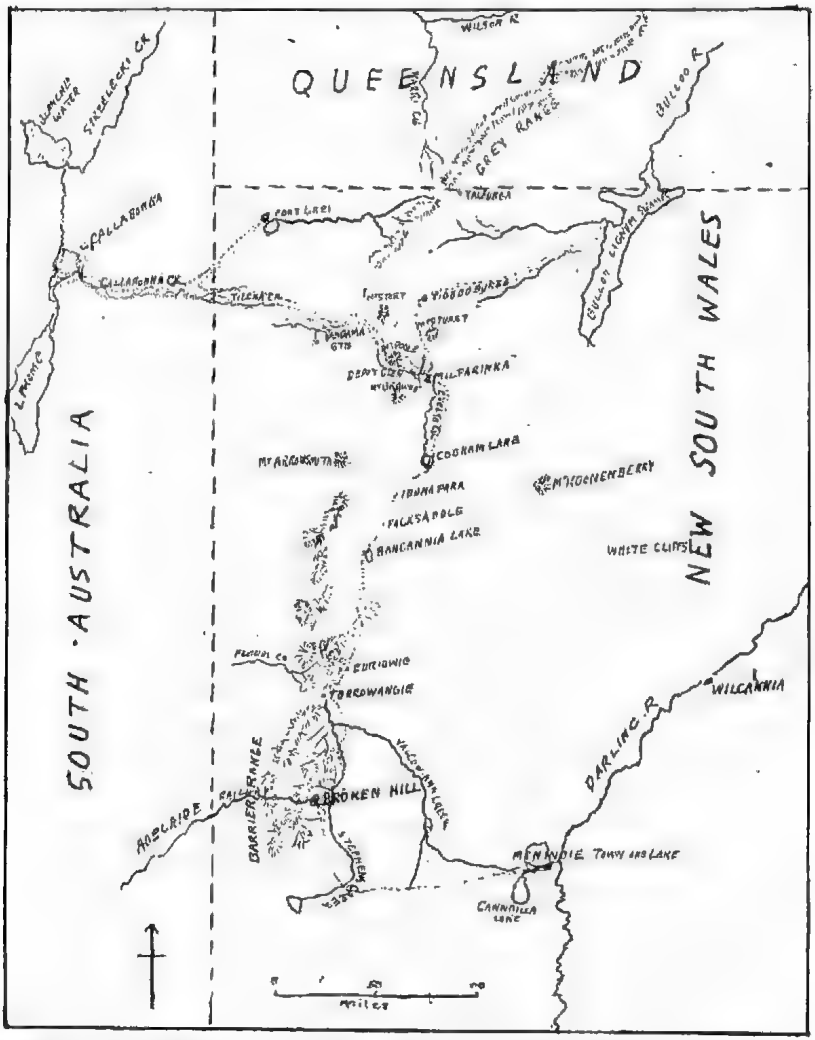
(*Read before the Field Naturalists' Club of Victoria, 13th Nov., 1922.*)

ON the 13th August, 1921, Dr. Chenery and I packed our belongings on a Ford trolley and started in the forenoon on the northern road. Two friends, Mr. and Mrs. Heywood, and my son were to follow after lunch in a Dodge car. From Broken Hill the road crosses Stephens Creek, nine miles out, and runs parallel with a tributary stream, bordered—as are all these creeks, in the Barrier Range—with Red Gum, *Eucalyptus rostrata*. We pass the ruins of the old Mt. Gipps woolshed, cross a sandy water-course with odd specimens of *Acacia sentis* along its banks, and make our way over a rocky rise, which is quite gay with flowering plants and shrubs—*Eremophila alternifolia*, *Isotoma petraea*, and *Prostanthera striatiflora*—which seem to get all the nourishment that they want from crevices in the rocks.

We pass a point in the sandy water-course marked by a jutting rock where there is a soak, doubtless known of old to the aborigines, and scraped out in time of drought by the Euros, *Macropus robustus* (Kangaroos) and Yellow-footed Rock-Wallabies, *Petrogale xanthopus*, that were at one time plentiful in these ranges. A fine patch of *Acacia Burkitti*, flowering in a valley on our left, attracts our attention soon after crossing the Tarrawingee railway line. Albiontown, now a few ruins, serves to remind us of the silver boom of earlier years. Crossing Yalcowinna Creek, we make our way up a long stony rise, barren at most times, but now gay with white and yellow composites—*Helipterum floribundum*, *H. corymbiflorum*, *H. moschatum*, and *H. polygalifolium*, and occasional purple patches of *Swainsona tephrotrycha*. Soon after passing Thompson's Siding, and ascending on to the stony country again, the purple Swainsona patches become more frequent, but are rivalled by the beautiful brown and yellow *Swainsona phacifolia*. We run parallel with Campbell's Creek for a time, turn to our right near the ruins of an old hostelry, pass through a patch of that curious broom-like shrub, *Templetonia egena*, and enter the Euriowie Hills.

The country here, responding to an unusual rainfall, looked like a garden; even the Dead Finish, *Acacia tetragonophylla*, usually so rugged and forbidding with its spiky phyllodes, was now gaily dressed in yellow fuzzy balls, and had never looked so well for many years. *Helipterum polygalifolium*, with its golden heads, and the crucifer, *Blennodia lasiocarpa*, coloured the hillsides yellow or white, as position or soil favoured one

or the other. Cockatoos, *Cacatua sanguinea* and *C. roscicapilla*, came out of hollows in the gum-trees on every creek that we passed. Proceeding through picturesque hilly country till within a mile or two of Fowler's Gap, we pull off the road on to a creek bank to await the other car. During the hour that



we had to wait we rambled along the creek, which was well tenanted by Bare-eyed Cockatoos, *Cacatua sanguinea*, Rose-breasted Cockatoos, *C. roseicapilla*, Ring-necks, *Barnardius barnardi*, Crested Pigeons, *Ocyphaps lophotes*, and Yellow-throated Miners, *Myzantha flavigula*. After billy tea we go on,

and stay for the night at the Fowler's Gap Hotel, where we were entertained by the landlord's reminiscences till bedtime.

We are up before the grey dawn, and follow the road over gravelly, plain country till we reach Sandy Creek bore, where there is a watering-place for travelling stock. The road has taken us out of the Barrier Range, and the gravel now gives place to sand. The vegetation consists of a few scattered and stunted Mulgas, Kochia bushes, and annual salt-bush, with a few bunches of *Myriocephalus Stuarti*, not yet properly out in bloom, and the usual white patches of *Blennodia lasiocarpa*. Bancannia Lake, 100 miles from Broken Hill, is our next place of call—an open lake with a little box timber, *Eucalyptus bicolor*, at its northern end, and at present only half full.

Resuming our journey, the sand-rises north of the lake show many evidences of aboriginal occupation in the past in the shape of heaps of burnt earth, cooking stones, and scattered pounding or grinding stones and nuclei. The country now becomes more sandy, and supports a goodly growth of Mulga, *Acacia aneura*, with an underscrub of Turpentine, *Eremophila Sturti*, *Eremophila Duttoni*, with a few Hop-bushes (Dodonea). *Myriocephalus Stuarti*, the fine large "Ham and Eggs Daisy," is here more in evidence. Occasional bright yellow patches of *Senecio Gregorii* and the lighter yellow of *Goodenia glauca* tended to brighten the roadside. After passing Packsaddle, an out-station in the scrub, we get into hilly country, passing a few rocky outcrops out on to long, undulating, gravelly plains somewhat bare of vegetation. On one of these stands the Iduna Park Hotel, with a tobacco-bush (*Nicotiana glauca*) creek about half a mile in front, and another about a mile in the rear, bordered by a few scattered red gum and box trees. We push on till we come to the sand-hills that surround Cobham Lake, at present dry, but the sand-hills are covered with vegetation. The grey-green foliage and long racemes of yellow flowers on *Crotalaria dissitiflora* excite our admiration. This is a perennial pea that would well repay cultivation; the bushes grow to about two to three feet in height, and were often utilized as a support by a climbing pea, *Glycine clandestina*, with pretty little bunches of light purple flowers. The Blennodia growing here, *B. canescens*, var. *pterosperma*, was very much finer than that common about Broken Hill. This is a crucifer, very like Candytuft in its inflorescence. *Swainsona tephrotrycha* was in fine large bunches, with heads having as many as twelve to fifteen flowers on each. Many Bennett's Crows, *Corvus bennetti*, were building in the Mulgas, most of the nests being in course of construction.

After leaving the Cobham sand-hills our road ran for most of the way along flats parallel to and on the eastern side of a

well-wooded creek. These flats are subject to inundation, and, at the time of our visit, were supporting a wonderful growth of herbage, mostly salsolaceous and (more conspicuously) flowering plants. *Swainsona procumbens*, the Gilgai Pea, covered acres with a vivid mantle of purple. This is the largest of the Swainsonas, and only comes up and flowers in a good season, when it is usually to be found in crab-holes, or "gilgais," in salt-bush plains, or on flooded flats. We note that a large, bushy Eremophila has added itself to the vegetation near the creek; this is the "Quea Murra" of the blacks, or *Eremophila bignoniaeflora* of botanists. A number of stems commonly grow up from a common root stock and spread out fanwise, hence the blackfellows' name, which means fish's hand or fin.

About ten miles and we come to Milparinka. A rocky bluff intrudes itself on the right, and marks another change in the vegetation, as it is the southern limit of the Gidgee, or Stinking Acacia, *A. cambagei*, a fine timber tree, growing larger than any other Acacia in Western New South Wales, many being forty to fifty feet high, with solid trunks two feet in diameter. The wood is exceptionally durable, and takes a fine polish. When a shower of rain falls on the foliage a most disagreeable and sickening odour is given off, and no bushman ever lingers in a Gidgee forest when the trees are in flower, as the scent is equally bad. The approach to the town is along the creek through Red Gums, Gidgee, and *Eucalyptus microtheca*. Milparinka was a prosperous town about thirty years or more ago, when Mount Browne and other gold rushes were being boomed: but the glory has departed from it now that no mines are being worked, and successive droughts and the advent of the rabbit have cut down the stock on the stations to almost the vanishing point.

Here we leave the main road and take one in a westerly direction, which leads us through gibber country for nine miles to Mount Poole station. This homestead is picturesquely situated at the foot of a ridge with a gum creek running below it. It has an historic interest to all Australians, for it was here that Sturt, the greatest of our explorers, and his party were shut in for many months in 1845 by a pitiless drought. A few hundred yards down the creek, on the opposite side to the station, one finds a few old sticks and the ashes of the camp-fires where Sturt yarded his sheep and had his camp. Across a gully a hundred yards further down is an old Beef-wood, *Grevillea striata*, fenced in, and close by stands a concrete obelisk erected thirty-nine years ago by the station hands to mark the site of Poole's grave. On the tree itself is plainly to be seen an oval bare space from which the bark has been removed, and

chiselled into the wood, "J. P., 1845"—Poole's initials and the date of his death. The old tree looks good enough to weather another seventy-five years or more. What changes has that old tree seen since Sturt's time! and for how long before it is impossible to tell. About two miles above this spot is the famous Depot Glen, with its Cathedral Rocks, as depicted by Sturt himself—the only comparatively permanent water-hole in that corner of New South Wales. In Sturt's time, and after, the rare floods that came its way swept it clean and left it full, to last for twelve months or more. Man has tried to improve upon Nature by putting a dam across at its upper part; but, instead of converting it into two permanent holes, the result has been that it is not swept out when the creek floods, and both are silting up, and now only hold a few months' supply.

Behind the Glen is the mount from which the station takes its name, and on its top a cairn of stones put there by Sturt's party. To keep his men from brooding over their enforced imprisonment, Sturt got each man to carry a stone or two up to the top and add it to the pile every day. However, we leave all this for our return journey, and hasten on to Mount Sturt station—our destination for our second night out—where we are hospitably entertained by Mr. and Mrs. Bartlett.

On the following morning, after a delay occasioned by my having to go out to see a soldier settler's wife, who was seriously ill, we push on over undulating gibber country intersected with dry Gidgee water-courses, several of which were examined for bird-life, but birds were scarce both on the gibber and along the creeks, as the recent drought had thinned their ranks. We come to a gum and Gidgee creek, and follow it down to Yandama station, arriving in time for lunch, after which my son and Mr. and Mrs. Heywood go out to the blacks' camp, where there is an Englishwoman married to one of the aborigines, about the ughest man in the camp. She lives with him in a humpy, and has two sons, whom she hopes to take to England some day. Dr. Chenery and I go down the creek to the wool-shed, where there is a good water-hole. We find Galahs and Bare-eyed Cockatoos, *Cacatua sanguinea*, nesting in nearly every tree; but very few birds other than Crows, *Corvus bennetti*, and Miners, *Myzantha flavigula*.

We were early on the move next morning, taking "Siddown Jimmy" from the camp as our guide. A thirty-seven mile run brought us to the border of South Australia; then another seven and we pull up at Tilcha station for a meal, afterwards pushing on to Tilcha bore, another twenty miles. Here we find hot, slightly alkaline water gushing from a six-inch pipe, an invaluable asset in this dry country, as it runs the Callabonna Creek for about eighteen miles. We are now in the sand-hills,

all running parallel to one another, and this creek finds its way between two of them. It was our intention to push on to Callabonna, but fate ruled otherwise, as the Dodge gets stuck in trying to cross the creek a few miles below the bore, and our energies are occupied till dark in getting it out, so we decide to make camp where we are. The constant supply of water has freshened up all the trees along the creek and brought up many young ones, and it has also made the creek a resort of bird-life. Wedge-tailed Eagles, Whistling and Little Eagles, Black Kites, *Milvus migrans*, Brown Hawks and Kestrels, Crows, *Corvus bennetti*, Miners, Greenies, *Meliphaga penicillata*, and "Willy Wagtails," *Rhipidura leucophrys*, being well represented, Galahs, *Cacatua roseicapilla*, Bare-eyed Cockatoos, *C. sanguinea*, Blue Bonnets, *Psephotus xanthorrhous*, and a few Budgerigars and Cockatiels, but the Many-coloured Parrakeet was conspicuous by its absence. The Striated and Red-lored Pardalotes were in equal numbers. Broken Hill is about the southern and eastern limit of the Red-lored Pardalote. Whitefaces were numerous. Flowers were plentiful, *Senecio Gregorii* and *Helipterum polygalifolium* lining the slopes of the sand-hills and the valleys between them. Along the tops of these hills the Green Sand-hill Pea, *Crotalaria Cunninghami*, and the Yellow, *Crotalaria dissitifolia*, were blooming profusely in company with *Myriocephalus Stuarti*. *Acacia ligulata* was well in flower, and a beautiful object; it is usually a low, squat bush, but varies with locality. The Gidgee disappeared gradually after we left the stony country, and was replaced by *Hakea leucoptera*, which became more and more numerous.

On the following day we follow a track more or less obscure, but cannot go wrong, as the sand-hill walls us in on our left and the creek is on our right. We reach Callabonna station at about 1 p.m. We are anxious to see the deposit of fossil bones, the graveyard of numbers of Diprotodon and other extinct marsupials and birds, from which numbers of specimens had been unearthed twenty-five years previously by the South Australian Museum authorities, from whom I held a permit to view but to touch not; but this we find quite unnecessary, as no local personage seems to know where the deposit is, and drifting sand has covered all trace of former excavations. We have faith, however, in our guides, "Boolka Fred" and "Siddown Jimmy," and they take us along a most atrociously rough track down to a creek that runs into the lake, and then point to an island about two miles away in the vast expanse of white salt. The outlook is desolate in the extreme, the lake being surrounded by sand-dunes, the elevations being held by samphire bushes, with the intervening

spaces wind-swept. The greater part of the lake bed is covered with a saline efflorescence, water intensely blue in the centre. With the exception of a few Orange-fronted Chats, bird-life is absent from the dunes. We tramp out to the island, but find it occupied only by a solitary fox and a few Chats. We return to camp on the creek, and are informed by our sable guides that the bone deposit is probably on the opposite side of the lake. The Common Mallow, *Lavatera plebeia*, which grows so profusely and rankly in many places, they tell us, was one of their principal sources of cordage for making the nets for capturing Emu and Kangaroo. The bark and outer woody layer were stripped off, baked in hot ashes for about an hour, then macerated in water till soft, after which the fine white fibres were separated and twisted into strands. This plant should be of commercial value for its fibre and the ease with which it could be cultivated.

We return next morning to the station, and decide to visit another part of the lake where the bones were most undoubtedly to be found, three guides accompanying us in a waggonette and pair of horses. We follow the Mumpeowie road, which goes north—quite a good road—till we are directed to turn off through a dry, wide blue-bush and cane-grass flat. Crossing this, we disturb several flocks of Grass-Parrots, *Neophema elegans*, that were feeding on the ground under the blue-bush. These flocks consisted mostly of young birds. We go over a very rough rise on which are a few stunted needle-bushes, *Hakea leucoptera*, or "Purrunda" of the natives, and Dead Finish. The Dodge comes to a halt on top, and I wander off amongst the bushes. A few Pigeons, *Ocyphaps lophotes*, Whitefaces, *Aphelocephala leucopsis*, *Artamus cinereus*, and Short-billed Crows were the only birds recognized. During my absence from the car, two parrots, answering to the description of the Scarlet-chested Grass-Parrot, *Neophema splendida*, came and sat for some minutes on a small Dead Finish within ten yards of the car. They flew off, and, though we searched the locality, neither Dr. Chenery nor myself caught a glimpse of them again. Dr. Chenery followed some Calamanthus in the cane-grass, but was not successful in obtaining a specimen.

Our further search for the fossil bones being without result, we return to the road and follow it to a well, and make camp for the night. From one of the stunted gums not far from our camp we disturb a pair of Spotted Harriers, and find their nest, containing one egg, placed amongst the leaves at the end of a horizontal branch at about 20 feet from the ground. Along the bed of the creek were some fine bushes of *Crotalaria dissiliflora* and *Swainsona lophrotrycha*, and, in places, quite a forest of the Mallow, *Lavatera plebeia*, many of the plants being

ten feet high. The night was a calm one, beautifully mild and moonlit. My son, Ian, and I walked out on to the sand-dunes which surround the lake. These are held together by samphire bushes, with drifting sand between, and before us, stretching away for miles, was the white expanse of Callabonna. Not a sound broke the silence, though we strained our ears to listen. A silence as of the dead brooded over the place; no mammal or bird stirred or uttered a sound. We could not help thinking it a fitting resting-place for the remains of the giant marsupials and birds who roamed these regions before fertile and well-watered hills and valleys gave place to sand and stones and salt.

On our way back next day, Dr. Chenery and myself left the cars to walk through the flat where we had seen the Grass-Parrakeet, *N. elegans*. We disturbed at intervals Orange-fronted Chats, Wedgebills, and White-winged Wrens. Several flocks of the parrots were again disturbed, and a few Cinnamon Ground-birds, *Cinclosoma cinnamomea*. We tried to obtain specimens of a Calamanthus, but the wily little bird eluded all our attempts, and remained unidentified. My son, Ian, who came back to meet us from where the cars waited, reported having seen a Wedgebill's nest containing one egg in a blue-bush, and flushed a Boobook Owl from its resting-place in the cane-grass. We went back to the station to fill radiators and water bags, and take the back road to Tilcha. Many Black Kites, *Milvus migrans*, were about the station, and a pair of Whitefaces had their nest in the verandah spouting, and were feeding young. Through the flat before us we pick up the bore water, and note many old Hawks' nests, mostly those of Whistling Eagles and Kites. We disturb a pair of Letter-winged Kites, *Elanus scriptus*, from their nesting-tree, and stop our cars to admire the beautiful colouring of these rare birds as they fly round close above us. In the bright sunlight they appeared to be pure white, with a jet-black mark round and behind the eyes, and the broad black stripe down the centre on the underside of each wing forming, with the wings bent, the letter W, which gives the bird its name. The wings are long, and the manner of flight is quite unlike that of any other hawk, and reminded one of the slow, flapping flight of the larger Terns, the wings being raised well above the horizontal before the slow down stroke, a few of these alternating with a sailing flight with widely-outstretched wings, but no separation of pinions. The nest was compactly built of fine sticks lined with fur and leaves, and about a fortnight later contained four eggs.

Crossing the creek where the bore water ends, we follow the road back along the south bank of the stream, and between it

and the sand-hill which runs parallel to it. The creek is lined with *Eucalyptus microtheca*, Cattle-bush, *Heterodendron oleifolium*, and *Acacia ligulata*. This Acacia and the Needle-bush, *Hakea leucoptera*, are the principal trees on the flat between the creek and sand-hill. The sand-hill is of loose red sand, on which a scanty vegetation grows when the seasons are favourable, as on the occasion of our visit. Besides the two Sand-hill Peas previously mentioned, and the usual Composites, we find here occasional patches of Parakeelyah, *Calandrinia balonnensis*, with its thick, watery leaves and heads of glowing reddish-purple flowers. Birds are numerous along the creek. Galahs and Bare-eyed Cockatoos are occupying all available hollows, and other nesting birds are Miners, *Myzantha flavigula*, Greenies, *Meliphaga penicillata leilavalensis*, "Willie Wagtails," Grallinas, and Nightjars. Short-billed Crows' nests occur every twenty or thirty yards. The Whistling Eagle was the most numerous of the Hawks, then the Black Kite, *Milvus migrans*, with the Little Eagle, *Hieraetus pennatus*, third. A Wedge-tailed Eagle flew from its nest in a tree about 500 yards out from the creek, but we did not bother to examine it, and later flushed another from a nest on the creek, which contained a finely-marked pair of eggs. A pair of Grey Falcons, *Falco hypoleucus*, were flushed from a nest about 40 feet up in a gum, but, though complete, it did not contain eggs; the birds, which were of a beautiful light grey colour, sailed round above us. This is the most tractable of our four Falcons when in captivity.

Dr. Chenery and myself had been walking along the creek, and soon after came to where the cars had halted for the night. After an early breakfast we find a nest of the Black Falcon, *F. subniger*, on an old Kite's nest which the Falcon had commandeered for breeding purposes. This contained two downy white chicks, about a week or ten days old. A short walk brings us to where a Grey Falcon is seen sitting on the edge of her nest, about forty feet up in a gum; this contained four fresh eggs. A Little Eagle's nest placed near the top of a fairly thick limb was examined by Dr. Chenery and found to contain a finely-marked pair of eggs. This bird lives mostly upon rabbits, and, seen along the creeks, appears to be a quiet and inoffensive bird; it will, however, kill other birds, and has an evil reputation amongst the rest of the avian population, who are given to mobbing it more than they do any other hawk. A pair of Black Falcons were seen harrying a Whistling Eagle, one chasing it out over the sand-hills; the Eagle, however, returned, and the Falcon renewed the attack, and, finally clinching, and locked together, the two went down in a spiral, screaming as they went, followed by the Falcon's mate, who came down from a higher plane to his mate's rescue.

We pass several Teal on the larger hole on the creek; two pairs were caring for young broods. A bank contained a number of Pardalote holes, the Red-lored and Striated being in equal numbers in the trees. Most of the Brown Hawks were of the lighter type. Of water birds, odd lots of Water-Hens, *Microtribonyx ventralis*, and Black-fronted Dottrel were disturbed at intervals. Before we come to the bore itself we flush another Grey Falcon from a nest high up on a slender limb, and a Little Eagle from her nest not far from the Falcon's.

After leaving the bore our road runs back between the sand-hills for some time, the hills being farther apart, with a scanty scrub of Needle-bush, Mulga, and Dead Finish on the intervening flat. Feeding out from some scrubby patches on the sand-hills, Cinnamon Ground-birds are noted at intervals along our track. On some of the lower sand-rises we come across a fine growth of the Wild Parsnip, *Didiscus glaucifolius*, with its pale mauve flowers. After leaving Tilcha station we go on to a small, dry creek and camp at dark. A Needle-bush near the camp contains nests of the Crested Pigeon and Yellow-tailed Tit, both birds sitting on eggs, and in a near washaway bank a Red-lored Pardalote had her burrow, with a pair of Short-billed Crows feeding their young in a nest about twenty feet up in a gum-tree.

We turn off near a dam, which has been dedicated to England's patron saint, at right angles to our sand-hills, and others that are now ahead of us, our objective being Fort Grey, a spot in the extreme north-west corner of New South Wales, so named by Sturt in 1845 after the then Governor of South Australia, who afterwards became Sir George Grey. This spot was Sturt's base for his final struggle to reach the centre of Australia in a year of exceptional drought and excessive heat—an effort of heroic endeavour which has never been excelled in the annals of Australian exploration. We have now to cross the parallel sand-ridges at frequent intervals. Some give us much exercise in pushing or making corduroy over the loose sand; others we run down to find an easier way over where the slope is more gradual or where a sufficient vegetation binds the sand. The tops of some of the sand-hills support quite a number of flowering plants, the Yellow Pea, *Crotalaria dissitiflora*, being the most conspicuous, with yellow and white composites. Here we see for the first time a trailer, *Indigofera brevidens*, with a violet-blue inflorescence, and quite a luxuriant growth of the climber *Glycine clandestina* supporting itself on the hop-bushes, *Dodonæa viscosa*, var. *attenuata*. On a sand-hill nearer St. George we found a very beautiful Cassia, *C. pleurocarpa*, just coming into flower—trusses of large yellow flowers and pretty, pinnate green leaves; the flowers were very

sweetly scented, and the bushes about three feet high. This shrub dies down to the root in the dry weather and shoots up again after good rains. The two desert lovers, *Eremophila Sturti* and *Eremophila Duttoni*, were fairly common as undershrub to the Mulga. About ten miles from St. George we halt by a small lake to fill our radiators. This is Lake Stuart, named after M'Douall Stuart, who was with Sturt in these parts and afterwards was the first man to cross the continent from Adelaide to the Northern Territory coast.

A long run brings us to another dam, where the number of scattered bones and skeletons of cattle bear evidence of the severity of the last drought. On some of the sand-hills near here we admire the clumps of White-wood trees, *Atalaya hemiglauca*, with their clean trunks and fine bushy heads. Like many of the trees of this semi-desert land, these clumps are all connected by their root systems. Needle-wood is not so common here as it was near Callabonna. Birds are scarce—a few Cinnamon Ground-birds, Whitefaces, Crows, "Willie Wagtails," Ground-Larks, and occasional Orange-faced Chats. No Parrots in this scrub except Blue-Bonnets and Budgerigars. The former is holding its own in the struggle for existence, and the latter are migratory, and can usually find better feeding-grounds in time of drought, though they will sometimes keep to a drying watering-place till every bush surrounding it shelters heaps of their dead.

The presence of Tea-tree, *Melaleuca trichostachya*, in the vegetation announces the neighbourhood of Fort Grey and its Lake Pinnaroo. We drive round the edge of the lake to the old house, and find no one at home. As darkness has overtaken us we ask our dusky guide for a camping-place near water, and he, not knowing that the lake still contains water, directs us towards its centre, till the leading car sinks in the mud, and the black is not popular during the next two hours of perspiring effort which it takes to get it out. We pass an uncomfortable night, as it is windy and inclined to rain before daylight, forcing us to get up and pack our bedding. We soon hear Galahs and Bare-eyed Cockatoos clamouring on all sides, as they have nesting-hollows in all suitable trees round the lake. Budgerigars are also prospecting dead trees and stumps for hollows small enough for their purpose. A few Blue-bonnets come to inspect us, and a nestful of young Magpies are calling for their early morning feed.

Dr. Chenery, Ian, and myself leave our friends to rest whilst we set out to walk round the lake and get an idea of the birds in the wide margin of box-trees, outside of which is a scrub, consisting mostly of tea-tree. As we cross the dried marginal area we cannot help remarking the sweetly-scented atmosphere,

due, we find, to a small crucifer, *Blennodia nasturtioides*, which carpets the ground. Many Hawks' nests are in the bordering box-trees, but few occupied. A Little Eagle is flushed from one of these, and a few yards on we disturb a Tawny Frogmouth from a tree next to one in which its mate is sitting on its nest and pair of eggs. Many Diamond Doves are calling, and Miners and Greenies are numerous elsewhere. One Galah's hollow contained five hard-set eggs on the usual bed of leaves. A Delicate Owl hurriedly leaves a hollow as we pass, and is immediately mobbed by the smaller birds. We wander over the sand-ridge which marks the division between gum-trees and scrub, and note Red-capped Robins, Mistletoe-birds, Caterpillar-eaters, and Chestnut-tailed Tit-Warblers. We return to the box margin and note a Crested Pigeon on its nest twenty feet up in one of these trees. This Pigeon, although edible, seems to be holding its own, and all through the back country it is, if anything, in increased numbers. Changes in environment do not seem to affect it. On the lake we note Grey Teal, Pink-eared Ducks, and a few Grey Duck, *Anas superciliosa*. A small party of Yellow-billed Spoonbills, three White-necked Herons, and about twenty Blue Herons, *Notophoyx novæ-hollandiæ*, are along the margin. A pair of Brolgas rise on their wide-spreading wings and go trumpeting away. To the Mectha tribe of aborigines, who roamed these parts, they were known as "Cooralko," in imitation of their call. Our vernacular name is a corruption of that in use by the aborigines who at one time lived on the Macquarie, and is their version of this bird's call, "Bouralgo."

From a gnarled and ancient box near the margin of the water a Kestrel, Delicate Owl, and Bare-eyed Cockatoo emerge from separate hollows. The Hawk has five eggs, the Cockatoo three, but the Owl none. We are next interested by finding the tree, *Eucalyptus bicolor*, on which Sturt had set his mark, which is overgrown and almost illegible. A Government surveyor has, however, re-marked the tree, a shield-shaped piece of bark having been removed and a broad arrow over "W" and "Sturt, 1845," chiselled into the wood. The tree is in a good state of preservation, and two Parrots were utilizing it for nesting purposes—a Blue-bonnet and a Budgerigar. We pass on and find the timber thinning, and numbers of traces of old camp-fires, with flint chippings, cores, and grinding-stones of the blacks. Dr. Chenery draws my attention to a Black Falcon flying from a group of trees ahead in which there are four old Hawks' nests. We find, after examining the lot, that the fourth, an old Kite's nest, contains a fine set of four eggs of the Falcon. Little of interest engages our attention till we round the bottom end of the lake, when a Delicate Owl is

flushed from a hollow about fifteen feet up in a rugged old box. The hollow, a large one, contained a fine clutch of seven eggs on a bed of woody *débris* and castings. Incubation was at a different stage in each of the eggs, the last laid being quite fresh.

As rain still threatened, we made a late afternoon start back, passing at first through a good deal of stunted Needle-bush, tea-tree, and Mulga, until a few miles from the lake, where the prevalent trees and shrubs are Mulga, Needle-bush, Dead Finish, *Eremophila longifolia*, and *Acacia ligulata*. *Acacia Murrayana* was growing near the lake, but not yet in flower; this is a very fine species with long, narrow phyllodes and a beautiful bright yellow inflorescence. We saw it in full bloom a year previously on the Cooper, where it grew round the Nappa Merrie homestead. We ran on to a long plain between sand-hills, but one of our cars had trouble in negotiating a gutter, and, as the day was drawing to a close, we find a sheltered spot over a sand-hill, and camp for the night. The prevalent vegetation round this camp is Mulga, Needle-bush, Dead Finish, *Acacia ligulata*, *Eremophila longifolia*, *Cassia phyllodinea*, and *Cassia Sturtii* in one of its forms, White-wood, Cattle-bush, Wild Cherry, *Santalum lanceolatum* and *Pittosporum phillyræoides*: much dead grass, Wild Parsnip in flower, *Myriocephalus Stuarti*, *Helipterum polygalifolium*, *Salsola kali*, *Ptilotus alopecuroides*, and two species of Zygophyllum —*Z. podocarpus* and *Z. fruticulosum*.

Next morning, after a good run, the car develops engine trouble, and sticks on top of a sand-hill for a while. Along this ridge are many bushes of *Cassia pleurocarpa* and *Dodonæa attenuata*, with Parakeelya, in full flower, Wild Parsnip, and the usual Composites. A pair of fledged young Wedgebills are quite confiding, and let us snap them sitting on a dead bush. Blue butterflies are here flitting rapidly about the Mulgas, but it is early in the season for others, though *Danaida chrysippus petilia* and *Papilio sthenelus* are present. In the previous spring, summer, and autumn these two species were very numerous throughout the district. The rest of the journey back is uneventful, many nests of the Short-billed Crow being passed, and one nest of the Rufous-crowned Babbler examined and found to contain young. This Babbler keeps to the Mulga scrub, whereas its congener, the White-browed Babbler, frequents the timber along the creeks.

Nearing Yandama we leave the sand and enter the gibber country and the region of the Gidgee and Nalya, *Acacia cana*. We hear that the patient near Mount Sturt is seriously ill, and Dr. Chenery and myself hurry on to the station and go on to see her with Mr. Bartlett, the owner of the station. It is

dark when we arrive, and on our way back our lights fail, and we have a little trouble in keeping to the track.

Next morning we go on to Mount Poole, and later to Milparinka, where we part with our lady companion and her husband, who make the return journey to the Hill, whereas we go on to Tibooburra with the idea of examining the Bulloo flooded country. Our road passes through a Gidgee forest for many miles, then skirts a gum creek. Two old trees stand out from the creek margin. By the road seven Bare-eyed Cockatoos leave separate hollows—two from one and five from the other. The country is undulating and very stony. We flush a female *Ashbyia lovensis* from near the track, but fail to find her nest. Nearing Tibooburra, the stones give place first to sandy country, supporting a scrub of Mulga, Dead Finish, with *Eremophila Duttoni* and Needle-wood. The town consists of one or two streets laid out through large granite boulders, the soil being sandy and auriferous one of the pastimes of the inhabitants being to search the ground for small specks of gold whenever rain falls and renders them visible. Unfortunately, this is not a lucrative pursuit, as rain only falls at rare intervals.

After a short stay we leave the town, taking a north-easterly road through the boulders. Wild-flowers abound between the boulders and grow from crevices in the rocks, bunches of white-flowering *Isotoma petraea* and the lavender-flowered *Eremophila Freelingii* being the most conspicuous. A little to the north of the town a Blood-wood, *Eucalyptus terminalis*, grows, and, in season, is covered with large bunches of conspicuous cream-coloured or rose flowers The Sturt Pea, *Clianthus Dampieri*, also grows freely in the valleys; the 1921 spring and summer was a record one for this plant throughout the district, acres being covered with its gorgeous blooms in places. About thirty or more coloured variations were recorded, varying from pure white through shades of pink, red and white, striped, to dark blood-red. The seeds of this pea, though small, can wait for a favourable time to germinate, sometimes thirty years or more. Naturally, it requires good autumn rains to bring it up, the plant makes good growth through the late autumn, and blossoms in June, and continues through the spring months. It will last, under exceptionally favourable circumstances, for four years—that is, when protected in a garden. In a state of nature it is usually an annual, or, at most, a biennial.

When we pass out of the ranges into open country wild-flowers are still plentiful. *Swainsona tephrotrycha* in fine purple patches on the drier ground, with yellow and white composites covering the rest of it. Our road now runs for about twelve

miles through a fine Gidgee forest, the trees growing along a creek amongst the gums and out over the hills and flats that border it. The country becomes more hilly as we approach Mount Wood station, where we pull up to have tea with Mrs. Little, who showed us a fine fossil bivalve and a section of "tree-fern" found on Mount Wood. We cross the creek and go on to the shearing shed, where all hands, including the owner (Mr. Little), are busy. We get directions, and go on through flat country gay with flowering plants, *Swainsona procumbens* covering large areas with its dark purple flowers. A beautiful mauve composite with yellow centre, *Minuria integerrima*, grows in large bunches, and is much admired and prized by the ladies at Mount Wood for its decorative effect. We run by an old yard and deserted public-house, and come to the country from which the flood waters of the Bulloo have subsided; the cattle tracks in the mud are now dry, and make the going very rough. The Bulloo forms a little water system of its own, being separated from those creeks and rivers that run into the central salt lake by the Grey Range. It empties itself into large areas of lignum country that extends well over the New South Wales border, and is there absorbed. Further to the east the Paroo crosses the border at Hungerford, and runs towards the Darling, but is being gradually separated from it, most of its floods being absorbed in lignum swamps before reaching that river.

We reach Coonulpie station, where we interview the owner, Mr Davies, and his *chef* as to the extent and prospects for bird-life in "the waters." We are disappointed, however, on being told that the breeding of the water-fowl had ended with the subsidence of the flood water. Next morning we are up early. Many Crows and Kites are about the homestead. *Acacia stenophylla* grows thickly at the back of the house, and supports an abundant growth of *Loranthus exocarpi* and *L. linophyllus*; the latter being covered with its round, white, ripe fruits, attracting a number of Mistletoe-birds to the feast. These birds show no fear, and feed eagerly within two feet of me. Singing Honey-eaters and Greenies were also quite numerous, and Fairy Martins were busily constructing their spouted mud nests under the verandahs. We go on for about three miles and make our camp on a water channel by the road to the "Adelaide Gate" in the border fence. Many Water-hens are about this camp, also Wedge-tailed Eagles, Galahs, White-browed Babblers, and Crested Wedgebills. The creek is bordered with *Eucalyptus microtheca*, *Eremophila bignoniæflora*, Lignum, Old Man Salt-bush, and smaller plants. After pitching our tent and putting all our baggage and comestibles in it, we all go for a walk towards the cane-grass. This we

enter from the road, and walk through it parallel with one another. The result is disappointing, as it is too dry, a few Chats and Allied Wrens being the principal inhabitants. Dr. Chenery flushed an Amytis, but did not secure a specimen. After a long and fruitless search we come out and make for the creek, and follow it back to the camp. This is well tenanted, mostly by the commoner birds, such as Crested Pigeons, Diamond Doves, Wedgebills, Greenies, Allied Wrens, Grallinas, and a few specimens of that glorious singer of the bush, the Spiny-cheeked Honey-eater. After a late lunch, Dr. Chenery goes back to look up the Amytis, whereas Ian and myself make our way down to the lignum. There is very little water in it, and all water-birds have gone. We return to camp before dark, and decide to return to Tibooburra on the morrow.

Early on the following day we are back at Coonulpie, where we are shown a big hemispherical piece of sandstone with grooves deeply cut into it in varying directions. This, we learn, was used by the natives for sharpening their spears. On our way back several young Australian Dottrel are seen near the track. These are beautiful little things in down, pale grey, slightly rufous down the back, lined and marked with dark brown and black in wavy patterns. They flatten themselves out on the ground after the manner of many ground-birds, and keep perfectly still, and are really very difficult to distinguish from their surroundings. We push on to Tibooburra, and, after a short rest, resume our journey, arriving in Milparinka late in the evening.

Next day we go on our way, but, after passing the bluff, Dr. Chenery and I decide to walk a section of Evelyn Creek, Ian taking the car on for a few miles and walking back to meet us. This creek is a fairly large one, and well timbered with red gum and box. Numbers of Galahs and Bare-eyed Cockatoos are nesting, also a few Budgerigars and occasional pairs of Ring-necks. A solitary specimen of *Acacia farnesiana* attracts my attention, as this is about the southern limit of its range. I had seen this shrub in fair numbers on some of the smaller creeks that run into the Cooper. We find Ian half-way up a box that is growing out from the bank, and from which he has flushed a Spotted Harrier. The nest was about forty feet up, as usual loosely built of fine twigs and lined with leaves and placed on a bushy, horizontal bough; it contained four fresh eggs.

We resume our journey along the Coally flats, resplendent with purple Swainsonas, white and yellow Helipterums, till we enter the sandy country, with its clothing of Mulga, Needle-bush, Dead Finish, and *Eremophila Duttoni*, and under-dress of Myriocephalus, Senecio, and Helipterum. At Cobham we

only delay for a few minutes, then out of the sand over several flats, which were a trial and tribulation to us after rain a year previously, to Iduna and the stony plains, then into the sand again past Packsaddle, to camp on a box and lignum creek about five miles before we come to Bancannia. We decide to look up some lakes and swamps at the back of Bancannia on the following day. We are told there that Bullocky's Swamp is getting low, and that all the Swans and other water-fowl are walking across to Jones's Lake, about a mile from it, with their young broods. Consequently, we follow a very rough track to Bullocky Swamp, which still contains a fair amount of water, with cane-grass growing in it, but very little bird-life. We pick up a camel pad and follow it to Jones's Lake. On the way we come across a pair of Swans walking in the same direction with a brood of downy cygnets. Bullocky had become too shallow, and accessible to foxes and other enemies, and they were making for Jones's Lake, where a larger area of deep water would protect the young till able to take to the wing. We pull up to examine this lake, and find it very open, with a little box on one side and a patch of lignum where a creek runs into it. In this we hear the lively song of the Reed-Warbler and the plaintive notes of the little Grass-birds. Many Teal and a few other ducks are feeding amongst the water-weed and rushes. We pick up the camel pad again and make our way to Wyalla Lake. This is very full, and contains much timber standing in water. The weather has, however, become very threatening, and rain evidently falling to the south, so we decide to make back to the road before our retreat is cut off. We make good progress till near Sandy Creek bore, where a heavy shower gives us a difficult track for several miles, and delays our arrival at Fowler's Gap. We replenish our water and go on for about five miles before having our lunch late in the day.

The Euriowie hills are gayer than when we went up, *Acacia loderi* being now in flower all over them, the ground being carpeted with a brilliant yellow mass of *Helipterum polygalifolium* or with the paler yellow of *Craspedia chrysantha*, and white with *Helipterum corymbiflora* and others. As we emerge from these hills we meet a motor party, and are cautioned by them to be careful of the next few miles, as a very heavy hail-storm had just crossed the track. We soon find this to be true, the hail being banked up under every bush and all the water-courses running. We make every effort to cover as much of the road as possible before dark, but the last nine miles is in inky darkness, with most of the ground under water. However, we reach Broken Hill without any mishap.

Wild-Flower Exhibition.—Miss C. C. Currie, of Lardner, writes that the statement on page 82 of the November *Naturalist* that the specimens of *Boronia pinnata* exhibited were collected by the Misses Bingham, Hardie, and Maddock at Jindivick is incorrect, and that the flowers in question were collected at Athlone, in quite another direction, by her brother, Mr. T. Currie.

The Mueller Medal.—This medal, founded in honour of Baron von Mueller, and awarded by the Australasian Association for the Advancement of Science at its meetings to eminent workers in Australian natural science, has this year been bestowed on Mr. J. H. Maiden, F.R.S., F.L.S., &c., Government Botanist of New South Wales and Director of the Sydney Botanical Gardens. Mr. Maiden is well known for his splendid contributions to botanical literature, and we feel sure the choice will be a popular one throughout Australia.

South Australian Brown Coal.—The *Transactions of the Royal Society of South Australia* for 1922 (vol. xlvi.) contain a joint paper by Sir Douglas Mawson, D.Sc., and Mr. Frederick Chapman, A.L.S., F.R.M.S., on the brown coal deposits of Moorlands, situated between Murray Bridge and the Victorian border. The deposit appears to cover a considerable area, probably the greater part of the great Murray delta of Tertiary times, and resembles the Morwell deposit, though, so far as known, does not possess the great depth of that formation. However, as South Australia is deficient in coal-bearing strata, it will probably prove of great commercial value in years to come.

The Genus Pultenæa.—In continuation of his work on the genus Pultenæa, an extensive genus of the Australian Leguminosæ, Mr. H. B. Williamson, F.L.S., contributes to part 1 of vol. xxxv. (n.s.) of the *Proceedings of the Royal Society of Victoria* (Dec., 1922) the third instalment of his revision of the genus. In this he deals critically with seventeen species, six of which are hitherto undescribed. Three of these are Victorian—*P. D'Altonii*, from Nhill; *P. Readeriana*, from the Grampians, collected by the author in 1907; and *P. prolifera*, collected by Miss Sceaney at Carlisle River, 1906. Unfortunately, according to the Vienna rules of priority, our unique species, *P. rosea*, F. v. M., of the Grampians, loses its well-known name and becomes *P. subalpina*, Druce. The genus is a difficult one, the differences between species being in many cases very slight, depending on such particulars as size of calyx lobes, bracts, or bracteoles. The paper is illustrated by drawings of the new species.

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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, 1923. The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about sixty members and visitors were present.

CORRESPONDENCE.

From Mr. C. French, sen., thanking the Club for his election as an honorary life member, and wishing the Club continued success.

REPORTS.

A report of the excursion to the Botanic Gardens on Saturday, 23rd January, was given by the leader, Mr. E. E. Pescott, F.L.S., who said that there had been a large attendance of members and friends. A general ramble had been taken through the Gardens, and notable trees, &c., pointed out. The propagating grounds and houses had also been visited, and many interesting plants seen.

A report of the excursion to Torquay on Saturday-Monday, 27th–29th January, was given by the leader, Mr. F. Chapman, A.L.S., who gave a very interesting account of the outing, during which a fair number of fossils were collected from the limestone cliffs in the vicinity of Bird Rock. The aboriginal ovens and shell mounds near Bream Creek had also been visited, and the members of the party were much impressed by the evidences of human industry displayed in the remains. Later he exhibited several lantern slides of incidents of the excursion.

A report of the excursion to Eltham on Saturday, 10th February, was given by the leader, Mr. F. E. Wilson, who reported a large attendance of members, but, owing to the heat of the day, their reward was not equal to the enthusiasm displayed. Insects, on the whole, were scarce, and only some of the commoner species were recorded.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Maude M'Lean, 314 Cardigan-street, Carlton, and Mr. R. B. Paul, 280 Bourke-street, Melbourne, were duly elected as ordinary members of the Club.

GENERAL BUSINESS.

The president said that the committee had decided to recommend that the seven "original" members remaining on the Club roll be elected life honorary members of the Club. These were Messrs. W. M. Bale, F.R.M.S., F. G. A. Barnard,

D. Best, J. E. Dixon, F. Pitcher, T. G. Sloane, and F. Wisewould. They had been elected in May or June, 1880, and had kept up continuous membership of the Club ever since. He thought it well that these members should be honoured for their faithfulness to the Club while still alive and taking an active interest in its work, rather than that their memory should be honoured later on. He moved to that effect. The motion was seconded by Mr. E. E. Pescott, F.L.S., and carried unanimously.

Messrs. F. G. A. Barnard and F. Pitcher returned thanks on their own behalf and on behalf of their fellow "original" members for the honour conferred upon them, and hoped they might be long spared to attend meetings of the Club.

The president extended a hearty welcome to Mr. A. N Lewis, of Hobart, a member and past president of the Tasmanian Field Naturalists' Club, Hobart. Mr. Lewis briefly responded, and thanked the meeting for its welcome.

PAPERS READ.

1. By Mr. A. L. Scott, entitled "Notes of a Geologist in New Zealand."

The author said that he did not claim to be a geologist, but he proposed to illustrate, by means of lantern slides, some notes made during a recent holiday of a couple of months in New Zealand. Dealing with the hot lake district of the North Island and with Mount Cook and the surrounding mountains in the South Island, he gave some account of the geological features as seen by visitors.

2. By Mr. Chas. Oke, entitled "Notes on Victorian Chlamydopsini (Coleoptera), with Descriptions of New Species."

The author gave some general notes on a number of beetles which live principally in ants' nests—for what reason is not really understood. Several descriptions of new species were taken as read.

REMARKS ON EXHIBITS.

Mr. E. E. Pescott, F.L.S., drew attention to Mr. T. Green's exhibit of flowers of the rare Mint-bush, *Prostanthera Walteri*, from Buffalo Mountains, found only there, on Mount Kosciusko, and on Mount Ellery, in East Gippsland.

Mr. F. G. A. Barnard drew attention to a fresh specimen of the rare fungus, *Polyporus mylittæ*, commonly known as "Native Bread." This had developed from a specimen of the sclerotium exhibited by Mr. A. G. Brown at the previous monthly meeting of the Club. He also gave some account of the early history of this fungus.

Mr. H. B. Williamson, F.L.S., said that he had grown the fungus from damaged portions of the sclerotium.

EXHIBITS.

By Mr. F. G. A Barnard.—Fructification of fungus, *Polyporus mylittæ*, commonly known as "Native Bread"; also egg-cup carved from the sclerotium, lent by Mr. D. M'Alpine.

By Mr. F. Chapman, A.L.S.—Photographs and lantern slides of Torquay and Bream Creek; shells of *Succinea australis*, Ferussac, from charcoal stack at Bream Creek; barnacles from shore pools at Rocky Point (Balanus and Scapellum); *Porina gracilis*, a fossil Polyzoan, from limestone slab (Miocene) at Spring Creek, Torquay; rolled fragments of travertin limestone.

By Mr. C. French, jun.—Fine specimens of remarkable gall making coccids (scale insects), *Apiomorpha strombylosa*, male and female, from Diamond Creek, Victoria; also a specimen of the so-called Crested Grasshopper, *Alectoria superba*, a rather rare and remarkable insect, from Benalla, Victoria.

By Mr. T. Green.—Flowers of *Prostanthera Walteri*, F. v. M., a rare Mint-bush, from Mount Buffalo.

By Mr. A. E. Keep.—Wallaby and wombat bones from aboriginal kitchen middens on sand dunes near Bream Creek, Torquay; fossil corals and shells from ancient sea mat reef, in polyzoal limestone rock (Miocene period), from Torquay beach, near Spring Creek.

By Mr. C. Oke.—Insects from Eltham excursion; a specimen of *Chlamydopsis setipennis*, n. sp., under microscope, in illustration of paper.

By Mr. A. E. Rodda.—Growing fern, *Grammitis rutifolia*, Kororoit Creek, near Braybrook.

By Mr. A. L. Scott.—Maps and photographs in further illustration of his paper.

By Mr. A. J. Tadgell and Mr. A. G. Hooke.—Twenty-one species of Alpine flowers and ferns, fresh, from Mount Bogong, Victoria—*Blechnum penna-marina* (*Lomaria alpina*), *Brachycome Tadgellii*, *Eucalyptus coriacea* (bark, fruit, and flowers), *Exocarpus nana* (fruit and flowers), *Herpolirion novæ-zealandiæ*, *Didiscus humilis*, *Veronica serpyllifolia*, *Thelymitra venosa* (in sphagnum), *Aciphylla glacialis*, *A. simplicifolia*, *Podolepis longipedata* (*robusta*), *Senecio pectinatus*, *Celmisia longifolia*, *Gentiana saxosa* (mountain form), *Helichrysum rosmarinifolium*, *H. rosmarinifolium*, var. *ledifolium*, *H. baccharoides*, *Baeckea Gunniana*, *Colobanthus Billardieri*, *Polypodium australe* (mountain form), *Trisilum subspicatum*, *Scleranthus uniaroides*, *Olearia ramulosus*, var *communis* (syn. *Olearia ericoides*), rare.

By Mr. L. Thorn.—Case containing four species of Emperor moths—viz., *Antheræa eucalypti* and *A. helena*, from Victoria, *A. simplex* and *A. janetta*, from Queensland; *A. eucalypti* and *A. janetta* showing considerable variation in the markings.

By Mr. H. B. Williamson.—Flying phalanger, picked up dead at Dandenong.

After the usual conversazione the meeting terminated.

EXCURSION TO NAR-NAR-GOON.

(Abridged.)

THE visit to the country lying to the north of Nar Nar Goon, on Saturday, 18th November, was very enjoyable owing to the weather experienced and the large variety of flowers met with, leguminous shrubs, &c., being very plentiful. Among these were *Pultenæa villosa*, Hairy Bush-Pea, *Platylobium formosum*, Handsome Flat-Pea, *Dillwynia floribunda*, Crowded Parrot-Pea, *Gompholobium Huegelii*, Dwarf Wedge-Pea, and *Sphærolobium vimineum*, Leafless Globe-Pea. After passing a sawmill we were attracted by a young forest of Messmate (*Eucalyptus obliqua*) saplings; these were at least forty feet in height, and, we were informed, were only about six years old—an evidence of the rapid growth of trees in this district. Several other species of eucalypts were noted about here. Descending into swampy country, near Dingo Creek, some fine young plants of *Pultenæa Weindorferi*, one of the handsomest species of this genus, were seen. The Forked Sundew, *Drosera binata*, decked a wet bank with its delicate white flowers, while the bright blue flowers of *Lobelia gibbosa* and the golden yellow of *Goodenia ovata* added colour to the scene. Altogether over eighty species were seen in bloom, indicating that in a late spring good collections of flowering plants could be made in the district.—J. W. AUDAS.

EXCURSION TO UPWEY.

SIX members went to Upwey, on the southern slopes of the Dandenong Ranges, by the early train on Saturday, 16th December. On leaving the station we crossed the line and entered a patch of swampy ground not far from the railway. Here there were odd branches of Leptospermum still out in flower. On these were a few common beetles, mostly Stigmodera—*S. erythroptera*, *S. crenata*, and *S. australasiæ*—and Mordellids. A few Hymenoptera were flying around, principally Thynnid wasps and Ichneumon flies, though one very pretty saw-fly was seen. Numerous specimens of the Mountain Brown Butterfly, *Epinephile abeona*, were on the wing, and two or three were caught. We followed a narrow track up the hill and came to a most enchanting spot, where the Eucalyptus trees were growing closely together and the ground was covered with beautiful green grass. Here it was remarkable the number of orb-spinning spiders that had spread their webs. No doubt they appreciated this nice, quiet, shady spot, but not for itself; it is merely cupboard-love, because it is places like this that bush flies and moths delight in—hence the spiders. Some of these latter were very brightly coloured, one in particular that attracted attention being a pretty shade of buff, silvery

along the sides, lemon on top, with maroon markings. Here we also obtained three specimens of a Pterostylis, which, it is thought, may be new to science. Continuing our way, we crossed the creek and ascended a little further up the hill. It was then decided to work towards a good spot of which the leader knew. Collecting and observing a few insects as we went, we just wandered on, and seemed to arrive at nowhere in particular, till the ladies declared it was lunch time. This proved to be the chance to look for small things, and some interesting little insects were seen. Included among the latter was a very small Staphylinid beetle; it is smaller than the head of a "lillikin," and under the microscope appears rather like a Conosoma with large bristles on its antennæ and abdomen. It is black, with a reddish "tail." On the gum-trees were numerous examples of that gaily-coloured spider *Nivodemus bicolor*. This is of a pretty shade of blue, with pink or red (the colour varies), and is apparently quite harmless, though its colours put it in the alleged "danger" class. The males have a peculiarly-shaped pedipalp, and these are well worth a close inspection. As some of the party wanted to catch an early train, we all decided to walk back towards the main road. Under a gum-tree we found six spikes of the Potato Orchid, *Gastrodia sesamoides*; one spike had twenty-five flowers and buds on it. From some blackberry bushes growing near the track we obtained three species of Skipper butterflies, all well-known species. On the flat, near the main road, a spike of a Cryptostylis was noticed. As it was only in bud it was passed over; but on second thoughts it was decided to dig it up, as it appeared to be a little different from the ordinary form. Seven days later it came out, and it proved to be *C. leptochila*, a rather rare orchid. After a further short ramble up the hills we made our way back to the station in time to catch the last train home, well satisfied with a pleasant day's outing. I am indebted to the late Mr. J. R. Tovey for the identification of *Cryptostylis leptochila*. This was almost certainly the last determination he made, as it was long after closing time when I left his office, and he passed away the same evening.—Chas. Oke.

EXCURSION TO TORQUAY.

This year the Foundation Day excursion was arranged for Torquay, a locality not hitherto visited by a Club excursion. Torquay, well known for the profusion of its Tertiary fossils, is situated on the western shores of Bass Strait, about sixty miles from town (*via* Geelong). A small party, including two ladies, left town by the mid-day train on Saturday, 27th January, and by 2.30 p.m. the luggage had been left at the respective

boarding establishments, and we had turned our steps towards the cliff section in the direction of Bird Rock. Passing the golf links and over Spring Creek, it was noticed how low the sand-dunes were compared with former years, before the marram grass was planted, though the grass was really responsible for the retention of the dunes such as they are at present. Along the foreshore the old dune, of Pleistocene age, was observed, where it lies surmounted by the more recent sand-dunes, the former being hardened by percolation and deposition of carbonate of lime, and showing occasional layers of travertin where there happened to be springs in the vicinity. Passing Spring Creek mouth, now barred up by blown sand, the Middle Tertiary limestone was seen in tumbled blocks. They were eagerly scrutinized for the remains of brachiopods (*Magasella*, *Terebratella*, and *Terebratulina*), for echinoids (*Scutellina*, *Lovenia*, and *Eupatagus*), and polyzoa (*Porina*, *Adeona*; and the profuse and multiform *Cellepora*). The latter sometimes constitutes the bulk of the polyzoal rock, and, as the zoaria was frequently branched and massive, this gave the appearance of a raft of matted twigs. We may thus picture how like a thick scrub the sea-bed must have looked when the polyzoal limestone was forming at the bottom of the fairly deep and comparatively clear sea of the Janjukian of this phase of palæogeography. All the members of the party were converted to the ways of geologists on the spot, and hammers and penknives were put to the best use in extracting medals of creation and boxing them for safe carriage. This intense interest in the fossils accounted for the time slipping past unnoticed, and the return for tea had to be made with record speed.

Joined by a visitor to the district, who showed himself to be an ardent geologist, we started early the next day for a quiet stroll into the country and along the shore towards the Bird Rock section. Turning off near the No. 1 Torquay oil-wells boring at the Jan Juc Creek, two of the party crossed to the Sheoak Gully and down the Fishermen's Steps, where they met the remainder after their scramble over fallen rocks and stretches of sand. As far as a rising tide would allow, some interesting fossils were secured from the Spring Creek Ledge, the *Trigonia* and coral beds, and the *Spirulirostra* bed. From the latter our friend Mr. Parr was so fortunate as to find two examples of this very rare fossil a few days before the party arrived, and members were shown the actual places where they were found. A welcome rest was taken in Sheoak Gully, where Mr. Barnard said a few words about the plants met with, and we exchanged notes while the billy boiled. Proceeding south-westerly along the top of the cliffs, Rocky Point was reached. Here we descended to the beach and peered into the beautiful rock pools that are

revealed to curious terrestrial bipeds twice in the day. But it requires an Alfred Noyes to do justice to this scene:—

> "Bright as a fallen fragment of the sky,
> 'Mid shell-encrusted rocks the sea-pool shone,
> Glassing the sunset clouds in its clear heart,
> A small, enchanted world enwalled apart
> In diamond mystery,
> Content with its own dreams, its own strict zone
> Of urchin woods, its fairy bights and bars,
> Its daisy-disked anemones and rose-feathered stars."

Here we saw strange-looking barnacles (*Balanus* and *Scalpellum*) and maroon-coloured anemones, with flecks of pure sky-blue at the tentacle base; whilst the seaweeds were here in profusion—a gently undulating flora of a beautiful marine rock-garden. It is along the cliff-section on this Point that the soapy clay bands can be traced as soft undercut layers beneath salient ledges of hard, iron-stained limestone; they are on the same horizon as at Zeally Bay, about five miles away to the north-east, representing two legs of the same anticline. This band of marl is rich in Foraminifera in a beautiful state of preservation, as the leader discovered in 1903. One of the younger members collected a few pounds of this material to work through at his leisure, and this will keep him occupied for many evenings. The fossils particularly numerous here are the echinoids, several of which were obtained; and this is the classic spot where Dr. T. S. Hall found his fine specimen of the Patagonian shark tooth, *Carcharoides*, now to be seen in the National Museum. The return to the township was made over the old cliff road, the high-level gravels with quartzite—evidence of a much older river system—being noticed by the way.

Monday morning was devoted to a ramble along the shore to near the mouth of Bream Creek. The objective was the sand-hills, where the marram grass has not yet quite spoiled the wonderful wind effects in remoulding the beautiful hill forms, where cirques, mounds, slides, and ripples can be studied with advantage. The beach along this route proved very barren in molluscan life, only *Scutus anatinus* and *Mactra rufescens* (several isolated valves) being noted. Two fair-sized "gummies" (*Cestracion* or *Heterodontus*) were lying stranded, in fresh condition, on the foreshore. In the middle distance was seen what looked like a piece of wreckage with a row of rusty hook-nails projecting from it in a serried line; but, on approaching the spot, the apparent ironwork moved away in line formation, and revealed itself as a body of Cormorants, which had been resting after a fish dinner. As we approached the dunes the abundance of the aboriginal shell mounds impressed itself on one. Where the sand-blows had uncovered large areas, the surface of the ground, as one member remarked, resembled in the distance a daisy field, with the nacreous

white of the *Turbo* shells (fig. 1) glistening in the sun. In one or two instances blackfellows' ovens were seen to perfection, with the blackened stones, chiefly limestone and basalt, lying in fairly regular circles on a slightly elevated mound. A travertin ledge is here exposed, which apparently dates back to the old dune formations of the corresponding exposures of Sorrento and Warrnambool. Portions of this travertin had broken away, and, probably by wind erosion and rolling action, had formed rounded masses of the size of a cricket ball. The force of the wind is so great as to roll up echinoids in their fresh state from the beach, the genera *Heliocidaris* and *Amblypneustes* both being apparently represented. What was perhaps the most remarkable of these phases of this sand-dune formation which we saw was a stack of blackened sand (fig. 2) standing up by reason of its superior hardness in a hollowed area in front of the great dune. That here it was once more swampy and overgrown with vegetation was shown by the numerous shells of *Succinea australis*, Ferussac, found in the sand of the hard stack mentioned. A shell of the helicoid *Laoma penolensis*, Cox, sp., was also found with the *Succinea*. This evidence, together with that of the destruction of the tea-tree, under which the blacks must have formerly camped, gives to this tribe, at all events, a fair antiquity, for the immediate surroundings are now quite bare and sand-covered. This part of our excursion gave us quite a different aspect of coast scenery, and formed a fitting close to our short visit to Torquay. After lunch we spent a profitable hour on the Rocky Beach portion of the foreshore, returning to Geelong in good time to catch the 5.55 train to town.

It may be of interest to future visitors to have a list of the seaweeds which I collected about twenty years ago at Torquay, and which have been lately named for me by our esteemed fellow-member and high authority on this group, Mr. A. H. S. Lucas, M.A., B.Sc. — PHÆOPHYCEÆ (Brown Seaweeds). — *Cystophora Brownii*, J. Ag., *C. platylobium* (Mert.), J. Ag., *C. retroflexa* (Lab.), J. Ag., *Cystophora*, sp., *Melanthalia obtusata* (Lab.), J. Ag., *Seirococcus axillaris* (R. Br.), Grev., *Zonaria Turneriana*, J. Ag. CHLOROPHYCEÆ (Green Seaweeds). —*Caulerpa Muelleri*, Sond. RHODOPHYCEÆ (Red Seaweeds).— *Acrotylus australis*, J. Ag., *Ballia callitricha* (Ag.), Mont., *Callophyllis Lambertii* (Turn.), Grev., *Cardiea laciniata*, Harv., *Corallina Cuvieri*, Lamour., *Delisea pulchra* (Grev.), Mont., *Haloplegma Preissii*, Sind., *Hypnea*, sp., *Melobesia patena*, Hook. and Harv., *Mimospora Griffithsioides* (Sond.). De Toni, *Phacelocarpus Billardieri* (Mert.), J. Ag., *Plocamium Mertensii* (Grev.), Harv., *Pterocladia lucida* (R. Br.), J. Ag., *Rhabdonia coccinea*, Harv., *R. nigrescens*, Harv., *Rhodymenia australis*, Sond., *Stenocladia Harveyana*, J. Ag. This list could doubtless be considerably augmented by further collecting.

PLATE III.

FIG. 1.–SHELL MOUNDS, NEAR BREAM CREEK.

F. C. *photo.*

FIG. 2.—CHARCOAL STACK, NEAR BREAM CREEK.

F. C. *photo.*

I am indebted to Mr. F. G. A. Barnard for the following notes on the botany and entomology of the trip. He says:—"The botany of the Torquay excursion does not call for any extended account. Of course, the end of January is not the time for a great variety of flowering plants to be found in bloom. The most prominent were the Small-flowered Tea-tree, *Melaleuca parviflora*, and the Sweet Bursaria, *Bursaria spinosa*. The former occurred on the tops of the cliffs along the shore, while the Bursaria was generally seen further inland. The Golden Wattle, *Acacia pycnantha*, with here and there the Varnish Wattle, *A. verniciflua*, seems to have covered most of the country around the township. It still remains in considerable numbers, and should form a pleasant sight in the early spring. Other shrubs near the coast were the Common Correa, *Correa speciosa*, which assumed an ornamental form somewhat different to that occurring at Sandringham, and *Correa alba*, which was in bloom, bearing star-shaped flowers resembling an Eriostemon. Other coastal shrubs were *Styphelia richea*, on which a few white wax-like fruits still remained, and *Lasiopetalum Behrii*, which bears pink, solitary blooms in the spring. During a ramble towards the oil borings and Point Addis more wooded country was seen, with gums, Silver Wattles, Casuarinas, and Native Cherries. Of the former, the Messmate, *E. obliqua*, was in bloom in several places. Here a rather unfamiliar shrub, *Thomasia petalocalyx* (Sterculiaceæ), was met with in bloom, and occasionally in the almost prostrate vegetation were flowering plants of the Native Heath. *Epacris impressa* (pink). The Cranberry, *Astroloma humifusa*, was also found in bloom. *Cryptandra vexillifera*, *Olearia* (*Aster*) *axillaris*, *Comesperma polygaloides*, *Scævola microcarpa*, *Erythræa australis*, and *Helichrysum apiculatum* were other small plants found in bloom. Numerous introduced plants were seen, of which a grass, *Lagurus ovatus*, Hare's Tail Grass, was both conspicuous and ornamental.

"Entomology.—Insects were well represented during our outings by the common house-fly, or one very like it, which followed us in places by the thousand, and March flies, otherwise few insects were seen; though the Bursaria was looked over in several places, only a ladybird was seen on it. Two or three specimens of the Wood Brown Butterfly, *Heteronympha merope*, were all the lepidoptera noted, but a fine orthopterous insect of the grasshopper family, with pale-coloured body and long antennæ, *Apotrechus unicolor*, Br., Long-horned Locust, was secured, and presented to the National Museum."

The party returned to town on the Monday evening, well pleased with their short visit to such an interesting locality, regretting that it was so far from town.—F. Chapman.

ON A CAST OF A FOSSIL SEA-URCHIN FROM THE RED SANDS OF STUDLEY PARK, KEW.

BY FREDERICK CHAPMAN, A.L.S.

INTRODUCTORY.—The chief interest of this short note lies in the occurrence of an undoubted marine fossil in the Red Sands covering the Nillumbik peneplain at Studley Park. These sands have been hitherto regarded as purely fresh-water or sub-aerial accumulations; and, further than this, the present discovery of a cast of a Kalimnan sea-urchin helps to decide the age of these Red Sands as Lower Pliocene, and belonging to the same series as the main part of the Beaumaris cliffs and the Brighton ironstone beds.

DESCRIPTION.—The specimen under notice is a cast of the test of a spatangoid sea-urchin, in a whitish or slightly ferruginous sandstone, composed of rounded and subangular quartz grains. The internal impressions of the ambulacral grooves, due to their slight projection within the test, are seen in this cast as distinct furrows. The cast of the test agrees in the main with *Lovenia*, and, in fact, is the only Kalimnan genus to which it shows any resemblance. The test must have been subjected to some compression during fossilization, as the cast is only slightly convex aborally. At present the specimen is split in two along the lines which indicate the anterior and left posterior furrows. The left anterior groove is twisted out of its proper angle some 25 degrees, which might easily have happened through crushing; this groove is bordered by rather definite lines, and agrees with the lines seen on the edge of the ambulacrum mentioned. The right anterior ambulacral groove is curved at its normal angle, dipping steeply down to the apical region, and carried over to the ambitus. The crack which was induced along the left ambulacral groove is developed along one side of the ambulacral area. The right posterior ambulacrum is marked out by an irregular sulcus, probably the junction line of the pairs of plates forming the ambulacrum.

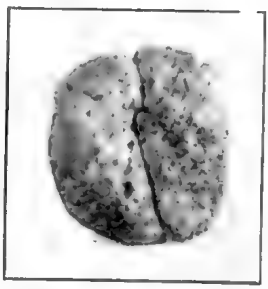
On the oral side the cast is nearly flat, but rounded at the ambitus. The peristomal depression is indicated not only by a hollowing of the surface, but the margins, feebly ridged, are seen both at the left and right, where the left anterior and left posterior and the right anterior and posterior ambulacra respectively meet.

CONCLUSIONS.—There are, to my mind, sufficient indications to show that the furrows, general shape, and depressions on the fossil cast are not accidental, but due to the former presence of an echinoid test surrounding the sandy matrix, and that the balance of evidence is in favour of the genus *Lovenia*.

Detailed microscopic examination of these sands, especially

PLATE IV.

ABORAL ASPECT.



ORAL ASPECT.

CAST OF A FOSSIL SEA-URCHIN (*cf.* LOVENIA) IN KALIMNAN RED SANDS, STUDLEY PARK, KEW.

VIEW OF THE KALIMNAN RED-SAND PIT, STUDLEY PARK, KEW.

Photo. by MISS L. CRESPIN, B.A.

some samples obtained for me by Mr. H. Prentice, has shown the presence of fresh-water sponge spicules, such as have already been found in other localities in the same Red (Kalimnan) Sands, as at Balwyn (by myself) and at Canterbury (by Mr. N. Benprath).

Judging from this evidence, we may infer that the above cast indicates a close proximity to the marine shore-line, and that the spicules may have been, at this locality, washed into the littoral accumulation from higher and swampy ground.

OCCURRENCE.—The above fossil was found at the sand-pit above Studley Park during Prof. Skeats's excursion of Part I geology students in 1917.

I would here express my sincere thanks to Prof. Skeats for the opportunity of examining and describing this very interesting fossil; also to Miss Irene Crespin, B.A., for so kindly taking the photograph of the section where the fossil cast was found.

POLYPORUS MYLITTÆ.—With reference to my exhibit at to-night's meeting of the fungus *Polyporus mylittæ*, Cooke and Massee, it is perhaps worth while calling attention to the mystery which for so many years surrounded this fungus, or, rather, the absence of the fungus. For fifty years or so the substance known as Native or Blackfellows' Bread had been discussed, but no definite conclusion had been come to regarding it until October, 1892, when Dr. M. C. Cooke, the well-known mycologist, announced in the *Gardeners' Chronicle* that at last the complete plant had been received, and that he intended to name it as *Polyporus mylittæ*. That specimen was reported to have come from South Australia, but there is no doubt that it was a specimen sent from Victoria by Mrs. Martin, better known in the early days of our Club as Miss F. M. Campbell, an ardent fungus collector. In May, 1904, our late member, Mr. H. T. Tisdall, read a paper on the subject (*Vict. Nat.*, xxi., p. 56), stating that in 1884 he received a sackful of Native Bread from a friend at Rosedale (Gippsland). These he tested in various ways to see if they were really edible, but could make nothing of them, so they were put away in a sort of cellar he had dug in the hillside at his house in Walhalla. Going to the cellar some months afterwards, he was surprised to find that some of the "bread" had developed a "parasitic" growth resembling a fungus which, he considered, belonged to the genus Polyporus, and as such exhibited drawings, &c., at the Club meeting of 11th November, 1885 (*Vict. Nat.*, vol. ii., pp. 94, 109, Jan., 1886), and expressed his intention of sending specimens to Dr. Cooke. This, according to Mr. D. M'Alpine in an article in the *Naturalist* for August, 1904 (vol. xxi., p. 59), was the first undoubted notice of the fructification of the

Mylitta,* as it had been known, and Mr. Tisdall was the first person to recognize it as a Polyporus and not a Mylitta, it having been supposed to be a member of the truffle family. It was scientifically described by Dr Cooke in *Grevillea* for December, 1892. Mr. M'Alpine has kindly forwarded me a copy of a letter received by him in January, 1905, from Sir William Thistleton-Dyer, Director of the Royal Botanic Gardens, Kew, London, in which he acknowledges a copy of Mr. M'Alpine's article on the subject in the *Journal of Agriculture*, Victoria, for November, 1904, and says:—"Unfortunately, Mrs. Martin's specimen, on which *Polyporus mylitta* (*sic*) was founded, and which was therefore the type, was returned to her at her request. We have no specimen at Kew, and would be most grateful to you if you could procure us one. We have plenty of old specimens of the sclerotium, but none of the Polyporus, either separately or attached." From this note it will be seen that Mr. Tisdall must have failed to carry out his intention of sending specimens to Kew in 1886, or he would have been recorded as the first sender. However, Mr. M'Alpine filled the gap at Kew, which is acknowledged in a letter dated Kew, 4th March, 1905. Mr. M'Alpine says, in response to my application to him for information about this rare fungus:—"When keen on the hunt for specimens of Native Bread I found them most plentiful at Emerald, in the nursery of the late Mr. Nobellus. I was able to get sackfuls of the sclerotia, and, as they were about the consistency of cheese when freshly gathered, I was able to carve out various articles, such as pipes, teaspoons, egg-cups, &c. I have often thought since that disabled returned soldiers might manufacture out of this substance various kinds of genuine Australian curios, for which there ought to be a ready sale." He forwarded as an exhibit an egg-cup which had been cut out as suggested, making a very useful article. It is so hard now that one can hardly make an impression on it with a sharp pen-knife. It seems to me that the fungus may be more common than is usually supposed, as from its mode of growth it might often be gathered, even by a field naturalist, without any suspicion that it was attached by perhaps a rather long stem to the underground substance known as Native Bread. The specimen exhibited to-night grew from a broken sclerotium which was soft when I got it, and was put on a shelf as a curio. I did not happen to notice the growth, which is of velvety appearance and lemon-coloured, for about a fortnight afterwards, so whether it grew while the mass was soft, or after it had hardened, I cannot say. As it is so rare, it is my intention to hand the specimen to the National Herbarium, which, I understand, does not possess a specimen.—F. G. A. Barnard. 12th February, 1923.

* The reference in Cooke's "Australian Fungi" (1892) is—"1351, *Mylitta australis*, Berkeley—spores unknown."

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting was held at the Royal Society's Hall on Monday evening, 12th March, 1923.

The president, Mr. C. Daley, B.A., F.L.S., occupied the chair, and about fifty members and visitors were present.

CORRESPONDENCE.

From Mr. D. Best, thanking the Club for his election as an honorary life member, but declining the honour, as he felt that the Club required all the subscribing members it could obtain. He therefore desired to become a regular life member of the Club, and enclosed a cheque for five pounds as his membership fee.

From Mr. W. M. Bale, F.R.M.S., and Mr. F. Wisewould, thanking the Club for the honour done them in being elected honorary life members.

REPORTS.

A report of the excursion to Black Rock on Saturday, 24th February, was given by the leader, Mr. J. Stickland, who said that, though favoured by a beautiful day and a low tide at the right time, there was just sufficient sea raised by the wind to prevent any satisfactory work being done among the rocks. A search was made, however, for interesting objects out of reach of the waves, when quite an interesting series of objects was met with and discussed among those present.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. Willoughby Curtois, 7 Erskine-street, Malvern; Mr. Allan T. Latham, 26 Scott-street, St. Kilda; Mr. A. N. Lewis, "Wallington," Hotham-street, East Melbourne; Mr. V. Miller, High-street, St. Kilda; Mr. Walter J. Parr, 18 Bokhara-road, Caulfield; Mr. C. F. Argyll-Saxby, M.A., F.R.G.S., 182 Collins-street, Melbourne; and Mr. Joseph H. Woodward, 1 Rathdown-street, Carlton, were duly elected ordinary members of the Club.

GENERAL BUSINESS.

Mr. A. E. Keep referred to some correspondence that had passed between the Society for the Prevention of Cruelty to Animals, Mr. Latham, M.H.R., and the Minister for Trade and Customs, relative to the exportation of native birds. The Minister had given an assurance that as soon as possible the export of most of our native birds would cease.

Mr. C. Oke drew attention to the fact that more than one expedition was exploring in Australia for natural history purposes. He considered that the scientific societies of Australia should combine and urge the Commonwealth Government to prohibit the removal from Australia of any type of a new species, or, if they be removed for comparison with other specimens in other countries, that a guarantee be given that they would be returned to Australia.

PAPERS READ.

1. By Mr. H. B. Williamson, F.L.S., entitled "Our Alpine Flowers."

This took the form of an illustrated lecture, in which the author directed attention to the more notable plants growing at altitudes of 5,000-6,000 feet in North-Eastern Victoria, the character of the scenery of the high table-lands, and the appearance of the vegetation with which they are clothed.

2. By Mr. F. Chapman, A.L.S., entitled "On Concretionary Limestones in General and on Pebbles from Lake Omeo in Particular."

The author gave some account of the formation of these concretions. The nodules, on being sliced and prepared for microscopic examination, usually exhibit a nucleus, with the general structure composed of minute organisms. He illustrated his remarks by means of lantern slides.

3. By Mr. J. C. Goudie, entitled "Notes on the Coleoptera of North-West Victoria, Part IX."

The author dealt with the genus Heteronyx of the family Scarabidæ and those representatives of the Elateridæ, Rhipidoceritæ, Dascillidæ, and Malacordermidæ, which he had observed in the Sea Lake district, giving brief notes as to their occurrence, &c.

REMARKS ON EXHIBITS.

Dr. Geo. Horne, V.D., drew attention to the uses of some aboriginal implements exhibited from the Lake-Eyre district, South Australia.

Mr. A. J. Tadgell called attention to three additions to the flora of Victoria made by him during a recent visit to Mount Bogong, North-East Victoria, and an extension of habitat of a Grampian plant. The new plants were a fern, *Cystopteris fragilis*, Bernh., syn. *Woodsia læto-virens*, Brittle Bladder-fern; *Erigeron pappochroma*, var. *oblongatus*, Benth.; and *Carex pyrenaica*, var. *cephalotes*, syn. *C. cephalotes*, Round-headed Sedge; while *Olearia ramulosus*, var. *communis*, syn. *O. ericoides*, now found on Mount Bogong, had previously been recorded only from the Grampians. He also called attention to a

specimen of *Epilobium confertifolium*, Alpine Willow-herb, from a height of about 6,300 feet, showing the cushion form of the plant and the very narrow twisted seed-vessels.

NATURAL HISTORY NOTE.

Mr. C. Oke said that when recently examining an ants' nest at Eltham he was surprised to see an ant come out of one of the entrances to the nest with a small shell, which it deposited on the mound outside. On looking round he found two more examples of the same shell. Thinking they might be a fossil form, he submitted them to Mr. F. Chapman, A.L.S., who recognized them as *Diola lauta*, A. Adam, and thought they had probably reached the locality in "shell grit," frequently given to fowls.

EXHIBITS.

By Mr. F. Chapman, A.L.S.—Concretionary nodules from Lake Omeo, collected by Mr. C. Daley, F.L.S.; concretionary nodules from Tarcoola, South Australia, from National Museum collection; also concretionary limestone from Pinnaroo, Victoria, obtained from Mallee Bore No. 7 at 4–8 feet from surface, and micro-photographs in illustration of paper.

By Mr. F. Cudmore.—Fossil teeth of sharks and rays, from the Table Cape (Janjukian) beds, Tasmania.

By Miss M. Guerin.—Salt from the Pink Lakes, Linga, North-West Mallee, Victoria; this salt has a distinctly pink tinge, easily visible in daylight.

By Dr. G. Horne, V.D.—Stone implements used by the aboriginals of the Lake Eyre district, South Australia, including scrapers used for fine work; drills; knives, mounted, and used for cutting off dead men's hair; hollow bone, in which two flies are enclosed, and then buried, in order to keep away flies, which are a terrible pest in the locality.

By Mr. C. Oke.—Marine shells, *Diola lauta*, A. Adam, found in meat ants' nest near Eltham.

By Mr. A. L. Scott.—Pitchstone from Ngongataka, Rotorua, New Zealand. The acid magma cooled before the various minerals had time to develop, the result being a dark, brittle glass. Some specimens crumble with even careful handling.

By Mr. J. Stickland.—A fine colony of hydrozoa attached to a seaweed; Acorn Shells upon the carapace of a crab; and foraminiferous sand, collected on Black Rock excursion.

By Mr. A. J. Tadgell.—Plants from Mount Bogong, referred to under "Remarks on Exhibits."

By Mr. H. B. Williamson, F.L.S.—Dried plants from Bogong High Plains, &c., in illustration of paper.

After the usual conversazione the meeting terminated.

EXCURSION TO BLACK ROCK.

Ten or twelve members of the Club visited Black Rock on the afternoon of Saturday, 24th February. As the day was beautifully fine and the tide well out, conditions seemed all that could be desired; but unfortunately a stiff breeze made the sea so rough that no work could be done on the seaward side of the rocks. However, we placed a liberal interpretation upon our commission to study shore-life, and bestowed considerable attention upon organisms found upon the shore, although not dwellers there. At the end of the afternoon we had found representatives of most of the lower forms of marine life. To commence with the lowest group, the Protozoa, a tuft of fine filamentous seaweed growing in a tide pool furnished two or three species, including many specimens of the beautiful little loricate form Cothurnia, while a collection of white sediment from the ripple marks on the sand-banks was found to contain forams. A higher group, the Porifera, was represented by the skeletal remains of quite a variety of horny sponges. The phylum Cœlenterata comprises those animals which may be described as being little more than digestive sacs surrounded by tentacles. This phylum had examples in the shape of the beautiful hydrozoon of the Plumularia type (exhibited on the table) and numerous sea anemones and corals. The hydroids are of particular interest, supplying as they do many examples of alternation of generation of a remarkable type. The hydriform persons are asexual, while the sexual generation is of the form of a medusa, or jelly-fish. Several species of Crustaceans were noted, such as sand-hoppers and crabs. The diminutive tail part or abdomen of the latter, it was pointed out, constituted them examples of the Brachyura, or short-tailed crustaceans, as distinguished from the Macruran or long-tailed section, such as the crayfish. That extremely interesting crustacean, the Acorn Shell, which is sometimes to be had, was sought for in vain. These might easily be taken to be molluscs, but in reality they belong to the Entomostracan division of the Crustacea. In their juvenile stage they are free swimmers, but as age advances they settle down, attaching themselves by their heads, and form shells, from which they extend their feet to catch food. An example of these will be seen on the table which have built their residences upon the carapace of a crab, doubtless without asking permission. Worms were plentiful. Spirorbis, which builds a tiny spiral tube of almost microscopic dimensions, was noted, while another beautiful tube-dweller, Serpula, was, of course, in evidence everywhere. A univalve mollusc was found with its shell completely covered with the tubes of the little builder just mentioned. On being placed in a bottle of water the

mollusc began its travels, while the Serpulæ extended their plume-like gills, to the pleasure of all beholders. Another much larger polychæte worm, in the shape of a species of Nereis (probably), was also found. Polyzoa or Bryozoa had one example. These are classed as worms by some authorities, and as allied to molluscs by others, being called Molluscoidea. Molluscs, of course, were plentiful, including the curious form Chiton, which has its shell divided into eight plates, which gives it a certain amount of flexibility. Of the interesting groups Tunicata and Echinodermata no representatives were found on this occasion. Had there been rough weather a day or two before our visit took place, probably numerous tunicates would have been thrown up on the beach. It seems to us that the number and variety of marine organisms to be taken on the shore near Melbourne is very much less than in days gone by. Pholas, that interesting rock-boring mollusc, and some others we have not found for many years. Marauders in the shape of thousands of holiday-makers are doubtless to blame.—J. Stickland.

"Australian Science Abstracts."—The third number of this journal (for February, 1923), published quarterly by the Australian National Research Council, is to hand. It contains brief abstracts of papers published in various Australian societies' proceedings, &c., during the quarter, embracing agriculture, botany, chemistry, geology, mining, pathology, veterinary science, zoology, &c., and should prove very useful to workers both in Australia and elsewhere. The subscription price is 4s. per annum. It is obtainable from the editor-in-chief, Dr. A. B. Walkom, D.Sc., 23 Ithaca-road, Elizabeth Bay, Sydney, N.S.W.

Forests Commission of Victoria.—The third annual report of the commission for year 1921–2 has the somewhat unique distinction of being printed on paper manufactured from pulp containing 67 per cent. soda pulp, made from Victorian timbers—viz., Mountain Ash, *E. regnans*, Woolly-butt, *E. delegetensis*, Messmate, *E. obliqua*—and 33 per cent. imported "sulphide" pulp. The paper was supplied by the Institute of Science and Industry, which has been conducting experiments in the manufacture of paper from Australian woods at the mills of the Australian Paper and Pulp Co. Ltd., Fyansford, near Geelong, these experiments being subsidized by the Forests Commission of Victoria. The paper seems to be of excellent quality and good colour. The report states that one million and a quarter conifers were planted out during 1921, with about 50,000 eucalypts and other trees.

THE MEASURING OF TALL TREES.

(WITH PLATE.)

BY A. D. HARDY.

(Read before the Field Naturalists' Club of Victoria, 16th Jan., 1923.)

OWING to misstatements and doubtful records recurring in print, I am again bringing under your notice the subject of tall trees—this time chiefly with special reference to the method and difficulty of obtaining their heights.

It is unfortunate for students of natural science generally, and tree-lovers in particular, that science periodicals are little read by other than members of the societies which produce them. Technical treatment of the various subjects is at times quite necessary, but unless there is a fair amount of journalistic leaven in the literary dough the volumes, bound or unbound, rest solidly on the library shelves. When one seeks through such a medium to render innocuous the errors far-flung by means of flamboyant articles in popular journals and magazines so readily obtainable at the local news agency or railway bookstall—magazines attractively gotten up and profusely illustrated, so as to be transferred from hand to hand until too tattered for use—the handicap is severe. But we are sorely smitten when official or semi-official publications—with title and general tone suggesting a sense of responsibility, and with a wide circulation both in the country of origin and abroad—get a good start with erroneous or doubtful information; or we are left dissatisfied with the omission of reference to data or its verification.

In a paper entitled "The Tall Trees of Australia," read before this Club in March, 1918 (*Vict. Nat.*, xxxv., p. 46, July, 1918), I drew attention to the fact that our tall tree height records were those of trees that had long since passed away, either through the action of incendiaries or through the subordination of sentiment in the interests of forest utilization, and that we had a poor showing against the preserved giants of California, many of which, however, are on private property, and may be converted into lumber.

Here are two extracts—the first from the letter of one of my American correspondents soon after his return from a visit to Australia, the second from a widely-circulated forestry periodical (in both cases the italics are mine):—

(1) "Referring to your article on the big trees of the world, I wonder if you saw an article in the *National* (U.S.) *Geographic Magazine* for July, 1909—'The Tallest Tree that Grows,' by Egerton R. Young, describing the eucalypts of Australia, in

which he states that *specimens of Eucalyptus amygdalina* * *reach a height of 480 feet!* He says *specimens over 400 feet are frequently found* (if so, I should like to find some). I would be glad to have your comment on this article if you can find a copy." In a later issue of the same journal (for December, 1916) Prof. H. E. Gregory ignores the references quoted above and gives 346 feet as the highest recorded Australian tree. Cornthwaite's measurement of 375 feet had, however, not been published at the time.

(2) By Mr. Detwiler, June, 1916:—"The average diameter of a fully-developed Sequoia is 25 feet. . . . At least one Sequoia has been cut down whose diameter was almost 31 feet. . . . . That tree was 302 feet in height. The average height is 275 feet, but *a few attain 350 to 400 feet.* Still, the Sequoia is not the tallest tree in the world, though it is by far the largest or most massive. *The Eucalyptus trees of Australia exceed it in height,* but are more slender." (Muir's "500 feet high are not uncommon" for Sequoia seems thus discounted, but I should be glad of verification of Detwiler's "400 feet.")

The circulation of the former magazine is easily 100 times greater than that of the *Victorian Naturalist*—probably 1,000 times as great in America. It may seem a little incongruous that at least two American writers should conscientiously endeavour to hand the prize for tall trees, so coveted by their countrymen, to Australia, and that an Australian should disclaim our right to accept it. True, I have been reproached by many for "belittling the Eucalypt," but it would be unwise to allow well-meaning protagonists of the Sequoias to so advertise fictitious heights for *Eucalyptus regnans* that, when called upon some day to "produce the goods," we should be unable to point to anything much over 300 feet. In the absence of a disclaimer, our silence might be taken as equivalent to consent.

Let me briefly refer to four trees (now gone into lumber, palings, or smoke) of excessive height, whose dimensions were obtained by measurers of undoubted ability; trees of the splendid past, all of the species *Eucalyptus regnans* (Mountain Ash), and all Victorians.

RELIABLE RECORDS OF HEIGHTS.

1. Mount Dandenong; G. W. Robinson, C.E.; 342 feet to broken 9-inch diameter top; estimated total height, 360 feet.
2. Thorpdale, Gippsland; G. Cornthwaite, L.S.; 375 feet.
3. Olangolah, Otway Mountains: Colac Shire Engineer; 329 feet to the broken top.

* *E. regnans.*—A. D. H.

4. Mount Baw Baw, Gippsland; Cunningham, L.S., Pierce, C.E.; 326 feet 1 inch (the apparently absurd "1 inch" being due to exact mathematical calculation, and points to the meticulous care of the surveyors in recording).

I purposely omit reference to bulk, girth, &c., as it is the height measurement and its difficulty that I am bringing under notice this evening, hoping that members and others whom my hints may reach will exercise due care in ascertaining and caution in publishing figures that would be of interest not only in Australia, but in other countries.

METHOD OF MEASUREMENT.

Nothing less than a theodolite and 1/16 inch steel tape controlled by a person certified as competent to use them is a satisfying condition in this matter, since the tallest tree record is the subject of international competition, with the United States slightly in the lead, and the difference between the points ultimately gained by the contestants, whichever succeeds, may be very small. The rigidly-set theodolite and a steel tape long enough to reach from the instrument to the tree—that is, a five-chain tape to reach between the vertical axes of instrument and tree, with a vertical angle of 45 degrees or thereabouts employed—give ideal mechanical conditions; but in densely-forested mountainous country the carrying of such a heavy load requires much enthusiasm on the part of the measurer, or a considerable survey fee. However, we remember the recipe for "jugged hare"—"First catch your hare." The search for the tall eucalypt may be done with a clinometer and tape. There are various other handy instruments, such as the hypsometer, dendrometer, and contrivances of various sorts, all more or less inadequate. In the hands of one experienced in its vagaries and its use, the aneroid barometer might be used on a steep slope, provided the upper station were of even altitude with the tree top; but it is difficult to read less than 5-feet differences, and in any case an allowance of 3 per cent. to 5 per cent. or more of error for short-height intervals puts this instrument out of court for our purpose.

I am not conversant with the special aneroid used by Abercrombie for the measurement of heights of ocean waves, but, as it indicated differences of from 1 to 2 feet, such an instrument might be used for tall trees. Another method theoretically possible, but almost impracticable, would be the use of the Dumpy level, by which an ascending or descending series of sectional heights could be obtained, giving in the aggregate the height of the tree; but this would involve a tremendous amount of clearing, and, further, the chance of disturbing the

PLATE V.

"THE BARON,"

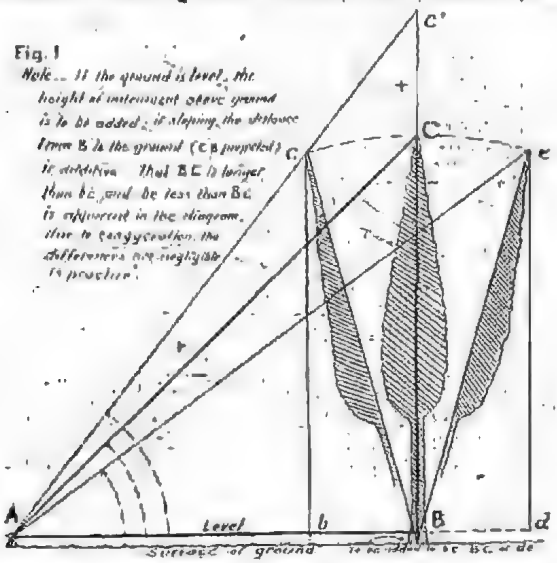
A giant eucalypt, *E. regnans*, formerly standing near the junction of Perrin's and Sassafras Creeks, Dandenong Ranges.

instrument at any of the many stations required between the adjustment and the first observation, or between complementary observations, owing to the difficulty in obtaining rigidity for the tripod or secure footing for the operator, disqualifies this method also.

Let us suppose that our spies have reported the locality of a tree the like of which has never been heard of. Incredulous, though not without cause, we decline to burden ourselves with unnecessary impedimenta, and approach the big vegetable with axe, steel tape, clinometer, pocket book and pencil, and perhaps the essentials of a temporary camp have to be packed and carried. Arrived at or near the tree, we find, in all likelihood, that it stands amid a dense lower story of the forest flora perhaps reaching 40 feet in height, and comprising Musk, Hazel, Christmas-bush, Blanket-bush, Stinkwood, Blackwood, and with Correa, Clematis, Lyonsia, wire-grass, and fern compacting the ground cover.

This is well illustrated in the accompanying plate, which shows "The Baron," a tall tree which at one time grew in the Dandenong Ranges, near the junction of Perrin's and Sassafras Creeks, whose height was recorded at 219 feet 9 inches to the broken top. I am indebted to the Forest Commission for permission to make use of this illustration.

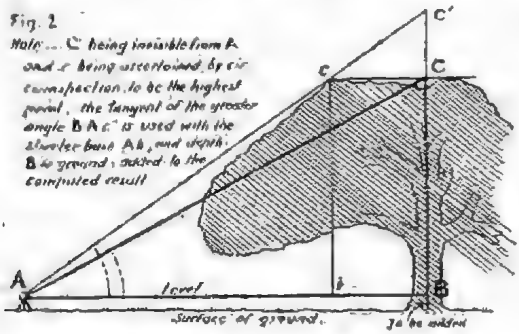
As we cannot see top and bottom of such a tree at the



same time, we get to work with the axe, or, if we have had previous experience, several axes. Having cleared a narrow lane for visibility and footway for chainage, we next

set about measuring the vertical angle and the base line. To measure the angle seems simplicity itself, and is so with an instrument in perfect adjustment, properly set and levelled, if we can see what we want. This is just where the main difficulty comes in. By means of a few diagrams I hope to demonstrate that to exactly measure the height of a tall, old eucalypt is almost impracticable with ordinary surveying methods and appliances, and from what I have seen of old Sequoias in photographs the remark applies to that genus also.

Theoretically, we obtain the ratio of a right-angled triangle, of which we measure the base and compute the perpendicular, which latter, under ideal conditions, coincides with the axis of the tree; but the coincidence rarely if ever happens, the chances being more than 100 to 1 that the ground is sloping in the most convenient sighting position, and that the tree-top is not exactly over the bottom. So the measurement of a lower as well as an upper angle is necessary, as well as much manœuvring and some computing to obtain the theoretical summit of the tree's axis, the length of base to be measured to correspond with the top of a symmetrical but leaning tree, or to correct for an observation to a point neither the physical top nor theoretical top, but a twig or branch end, the only sighting point available (see figures 1 and 2, angles BAc, BAC, or BAe).



If with clinometer and tape, and with due precautions, we find that the tree is apparently over 300 feet, it is worth while to return later with a theodolite. If we remember that 1 degree of difference in a vertical angle of about 45° means 3·5 in 100 units of lineal measurement, or, say, 10 feet in the height of a 300-foot tree, we will exercise extreme care in setting up the instrument, and this care is a moral obligation if we are out to break previous records or secure others worthy of preservation and to withstand criticism. By circumspection we may to some extent choose a better *point d'appui*,

and so eliminate part of the error due to eccentricity of the tree-top, and the balance may be reduced by a supplementary observation at right angles to the first to obtain the distance *Cc* or *Ce* (figure 1) respectively as the tree leans to or from the first station of observation, for correction of the base measurement, or by further computation of the small triangle at top of tree arrive at further data for correction of the height. If you imagine the rectilinear part of figure 2 applied to a tree such as a River Red Gum, *Eucalyptus rostrata*, the trouble in sighting the top of a tree of other than pyramidal habit will be apparent.

Now, I have pointed out only some of the principal difficulties —viz., locating the tree, clearing the site, centering the top, obtaining a secure footing for the theodolite in the spongy mulch of many years' accumulation of rotted leaf, twig, and bark, all soft, damp, and yielding in that shaded place.

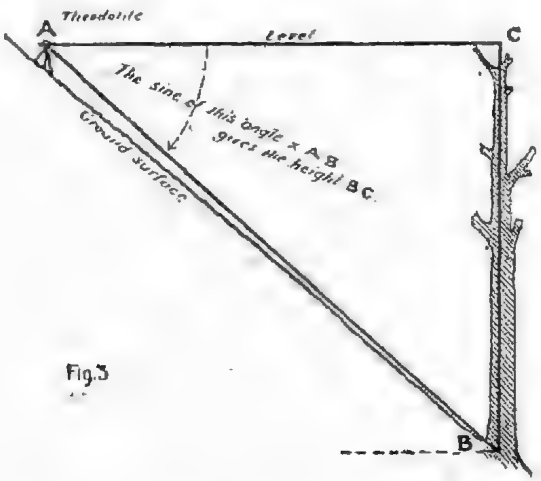


Fig. 3

Alternatively, on a steep hillside, with obstacles in the way of lateral attack, we might locate, by the trial and error method, a spot on the mountain side opposite the top of the tree for the levelled telescope, and then by depression obtain (1) the vertical angle measured downwards, and (2) the length by chainage between the vertical axes of the theodolite and the tree at its base, thus providing data for a different computation (figure 3), in which the sine of the angle CAB is used.

Having heard of some of the difficulties suppositiously encountered on the site, you will, I feel sure, hear with interest an account by a backwoodsman who guided a survey party to a tree on Baw Baw. Mr. Dowey, now an officer of the

Forests Commission of Victoria, was then engaged in paling splitting in the Gippsland forest. From the story which he kindly put in writing for me a few years ago the following is extracted:—"Myself and brother, accompanied by Messrs. Cunningham and Pierce (surveyor and photographer), started from Neerim early one June morning in the year 1888. Crossing the Latrobe River, we travelled twelve miles up the ranges (Baw Baw). The country was at that time covered with thick Stinkwood* and Horizontal Scrub.† We took with us a light lunch (expecting to be back the same night), a fairly large camera, and some 'slashers.' Reaching the Mountain Ash belt late in the evening, we found nearly two feet of snow covering the ground; the altitude about 3,000 feet. It being nearly night, we decided to make the best of matters and camp. We had no covering of any kind and no food. Setting fire to an old hollow shell, we sat or stood round the fire till daylight. The cold was intense. We found a tree close to our camp and took the measurements. (Later, when the belt was opened up, I saw much higher trees.) Starting back down the mountain, Pierce, who had lately come from England, was getting very exhausted with the night's exposure, and we each had to assist him on the weary journey back, reaching Messrs. Ross's selection about dark. Everyone was about done. This particular belt of Mountain Ash contained about 300 acres, and was named by paling splitters 'New Turkey.' Messrs. Ross treated us very kindly. I have not seen the two gentlemen (Cunningham and Pierce) since, but I am quite sure that both, if alive, will never forget their experiences on that occasion." Mr. Dowey naively adds:—"This belt of Mountain Ash was opened up by paling splitters (self included) some three years later, and turned out one of the best belts of timber in that mountain country. The particular tree that was measured was split up for palings, and turned out about 6,000 six-feets."

Now a remark or two as to estimating—not guessing. By this I mean a rough result obtained without instruments. The pencil method employed by landscape painters and other artists to obtain proportion is applicable to inconsiderable heights where precision is not essential. Where the height is great and the result desired is to be near the mark, the endeavour is defeated by the fact that in raising the pencil hand there is described an arc which, the higher the hand goes, is, if the pencil be kept at right angles to the line of sight, swung until, if continued, it is in a line with the zenith, and all intermediate positions are proportionately productive of error. The pencil cannot be kept with axis transverse to line

* *Zieria Smithii.* † *Correa Lawrenciana.*

of sight and at same time parallel with axis of the tree, and if kept parallel is seen more and more obliquely with each successive vertical section of the tree measured, the increasing error, being in excess, gives too tall a tree.

Stepping or Pacing the Length of a Fallen Tree.—I was told that this is "as easy as falling off a log"; but it is not easy to fall off a log deliberately—let anyone try it. Even surveyors, who are daily relying on accuracy in pacing to locate old pegs, &c., would not claim accuracy greater than 2 per cent., or substantiate the claim if made, even on level land. Imagine, then, the stepping on a slope littered with the original *débris* of the forest floor, and with the tangle and canopy of the fallen giant added. Such a task is easily performed by one in an office chair, or seated on a fence rail, by means of a vivid but treacherous imagination. Recently I had an opportunity of watching a number of men, who had gathered from various mountain sawmills in the locality, competing at holiday sports. One event was the stepping of 66 feet (1 chain's length). Each contestant stepped his twenty-two yards and thrust a long nail into the ground. At the finish the standing nails were distributed much like bowls on a green, with the "kitty" absent. When the objective point was located by tape measurement it was found to be about midway between the longs and the shorts, which together extended over 15 feet. What sort of tree heights would the short-steppers, who predominated in proportion 5 : 3, return conscientiously enough from a like effort to obtain three hundred feet of tree length on bad footway? The contestants were men of mixed nationality and of varying age.

In my earlier article I did not state or imply doubt as to the good faith of recorders of phenomenal measurements, but rather questioned their methods or deplored their over-credulity in listening to others. In most cases the information was second or third hand. I would rather accept a bushman's statement that a tree in one locality was taller than another elsewhere than attach undue importance to its being so many feet high, and we may note Mr. Dowey's statement that he subsequently saw much taller trees (than the one measured and recorded as 326 feet)* in that locality.

Convergence of opinions of old bushmen, such as cattlemen, splitters, tin-mining fossickers, &c., and surveyors, leads one to believe that the move in 1888 to secure big tree measurements came too late, the tallest trees having been already converted into palings. Our great grandchildren may have a remote chance of seeing what our grandfathers saw if sufficient

* A distant view of this tree was given in the *Gum Tree* for June 1921, from a negative in the possession of the Forest Commissioners.

areas be held in reserve for the growth and development of trees in favourable localities. *Eucalyptus regnans* continues its upward growth after it is capable of yielding merchantable timber, and the unsympathetic individual, who can be found not only in the splitters' tent, the graziers' homestead, or the sawmillers' camp, but also in higher places, should be warned by *us*—the people, the owners of the trees—to keep sacrilegious hands off such magnificent specimens of the Creator's work.

Perhaps I may be thought maudlin in the opinion of some folk when I express or harbour the feeling that when a tree of over 300 feet describes an arc of the landscape, first with an ominous cracking and rending of fibres at the cut stump, then with a sigh above that becomes (with the tree's descent) the sound of a hurricane wind, and next the tearing and crashing through the undergrowth that ends in a great smashing blow on the ground and a bounce up of a few feet, perhaps, before all is quiet save for the fluttering of the glossy leaves of the twig tips for a moment longer—then it seems that murder has been committed. The awful silence which follows in the forest is broken by the sound of axe and saw dismembering the carcass, the boards from which may presently provide a dancing floor or a coffin for one's self. We kill the ox and the sheep for food, leather, and wool, and we rear them for such: we asphyxiate or pole-axe the useless dog and cat, either to put them out of their misery or to prevent a public nuisance or a menace to our health; but we do not, utilitarians though we be, stick a knife into the pet sheep's throat nor poison the old dog except for pity's sake. Our sentiment disallows it. Is it only the artist—pictic or photographic—or the poet, the naturalist, and other such "cranks" that will strive for the protection of and decry the destruction of these gigantic forest growths?

We have heard a great deal in the past of the striving for the "almighty dollar," but we live in a glass house, and should avoid stone-throwing; there is such a thing as the almighty pound sterling, for a surplusage of which some folk would sacrifice their souls. Dollars or no dollars, our American cousins can "produce the goods" when asked to point out their giants. What can we do in return but point to axe chips or burnt stump ashes and say, "There was a great tree! I remember, &c.," or produce a photograph, or a copy of the *Victorian Naturalist*, the *Gum Tree*, or an old *Leader* or *Australasian*, showing the long-deceased "Big Ben" or "Uncle Sam." We can even produce a photograph of part of "King Edward VII.," and show that it *was* 80 feet round at 10 feet and 112 feet at the ground.

If we will not measure and treasure for ourselves, at least let us reserve the material necessary for the enthusiasm, enjoy-

ment, and interest of future generations of men more appreciative, surely, than ourselves. I am not, of course, referring to legitimate and economic forest work, but to the unnecessary killing of the great and beautiful in select places.

THE GOLD COAST, WEST AFRICA.—The director of the Gold Coast Geological Survey, Mr. A. E. Kitson, C.M.G., O.B.E., in his report for 1921, recently to hand, states that, while no discovery of outstanding value has been made, steady progress in determining the geological features of the Colony is being accomplished, notwithstanding the difficulties of the climate, &c. Included in the staff is Mr. O. A. L. Whitelaw, also a former member of the Victorian Geological Survey staff.

A FERN NEW FOR VICTORIA.—During a recent trip to Mount Bogong, Mr. A. J. Tadgell collected a fern growing among the rocks near the summit which proved to be *Cystopteris fragilis*, Bernh. This fern has been recorded from Tasmania and New South Wales, and, like several other alpine plants, the connecting locality, Victoria, is now recorded. Bentham's description of the genus is:—Delicate ferns, limited to the colder mountainous regions of both hemispheres. Sori small, circular, on under surface, enclosed when young in a thin globular membrane which opens into a cup. The description of the species is:—Root-stock creeping, fronds tufted, in general outline oblong lanceolate, twice pinnate, stalks slender without scales, segments lanceolate, deeply pinnatifid, lower pinnate lobes obtuse. Fronds four to eight inches. This fern is known as the "Brittle Bladder-fern," and was formerly listed as *Woodsia lœto-virens*. It is cosmopolitan in its occurrence, always at high altitudes.

"EUANCONDIT."—In 1895 "Henry Goldsmith" (Mr. Armstrong), a solicitor of Kyneton, published an Australian novel under the above title, "Euancondit," being the name of the heroine of the book. When in Kyneton recently I found that this was the accepted vernacular name in the district for the Fairy Waxflower, *Eriostemon obovalis*, and on making inquiry was told that it was the aboriginal name for that flower. The following extract from Mr. Armstrong's book is interesting:—"To them she was always Euancondit—the pure white little flower of the hills. It was the native name of a little, rare, white waxflower that grew in small sprays in the gullies and gulches of the mountains, and this name they (*i.e.*, the blacks) applied affectionately to her as characteristic of her appearance and manner. They knew her real name was Katie, but never called her by it. To them she was always the little white flower of the mountains—Euancondit."—E. E. P.

ALPINE ORCHIDS.—At the February meeting of the Club Mr. A. J. Tadgell exhibited a number of Alpine plants he had recently collected on Mount Bogong, Victoria's highest mountain, at an elevation of 5,800 to 6,400 feet. Among them were several orchids. Dr. Rogers, of Adelaide, to whom duplicate specimens were sent, writes as follows:—"The Mount Bogong orchids proved exceedingly interesting. Although many of the specimens carried badly, I was able to determine several of the Prasophyllums without difficulty. In addition to *Thelymitra venosa* and *Chiloglottis Gunnii* your parcel contained examples of *Prasophyllum Suttonii* (the connate sepals variety), and *P. Frenchii*, var. *Tadgellianum*. I am inclined to think that the latter should rank as a distinct species."

MACQUARIE ISLAND.—In July, 1918, a somewhat spirited discussion took place at a meeting of the Field Naturalists' Club with regard to the bird life of Macquarie Island, a desolate speck in the Southern Ocean, about 900 miles to the south-east of Tasmania, and under the control of that State. In the *Papers and Proceedings of the Royal Society of Tasmania* for 1922 Sir Douglas Mawson, Kt.B., D.Sc., O.B.E., gives some account of the island, and discusses its animal and bird population, illustrated by a map and several plates. He comes to the conclusion that the best use that can be made of the island is to proclaim it a "National Faunal Reserve." Some idea of the quantity of life on the island is given by the fact that during an average season 700 sea-elephants and 300,000 Royal Penguins are killed and the oil extracted from their bodies, but this terrible slaughter is having its effect on the rookeries, hence the desirability making the island a strict sanctuary, more especially in view of the fact that the revenue derived from all this butchery is only about £20 per annum.

OUR FORTIETH VOLUME.

WITH the next issue of this magazine (May, 1923) it enters on its fortieth year and must be considered quite aged as such publications go, especially in Australia. The committee of the Club has had under consideration for some time the possibility of making the magazine more useful and more attractive even than it has been, and with that view it is proposed to enlarge the publication regularly to twenty-four pages by including special sections for notes (with illustrations) about birds, insects, pond-life, &c., &c. To keep these sections going depends almost entirely on the members of the Club. No editor, whoever he may be, can provide pages of notes of a readable nature unless the facts are furnished to him by reliable witnesses. It therefore falls upon the shoulders of every member of the Club to do his or her bit in carrying out the desire of the committee.