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OF THE

Field Naturalists' Club of Victoria.

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

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ILLUSTRATIONS.

ERRATA.

Page 10, line 15 from bottom—For "*Centaurea*" read "*Erythræa.*"

Page 17, line 2 of report—For "20th" June read "13th."

Page 47—See paragraph headed "Correction."

Page 104, line 27—For "*Farragel*" read "*Farrangei.*"

Page 121, line 11 from bottom—For "*Lagenaria*" read "*Lagunaria.*"

The Victorian Naturalist.

Vol. XXXVIII.—No. 1. MAY 5, 1921. No. 449.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 11th April, 1921.

The president, Mr. J. Gabriel, occupied the chair, and about sixty members and visitors were present.

REPORT.

In the absence of the leader, Mr. F. Cudmore, a report of the excursion to Beaumaris on Saturday, 9th April, was given by Mr. A. L. Scott. The afternoon was boisterous, and unfortunately the tide did not suit for an examination of the fossil beds; however, Mr. Cudmore explained the geological history of the locality, and, having brought with him a number of specimens collected at Beaumaris, he was able to demonstrate to the party the relationship existing between the extinct species and allied forms still living in Port Phillip Bay. Included in the specimens were Cetacean vertebræ, teeth of the Porcupine Fish (Diodon), Ray (Myliobatis), and a Dolphin (Steno), also numerous sharks' teeth, representing about twenty species. Notwithstanding the disappointment of no actual search for fossils, the party spent an interesting afternoon, resolving to try and arrange another outing to the locality soon.

ELECTION OF MEMBER.

On a ballot being taken, Mr. H. Walker, Torrington-street, Canterbury, was duly elected a member of the Club.

GENERAL BUSINESS.

Reference was made to the forthcoming exhibition of specimens, in conjunction with the Microscopical Society. Mr. D. Best said that the Club ought to be able to make an attractive exhibition without the help of another society. It was pointed out by Messrs. F. Chapman and F. Pitcher that the Microscopical Society had been of great assistance to the Club on several occasions in connection with the exhibitions of wild flowers, and they thought that a combined exhibition would prove of great public interest. On the motion of Messrs. Wilcox and Sutton it was resolved—"That, in view of the great assistance received from the members of the Microscopical Society in past years, the proposal of the committee to hold a combined exhibition be approved of." Messrs. Gabriel, Pitcher, Barnard, and Williamson were

appointed as a sub-committee to act in conjunction with a sub-committee of the Microscopical Society.

Mr. C. Gabriel said that members would be pleased to learn that the Mutton-birds at Phillip Island were being protected, and that up to date seventy-five foxes had been destroyed.

Dr. Sutton, in reply to a question, said that the Plant Names Committee had experienced delay in getting the final revision of the list completed. He thought, however, that there was sufficient money in hand for the publication of the volume.

PAPERS READ.

1. By Mr. B. Blackbourn (communicated by Mr. C. French, jun.), entitled "Some Observations on Mantids."

In the absence of the author, the paper was read by Mr. C. Oke. The author stated that his notes referred to the common Green Mantis of our gardens. Specimens of these he had obtained when very small, and carefully watched their growth until almost the adult stage. Interesting particulars were given of the casting of the skin as they increased in size, and of the injury to limbs and their replacement.

Mr. E. Keep said that he had kept mantids in captivity, and could corroborate many of the statements made in the paper.

Mr. H. B. Williamson drew attention to a statement in the *Argus* nature notes recently that mantids drained the juices out of flies, leaving only the dry skin. Mr. C. Oke said this could not be true, as mantids were provided with mouths for biting, not sucking.

2. By Mr. Jas. Hill, entitled "Notes on the Migratory Locust, and the Visitation of 1886."

In the absence of the author the paper was read by Mr. C. Oke. The author gave an interesting account of the arrival of the locusts at Kewell (Wimmera district) in the summer of 1886, the laying of the eggs, the hatching, casting of skins, and general habits of the insects.

Mr. H. B. Williamson said that he had experience of a similar flight of locusts in the North-Eastern district.

The chairman remarked that he had seen similar swarms in Central Victoria, and mentioned that at the time trains had been stopped owing to the crushed insects preventing the engines from gripping the rails. He said that the Ibis and Galah (Rose Cockatoo) had done great work in eating the eggs, and so reducing the next season's numbers.

NATURAL HISTORY NOTE.

Mr. A. J. Tadgell gave some notes of an Easter afternoon at the "Organ Pipes," near Sydenham, which, he said, were easily reached by a good walker, remarking that the enthusiast in

botany, geology, or photography would find much to interest him there. Though the wrong time of year for flowers, he had noted 155 species of native and introduced plants, some in flower, such as *Pelargonium Rodneyanum*, *Senecio Cunninghami*, and *Ixiolæna leptolepis*.

EXHIBITS.

By Mr. C. J. Gabriel.—Victorian marine shells, *Fasciolaria australis*, Perry, also var. *fusiformis*, Val., and var. *Bakeri*, Gatliff and Gabriel; also egg capsules of the same.

By Mr. A. J. Tadgell.—Dried specimens of *Scutellaria humilis*, from just above high water mark at Beaumaris; Gooseberry Cucumber, *Cucumis myriocarpus* (introduced), from Jackson's Creek, Sydenham; Knotweed (introduced), *Polygonum aviculare*, and a very similar plant, Whitlow-wort, *Paronchia Chilensis*, a native of Chili, from Sunbury, Sydenham, Frankston, &c.; also *Plectranthus parviflorus*, Cockspur, from East Gippsland, a handsome decorative plant.

By Mr. L. Thorn.—Larvæ in various stages of the Emperor Moth, *Antheræa eucalypti*, with pupa cases and perfect insects.

By Mr. J. R. Tovey.—Introduced plants—*Cirsium Syriacum*, Gaertn., "Syrian Thistle," from Mansfield district, R. G. Dundas, Dec., 1920; a native of the Mediterranean regions, not previously recorded for Victoria; proclaimed under the *Thistle Act* for the whole State. *Medicago echinus*, D.C., "Calvary Medick or Crown of Thorns," Drysdale district, December, 1920, from the Mediterranean region, in process of naturalization in Victoria. *Salpichroa rhomboidea*, Miers, "Pampas Lily of the Valley," a native of South America, recorded from Black Rock, Burnley, and Camberwell; this plant was erroneously recorded in *Proc. Roy. Soc. Vict.*, vol. xxxi. (1919), p. 377, under name of *Withania somnifera*, Dun., which does not occur in Victoria.

After the usual conversazione the meeting terminated.

"The Gum Tree."—The March issue of this quarterly (vol. vi., No. 17) is to hand. Mr. A. G. Campbell writes on "The Economic Value of Australian Birds to Australian Forests," pointing out that a large number of Australian insects are timber destroyers, hence all insect-eating birds should be fully protected. An interesting illustrated account is given of the Powelltown mill and its activities. We regret to see that Dr. C. S. Sutton, who has been hon. secretary of the Forest League since its inception, has, through lack of time, been obliged to relinquish the position. Mr. Guy P. Smith has been appointed to the vacant post.

THROUGH THE BALANGUM RANGES AND AT ROSE'S GAP (GRAMPIANS).

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

(Read before the Field Naturalists' Club of Victoria, 14th March, 1921.)

LESSER known than the Grampians, the Balangum Ranges, situated about thirty-five miles north-east of Stawell, are well worthy of a visit by the nature-lover, be he interested in agriculture, botany, or geology. I had long desired to visit the locality, and, having arranged with my friend, Mr. Charles D'Alton, to join me in October last, we proceeded by jinker from Stawell to Callawadda on the 25th of that month. Stawell, a famous mining centre, once known as Pleasant Creek, still boasts one great mine, the Magdala (one of the deepest in Victoria), which has been working continuously for over 50 years, and employs some two hundred men. The district around shows traces on all sides of mining operations in days gone by.

The original site of the gold rush at Pleasant Creek is about a mile outside the town, where not a house remains (the population having centred more closely to the railway), a monument now marking this famous spot; but Stawell, though its mining industries have declined almost to extinction, cannot be said to have felt the loss, for it has reaped the riches of the immense fertile Mallee agricultural areas which have become settled and populated around it. For about eight miles surrounding the town the country is just ordinary scrubby bush land whereon we noted nothing worthy of interest, except, perhaps, the beautiful show of blooms on the Common Fringe-Myrtle, *Calytrix tetragona*, which spreads over acres, and quite justified its claims to rank high as a decorative plant. At Campbell's Bridge we crossed the Wimmera River, and emerged on the flat agricultural area, rich in fertility, and stretching onward to the once-despised Mallee country, now regarded as the backbone of our State. The course of the Wimmera, flowing through this almost treeless area, could be traced far into the distance by the foliage of the Red Gum trees, *Eucalyptus rostrata*—fine specimens flourishing over the rich black loam of the river flats.

Of paramount importance in raising the value and increasing the carrying capacity of poor Mallee country is the "Wimmera" Rye-grass, *Lolium subulatum*, which has been extensively planted during the last few years. Save for the one great fault of too free propagation, it seems to possess every other virtue necessary to improve the carrying capacity of the land. This grass is supposed to be a native of Southern Europe, and very

closely resembles Italian Rye-grass, *L. italicum*, but with a few marked differences. For instance, it does not exhibit the large woolly awns of the latter; instead, its long, rigid outer glumes hold the seed tightly compressed, and the seed itself is much fuller and more plump than that of rye-grass. The purplish tinge noticed on the young stems of rye-grass is, in the case of *L. subulatum*, continued and intensified towards maturity, giving a paddock of this grass a very noticeable difference in appearance. It may be said to give sustenance all the year, for, coming into growth with the first autumn rain, it furnishes green feed from about April to December, and the dry stubble may be grazed for the remaining months. It also makes first-class ensilage when green, and good hay when properly cured. The mainstay of success with it, however, seems to be a knowledge of control; but, in my opinion, it must be considered a blessing, were it only to redeem the interminable acres which are now given over to Helipterums or Sunrays, of which three species predominate—viz., *H. floribundum*, *H. Cotula*, and *H. corymbiflorum*—which seem to be spreading of late years, for the country on all sides, at this period of the year, appeared like a huge white sheet, spotted only in low-lying places by the bright magenta blossoms of the Trailing Swainsona, *S. procumbens*. This plant does indeed contain much nutritive food, and can be safely grazed with other fodder; but the Helipterums, as is well known, cause impaction.

Leaving Callawadda with a number of friends at an early hour the following morning, we drove to the foot of the Balangum Ranges, the first interesting object *en route* being the Callawadda State timber reserve of 2,000 acres, which has been cleared of fallen timber and fenced for conservation by the Forestry Department. It consists almost exclusively of the Grey Box, *Eucalyptus hemiphloia*, with a light sprinkling of Blue Gum, *E. globulus*. Near the crossing of the Richardson River was seen a considerable quantity of Bull Oak, *Casuarina Luehmanni*, one of our most beautiful Australian timbers, which was named by Mr. R. T. Baker, F.L.S., in honour of my late chief, Mr. J. G. Luehmann, Government Botanist. This tree grows, on an average, to 60 feet, sometimes attaining 100 feet, with a diameter of 1½ to 2 feet. It has a clear stem of deeply-furrowed bark, which is very easily stripped from the trunk. The wood in the heart of the trunk is deep red, shading off towards the outer edges in pale pinkish tones, and giving a very handsome effect when used in cabinet work, especially when cut on the transverse. Its branchlets give sustenance to all kinds of stock, and it is frequently felled for that purpose in times of drought.

Much low-lying sandy soil, almost exclusively covered with sedges, here abounds, and presents a very burnt-off appearance, due to the black-coloured spikelets of these plants, of which the principal species is the Black Sword-Sedge, *Lepidosperma carphoides*. They are not eaten by stock, but may have some value as fibre plants. It was due to their unattractiveness as fodder that I was fortunate in securing an orchid new to Victoria amongst them, which otherwise would no doubt have been eaten off. This was *Calochilus paludosus*, closely allied to *C. campestris*, but of more slender growth and fewer flower-heads. Innumerable small annual composite plants were here seen, the most prolific being Dwarf Woolly-Heads, *Myriocephalus rhizocephalus*, Flannel Cudweed, *Gnaphalodes uliginosum*, Wiry Buttons, *Leptorrhynchos tenuifolius*, Orange Sunray, *Helipterum Jessem*, and Small Wrinklewort, *Rulidosis pumilio*.

At the Ballapur State school we left the main road and turned through a forest of eucalypts for about three miles before reaching the Balangum Ranges. Here we noted the Long-leaf Box, *Eucalyptus cæophora*, Apple Box, *E. Stuarliana*, Yellow Box, *E. melliodora*, and the Narrow-leaf Peppermint, *E. Australiana*. The rather skimpy undergrowth was composed of Soft Bush-Pea, *Pultenæa mollis*, Eutaxia, *E. empetrifolia*, Showy Parrot-Pea, *Dillwynia floribunda*, Rough Parrot-Pea, *D. hispida*, Slender Rice-flower, *Pimelea linifolia*, Erect Guinea-flower, *Hibbertia stricta*, Silky Guinea-flower, *H. densiflora*, and Red Correa, *Correa speciosa*. Proceeding through this forest country I collected two orchids, *Caladenia reticulata* and *C. leptochila*, the former being new to Victoria. Both these species have been carefully described by Fitzgerald, the famous orchidologist of New South Wales, in his monograph on Australian orchids. They were included by Baron von Mueller under the species *Caladenia Pattersoni*, but latterly have been recognized under the classification of the late Mr. Fitzgerald. Many orchids of lesser note were also collected, viz.:—Brownbeards, *Calochilus Robertsoni*, Large Tongue Orchid, *Cryptostylis longifolia*, Dotted Sun Orchid, *Thelymitra ixioides*, Horned Orchid, *Orthoceras strictum*, Short-lipped Leek Orchid, *Prasophyllum brevilabre*, Bearded Tongue Orchid, *Pterostylis barbata*, Hare Orchid, *Caladenia Menziesii*, and Slender Caladenia, *C. angustata*—the latter being new to Victoria when I first found it at the "Wild-flower Garden" of the Grampians in 1918. Near the foot of the ranges are seen, still standing, the old poppet-heads of the once famous Kingston mine, and the country round about shows evidence of having been extensively mined. A peculiar and striking feature was the prevalence of two shrubs which invariably persist in country of auriferous formation: they were the

Golden Wattle, *Acacia pycnantha*, and a small shrub, the Peach Heath, *Lissanthe strigosa*. These may be noted by any ordinary observer on many of our goldfields—for instance, in the country round Bendigo and Ararat. The soil, as may be inferred, was very poor, and the timbers stunted, but there was certainly a feast for the orchidologist, if not for any ordinary botanist. It would be impossible to mention or describe all the orchids which grew in profusion, despite the poorness of the soil. Among others I noted Austral Lady's Tresses, *Spiranthes australis*, Gnat Orchid, *Cyrtostylis reniformis*, Scented Lyperanthus, *Lyperanthus suaveolens*, Musky Caladenia, *Caladenia testacea*, Pink Fingers, *C. carnea*, Larger Glossodia, *Glossodia major*, Pink Sun Orchid, *Thelymitra carnea*, Yellow Sun Orchid, *T. antennifera*, and the rare and gorgeous Red Sun Orchid, *T. Macmillani*.

The famous Red Ironbark, *Eucalyptus sideroxylon*, so useful for heavy bridges and culverts, was the principal timber on the ranges, but had hardly attained sufficient growth for commercial purposes. Other eucalypts were Red Stringybark, *E. macrorrhyncha*, Grey Box, *E. hemiphloia*, Yellow Box, *E. melliodora*, Long-leaf Box, *E. elæophora*, and Apple Box, *E. Stuarliana*, of equally stunted growth. In such a poor locality one scarcely expects to find rarities, but nevertheless we discovered the Alternate-leaf Flat-Pea, *Platylobium alternifolium*, Leafy Templetonia, *T. Muelleri*, Phyllota, *P. pleurandroides*, and the less rare but still attractive and beautiful Grevilleas, *G. lavendulacea* and *G. rosmarinifolia*, both of which merit the attention of horticulturists. Of heaths there were not many, but we found fine specimens of *Epacris impressa*, var. *grandiflora*, on which both the foliage and flowers were much larger than usual. A straggling little shrub, *Scævola ænula*, belonging to the Goodeniaceæ, was blooming: its heliotrope flowers could hardly be considered beautiful when seen singly, but here, at this time, it was in such profusion as to be very striking indeed. It must have a very long flowering period, for it was October, 1920, when we saw it here, and quite three months later (18th January, 1921) I came across it again in flower at Yarra Junction.

Not finding the Balangum Ranges as interesting as anticipated, we returned to Callawadda, and decided to inspect an area of the Grampians which we had not yet visited, and therefore set out next day for Rose's Gap, about fifteen miles westward. It was well on towards mid-day before we reached the Gap, and called at a bee farm, owned by Mr. Edson, prettily situated on a clearing just beneath a point of the Grampians known as Briggs's Bluff. Here we arranged accommodation for a day or two while we inspected the beauty spots of the locality. In the afternoon we proceeded to the Fall, away

behind the homestead, passing on the way a large cave caused by water erosion of sandstone. On its walls were inscribed many hundreds of names—a permanent register of visitors to the locality. The Fall has a sheer drop of a hundred feet over sandstone cliffs, and when there is a sufficiency of water must be a fine sight; but at the time of our visit the volume of water was very small. Along the creek leading from the Fall we collected the following shrubs in flower—viz., Star Hair, *Astrotricha ledifolia*, Twiggy Daisy, *Olearia ramulosa*, Clustered Everlasting, *Helichrysum semipapposum*, Scented Groundsel, *Senecio odoratus*, Hairy Correa, *C. annula*, and Round-leaf Mint-bush, *Prostanthera rotundifolia*. On the cliffs at either side of the Fall we noticed *Leptospermum lanigerum*, var. *myrtifolium*, which has beautiful, large, attractive flowers, and is locally called "Wild Apple-blossom." It is one of the tea-trees, grows quickly and easily, and should prove worth the trouble of introducing into the flower garden. On precarious positions here and there above the Fall were Showy Bauera, *B. sessiliflora*, Rough Mint-bush, *Prostanthera denticulata*, Hairy Mint-bush, *P. hirtula*, Hairy Bush-Pea, *Pultenæa villosa*, and Golden Goodia, *G. lotifolia*. Flourishing in profusion at the foot of the Fall were the King Fern, *Todea barbara*, intermixed with Fan Fern, *Gleichenia lævigata*, Wire Fern, *G. dicarpa*, and Fishbone Fern, *Lomaria discolor*.

(To be continued.)

THE DANDENONGS AND RAIDERS.—In an article in the *Argus* of Saturday, 2nd April, Mr. Donald Macdonald points out the necessity for increased vigilance by nature-lovers if the beautiful gullies of Melbourne's greatest heritage, the Dandenong Ranges, are to be kept in anything like their original state. Unfortunately, tourists are not entirely to blame for the state of things, which is becoming more serious every day. The egg-collector, who collects "in the interests of science," is a menace to certain of the rarer birds. He mentions that no less than twenty clutches of Rose-breasted Robins' eggs have been taken by one "collector" this season! Surely such collecting must be done for trading purposes, and some means should be found to stop the practice. The taking of ferns also despoils the beauty spots. Little harm would be done if visitors confined their gatherings to small seedlings, easily found, but the average tripper takes large plants, which only languish and die when removed to the drier atmosphere of the metropolis. Attention is also called to the operations of the Forests Department, which seem likely to rob the forest of some of its finest specimens, on the grounds of making the reserve pay for its upkeep. Cannot something be done to preserve some of the large trees for the benefit of visitors from other lands?

The Victorian Naturalist.

Vol. XXXVIII.—No. 2. JUNE 2, 1921. No. 450.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 9th May, 1921.

The president, Mr. J. Gabriel, occupied the chair, and about seventy members and visitors were present.

CORRESPONDENCE.

From the private secretary to His Excellency the Earl of Stradbroke, stating that Lord and Lady Stradbroke would be pleased to be present at the nature study exhibition on 14th prox.

REPORT.

A report of the visit to the Macedon State Nursery on Saturday, 23rd April, was given by Mr. C. Daley, F.L.S., who acted as leader in the unavoidable absence of the leader, Mr. A. D. Hardy, F.L.S. He stated that the party had spent a most interesting forenoon, and were greatly indebted to the officer in charge of the nursery, Mr. J. Firth, for a very instructive demonstration of the contents and methods of carrying on the nursery. In the afternoon a brief visit was paid to Messrs. Taylor and Sangster's nursery, where a large variety of ornamental trees and shrubs were seen in all the glory of their autumn-tinted foliage.

On the motion of Messrs. Daley and Sutton, the hon. secretary was directed to convey to Mr. Firth the thanks of the Club for his kindness on the occasion.

In referring to the outing, Mr. A. D. Hardy, F.L.S., stated that the Forests Commission had a large number of tree seedlings which it would be pleased to distribute to country residents at nominal rates.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. H. R. Stevens, 1 Mont Albert-road, Canterbury, was elected as an ordinary member, and Messrs. Keith L. Carnegie, Studley-avenue, Kew, and Hugh R. Syme, Barker's-road, Kew, as associate members.

GENERAL BUSINESS.

Nominations were made for office-bearers for the year 1921–22, and Messrs. A. J. Tadgell and F. Wisewould were elected to audit the accounts for 1920–21.

EXHIBITION ITEM.

Mr H. B. Wilkinson moved that it be a recommendation to the committee that a refund of out-of-pocket expenses be made

to senders of wild-flowers to the forthcoming exhibition. This was seconded by Mr. C. A. Lambert and carried.

PAPER READ.

By Dr. G. Horne, entitled "Some Aboriginal Stone Implements."

The author gave an interesting account, illustrated by lantern slides, of various kinds of implements, and the localities where they may be likely to be found.

Several members took part in a brief discussion which followed.

EXHIBITS.

By Mr. C. Barrett, C.M.Z.S.—Specimens of *Helix desertorum*, from Giza, Egypt. This snail is noted for great tenacity of life. The supposed shells of two specimens, collected in 1846, were gummed to a tablet and placed in the British Museum. In 1850 they were removed and placed in water, when one of the snails emerged, and next day fed upon a cabbage-leaf.

By Mr. F. Chapman, A.L.S.—Conodonts, teeth of worms, Devonian, from Erie County, New York, U.S.A.

By Mr. F. Cudmore.—Aboriginal stone implements from Darling district, Western New South Wales, and from Morgan, South Australia.

By Miss G. Nokes.—Three autumn orchids from Sandringham —viz., Tailed Green-hood, *Pterostylis pedaloglossa*, Tiny Green-hood, *P. parviflora*, and Fringed Caladenia, *Caladenia fimbriatus*.

By Mr. A. J. Tadgell.—Specimens of Stinkwort, *Inula graveolens*, collected at Sandringham, 7th May, 1921.

By Mr. J. R. Tovey, on behalf of National Herbarium.—Proclaimed weed, *Carthamus glaucus*, Bieb., "Glaucous Star-thistle," a native of Egypt, Asia Minor, and Persia, collected at Kowree by Mr. R. Lamond; also *Centaurea australis*, R. Br., Austral Centaury (Gentianaceæ), a white-flowered form from Pemberton, W.A., collected by Max Koch; normal form, native of all the States of the Commonwealth.

After the usual conversazione the meeting terminated.

The Genus Stipa (Gramineæ).—Twenty-four pages of No. 1 (1921) of the *Bulletin of Miscellaneous Information*, issued by the Royal Botanic Gardens, Kew (England), are devoted to a revision of the Australian species of the genus Stipa, with the result that the fifteen species of the "Flora Australiensis" have been expanded to forty (Mueller listed nineteen in the "Second Census of Australian Plants," 1889). The work has been done by Miss D. K. Hughes, who has arranged the species into nine groups. Six pages of illustrations, figuring the spikelets and sections of the leaves, accompany the paper.

THROUGH THE BALANGUM RANGES AND AT ROSE'S GAP (GRAMPIANS).

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

(*Read before the Field Naturalists' Club of Victoria, 14th March, 1921.*)

(*Continued from page 8.*)

Next morning we decided to examine the surrounding hills, taking the main track which leads through Rose's Gap to the Wartook Reservoir. However, as we did not wish to continue to the Wartook Reservoir, having visited it previously, we turned off in a northerly direction, and struck across for Shepherd's Gap, which runs parallel to Rose's Gap. One quickly realizes how this spot received its name, for it is most beautiful country, lightly timbered, and stretched away in soft, rolling, grassy slopes. At one point the red sandstone cliffs rise to a height of several hundred feet in towers and terraces, giving the appearance of a beautiful old castle. From the lovely view to be obtained at the top we named it "Shepherd's Lookout." On the way we gathered a number of shrubs, one of which we thought at first was *Hibbertia densiflora*, but on closer examination it proved to be a rutaceous plant, the Downy Starbush, *Pleurandropsis phebalioides*; it grows to a height of eighteen inches, has bright yellow flowers, and rather uncommon foliage. Another rutaceous plant, and a very beautiful one, which we had not previously collected in the Grampians, was the Small-leaved Wax-flower, *Eriostemon difformis*. It has small pinkish-white flowers, grows to a height of about two feet, and is closely related to our much-loved native Boronia. Another rather rare plant I had not previously found personally on the Grampians, but which, no doubt, may have been collected by others, was the Large-leaf Ray flower, *Anthocercis Endesii*. It is a small, erect shrub of three or four feet, with small white flowers and hairy foliage. After much hard climbing over this very isolated and difficult area, when crossing a gully we came upon the Hairy Hop-bush, *Dodonæa boronifolia*, which has foliage somewhat resembling *Boronia pinnata*, but flowers like those of the Common Hop-bush. Flourishing also in the gully was the Heathy Parrot-Pea, *Dillwynia cricifolia*, var. *glaberrima*. The ordinary form of this species met on average soil does not grow above six feet, but this variety, which is invariably found in gullies or near water, attains a height of fifteen feet, and its leaves are much more numerous and its flowers more compact and larger than those of the ordinary form. The country was still very rough and difficult, but we forged ahead in a northerly direction, and reached a peak from which we obtained a most

glorious panoramic view of the country for an immense distance. Directly opposite, towering up like a sentry guarding the entrance to Rose's Gap, was Briggs's Bluff, beneath which was the residence in which we had passed the previous night. Lake Lonsdale and Mount Dryden could be seen in the far distance. To the west was the Wartook Reservoir, and to the north the fine new artificial lake, Lake Taylor (30,000 acre feet), which has just been completed to provide water for the Mallee by the State Rivers and Water Supply Commission.

High up among the hills, before descending, we found a small shrub, which has always been known as *Pultenæa stypheliodes*, but which Mr. H. B. Williamson, who is making a revision of the genus Pultenæa, considers is not correct; he purposes to publish it as a new species, to be called *P. costata*. Its erratic habit of growth has possibly added some doubt as to its validity, for while normally it grows into a compact shrub, occasionally it will be found trailing along the ground. There were also here, high among the rocks, two orchids which are sufficiently important to merit some mention. The former was discovered for the first time by Mr. E. E. Pescott and myself at Mount Difficult in October, 1913, and was considered to be *Caladenia congesta*; but Dr. Rogers, of Adelaide, after very mature consideration, has lately published it as a new species, which he has named *C. iridescens*. It is of most unusual and beautiful bronze colouring, and seems to flourish only high up in the barren, stony mountain soil. The other is *Thelymitra megcalyptra*, one of the Sun Orchids; its flowers are blue when growing, but turn pink when dried. This orchid has been previously recorded for New South Wales, but this was the first occasion on which it had been found in Victoria. We discovered it in very interesting circumstances. In a small crevice on top of a large rock there were quite a hundred flowers, and it was evident that the plants must have been there a very long time, having no doubt multiplied from the first seed.

When descending the range on the eastern side we came upon a solitary bush of *Sphærolobium daviesioides*, a leguminous shrub with spiny branchlets, growing to a height of three feet, and having small brownish-red flowers. A little lower down we found two more leguminous plants: they were the Dwarf Wedge-Pea, *Gompholobium minus*, and the Dwarf Bush-Pea, *Pultenæa humilis*. The former is the more attractive of the two on account of its extremely vivid green foliage and bright red flowers, similar to in shape, and quite as large as, Sweet Peas. The foliage of the latter is very woolly, and its yellowish-red flowers are not so large, but it grows much taller than the Gompholobium. Another plant of proteaceous

form, the Mountain Conosperm, *Conospermum Mitchelli*, formed patches here and there, and, as the shrubs were in flower, presented a fine appearance. When not in flower they are exactly similar to young pine-trees, but later they become covered with masses of white, cauliflower-like flower-heads.

Passing along the foot of the ranges, we passed through acres of Crimson Kunzea, *K. parvifolia*. It was in full bloom, and made a striking show, with its fluffy crimson flowers, among which we discovered one plant bearing white flowers. On the swampy flats quite a large number of myrtaceous plants flourished, many being fine ornamental shrubs, three we noted in bloom being the Cross Honey-Myrtle, *Melaleuca decussata*, Slender Honey-Myrtle, *M. gibbosa*, and Scarlet Bottle-brush, *Callistemon rugulosus*. The latter is, perhaps, the most ornamental, its spikes of bright red flowers being about six inches long, and has well-shaped foliage of very striking appearance. On rising ground, as we again ascended the ranges, we crossed over some heathy country and collected the Blue Tinsel Lily, *Calectasia cyanea*, an everlasting shrub, which attains a height of about two feet. Here we noticed a freak of Nature—a Yellow and Grey Box had become united in one tree, but having different root systems.

Returning towards Briggs's Bluff, we had to force our way through veritably acres of the Shrubby Velvet-bush, *Lasiopetalum dasyphyllum*, a sterculiaceous plant which grows about ten feet in height. It is very handsome, the large leaves, about four inches long, being deep green on top and russet brown beneath, and its rather inconspicuous flowers are of the same russet hue. On a stretch of clear country approaching the homestead we collected about a dozen specimens of very minute plants, some so tiny as to render it necessary to go on one's hands and knees to find them. The names of those collected are:—Tiny Bladderwort, *Utricularia lateriflora*, Tufted Centrolepis, *C. fascicularis*, Smooth Centrolepis, *C. glabra*, Wiry Centrolepis, *C. polygyna*, Hairy Centrolepis, *C. strigosa*, Dwarf Aphelia, *A. pumilio*, Slender Aphelia, *A. gracilis*, Hairy Stylewort, *Levenhookia dubia*, Tiny Sunray, *Helipterum exiguum*, Small Trigger-plant, *Stylidium despectum*, Spurred Trigger-plant, *S. calcaratum*, Slender Trigger-plant, *S. perpusillum*, and the Bristly Trigger-plant, *S. soboliferum*. The latter is a most attractive little plant. It grows in thick mossy mats, sends up a straight stem about three inches high, which bears a tiny pink blossom. It would certainly make a pleasing border for small garden beds if it could be cultivated. I should say it was hardy, as I came across it on very dry spots as well as moist, shaded places.

Next morning we set out on the return trip to Hall's Gap,

and in order to cover more country we chose a route leading southward in the direction of Lake Lonsdale. On a heathy patch we found rather a lot of the Mealy Honey-Myrtle, *Melaleuca squamea*. It is a beautiful little bush, with flower-heads very closely resembling *Kunzea parvifolia*, but slightly larger. Here we saw the famous Grampians plant, the Bushy Heath-Myrtle, *Thryptomene Mitchelliana*, growing literally by the acre, and of most prodigious growth: many shrubs—in fact, the majority of them—were twelve feet high, and spreading widely. It had finished flowering, and was in fruit, showing that the plants must flower much earlier on this part. It was comforting to see such a great area of this beautiful shrub, as on other parts of the Grampians it is in danger of being killed out by the inroads of civilization; here it would not be likely to become extinct. As we approached Dadswell's Bridge the Sallow Acacia, *A. longifolia*, was seen in abundance, extremely healthy plants, having exceptionally long phyllodes. It also had finished flowering. This species is known throughout the Grampians as "Dadswell's Bridge Wattle," and is greatly beloved by gardeners.

This locality is also "bee country." It is, indeed, the principal honey-producing area in Victoria. The timbers are the Yellow and Grey Box, so famous for flavouring honey. The flats were covered with Red Gums, but mostly young plants coming on, as this part was the scene of great sawmilling operations, now abandoned, as all the timber has been cut out. When crossing through the Ledcourt station we noticed a paddock which had not been grazed; it showed a prolific growth of Kangaroo Grass, *Anthistiria imberbis*; and, as showing how sheep eat out plants, we did not find on the grazed portions a single specimen of two plants which flourished in profusion on the ungrazed portions: they were the Large Vanilla Lily, *Dichopogon strictus*, and Yellow Lily, *Bulbine bulbosa*.

Throughout the morning we had been frequently passing over numerous channels constructed by the State Rivers and Water Supply Commission to distribute the waters of Lake Lonsdale, some of which traverse the country as far as Swan Hill, a distance of 200 miles. We stopped at Lake Lonsdale for lunch, and passed a little time inspecting the huge artificial bank. It is of great height, and a mile and three-quarters long. The lake has a large water capacity, being 45,500 acre feet, the flow to the channels being regulated by weirs. At the time of our visit the lake was full, the surplus water escaping with a great roar through two large cement pipes at the by-wash, where it fed the source of the Little Wimmera River.

Around Mount Dryden the Red Gum flats are the scene of quite a lucrative business—that of charcoal-burning. A number of kilns were burning, and I understand the output never catches up with the demand. The mount is of basaltic formation, and of such a hard nature that stone-crushing operations had to be abandoned. The only thing interesting in a botanical way was the Common Rock Fern, *Cheilanthes tenuifolia*, which grew in profusion, and softened the otherwise harsh stony appearance of the mountain. We noticed at the foot what we first thought to be a miniature form of the Stinkwort, *Inula graveolens*, but which proved, on examination, to be a native plant, the Common Sunray, *Helipterum dimorpholepis*. In this locality the State Forest Department is clearing up the timber areas by thinning out all deformed trees. These are cut into firewood, and hundreds of tons are sent away by railway annually.

On the way back to Hall's Gap we passed another weir, constructed across a cut which enables the water of Fyans Creek to be turned either into Lake Lonsdale or Fyans Creek. This work is portion of the gravitation channel system, and has only recently been made. An immense bank, which runs along the roadside for many miles to protect the route from overflow, has also been completed. Nearing Hall's Gap, we passed through some nice Red Gum and Yellow Box country, and it was an unusual sight to see red flowers on the Yellow Box trees, which generally bear creamy-coloured blossoms. On a farm hereabouts (which, owing to overflow, had to be abandoned and was purchased by the Water Commission) it was interesting to note how rapidly the Wirilda, *Acacia retinodes*, had spread and taken complete possession of the so recently cultivated land. It was absolutely dense, and presented a very pretty appearance; its foliage is very bright green, and it possesses the unusual faculty of blooming all the year round.

The following morning we made a short excursion across the "Wild-Flower Garden" to Mokepilly Creek, and on the grassy patches we collected a number of orchids, including *Thelymitra carnea*, *T. flexuosa*, *T. epipactoides*, *T. pauciflora*, *Diuris sulphurea*, *D. pedunculata*, *Microtis parviflora* (new for the south-west), *M. atrata*, *Pterostylis rufa*, *P. barbata*, *Acianthus caudatus*, *Prasophyllum gracile*, *P. album*, and *P. odoratum*. The three latter are interesting. They have all been described by Dr. Rogers, *P. gracile* being new for Victoria, and *P. album* and *P. odoratum*, not previously found at the Grampians, are new for the south-west. Further on we advanced into timber country and collected some good specimens of the Flying Duck Orchid, *Caleana major*, also *Caladenia filamentosa*, *C. clavigera*, *Cyrtostylis reniformis*, *Acianthus caudatus*, *Praso-*

phyllum australe, *P. elatum*, *P. patens*, and *Thelymitra fusco-lutea*. Patches of heathy country further on were interspersed with *Banksia ornata* and the recently described *Melaleuca neglecta*, which was first collected by Mr. St. Eloy D'Alton. Returning by another route, we passed what was formerly known as the Black Swamp (17,000 acre feet), but which has been banked up and enlarged by the Water Commission, and is now called Lake Fyans. Here, in the swampy ground, we collected the Spreading Bush-Pea, *Pultenæa laxiflora*, Clustered Bush-Pea, *P. dentata*, Thready Bush-Pea, *P. Luehmanni*, Slender Conosperm, *Conospermum patens*, Shrub Violet, *Hybanthus floribundus*, and the sedges, *Gymnoschænus adustus*, *Cladium schænoides*, *Gahnia tetragonocarpa*, *Lepidosperma canescens*, and *Schænus axillaris*. The fruit was well developed on *Hybanthus floribundus*, showing that it must have flowered particularly early. Helichrysums prevailed remarkably, there being literally acres of them, and the Woolly Everlasting, *H. Blandowskianum*, being predominant. It was in the budding stage, when the petals are glistening pink, and presented a very ornamental appearance.

The following day, accompanied by Mr. J. Cronin, Director of the Melbourne Botanic Gardens, and Mr. H. Rowe, of the Municipal Gardens, Stawell, we proceeded over a portion of Mount Difficult as far as the "Grand Canyon," which forms the entrance to "Wonderland." On this excursion we were greatly disappointed, as the bush fires had swept the locality, destroying everything but big standing timber, which will, no doubt, ultimately recover: but everything of lesser size was completely demolished. The whole trip revealed nothing interesting botanically, except, perhaps, a hill so completely covered with Blue Pincushions, *Brunonia australis*, that we named it Brunonia Hill. A rather uncommon sight was the parasite *Loranthus pendulus* on a Manna Gum sapling, *Eucalyptus viminalis*. It showed no stems whatever, but issued from the bark right up the trunk in thick sprouts; and on a late Black Wattle, *Acacia mollissima*, we noticed four mistletoes—viz., *Loranthus celastroides*, *L. pendulus*, *L. linophyllus*, and *L. Exocarpi*. I particularly made this excursion to gather fresh material of *Trymalium ramosissimum*, a species new to science, which Mr. D'Alton and myself had found the previous year, but after searching diligently was unable to secure the smallest specimen.

The Victorian Naturalist.

Vol. XXXVIII.—No. 3. JULY 7, 1921. No. 451.

FIELD NATURALISTS' CLUB OF VICTORIA.

The forty-first annual meeting of the Club was held at the Royal Society's Hall on Monday evening, 20th June, 1921.

In the absence of the president through sickness, Mr. F. Chapman, A.L.S., one of the vice-presidents, was voted to the chair, and about sixty members and visitors were present.

REPORTS.

A brief report of the visit to the National Museum on Saturday, 2nd July, was given by Mr. C. Daley, F.L.S., who said that the members were met by the Curator of Zoology, Mr. J. A. Kershaw, F.E.S., who showed them portions of the reserve collections, including a portion of the "H. L. White Collection" of Australian bird-skins, the collections of invertebrates, &c. A very interesting afternoon had been spent, the members being astonished at the great amount of material available for workers.

A report of the excursion to Ferntree Gully on Monday, 6th June (King's Birthday), was given by the leader, Mr. F. Pitcher, who said that an enjoyable day had been spent in investigating the Gully, which, though showing the wear and tear of thousands of visitors annually, is still worthy of a visit by nature lovers. On leaving One Tree Hill, roads and tracks were followed *via* Ferny Creek to the neighbourhood of Upwey, and thence back to Ferntree Gully station. He had been pleased to find the ferns *Pteris tremula* and *Doodia* (*Woodwardia*) *caudata* in fair quantities.

ELECTION OF MEMBERS.

On a ballot being taken, Messrs. Aubrey E. Atkyns, Studley Park-road, Kew, and Claude R. Kerr, Swanston-street, Melbourne, were elected as ordinary members; and Messrs. Murray Moodie, Nareen, *via* Coleraine, and Thos. C. Bryan, "Labana," P.O., Molesworth, as country members of the Club.

NATURE LOVERS' EXHIBITION.

Reports were given by the organizers of the sections of the principal exhibits of their sections. All agreed that the exhibition had been very successful. Mr. F. Pitcher gave a brief statement of the finances, which so far indicated that there would be a surplus of about £50 for division between the Club and the Microscopical Society.

Members generally were satisfied with the effort, and votes of thanks were passed to His Excellency the Earl of Stradbroke

for opening the exhibition; Miss Gabriel and ladies for attending to the refreshment department; to the Royal Australasian Ornithologists' Union for the loan of exhibits; and to the Forests Department for the display of forest products.

ANNUAL REPORT.

The acting hon. secretary, Mr. F. G. A. Barnard, read the forty-first annual report for the year 1920-21, which was as follows:—

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

"Ladies and Gentlemen,—In presenting the forty-first annual report of the Club for the year ended 30th April, 1921, your committee congratulate the members on the continued success of the Club.

"Commencing the year with a roll of 246 members, there were elected during the year 22 ordinary, 4 country, and 3 associate members, making a grand total of 275; but against this have to be made deductions for members who resigned or died, amounting to 16, leaving a net total of 259. The deaths were unsuually heavy, including Sir F. Madden, Rev. W. W. Watts, Messrs. R. A. Bastow, J. Booth, M.Sc., and H. Quiney. Reference to each of these was made in the *Naturalist* at the time. We also lost by death two honorary members, Messrs. E. D. Atkinson (Tas.) and Capt. T. Broun (N.Z.), thus reducing our honorary members' roll to two—Mr. A. H. S. Lucas, M.A., the first editor of the *Naturalist*, now of Sydney, and Lord Novar (Sir Ronald Munro Ferguson, G.C.M.G.)

"Owing to industrial troubles considerable interference to the regular monthly meetings and the publication of the *Naturalist* was experienced. The June and July (1920) meetings, as also the January and February (1921) meetings, had to be abandoned owing to lighting restrictions and the limited traffic allowed. The attendance, however, at those held was very satisfactory.

"The papers read numbered only ten: they were:—May—'A Fifteen Years' Retrospect of the Club,' by Mr. F. G. A. Barnard; August—'Introduced Animals,' by Mr. G. A. Keartland, and 'To the Alps for Coleoptera,' by Mr D. Best; September—'Three Anglers at the Murray, by Mr. J. C. Goudie; October—'New Victorian Orchids,' by Messrs. E. E. Pescott, F.L.S., and C. French, jun., also 'The Orchids of Victoria,' by Mr. E. E. Pescott, F.L.S.; November—owing to a failure by the oxygen apparatus, an illustrated paper on the 'Geological History of Australian Plants,' by Mr. F. Chapman, had to be held over until December; January and February, no meeting;

March—'Through the Balangum Ranges and at Rose's Gap (Grampians)'; and April—'Remarks on Mantids,' by Mr B. Blackbourn (communicated by Mr. C. French, jun.), and 'Notes on the Migratory Locust,' by Mr. Jas. Hill. Grouping the papers according to the subject-matter, they may be set down as follows:—Relating to mammalia, 1; entomology, 3; botany, 3; geology, 1; and general, 3.

"The excursions, one of the principal features of the Club, have been carried through with considerable success. Many localities in the vicinity of the metropolis have been visited, and their points of interest pointed out to members by the respective leaders: while places so far afield as Lerderderg, Bendigo, and Walhalla have also been visited. On the first-named excursion the members were deeply indebted to a fellow-member, Mr C. C. Brittlebank, for the arrangements he had made, thus greatly adding to the interest of the outing. Your committee is deeply grateful to the leaders of excursions for giving the members the benefit of their knowledge of the localities chosen. A friend of the Club has handed to the treasurer the sum of £10, to be devoted to paying portion of the expenses of a char-a-banc trip if arranged, which is gratefully acknowledged.

"In general matters the Club has had under consideration the questions of foxes at Phillip Island and the taking of eggs of protected birds. These have been dealt with satisfactorily by the Fisheries and Game Department. It is gratifying to record that the Lands Department has decided that the grazing rights at Mount Buffalo are not to be renewed for 1921, while the bird sanctuary at Lake Hattah (Wimmera) is not to be interfered with.

"The love for our native animals and plants is steadily growing, and, we trust, will be sufficiently strong to prevent the loss of species of either section of our unique animal and vegetable life.

"The annual exhibition of wild-flowers was held, under great disadvantage, in the upper hall of the Melbourne Town Hall on 28th September, when the Acting Governor, Sir Wm. Irvine, K.C.M.G., opened the exhibition, and expressed his great appreciation of the display. A profit of £107 was made, portion of which was added to the Plant Names Publication Fund. The Club was greatly indebted to members of the Microscopical Society for adding to the interest of the exhibition, and to several lady members and friends for the successful management of the refreshment department. To the Director of the Botanical Gardens, Mr. J. Cronin, the Club is greatly indebted, as on many previous occasions, for the fine display of Australian flowers, thereby indicating the possibilities of

Australian plants for garden culture. To those members and friends who, by their generous help in collecting flowers and carrying out minor details, rendered the exhibition possible, your committee would tender its very best thanks.

"The Club has again been unfortunate in some of its executive officers elected at the annual meeting. In July Mr. W. Glance, who had been assistant secretary for five years, was compelled to resign, owing to ill-health; after some interval Mr. C. Oke consented to fill the vacancy. In February Mr. R. W. Armitage, M.Sc., found that his official duties did not allow him sufficient liberty to carry out the duties of hon. secretary, and asked to be relieved of that position. Mr. F. G. A. Barnard kindly added the duties to that of editor until the annual meeting.

"The increased cost of printing the *Naturalist* has been the most important business before the committee during the year, and, notwithstanding that the journal has been curtailed as much as possible, the volume for 1920-21 being 26 pages less than that for 1919-20, the cost has been about £60 more. This great increase in printing charges has greatly exercised the thoughts of your committee, and there seem to be two alternatives which might be adopted (it is to be hoped only temporarily)—viz., further curtailment of the *Naturalist* or an increase in the annual subscription to the Club. This question will require grave consideration by the incoming committee. Meanwhile, your committee desires to acknowledge with many thanks donations amounting to £11 from several members towards the expense of publishing the *Naturalist*.

"The issue of the Club's journal was hampered to some extent by the printers' strike in March and April, 1920, but lost ground was recovered, and, under the editorship of Mr. F. G. A. Barnard, the journal has continued to chronicle the various aspects of natural science in Victoria from month to month.

"The meeting of the Australasian Association for the Advancement of Science, by reason of transit difficulties, was transferred from Hobart to Melbourne; hence many more members of the Club were able to avail themselves of the advantages of the Association gathering than would have been possible had the original programme been carried out.

"The fortieth anniversary of the founding of the Club, which fell upon the May meeting, was made the opportunity for a gathering of the surviving founders and early members, with very pleasing results. Of the eight original members still on the roll seven were present, and, in addition, eleven members of over twenty years' standing were present. Mr. F. G. A. Barnard read an interesting *résumé* of the last fifteen years' history of the

Club, and to Mrs. E. Bage, the only life member, is due the initative of light refreshments and a pleasant half-hour at the close of the meeting. Opportunity was taken at the meeting to present Mr. G. Coghill with a memento of his fifteen years' occupation of the treasurership of the Club, from which he retired in June, 1920.

"Owing to the excessive cost of printing, nothing has resulted from inquiries as to publishing the results of the Plant Names Committee's deliberations. This is greatly to be regretted, as there are numerous nature students in all parts of the State anxiously looking for the promised solver of botanical riddles.

"The balance-sheet to be presented by the hon. treasurer is not so satisfactory as could be wished, owing, as before intimated, to the excessive cost of printing, to which must be also added the increase in postal rates. Little relief is to be expected under either of these headings during the coming year, and your committee would impress upon all members who have the interest of the Club at heart that the best way in which they can express it is by the prompt payment of their annual subscriptions.

"After having had the advantage of the use of Messrs. Coghill and Haughton's office for many years free of cost as a meeting-place for the monthly committee meetings, owing to a change in the caretaking arrangements the committee had to return to the Royal Society's Hall for its meetings, thereby increasing the monthly expenditure.

"Finally, your committee trusts that, though the outlook is at present somewhat gloomy, there is still a good future before the Club, and that when the aftermath of the Great War is finally cleared up it may be possible to record greater progress at a considerably reduced expenditure.

"On behalf of the Committee,

"J. GABRIEL, *President.*

"F. G. A. BARNARD, *Acting Hon. Sec.*

"Melbourne, 25*th May*, 1921."

The reception of the report having been carried, Mr. F. Wisewould congratulated the members on the satisfactory position of the Club, considering the difficulties of the past year; Mr. A. D. Hardy, F.L.S., said that the industrial troubles had greatly hampered the Club in more ways than one; Messrs Best, Tadgell, Pescott, and Whitmore referred to the great increase in cost of the *Naturalist*, and offered various suggestions; Mr. C. C. Plante urged the committee to take a broader view of the position, and try and induce a larger membership, and thus enable a more suitable place of meeting to be secured, and predicted a great future for the society; Mr. F. E. Wilson

contended that much more favourable prices could be obtained for printing the *Naturalist*, which would allow of its improvement.

The report was adopted, on the motion of Messrs. E. E. Pescott and C. A. Lambert.

FINANCIAL STATEMENT.

The hon. treasurer (Mr. F. Pitcher) presented the financial statement for 1919–20, which was as follows :—

RECEIPTS.

To Balance, 30th April, 1920			£72 8 10
,, Subscriptions—			
Ordinary Members ...	£117 10 0		
Country Members ...	30 0 6		
Associate Members ...	2 5 0		
		£149 15 6*	
,, *Victorian Naturalist*—			
Subscriptions and Sales	6 0 10		
Advertisements ...	2 5 0		
Reprints	1 18 0		
		10 3 10	
,, Sales of Badges		0 6 0	
,, Donations—			
Char-a-banc Excursion Fund... ...		10 0 0	
40th Anniversary Celebrations ...		2 2 0	
Publishing Fund		11 0 0	
,, Interest—Savings Bank and War Loan ...		4 18 3	
,, Discount—Patterson, Shugg's Account ...		0 1 4	
			188 6 11
To Wild-flower Exhibition—			
Admissions		99 14 0	
Sales of Flowers		23 1 3	
Refreshments		12 6 0	
Donations		1 5 0	
			136 6 3
			£397 2 0

*Subscriptions :—Arrears, £19 ; 1920–1, £121 8s. ; advance, £9 7s. 6d.—total £149 15s. 6d.

EXPENDITURE.

By *Victorian Naturalist*—			
Printing (13 months) ...	£154 4 7		
Illustrating	13 4 8		
Free Reprints ...	7 4 0		
Reprints charged ...	1 17 6		
		£176 10 9	
,, *Victorian Naturalist*—			
Wrapping and Posting		19 11 10	
,, Rooms—Rent and Attendance, ...		13 10 0	
,, Library—Periodicals	2 11 6		
Insurance	0 7 0		
		2 18 6	
Carried forward ...		£212 11 1	

Brought forward	£212 11 1		
By Hire of Lantern	1 10 0		
,, Printing	21 8 7		
,, Postages, &c.	9 13 11		
,, Expenses—40th Anniversary	3 10 0		
,, Purchase of Badges	2 10 0		
		251	3 7
,, Wild-flower Exhibition—			
Hall and Attendance	9 5 0		
Specimen Glasses	3 10 3		
Expenses	15 17 6		
		28	12 9
,, Deposit in Savings Bank towards Publication of Plant Names		66	5 10
,, Hire of Town Hall for June, 1921, Exhibition ..		18	0 0
		364	2 2
,, Balance in Savings Bank	30 0 0		
,, ,, London Bank	2 19 10		
		32	19 10
		£397	2 0

F. PITCHER, *Hon. Treasurer.*
23rd May, 1921.

Audited and found correct.

F. WISEWOULD,
A. J. TADGELL, } *Auditors.*
24th May, 1921.

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

ASSETS.

Balance—Savings Bank and London Bank	£32 19 10
War Loan Bond	20 0 0
Arrears of Subscriptions (£80), say...	40 0 0
Badges on hand	2 15 3
Library and Furniture (Insurance Value)	150 0 0
Deposit in Savings Bank for Plant Names Publication ...	150 0 0
	£395 15 1

LIABILITIES.

Subscriptions paid in advance	£9 7 6
Donation to Char-a-banc Excursion Fund	10 0 0
Deposit for Plant Names Publication	150 0 0
	£169 7 6

On the motion of Messrs. E. E. Pescott, F.L.S., and P. R. H. St. John, the statement was received and adopted.

ELECTION OF OFFICE-BEARERS, 1921–22.

On a ballot being taken for the position of president, Mr. F. Chapman, A.L.S., was duly elected; for two vice-presidents, Messrs. C. Daley, B.A., 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; for hon. assistant secretary and librarian there was no nomination.

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

PAPER.

By Mr. J. W. Audas, F.L.S., entitled "Description of a New Trymalium (N.O. Rhamnaceæ)."

Owing to the lateness of the hour the paper was taken as read. The author described as *Trymalium ramosissimum*, on account of its branching habit, a small rhamnaceous shrub found in the Mount Difficult Range (Grampians) by Mr. C. W. D'Alton and himself, the new species being closely allied to *T. D'Altoni*, F. v. M.

NATURAL HISTORY NOTES.

Mr. E. E. Keep mentioned that one morning recently he noticed several blackbirds heckling a Butcher-bird which had some object in its bill. The bird happening to fly nearer to him, he was enabled to identify a Goldfinch as the object which was exciting the blackbirds' pity.

Mr. C. Oke stated that, among the objects he had taken on the recent excursion to Ferntree Gully was a specimen of Peripatus.

EXHIBITS.

The list of exhibitors and their exhibits is unfortunately crowded out of this issue, and will appear next month.

NATURE LOVERS' EXHIBITION.

A report of this exhibition, held on 14th June, will appear in the next issue.

After the usual conversazione the meeting terminated.

The Victorian Naturalist.

Vol. XXXVIII.—No. 4. AUGUST 4, 1921. No. 452.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 11th July, 1921.

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

REPORT.

A report of the visit to the National Museum (Palæontological Department) on Saturday, 18th June, was given by the leader, Mr. F. Chapman, A.L.S., who said that the party included several members of the Microscopical Society. The afternoon had been devoted to fossil vertebrates, and an instructive and interesting afternoon had been spent.

ELECTION OF MEMBERS.

On a ballot being taken, Miss N. Thresher, Black-street, Middle Brighton; Miss T. V. Healy, Southey-street, Sandringham; Mrs. M. Thompson, 26 Fawkner-street, St. Kilda; Mr. G. H. Shugg, Pensions Office, Elizabeth-street, Melbourne; and Mr. J. M. Wilson, 57 Swanston-street, Melbourne, were duly elected members of the Club.

GENERAL BUSINESS.

The chairman stated that since last meeting two members of the Club had passed away—Mr. E. H. Lees, C.E., of Mallacoota, and Mr. J. P. M'Lennan, of the School of Horticulture, Burnley. Each had been a useful member of the Club, and their loss would be keenly felt. Brief references to the deceased members were made by Messrs. Hardy, Daley, Barnard, and Hammet, and on the motion of Messrs. Barnard and Daley letters of sympathy were directed to be sent to the relatives. The motion was carried in silence, members standing.

Mr. F. Keep said that an important item had been forgotten at the previous meeting of the Club—viz., the proposal of a vote of thanks to the retiring office-bearers. He considered that great credit was due to the committee of management for the success of the Club, and moved accordingly. This was seconded by Mr. H. B. Williamson and carried unanimously. In the absence of Mr. J. Gabriel, the past president, the vote was briefly acknowledged by the chairman.

In pursuance of notice of motion, Mr. F. Keep moved that steps be taken to alter the rules of the Club so as to provide

that a retiring president becomes *ex officio* a member of the committee for the following year. After some discussion the matter was referred to the committee, with a request to take the necessary steps to embody the proposal in the rules of the Club.

Mr. A. D. Hardy, F.L.S., drew attention to the Club rule fixing the age of associate members at 16 years and upwards. He thought that, since the abolition of junior members, the age of associates might be lowered to fourteen, and moved that the committee take this alteration into consideration when arranging for a special meeting to alter the rules.

NOMINATION FOR ASSISTANT HON. SECRETARY.

Mr. P. R. H. St. John said that Mr. H. B. Williamson had consented to allow himself to be nominated for the vacancy in the office-bearers—viz., honorary assistant secretary and librarian—and nominated him accordingly. Seconded by Mr. C. Daley, B.A.

PAPER READ.

By Mr. F. E. Wilson, entitled "An Entomologist in Southern Queensland."

The author gave an interesting account of a recent visit to Southern Queensland, mainly with the view of adding to his entomological collection, in which he was very successful; nearly two hundred species of beetles had been taken, of which three were new to science. His remarks were not confined entirely to entomology, botany and ornithology receiving some attention. He mentioned that on cutting open some oranges obtained from an orchard they were discovered to be simply alive with the larvæ of the Queensland fruit-fly.

Messrs. C. L. Barrett, C.M.Z.S., and C. Oke congratulated the author on the interesting character of his paper and the excellent work he is doing amongst coleoptera.

EXHIBITS.

By Mr. F. Chapman, A.L.S.—Coralloid and other structures in magnesian limestone from Sunderland, England, photographed by Dr. W. J. Abbott, of Tunbridge Wells; flowering sprays of Sallow Wattle, *Acacia longifolia*, from a tree about three years old.

By Mr. F. Cudmore.—Large fossil oyster shells from the Janjukian beds at Boggy Creek, near Bairnsdale.

By Mr. C. Daley, F.L.S.—Seed-vessel of *Lambertia formosa* (N.O. Proteaceæ), Honey-flower of New South Wales. From their formidable appearance the seed-vessels are known as "mountain devils"; upper and lower jaws and scale of Queensland Lung-fish, *Ceratodus forsteri*.

By Mr. C. J. Gabriel.—Marine shells from Philippine Islands —*Pterocera aurantia*, Lam., *P. multipes*, Deth., and *Strombus lacimatus*, Chem.

By Mr. C. Oke.—Coleoptera collected on Macedon excursion.

By Mr. J. Searle (under microscope).—Section of head of embryo chick, showing pineal eye; larva of crayfish; Phantom Shrimp, Lucifer, sp.; and Coprella, sp.

After the usual conversazione the meeting terminated.

The following exhibits made at the June meeting were crowded out of the last *Naturalist*:—

By Mr. F. Chapman, A.L.S.—Section of Buloke, *Casuarina Luehmanni*, R. T. B., showing many points of structure.

By Mr. C. French, jun.—Orchid in flower, *Pterostylis præcox*, from Ashburton.

By Miss A. Fuller.—*Bryophyllum crenatum* growing from edges of leaves, from Nauru.

By Rev. A. J. Maher.—Photographic studies of trees.

By Mr. A. J. Tadgell.—Spear-fruited Salt-bush, *Bassia quinquecuspis*, F. v. M., var. *villosa*, from Sunbury—a stiff, bushy shrub, originally recorded from North-West Victoria, now spreading easterly; Narrow-leaved Podotheca, *P. angustifolia*, winter and summer forms; ferruginous clay from Bolinda Creek, near Lancefield Junction, suitable for use as a pigment.

By Mr. H. Whitmore.—Section of stem of Common Elm, *Ulmus campestris*, showing the branches originating from the heart-wood.

By Mr. H. B. Williamson.—Orchid, *Corysanthes bicalcarata*, Fitz., "Spurred Helmet Orchid," new for Victoria, collected at Healesville, 7th June, 1921, by the Misses D. and G. Coleman; also wild-flowers from exhibition on 14th June, collected by Mr. F. Wisewould, Pakenham, Mr. T. S. Hart, M.A., Bairnsdale, Mr. D. Paton, Bendigo, Mr. C. D'Alton, Hall's Gap, and the pupils of Dimboola, Ouyen, and Pakenham State schools; also from South Australian contributors—Miss Zoe Amos, Upper Sturt, Mrs. L. E. Page, Myponga, and head teachers of public schools at Kangarilla and Victor Harbour, per the Field Naturalists' section of the Royal Society of South Australia, Adelaide.

CORRECTIONS.—In exhibits by Mr. J. R. Tovey, in *Naturalist* for May, 1921, page 10, for "Centaurea" read "Erythræa."

In July *Naturalist*, page 17, line 2 of report, date should read "4th June."

NATURE STUDY EXHIBITION.

PARTLY in response to an expressed idea that an exhibition of natural history specimens would prove an interesting attraction to the general public, and partly to augment the funds of the Field Naturalists' Club and of the Microscopical Society—considerably depleted by the high cost of printing—a combined exhibition by the members of the two societies was held in the Melbourne Town Hall on Tuesday, 14th June. As anticipated, it was well attended, and it was gratifying to see that several schools took advantage of the opportunity to demonstrate some of Nature's handiwork to their senior pupils, the pupils of one school being brought by private conveyance from a distance of over ten miles.

Mr. F Chapman, A.L.S., president of the Microscopical Society and one of the vice-presidents of the Field Naturalists' Club, in welcoming His Excellency the State Governor, Lord Stradbroke, to the exhibition, gave a brief outline of the activities of the two societies. In declaring the exhibition open Lord Stradbroke said he was delighted to find so much encouragement being given to the people of Victoria to study Nature in all her aspects. Such an exhibition as this should help young people to take a pride in their country and its natural productions. He had not had many opportunities yet of becoming acquainted with the varied features of Victoria, but he doubted if he would become tired of the many varieties of gum-trees, as had been suggested to him. Later, His Excellency devoted considerable time to an examination of the exhibits, and mentioned that it was a great disappointment to Lady Stradbroke that she had not sufficiently recovered from her illness to be able to be present, for she was always greatly interested in exhibitions of the kind.

It is impossible in the amount of space at our disposal to do more than briefly list the exhibits of the different exhibitors. The exhibits of a similar nature were grouped together, and some very effective displays were made.

Botany.—Though not the wild-flower season, a fair display of native flowers was made through the organization of Mr. H. B. Williamson. Flowers were received from Western Australia and South Australia and from many parts of Victoria, the exhibitors being Miss C. Currie, Miss G. Nokes, Messrs. T. C. Bryan, G. Coghill, C. D'Alton, N. W. Gay, A. D. Hardy, T. S. Hart, D. Paton, A. Tadgell, — Thornhill, Rev. W. C. Tippett, A. Vroland, and F. Wisewould; the Creswick Forest School, Macedon State Nursery, and the Linton, Maldon, Ouyen, and Pakenham State schools. Mr. C. C. Brittlebank, 3 drawers of fungus pests.

Conchology.—Mr C. J. Gabriel, ten drawers of foreign and Australian marine shells (a very fine display); also an exhibit showing method of working of the destructive ship-borer, Teredo.

Entomology.—Mr. D. Best, two drawers of beetles (Carabidæ); Mr. J. E. Dixon, two drawers of Coleoptera; Mr. C. French, ten drawers life-histories of insects, &c.; Miss Fuller, gall insects from Western Australia; Mr. J. Kershaw, four drawers of Lepidoptera; Mr. C. Oke, two cases Coleoptera; Mr. F. Spry, three drawers of ants; Mr. L. Thorn, ten drawers of Lepidoptera; Mr. F. E. Wilson, two drawers of beetles (Tenebrionidæ); National Museum, case of trap-door spiders.

Ethnology.—Mr. E. Anthony, case of native weapons, &c.; Mr. C. Daley, case of aboriginal stone implements; Mr. T. C. Bryan, implements.

Forestry.—Mr. A. D. Hardy, F.L.S., on behalf of the Forest Department, comprehensive exhibit of forest products—timbers (dressed and undressed), honey, oils, kinos, foliage, &c.; photographs in illustration of forestry, both natural and artificial conditions.

Geology and Palæontology.—Mr. T. C. Bryan, fossil conglomerate; Mr. F. Cudmore, a large collection of fossil sharks' teeth and mollusca, illustrating and comparing the Tertiary formations of Australia and England; Miss C. Currie, matrix of turquoise, and gold in quartz, from Corryong; Mr. F. Chapman, A.L.S., Middle Cambrian fossils from British Columbia; Mr. C. Daley, B.A., collection of Australian minerals; Mr. T. S. Hart, M.A., natural lodestone from Nowa Nowa, Victoria; Mr. J. R. Mitchell, case of Australian minerals; Mr. W. Scott, flexible sandstone from India.

Ornithology.—Director National Museum, specimens of the larger birds of Victoria; Royal Australasian Ornithologists' Union, three drawers of Australian bird-skins, coloured plates from Gould's "Birds of Australia"; Mr. H. Syme, a white form of the Grey Goshawk.

Zoology.—Director of National Museum, representative collection of Australian animals, also reptiles in spirits; Miss C. C. Currie, mammals in spirits; Mr. H. W. Davey, F.E.S., live specimens of Japanese newts; Mr. D. Le Souëf, C.M.Z.S., live carpet snake and live stump-tailed lizard; Mr C. Oke, lizards and snakes.

The Microscopical Society was well represented by members with microscopes, who made a very fine display of objects of interest. These were a great source of attraction throughout the afternoon and evening.

SOME OBSERVATIONS ON MANTIDS,

WITH SPECIAL REFERENCE TO THE REPRODUCTION OF LOST LIMBS.

BY B. BLACKBOURN.

(Communicated by C. French, jun.)

(Read before the Field Naturalists' Club of Victoria, 11th April, 1921.)

IN the classification of insects the mantids form a very definite family of the order Orthoptera (straight-winged insects). A main difference of the insects of this order from those of the other orders is that the individuals, on emergence from the egg, resemble the perfect insect in most respects but size, and that they continue to grow until reaching the adult size.

My remarks refer principally to the common Green Mantis, *Orthodera ministralis*, Fab., to be found in most gardens about Melbourne.

It will perhaps be best if I simply describe the growth of a few which I have kept in captivity. On 6th November I found two young mantids, bright green in colour, with a dark stripe down the back, and about three-eighths of an inch in length, on some bean plants. A third was found, of about the same size, a few days later, though, as the other two had grown considerably meanwhile, I was able to distinguish them apart. At first I was at a loss to know how I could keep them for purposes of observation, but eventually obtained an empty glass potted-meat jar, into which I put some water and a few sprigs plucked from a climbing rose, and placed it on a sheet of white paper under a large glass clock-cover.

As most of my readers will know, the mantids are carnivorous insects, their habit being to lie in wait amongst vegetation and capture flying insects of various sorts that come within reach by means of their first pair of legs, which are modified into terrible weapons of offence—studded on their inside edges with rows of sharp spines, and shutting up while at rest on the same principle as a razor blade. They can fast for a considerable time, and in a state of nature probably go for long periods without food of any kind.

My first problem was how to find food suitable for creatures of such small size, as it is necessary that it should be in a living state. On the beans they doubtless fed on minute flies, but these were practically impossible to catch without damaging them. I at last hit upon a plan which proved remarkably successful. A jar full of pond life, well stocked with mosquito larvæ, provided me with a regular supply of fresh meat for my captives. As soon as the larvæ attained the pupa state I placed them in some water in a doll's mug. This I put under the glass cover, and in a short time the mosquitoes hatched,

and were soon supplying the young mantids with plenty of amusement, if not with an altogether satisfying meal. As the mosquitoes flew about, trailing their long legs, the tiny Mantids would strike at them as they passed, and in the early stages seldom caught the whole mosquito, but, instead, one or two of the legs. These they would consume with much gusto, commencing at one end and eating them in exactly the same way as some people eat celery. Most of the mosquitoes were reduced in a short time to one or two legs apiece. As the mantids grew in size they were able to catch the whole mosquito, and these formed their main food until they were large enough to tackle small house flies.

On 15th November No. 1 cast his old skin, and was followed by No. 2 and No. 3 on 23rd and 26th November. On 2nd December No. 1 again changed his skin, but lost one of the second pair of legs in the process. This did not appear to cause him any very serious inconvenience, and was useful in enabling me to distinguish between No. 1 and No. 2, which were exactly alike in size and appearance. On 23rd December No. 1 again changed his skin, and, to my surprise, the missing leg was replaced by one a size smaller than its fellow on the opposite side. I was aware that newts and crabs could replace lost limbs, and lizards lost tails; but that insects could replace lost limbs was new to me. What I cannot quite understand is where the new limb was developed. There was no sign of it until the old skin was cast off, and then the new limb appeared complete. However, I was to see more of this before long.

On Christmas Day No. 3 cast his skin for the third time, and in so doing had a serious accident. A day or two before this change of skin a mantis refuses food, and frequently becomes very restless if confined. Its one idea seems to be to get as high up as possible. Once there it attaches itself firmly to the under side of a leaf, the skin splits at the back of the thorax, and the creature gradually emerges hanging head downwards. As the operation proceeds the legs are freed one by one until at last it is left hanging only by the tip of its abdomen. Just as the observer expects it to slip out and fall to the ground the insect makes one tremendous effort, raises itself up, takes firm hold with its legs, and shakes the old skin off its abdomen. It cannot always rid itself of the skin in one effort, but with intervals of rest it tries repeatedly until it is freed. At this time it is in an extremely soft state, and easily injured. It appeared to me that No. 3 must have fallen during the operation. I was away at the time, but on my return I found it on the table, apparently dead. It revived, however, but was badly crippled. One of the clasping fore legs was twisted in such a way as not only to be useless, but to constantly become

entangled with its other legs when it attempted to walk. One of the back legs also was twisted, so as to get in the way of its fellow on the other side. A short time afterwards it fell into the water in the jar; and was fished out apparently drowned, but recovered. It was clear that in such a crippled condition it could not catch its prey, and, bearing in mind the replacement of the limb in No. 1, I amputated part of the fore leg, removing the femur, tibia, and tarsus, and also the tibia and tarsus of the hind leg. So little was the insect affected by this that a couple of minutes after it was cleaning its remaining fore leg with its mandibles as if nothing had happened. To make a long story short, on 8th January it changed its skin again. There appeared a slight lengthening of the hind leg, but I could not distinguish any difference in the fore leg. On 24th January another change took place, and this time a complete though small edition of the fore leg appeared, and the hind leg was larger, though still not quite perfectly developed. I hoped to be able to watch its growth until the adult stage was reached, but, being on the point of leaving for England, I was obliged to transfer this mantis, as well as No. 1, to a small jam jar. The change, unfortunately, proved disastrous to No. 1. In what I believe to be its final moult, it was badly crippled through becoming entangled in some twigs, owing, no doubt, to insufficient room in the jar.

I was afraid that, with only one clasping leg, mantis No. 3 might not be able to catch and hold its prey, but my mind was soon set at rest on that score. On one occasion it struck at a fly, but only caught it by the tip of one wing. Having only the one fore leg, it could not pin the fly down. What it did was to take the tip of the wing in its mouth and hold tight to that, while it let go with its leg and took a fresh hold round the fly's body. That action showed something remarkably like reasoning power.

In the early stages one house fly every other day appeared to be as much food as was necessary, though when nearing maturity they can manage several at a meal. I once had a full-grown specimen which, on first being found, ate six flies and a "blue-bottle" at one sitting, offered to it with a pair of forceps. When my mantids were really hungry it was amusing to watch the way they followed with their eyes a fly introduced into the cage, and they would hasten to take up fresh positions which offered a better chance of capture. On other occasions I have known them stalk an insect at a pace which was scarcely perceptible.

I once kept a mantis for some months in New South Wales which became quite tame. At the time of capture it was one and a half inches long, and it grew to be over five. One night

I placed a sleepy fly on the curtain, about three inches in front of its face. It took just half an hour to cover that distance. It would disengage one foot, bring it forward so slowly that the movement was hardly distinguishable, gently feel for a fresh foothold, and then repeat the process with another leg. The fly, which had been cleaning its wings, eyes, &c., quite unconscious of the approaching enemy, at the last moment turned to fly away, but too late—in a flash the mantis had her in its grasp.

It is curious that flies do not appear to perceive mantids. I have repeatedly seen them settle on one and run along its back or leg. If the mantis is not hungry it takes no notice, but if its appetite is keen it twists round like lightning and grasps the fly, whose fate is for ever sealed. Their bodies are remarkably flexible, and, though they will keep absolutely still for hours, their movements are at times so rapid as to be almost unperceivable. Often, when a mantis catches sight of possible prey, it commences a swaying motion from side to side, and keeps this up while stalking. The prey never appears to take notice, no doubt mistaking the mantis for a twig swayed by the wind.

I was surprised to find that mantids have a considerable power of jumping, though I do not think they exercise it in obtaining food, but only in escaping from enemies. The jump is not forward, but appears to be a kind of back somersault. One night, when a mantis was in a very excitable and restless mood, due to the near approach of the skin-casting business, there were three large and lively flies in the jar, one of which ran under its "nose," and the mantis jumped right across from one side of the jar to the other.

Mantids probably grow faster when in captivity, owing to regular and abundant food, but in a natural state they can go for long periods without food. This fact makes them excellent pets, as one need not worry if there is a difficulty in obtaining supplies for several days owing to change of weather or other reason.

NEW BRITISH MICROSCOPES.—The *Scientific Australian* for June contains an interesting description by Mr. W. M. Bale, F.R.M.S., of new standard types of microscopes which are being manufactured by British makers in order to meet the specification of the British Science Guild. There are three types—the cheapest, for students, to supersede the German instrument hitherto in use; a better type for pathological work; and a high-class instrument for research work. Examples of the types can be inspected at Messrs. Watson and Sons', Swanston-street, Melbourne.

DESCRIPTION OF A NEW TRYMALIUM (N.O. RHAMNACEÆ), *TRYMALIUM RAMOSISSIMUM*, nov. sp.

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

(*Read before the Field Naturalists' Club of Victoria, 20th June, 1921.*)

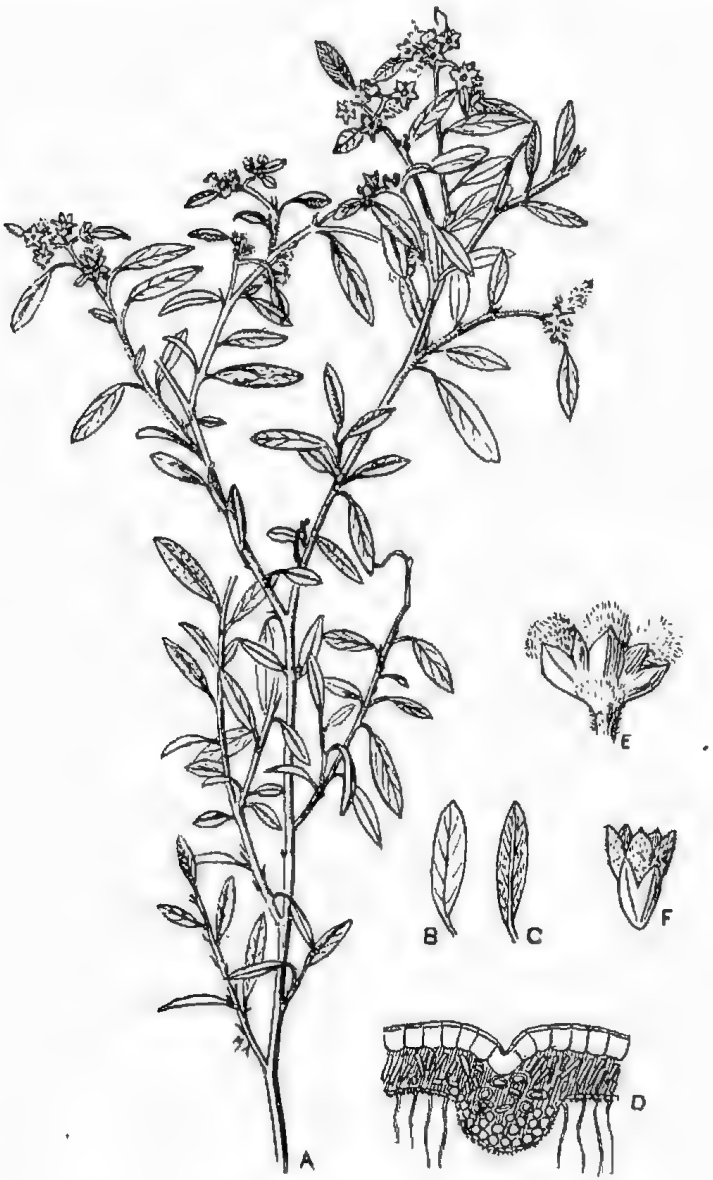
THE new Trymalium which I was fortunate in discovering at the Grampians, Victoria, in October, 1919, belongs to a very large order—the Rhamnaceæ—which occurs over a considerable area of the tropical and temperate zones in both hemispheres, Australia possessing about a dozen genera, some being much more widely dispersed than others, while a few are almost endemic.

The order is strongly marked and readily separated from all others, the only one bearing any similarity being Vitaceæ. It is a difficult order to characterize; the genera often merge into each other by the very finest gradations—so much, indeed, is the resemblance in flowers and foliage between Trymalium, Spyridium, and Stenanthemum that the late Baron von Mueller, in his "Census of Australian Plants," grouped them all under the genus Cryptandra. We find, however, that in Bentham's work, "Flora Australiensis," these genera are kept distinct, and botanists now recognize this classification.

This new Trymalium, which I have specifically named *T. ramosissimum*, on account of its branching habit, is closely allied to *T. Daltoni*. The latter was discovered at the Grampians about forty-five years ago by Mr. St. Eloy D'Alton, the well-known collector, and was named after him by Baron von Mueller.

In order to place before you the distinctions of this new species, I will compare it with its relative, *T. Daltoni*. On examining the leaves, those of *T. Daltoni* are long, sharp-pointed, with a deep centre furrow, and smooth, dark green surface, recurving so much as to almost hide the back of leaf, while those of *T. ramosissimum* are obtuse, ovate-lanceolate, only slightly curving at the edges, with a thick, prominent, raised line along the centre underneath. They are of a grey-green colour, and the flat surface shows distinct veining. When comparing the flowers the most striking feature is in the calyx, that of *T. Daltoni* being about the same length as the petals; but in *T. ramosissimum* the calyx exceeds the petals in length, and is much more woolly. The stipules also present differences. Those of the newer species are straight and have a broad, clasping base, while those of *T. Daltoni* are uniformly narrow, grading to a point, and somewhat curved. The bracts of *T. ramosissimum* are few, ovate: those of *T. Daltoni* are numerous,

PLATE I.



TRYMALIUM RAMOSISSIMUM, AUDAS, sp. nov.

A. Leafy and flowering branch. B. Under surface of leaf. C. Upper surface of leaf. D. Section of leaf. E. Bracts. F. Flower. D., E., and F. magnified.

lanceolate. In vestiture *T. Daltoni* is dark and somewhat coarse, having shorter appressed hairs. *T. ramosissimum* is much lighter, and has long silky hairs.

For general purposes I describe this new species as follows :—

TRYMALIUM RAMOSISSIMUM, sp. nov.

A small shrub 40-60 cm. (about 1½ to 2 feet) high, with spreading branches covered with a woolly tomentum; leaves flat, ovate-lanceolate, 10-15 mm. long, 3 to 5 mm. broad, glabrous, with distinct venation, greyish-green colour above, slightly recurved, the under surface hoary or white, with a very prominent midrib; flower-heads crowded; bracts brown, ovate, acute; calyx 3 mm. long, woolly, exceeding the petals; disk conspicuous; stipules channelled, straight, clasping.

Hab.—Victoria—Grampians (Mount Difficult), C. W. D'Alton and J. W. Audas.

TASMANIAN FIELD NATURALISTS' CLUB.—This society has again shown evidence of its activity by carrying out a well-planned Easter camp at Adventure Bay, South Bruny Island. In all, forty-one members and friends went into camp, the seventeenth organized by the Club. Previous to the war the parties were much larger, as many as one hundred visiting Wineglass Bay in 1914. The published report of the camp-out provides very interesting reading, and records quite a lot of useful work done in almost every branch of natural history. The report is nicely illustrated, and depicts some very fine rock scenery.

A FROG IN A PINE TREE.—The *Sunraysia Daily* (Mildura) of 11th June contains an account of the finding of a frog in the heart of a pine tree, Callitris, sp., when being felled at Red Cliffs, near Mildura. The tree had a stem diameter of about a foot, and was apparently quite solid, the Murray Pine being noted for its freedom from defects. The woodcutter was greatly surprised to find a hollow in the wood, and further surprised when a large green frog hopped out of it. Close examination of the tree failed to detect any entrance to the hollow, hence the questions arise, How did the frog get there? and how long had it been there? There were at least four inches of solid wood between the hollow and the outside of the tree, the hollow being ten inches long, with solid wood above and below. Unfortunately, the frog got away, and it is therefore impossible to say to what species it belonged, or to theorize as to its age.

OBITUARY.

THE LATE EDWARD H. LEES, C.E., F.R.A.S.—By the death of Mr. E. H. Lees on 30th June last Eastern Gippsland has lost one who was always ready and willing to point out its features and characteristics to strangers. Engaged for some years on geodetic survey work in northern South Australia, he there became acquainted with the native tribes and their customs, and in his only paper to the Club, "What is Nardoo?" (*Vict. Nat.*, vol. xxxi., p. 133, January, 1915), knowledge which he gained at that time is placed on record. His statements drew a rejoinder from Prof. Sir W. Baldwin Spencer, F.R.S., in a paper with the same title (*Vict. Nat.*, vol. xxxv., p. 8, May, 1918). Since 1890 Mr. Lees had been Government contract surveyor for Croajingolong, and resided at Mallacoota. His duties as selection and road surveyor took him into much new country, and, being of an observant nature, he thus gained an extensive knowledge of the plants and animals of the district. His membership of the Club dated from May, 1903.

THE LATE JOHN P. M'LENNAN.—After completing his course of training as a school teacher, Mr M'Lennan occupied positions in various parts of Victoria. When in charge of Emerald school, in 1900, he became acquainted with the late Mr. H. T. Tisdall, who, as a school teacher, had been induced to take up botany as a study by the late Baron von Mueller. Mr. Tisdall's enthusiasm caught on, and Mr. M'Lennan became a student of the flora of the Emerald district. Becoming a member of the Club in June, 1904, he forwarded many parcels of flowers to the Club's exhibitions from that district. His interest in plant life led to his appointment as Supervisor of Agriculture in State Schools, and he thus had opportunities of becoming acquainted with the botany of the whole of Victoria. In 1911 he became head-master of the Agricultural High School at Warragul, from which he was transferred in 1916 to the position of superintendent of the School of Horticulture at Burnley Gardens. He served as a member of the Plant Names Committee for several years, and on two ocasions conducted excursions of the Club to the gardens. His genial nature made him a general favourite in many connections, such as the Australian Natives' Association, the Freemasons, &c. He was, unfortunately, the victim of a serious boating accident towards the end of last year, when he almost lost his life, from the shock of which he never recovered, passing away on 6th July, after a long illness.

The Victorian Naturalist.

Vol. XXXVIII.—No. 5. SEPTEMBER 8, 1921. No. 453.

FIELD NATURALISTS' CLUB OF VICTORIA.

A special meeting of the Club to consider certain proposed alterations in the Rules was held at the Royal Society's Hall on Monday evening, 8th August, 1921.

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

Re minimum age of junior members.—Moved by Mr. F. G. A. Barnard and seconded by Mr. C. Daley—"That in clause *d* of Rule 4 the word 'fourteen' be substituted for the word 'sixteen.'"—Carried.

Re addition to Rule 12.—Moved by Mr. F. Keep and seconded by Mr. J. L. Robertson—"That the words 'the immediate past president to be an *ex officio* member of the committee.'"—Carried.

Ordinary Monthly Meeting.

REPORTS.

A report of the excursion to West Essendon on Saturday, 14th May, was forwarded by the leader, Mr. R. W. Armitage, B.Sc., who reported an interesting afternoon. Though the sand-pits are worked out, enough remains to indicate the geological characters of the occurrence, which was fully described, with an illustration, in the *Naturalist* for July, 1910 (xxvii., p. 48). Near an outcrop of quartz, &c., not far away a number of chippings of aboriginal stone implements were obtained.

A report of the visit to the Geological Museum on Saturday, 16th July, was made by Mr. C. Daley, F.L.S., who said that a party of members had been shown over the museum by Mr. R. Keble, who explained a number of the more interesting specimens and indicated the economic uses of many of them.

A report of the excursion from Greensborough to Eltham on Saturday, 6th August, was given by Mr. A. L. Scott, who said that, though the afternoon was cold and dull, the outing had been enjoyed. The wattles were rather backward, except near the river at Eltham, where some blooms were obtained for home decoration. Several curious growths of galls were detected on some eucalypts, and specimens obtained for further investigation.

ELECTION OF MEMBERS.

On a ballot being taken, Miss E. Bage, Fulton-street, East St. Kilda; Miss M. Boyd, 100 Grey-street, East Melbourne; Mrs. C. G. Whiting, 163 Glen Eira-road, East St. Kilda; and Mr. G. F. Onyons, 24 Malakoff-street, Malvern, were duly elected ordinary members of the Club.

HON. ASSISTANT SECRETARY.

There being no other nomination, Mr. B. Williamson, Waverley-road, Caulfield, was declared elected to the position.

REMARKS ON EXHIBITS.

Mr C. J. Gabriel called attention to his exhibit of three species of Victorian marine shells belonging to the family Gastrochænidæ, known as "Tube Shells." In this group the animals live enclosed in tubes or burrows, which they never leave, and which are frequently embedded in mud or stone, the shells or valves being either free or embedded. At first sight it might be considered that these peculiar shells should be placed among the univalves, but a closer examination will show that they are true bivalves. In the genus Brechites both valves are embedded in the walls of the lower end of the shelly tubes. In the genus Clavagella one valve is embedded in the tube, while the opposite valve is always free. In the genus Gastrochæna both valves are free in the thickened end of the calcareous tube.

PAPERS READ.

1. By Mr. T. S. Hart, M.A., entitled "The Gippsland Lakes Country: The Physiographical Features."

In the absence of the author, the paper was read by the president, Mr. F. Chapman, A.L.S.

The author said that the late Dr Hall's paper on the Gippsland Lakes, read before the Club, left some points untouched, which he had been able, during a residence of several years at Bairnsdale, to work out to some extent. There had been great denudation of the land to the north of the Lakes, and in certain places a considerable uplifting had taken place.

The paper was well illustrated by maps and photographs. Some of the latter, having been taken from an aeroplane, were of a unique character, depicting the remarkable silt-jetties of the Mitchell River at its entrance to Lake King in a very realistic way. The Lakes' Entrance and its surroundings was easily understood from its aerial picture.

The paper led to some discussion, in which Messrs. C. Daley, B.A., H. B. Williamson, and A. E. Keep joined.

2. By Mr. C. Oke, entitled "A Day's Beetle-Hunting at the Lerderderg."

The author gave an interesting account of a hunt under the stones at the Lerderderg Gorge for the minute beetles which frequent ants' nests, and exhibited a number of species in illustration of his remarks, some being shown as microscopic objects in order that their very peculiar structure might be more easily seen. The reason for this association of ants and beetles is still far from clear, and the author was unable to give a definite opinion on the subject.

The author was congratulated by Messrs. Barnard, Daley, Wilson, Barrett, and Davey on having taken up a subject which required so much patience and careful search, and the hope was expressed that his investigations would lead to the unravelling of the singular association of the two dissimilar groups of insects. A large number of specimens were exhibited in illustration of his remarks.

EXHIBITS.

By Mr. J. W. Audas, F.L.S.—Specimens of *Euryops abrotanifolius*, D. C. "Southernwood-leaf Europus" (Compositæ), a native of South Africa, which has become a garden escape at Menzies Creek and Paradise (Dandenong Ranges), collected by exhibitor, 6th August, 1921.

By Mr. F. Cudmore.—Specimen of the fossil volute shell, *Voluta macroptera*, M'Coy, from the Janjukian beds of Torquay, near Geelong.

By Mr. H. W. Davey, F.E.S.—Japanese newts (alive).

By Mr. C. J. Gabriel.—Victorian marine shells—*Gastrochæna Tasmanica*, T. Wds., *Clavagella australis*, Srby., *C. multangularis*, Tate, and *Humphreyia Strangei*, A. Ad.

By Mr. T. Green.—Stereo.-photographs of orchids recently collected by Mr. A. J. Tadgell, including a twin flower-spike of *Pterostylis concinna*.

By Mr. T. S. Hart, M.A.—Maps and photographs of the Bairnsdale area, in illustration of paper.

By Miss G. Nokes.—Orchid, *Corysanthes pruinosa*, twin flower, a rare form, from Sandringham.

By Mr. C. Oke.—Coleoptera from the Lerderderg, including Psclaphus, sp., *Aritecras curvicornis*, West., and *Chlamydopsis eclalomonæ*, Lea, under the microscope.

By Mr. P. R. H. St. John, on behalf of Mr. Justice Mann.—A singular fungus, found at Oakleigh.

By Mr. A. J. Tadgell.—Fresh flowers of forty species of indigenous plants, including seven wattles (acacias), *Leptospermum lævigatum*, five orchids, and *Hovea heterophylla*, &c.

By Mr. J. R. Tovey.—Specimen of "Purple-haired Bramble," *Rubus phœnicolasius*, Maxim (Rosaceæ), a native of Japan, collected at Narbethong, January, 1917, by Mr. A. D. Hardy, F.L.S., reported as becoming established in that district.

By Mr. L. Thorn.—Two species of Silver Wattle Moths. The larvæ and perfect insect of *Thalaina clara*. A beautiful silvery white moth, with prominent brown marking resembling a "W" on the fore wings. *Thalaina punctilinea*, also with glossy white wings, but no marking. Both insects breed on the Silver Wattle, the larvæ feeding in September, the moth appearing in February, March, and April.

After the usual conversazione the meeting closed.

NOTES ON THE MIGRATORY LOCUST AND THE INVASION OF 1886.

BY JAMES HILL.

(*Read before the Field Naturalists' Club of Victoria, 11th April*, 1921.)

THE "locust" to which these notes refer is known specifically as *Chortoicetes terminifera*, Walk., and belongs to the order Orthoptera (straight-winged), and is closely related to the grasshoppers. It is, however, in no way connected with the so-called "locusts" of Southern Victoria, which are species of Cicada, and belong to quite another order—the Hemiptera (half-winged)—an order of sucking insects, whereas the true locust is, as will be told later, a biting insect.

Residents of the Wimmera plains in 1886 have not easily forgotten the visit of the locusts in that year. They appeared about the end of February and beginning of March. As a resident of Kewell district, about twelve miles north-west of Murtoa, I had ample opportunities of seeing the destruction which can be caused by insects in enormous numbers. The country about Kewell had, at the time, plenty of green grass and self-sown wheat, six to eight inches high, which had come up in the stubble as the result of heavy rains a short time before—a rather unusual state of affairs during February and March in the Wimmera.

One day my attention was attracted by a few locusts flying from the north-west. These proved to be the forerunners of vast hordes that were to follow. When the great multitude arrived it was seen that they had chosen to visit Kewell for the purpose of depositing their eggs. This they commenced to do about the second week in March, and continued so doing for about two weeks. During this time they devoured every blade of green grass and wheat in the district. The eggs were deposited in the ground, from two to three and a quarter inches deep, by means of the insect's abdomen, which was inserted into the ground to that depth, two or three of the joints of the abdomen stretching out considerably longer than usual. Some of the holes were bored in soft crab-hole banks, others in the hard sand-rises. The eggs were placed in the bottoms of the holes in a leaning position, packed quite close together, from twenty to fifty eggs in each hole. They were about three-sixteenths of an inch in length, and filled about an inch at the bottom of the hole, the remainder of the hole being filled to the top with a white, frothy substance which hardened, and seemed to act as a protection from the depredations of other insects.

The eggs, which were laid in the middle of March, did not hatch until the next spring (October), although there was

plenty of hot weather at the end of March, in April, and part of May, during which I fully expected some of the eggs would have hatched, as I remembered that some three years before a small lot of locusts had laid their eggs in the beginning of January, the young insects emerging from the holes in about a month; but in the case of the 1886 insects there was no sign of life where the eggs were deposited all through the autumn and winter.

The ground was well soaked by the spring rains, but it did not seem to affect the eggs in any way, and early in November the locusts began to make their appearance in great numbers. When the eggs hatch the young burst from the shells, but still keep the leaning position as when in the egg, and appear perfectly helpless. They are closely packed together, with their heads upward, until the time arrives for them to emerge from their holes. They now begin to gain strength and move themselves a little, working themselves upwards through the frothy substance which has protected them up to that time.

As soon as the young locusts have reached the top of the hole and have free access to the air they immediately begin to cast their skins. This first moult occupies about one minute, and, if closely watched, it is possible to see the skin slip off the body. They are now of a light brown colour, and about three-sixteenths of an inch in length. They soon get darker, showing distinct markings. Thus they have changed in the space of two or three minutes from a life of torpor to one of activity, and we behold the lively little hopper now started on its journey of life, and travelling, when weather permits, till its journey ends in death.

The little creatures congregate together in their different bands, which cover various-sized areas of ground—some two or three yards square, others considerably larger. As soon as they join into these companies they begin to travel, all the bands seeming to take the same direction and keep to it until the insect is perfect and ready to join in one great army. The young locusts grow very rapidly. The bands, therefore, cover a greater area of ground, and travel a greater distance, each day, for as they grow stronger they jump or leap further each time.

When the time comes for their second moult they attach themselves to grass-stems, bushes, &c., with their heads downward. They are again in a state of torpor. The skin begins to split open on the top of the thorax and down the centre of the abdomen. The body is then freed from the skin by violent throes or movements of the insects, the skin being left hanging to its attachment. Again the insect soon hardens, considerably increased in size. The moult is accomplished in two or

three minutes, and the insect soon moves about again, and, joining a troop, begins to move forward again.

They are now in their third stage, in which they attain almost their full size. This stage lasts about twenty-four days, at the end of which they again cast their skins in the same manner as just described. The change is quickly completed, and it is difficult to see them in the act.

In the fourth stage, which is now commencing, the wings grow to their full size in the course of a few minutes, just as those of a moth or butterfly do on emerging from the chrysalis. They have at first very little colour, and are very soft, but they soon harden, and attain their proper colours.

As soon as the wings are hard the insects are ready for flight, which they do as soon as the sun is hot enough. They fly very direct, carrying the body in quite a level position, and appear to be able to fly an indefinite distance. Although the locusts have been in their several groups up to this time, they now combine into one migratory army, and carry destruction with them wherever they go. Finally, they halt to deposit their eggs, and after this act life departs, thus ridding the country for a time of one of the most destructive pests imaginable.

At the end of the year 1887 locusts again made their appearance in the Kewell district. On the 20th December the morning broke nice and fine; a light wind was blowing steadily from the north-east. Standing in a clear place where it was possible to see for a distance of half a mile or so, and looking towards where the wind was blowing from, about an hour before noon, apparently a dust-storm was to be seen in the distance, no other difference being noticeable beyond that a few more locusts than usual were flying about. However, in the course of a few minutes the dust-storm resolved itself into a moving mass of insects. The locusts had come, and come they did. They passed where I happened to be about as thickly as anywhere else. They were travelling at the rate of five or six miles an hour, and were so thick that a person could not see through them further than a quarter of a mile, and as high as you could distinguish them there were locusts. They were as thick as this for two miles wide, and continued passing for nearly five hours, the noise made by their wings sounding like the wind blowing in the tops of trees. Such an army of locusts would cover a great tract of country, but this was only a part of the army, for they continued passing from Tuesday, 20th December, to Saturday, 24th, whenever wind and weather permitted, though not so thick as on the Tuesday. From reports received the army must have been about fifteen miles wide. Who could express their numbers in figures?

At the time there was plenty of green grass, but where they

passed thick the grass fell before them like wheat before the sickle, for they levelled it as they went. Numbers of those which passed on the Saturday laid their eggs in small patches here and there, and if they had done so as they advanced the number of eggs laid is inconceivable. Thousands died while passing here, having probably arrived at maturity; they were usually found sticking on grass or bushes. A large number of the locusts were left behind, apparently not being able to travel any further; these also died in the course of a few days.

The eggs which were laid on Saturday, 24th December, matured, and the young locusts were coming out of the ground on the 12th January following, which, in this case, gives only nineteen days for the egg stage; thus it appears there is no definite time for their existence in the egg stage. I have come to the conclusion that the eggs require a certain amount of damp heat to cause them to hatch, for, after the eggs in this case were laid, there was enough rain to give the ground a good soaking, causing a damp heat, and thus making them hatch quickly.

Fortunately, like other insects, locusts are subject to many conditions which jeopardize their chances of arriving at full maturity. I remember one batch of locusts which were emerging from the holes for just a week, but two days after they were nearly all dead. Although they were so small, the ground was black with them. Their death was caused, no doubt, by the absence of food in the vicinity of their hatching. Thus Nature has her way of balancing countless hordes of insects, for if it were not the case the world and all that is therein would soon be a scene of desolation.

[Some interesting notes on the same subject, giving other details, will be found in the *Victorian Naturalist* for February, 1887 (vol. iii., p. 131).—ED. *Vict. Nat.*]

BOOK NOTICE.

GOLDEN WATTLE: Our National Emblem. By Archibald J. Campbell, Col. Mem. B.O.U. Melbourne: Osboldstone and Co. 63 pages, quarto, with 28 illustrations (5 in colour). 21 shillings.

In this volume the author, who is perhaps better known to Australians as an authority on birds' eggs than an exponent of the beauties of our Australian wattles, has produced a handsome book worthy of the subject. In a foreword, Sir W. J. Sowden, K.C.M.G., president of the Federal and South Australian Wattle Day Leagues, draws attention to the author's many achievements, not the least of which was the founding in 1890 of a Wattle Club, out of which has grown the customary Wattle Day

demonstrations of later years, and indirectly that love for native shrubs and trees which is gradually worming its way into the hearts of both professional and amateur gardeners. The letterpress of the volume is based on an illustrated paper read before the Field Naturalists' Club of Victoria on 13th September, 1909 (*Vict. Nat.*, xxvi., p. 86), entitled "Wattle-time, or Yellow-haired September." The latter designation is very apt, as the bulk of our acacias flower in September, though, as the author points out, species may be found in bloom, in some part of Australia, in every month of the year. Five of the plates are in colour, but the reproduction of wattles in their natural colours is still to be attained, though the printers have got very near it in one or two cases. There is a sort of transparency in the yellow which seems to be wanting in the prints. The "photo-pictures" are all from the author's camera, but it is questionable whether "the introduction of a figure for idealistic purposes" does not detract from the plates as wattle pictures, the figure occupying too prominent a position. However, the volume is a notable addition to our wattle literature, and deserves the support of an interested public. A copy of a leaflet issued by the Wattle League gives some details as to desirable species for cultivation in gardens.

Eagles and Hawks.—In the *South Australian Ornithologist* for July Mr. J. W. M'Gilp gives some very interesting notes about eagles and hawks, in which the usual beliefs about these birds are somewhat altered. He says the Wedge-tailed Eagle, commonly referred to as the "Eaglehawk," is claimed by many people to be a great destroyer of rabbits, and, therefore, of considerable benefit to pastoralists. This claim is based on the fact that large quantities of rabbits' bones may be found under the nests and feeding platforms of the birds. While admitting this evidence Mr. M'Gilp states that the eagle secures the greater part of its food from dingoes, foxes, cats, and hawks. The bird follows these animals in order to secure what they kill. When a fox has made a capture, often a rabbit, an eagle will swoop down, causing the fox to clear off, leaving its intended meal behind; this the eagle seizes in its talons and takes for itself. Eagles are not capable of rising from the ground with any great weight in their talons, as they require one foot to enable them to hop along the ground for a little distance before attempting to use their wings. They never carry any weight in their bills. The Little Eagle, he considers, is the best rabbit-killing bird. It is a most inoffensive bird, and never attacks lambs. On account of being despoiled of many of its kills by the Wedge-tailed Eagle it does not get credit for all the good work it does.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 12th September, 1921.

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

CORRESPONDENCE.

From Her Excellency the Countess of Stradbroke, intimating that she would be pleased to open the wild-flower exhibition on 27th inst.

From the Mount William (Ararat) Tourist League, inviting the Club to hold a camp at Mount William or to join the League in a camp. Referred to the committee.

REPORTS.

A report of the excursion to Cheltenham on Saturday, 20th August, was given by the leader, Mr. J. Searle, who reported a large attendance of members, some thirty being present. The excursion had been arranged for pond-life, but, as the district is a favourite one with botanists, several of the party devoted themselves to botany. Being so early in the season, the ponds were found to be full of interest, owing to the larval forms of phyllopods present. These are delightful objects for microscopical study, and much time could be profitably spent in working out their life-histories. In a week or two the adult stage of many would be reached, and the laying of eggs be in progress. The latter possess the power of retaining the life-germ during the times the ponds are dried up, and of commencing a new life-cycle when the wet season again sets in. Among the species reognized in the captures were.—Phyllopoda.—Eulimnadia rivolensis, Limnetis Tatei. Cladocera.—Daphnia carinata, var. gravis, Pseudomoina lemnæ, Chydorus, sp. Copepoda.—Boeckella Saycei, B. oblonga, Brunella australis, Cyclops albidus. Rotifera.—Euchlanis, Monostylus, Anuræa cochlearis, Asplanchnopsis, Philodina, Lacinularia elliptica. Protozoa.—Uroglena volvox, Bursaria, sp., Volvox aurens. Desmids and diatoms in profusion. Egg-masses of Chironomus and Tanypus were numerous, the jelly-like mass of the latter containing numbers of Nematodes and other small worms.

A report of the excursion to Ringwood on Saturday, 3rd September, was given by the leader, Mr. C. Oke, who said that a small party of members took part in the outing. It was

decided to try the banks of the Mullum Mullum Creek, which flows on the southern side of "Pinemount." By careful search under bark, logs, leaves, &c., numerous insects, principally beetles, were found, though of small size. Flower-haunting insects were scarce, but the first buprestid of the season, *Melobasis suboyanea*, Kerr, was taken. Moss and grass-roots yielded further interesting species of beetles. Lepidoptera were scarce, the season being yet early, but a few larvæ were secured for home-rearing. Of hymenoptera and diptera few species were noted. As the day was fine, members returned to town well satisfied with the outing.

ELECTION OF MEMBERS.

On a ballot being taken, Mrs. L. Hodgson and Mr. L. Hodgson, Grange-avenue, Canterbury, were duly elected as ordinary members; Miss R. Currie, Lardner, as a country member; and Miss Margaret Swinburne, Kinkora-road, Hawthorn, as an associate member of the Club.

PAPER READ.

By Mr. Owen Jones, B.A., Dip. For., entitled "Our Forests." The author laid stress upon the importance of the subject to all, timber and forest produce being essential to civilized existence. By means of a large number of lantern slides, kindly lent for the purpose by Mr. A. D. Hardy, F.L.S., the great beauty and value of our forests were illustrated, and a number of forest industries were portrayed. The relationship between forests and water supply, forests and agriculture, and forests and employment were detailed, and it was shown how the settler and the forester, instead of being antagonistic, were in reality mutually dependent. Forest fires, their causes, and the losses occasioned by them, were dealt with at some length, and suggestions were made as to how they might be minimized or prevented. The necessity for the introduction of conifers into Victoria was explained, and some interesting details were given as to the remarkable growth made by *Pinus insignis* at Bright on the tailings left by the gold dredges.

In a discussion which followed, the chairman, Messrs. Gabriel, Wisewould, Blake, and Pitcher took part.

EXHIBITS.

By Mr. C. Daley, F.L.S.—Flowering specimens of *Micromyrtus* (*Bæckea*) *microphylla*, *Pultenæa daphnoides*, *Grevillea linearis*, and *Thryptomene Mitchelliana*, grown at Caulfield; also portion of a Lawyer Palm, *Calamus australis*, pod of Cassia, sp., leaf of india-rubber tree, and leaves and fruit of *Coffea arabica*, from North Queensland.

By Mr. C. Oke.—Insects collected on Ringwood excursion.

By Mr. F. Pitcher.—Flowers of *Eriostemon myoporoides*, Long-leaved Wax-flower, Vict.; *Hardenbergia monophylla*, Purple Coral Pea, Vict., and *Chorizema ilicifolia*, Holly-leaved Flame Pea, Western Australia, grown on shaly ground at Punt Hill, South Yarra.

By Mr. A. L. Scott.—A spider and bee, taken at Ringwood. These were found in the cup of a flower, the bee quite dead, and the spider holding it tightly by the neck. The spider seemed to have little difficulty in carrying the much larger bee, and displayed great activity when trying to escape. The spider retained its hold on the bee's neck after being placed in the killing bottle.

After the usual conversazione the meeting closed.

Correction.—With reference to the exhibit by Mr. L. Thorn, recorded in the September *Naturalist*, the food plants of the moths exhibited should be—*Thalaina clara*, "W Moth," the Black Wattle, *Acacia decurrens*; and *T. punctilinea*, the Blackwood, *Acacia melanoxylon*—neither feeding on the Silver Wattle, the word "Silver" referring to the appearance of the perfect insect.

NATURE STUDY EXHIBITION.

In the report of the nature study exhibition in the August *Naturalist* (pp. 28, 29) several notable omissions occurred, due to lack of information about the exhibits. A fine display of blooms of winter-flowering Australian shrubs, &c., grown at the Melbourne Botanic Gardens, was made by the Director, Mr. J. Cronin, while Mr. F. Pitcher exhibited about twenty species of the smaller Victorian ferns obtained about Belgrave, as well as dried specimens of a number of the rarer Victorian species. Mr. J. H. Maiden, I.S.O., F.L.S., Director of the Sydney Botanic Gardens, forwarded a collection of New South Wales flowers, which, owing to delay in transit, did not arrive in time for exhibition; they were, however, utilized for teaching purposes in one of the public schools the following day, and so were not entirely wasted. The services of the lady friends of both societies, who, under Miss H. Gabriel, worked so energetically with the refreshments and in other ways, should not have been overlooked in the original report.

Wild-Flower Exhibition.—The annual exhibition of wild-flowers was held in the Melbourne Athenæum on Tuesday, 27th September. The exhibition was opened by the Countess of Stradbroke, and was well patronized by the general public. It was a financial success, and a full report will appear in the November *Naturalist*.

ABORIGINAL COAST CAMPS OF EASTERN VICTORIA.

By G. HORNE, V.D., M.A., M.D., Ch.B.

(Read before the Field Naturalists' Club of Victoria, 9th May, 1921.)

ALMOST anywhere along the Victorian coast, either at the steep sand-hill of Marlo or at the lower plain of Point Cook, a layer of shells can be found. It is the midden, or collection of shells whose contents have formed the food of the aborigines.

The places that I want to tell you about range from Cape Conran and Cape Ricardo, beyond Marlo on the Snowy River, through Prospect and the Ninety-Mile Beach, near Yarram, Venus Bay, from Cape Liptrap to Anderson's Inlet, Western Port, Port Phillip Bay, and the ocean coast-line past Bream Creek and Torquay.

Sometimes the wind has heaped sand high over the shells, so that they are hidden from view. Sometimes its action has stripped them bare so that many generations lie exposed. But when one starts to search for formed stone implements amongst these heaps of food-remains, their scarcity becomes apparent. Farther back chips seem common enough; but here, where the aborigines certainly lived, well-chipped models are very rare. Then the cause strikes one. These are the feeding-grounds of the tribes. For leagues they extend, ceasing to show themselves only where, as at Marlo, a new soil has been formed, leaving no shells to be seen, except where a cutting or a road lay bare a strata.

The feeding-grounds always lie near the water's edge, and, until one thinks of the years that have elapsed in their accumulation, they resemble much the deposits of the sea rather than the work of man. The presence of charcoal, mixed with emu fat, and the shells, show that this was not the case. It is found not only at Altona, but at spots all along the coast, mixed with the shells of the middens. Of course, near towns one doubts its authenticity, but on the Tarwin coast, twelve miles from the nearest township, and often many feet below the surface of the ground, it is obviously a genuine aboriginal production.

Generally, the sand is blown away from underneath the layers of shells, which drop down, falling on the ground immediately below. By that means layer after layer is added to the thick sheet until quite a heap of shells gathers where once a mound of sand existed. There seems no end to the possibilities of these layers having been formed. At Tarwin fifteen showed on one face, each pointing to a different period, perhaps years apart, that had yielded its spoils to the native. Some

PLATE II.

FIG. 1.—SHELL LAYERS OF THE MIDDENS, TARWIN.

FIG. 2.—FIRE STONES AT AVIATION SCHOOL.

of these were inches, some feet, apart. In the photograph (Fig 1) my colleague is standing on a ledge. The layers dip far below.

The feeding-grounds are not entirely barren of finds. Occasionally an elaborately-worked implement is found, and at Tarwin some of the polished axes (not a great number) were picked up amongst the shell heaps. It is interesting to note two, which were found together, were of entirely different material, one being a diabase and the other an altered sandstone. It seems probable that some may come from the hills behind Waratah, at the head of Wilson's Promontory.

The characteristic stones found are three in number—hammers, anvils, and stones for knocking mollusca off the rocks. Hammers are sometimes well worked, and of hard material. They are found both where the shells show that the aboriginals fed and also on what I will describe to you later as the "chipping grounds." Usually those made of limestone were found. These softer hammers, though numerous enough upon the feeding-places, were not found amongst the chips where the manufacturing took place. The anvils, similarly, were also made of softer stone. It was always something found on the spot, and around the west coast of Port Phillip Bay was of a porous surface basalt. Down the coast from Queenscliff towards Cape Otway, however, this was changed for silicious limestone. Anvils are flattened stone, roughly hollowed on one or both sides. They are not found on the chipping beds, where one finds, instead, the hard stones, scarred with the marks of many blows, but they are common on the feeding-places. At Bream Creek, on the ocean beach near Geelong, enormous numbers are to be picked up. They were probably used to hold the shells that were being smashed with the hammers. The pits on them must not be confounded with the smaller marks for finger grips so commonly seen on hammers, axes, and other tools.

The third stone, for detaching molluscs, consists of a pebble of altered sandstone that has been steeply flaked along one side down to a plane surface. Especially are they found near the mouths of creeks where the supply of fresh water made it a suitable camp for the natives' permanent needs. Sometimes these stones are most elaborately finished, with secondary stepped retouch extending all round. Just such implements are found also far inland, and are called colloquially "shoes." But the typical rough-chipped stone belongs to the feeding-ground, and similar implements were used quite recently in Queensland for dislodging oysters. The battered edges on many show that they have had just such rough usage. There are other implements that are found on the eating-places—

small bone rods, about two inches long, smoothed down and sharpened at each end. These are fish-hooks. All along the coast, on the feeding-grounds, they can be found, but notably about three miles from Warrnambool. Tied with a cord in the middle, and baited, they straighten up at right angles to the line when it is being pulled taut. This sticks the sharp ends into the fishes' mouths. Three similar fish-hooks, made out of the central pillar of Voluta or Lotorium, were found touching each other at the Aviation School. Just such fish-hooks or gorges are used in France to this day.

The most significant of the evidences of former inhabitants of these feeding-grounds is, however, found in the fire-stones (Fig. 2), which, wherever suitable material exists, lie grouped in heaps throughout the camp. They consist, as a rule, of porous basalt. The fires were used by the aboriginals to keep themselves warm at night, for the stones held the heat long after the fire had died down. Curled up on one side near these they would lie with the thighs drawn up to cover the abdomen (White). My pictures are from five places—Point Cook, Altona, Aviation School, Torquay, and Tarwin—or, to be accurate, 12 miles from Lower Tarwin. These show the fire-stones on the feeding-ground at Tarwin. They do not seem to have been intended for cooking upon, for frequently no burnt shells are found in the neighbourhood. The pictures prove conclusively that they camped on the same place as they fed. The fire-stone groups, however, are not so numerous there as they are on the chipping grounds. They not only served for warmth, but also to roast such game as they captured. The chipping ground at Aviation is separated by a ridge of tea-tree from the feeding-place, as seen in the distance. At Torquay also the fire-stones are shown.

The shells which form these vast accumulations are, as a rule, mixed haphazard, but sometimes a few square feet are entirely composed of one particular variety. The mussel, *Mytilus planulatus*, is perhaps the most frequently so found, and it lies in close-packed heaps. The Mutton-fish, *Haliotis naevosa*, the large oyster, *Ostrea angasi*, and *Voluta undulata* are also separately grouped. At Bruny, Tasmania, crayfish claws are similarly found. How these collections of a particular mollusc come about is a mystery. They are not thrown down casually when eating, for they lie absolutely overlapping each other in a small area, and outside there will not be one of that variety. For some reason (possibly connected with ceremonies of beginning of fishing) they are carefully piled in position. This is quite a different cause from that which sometimes makes the bivalve *Donax deltoides* almost the only mollusc for a quarter of a mile or more, with only a few other varieties

scantily interspersed. Turbo, sp., and Voluta, sp., were evidently often cooked. This is seen by the charred fragments of their shells, particularly of the opercula of Turbo.

Amongst the mollusca eaten, *Donax deltoides* is by far the most common, large sheets of the shell covering the sand-hills, with few intervals, for miles. Locally, *Arca lobata*, *Austrocochlea striolata*, *Haliotis naevosa*, *Turbo undulata* are frequently found. Sometimes individual species are so thick as to nearly exclude other varieties. Less common are *Cassis anatinus*, *Chione strigosa*, *Purpura succincta*, *Patella tramoserica*, *Ostrea angasi* *Pecten asperiensis*, *Mytilus planulatus*, and *M. rostratus*; whilst occasionally one finds *Natica plumbea*, *Nerita melanotragus*, *Conus anemone*, *Cypraea angustata*, and *Potamides australis*. At Altuna are found, in addition, the following:—*Arca fasciata*, *Natica conica*, *Murex triformis*, *Cardium tenuicostatum*, *N plumbea*, *Potamides australis*, *Bulla australis*, and *Cominella lineolata*.

However, it is to the chipping grounds that one first instinctively turns, for these are most emphatic proofs of the aborigines' industry. At Tarwin the line of demaraction between chipping and eating places is sharply delineated. In the picture the distance gives the low ridge of hummocks that closely follows the coast. On the sea slopes of this are found the shell mounds of which I have been speaking. In the foreground the sand is pushing inland, and gradually overwhelming the low scrub and stunted trees. Between the two there stretches a long valley, from 300 to 800 yards across. The shallow lagoons and swamps, not yet silted up, which lie in this area formerly harboured wildfowl. In the dried-up marshes one finds throwing stones that have been aimed at the birds, and were not recovered. From all this marsh area, from close up to the hummocks fringing the sea as far as ever the layer of sand has been swept away, chipping beds are to be found. No soft hammers or anvils for smashing shells are here, but where the wind has cleared a patch, or where the vegetation has held the soil together, the seeker is sure of a reward. This is not the only workshop at Tarwin, although by far the largest near this place. Wherever there is water—river, creek, lagoon, or swamp—there, as close as possible to the feeding spots, the workmen chipped out their implements.

It is often said that any stone might be used for any purpose by the aboriginal, and this is most true. Those who have lived amongst them can tell how a rough edge is chipped or flaked upon any casual pebble. It is used and thrown away. Similarly, any implement may be employed for purposes for which it was never designed. A polished axe is used to chip other stones, or as an anvil; a knife becomes a scraper, and

there is no tool which may not be made into a spokeshave. On the other hand, implements were definitely made by experts for definite purposes. This we know from those who have seen them at work. They all describe the old man who sits and chips continually, singing over his work "to make it good." Others fish or hunt or gather roots for him. He stored his trophies in a heap on the ground by his side. This is the specialist, and his work one finds on the chipping grounds. Most frequently it is noted in the making of those artifacts which require great skill and care, such as what one calls "thumb-nail scrapers" and "chipped-back" knives. These implements are found grouped close together, although scattered examples can also be picked up.

The feature of Tarwin, however, is the vast amount of quartz crystal and opaque quartz that can be found. These substances are most intractable to work, as they tend to flake down lines of cleavage. It is only by constant care and by accurate strokes that the correct form is attained. The result (especially with the crystal) when it is complete seems worth the trouble—knives with sharp point and razor edge, scrapers with the top finely chipped, as well as those with the long side serrated. The opaque quartz is similarly treated, and it, too, lies in patches, where all sorts of implements can be found. The material is got from pebbles and from veins which are broken up. One piece had been shaped into a throwing stone, and, although not entirely complete, the rough form is very apparent.

At Marlo and east from the Snowy as far as the country of the Bidwelli the same material is in almost universal use. At Cape Conran nothing else was to be found. Ochre was very abundant. One mass of the red was hollowed into a round cavity, in which the substance was ground up. This piece also shows the knife marks where grooves have been cut into it to scrape some off. A grindstone was picked up that is thickly coated with the red ochre, and had evidently been used in getting ready for corroboree. Red ochre is used by the local farmers for marking their sheep.

The basalt of Williamstown appears to be unfruitful, but, further on, Altona will at any time give a rich harvest. Here, as at many other places round the Bay, eating-grounds and workshop alike are buried. Where, however, a wheel-track cuts through the surface, the wind speedily does the rest. This is about eight miles (as the crow flies) from the G.P.O. It is dotted all over with the week-end shanties of the Footscray and Newport people: but at this spot we got our richest haul of chipped-back knives and thumb-nail scrapers ("grattoirs" of French schools). The hedge forms the corner of a fowl-run,

and inside as well as outside these artifacts were to be picked up by the score. The feeding-ground is quite close—seen on the right of the photograph, where the shells and but few chips appear. The oyster *Ostrea angasi* is much in evidence, though, I am told, it is disappearing from these waters. On the left is the workshop, within a few feet of the eating-place. A feature of this district is the use of tachylite, which, according to Mr. R. A. Keble, of the Geological Museum, must have come from Carlsruhe, 50 miles away.

One last point: the relative frequency with which skeletons are found on the feeding-places of the aborigines. Three of these were at Tarwin, one at Altona, and two at the Aviation School. One also was found at Coffin Bay, Eyre Peninsula, South Australia. Of only two of these was it possible to say that a definite burial had taken place; the others were groups of the long bones and fragments of cranium and vertebræ. The two were buried in shallow sand graves, from which the surface had been blown away, leaving the top of the cranium uncovered. These were in the squatting position, and facing the east (*vide* Howitt, p. 454).

We thus see that there was a division of the camp into feeding-ground and workshop. On the feeding-ground some lived, and others visited them at times. Sometimes the molluscs were knocked off the rocks with stones. They might be cooked and the contents picked out, or the shell might be smashed and the mollusc eaten raw. At the workshop specialists and others chipped out their implements. They busied themselves with the hunting and fishing with hook and line, for scrapers are picked up, and spokeshaves for sharpening their spears, as well as the straight bones that served as hooks.

Corroborees filled a not unimportant moiety of their time, for the ochre has come down to us. The vegetable food was supplied by roots and water-plants pounded with upper and nether stones that we find. They stalked the wildfowl in the lagoons, for their throwing-stones are there discovered. Sometimes their axes, and frequently boomerangs and throwing-clubs, were polished and smoothed down, sitting in the shade of a tree. In default of an opossum's tooth, a point scraper was used for scratching the designs which decorated the wooden implements. This had gone on for generations, as witness the many layers of shells. Finally, when they died they were buried with their knees drawn up, looking out to the east, in the soft sand near the sea.

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

AN ENTOMOLOGIST IN SOUTHERN QUEENSLAND.

BY F. ERASMUS WILSON.

(Read before the Field Naturalists' Club of Victoria, 11th July, 1921.)

QUEENSLAND, the Mecca of all southern entomologists, had long called me, but it was not till last October that I was afforded an opportunity of making the trip. Taking my wife with me, I travelled overland so as to save as much time as possible, and saw much of interest during the long if somewhat tedious train journey of 1,300 miles. The country between Melbourne and Sydney was familiar to me, but, after leaving Sydney, at many an inviting locality I heartily wished that the train would develop some shortcoming and enable me to obtain an hour or so collecting. However, all went well with the "iron horse."

After leaving the border station, Wallangarra, I was particularly interested in seeing the pine-clad ridges of the Macpherson Ranges, which reminded me somewhat of pictures I had seen of pine country in North America. The country hereabouts is wonderfully rocky, and it is here that the new Lyre-bird has recently been found, although unknown to ornithologists at the time of my visit. It is certainly the last place in the world that I should have expected to be tenanted by a Menura. Many very beautiful wild-flowers were noticed growing amongst the rocks, but the speed of the narrow-gauge train was too fast for me to be able to form an opinion as to their probable identity.

During the passage of the Darling Downs, which was a veritable Garden of Eden, thousands of the pretty little yellow butterfly, *Terias smilax*, Don., were observed, and at King's Creek the first Queensland beetle introduced itself by flying into the carriage and alighting on my coat. This I considered a good omen. However, I was able to greet it as an old friend, as I quickly recognized it as the noxious Pumpkin Beetle, so plentiful in our own State. On the margins of the muddy creek beneath the station a pair of Black-fronted Dottrels were feeding, whilst the sweet notes of Reed-Warblers issued from a neighbouring bed of reeds. At Toowoomba I was greatly struck with the huge honour-board that is erected in the station premises, and which testified as to the great patriotism of the local inhabitants. The scenery encountered after leaving this station is indeed magnificent, and many things of interest came under notice. Here I saw for the first time the football-like Termitaria attached to the sides of trees, and here also I caught my first glimpse of that avian gem, the Variegated Wren, *Malurus lamberti*. Along the banks of a creek the scarlet-flowering Callistemons made a great show, and a few

Silky Oaks, *Grevillea robusta*, with their yellowish flowers, were also noticed. On reaching the flats again I saw another form of Termitarium, consisting of a small mound about two feet in height, constructed of yellow earth. These were scattered over the paddocks in hundreds, and were quite a feature of the landscape. The white ant that builds these structures apparently feeds on grass, as in opening a mound at a later date I found most of the passages filled with dead grass. Owing to the fact that the mounds are so numerous, they must be a serious handicap to the pastoralist, as, apart from the grass-collecting propensities of the termites, the mounds take up a considerable area of the possible grass-growing land in each paddock.

Brisbane is not reached until nightfall, so one does not get one's first impression of the northern capital until the following morning. Our host, Mr. H. S. Pottenger, with whom I had spent many a pleasant collecting trip around Melbourne, welcomed us at the station. The next few days were spent in visiting the entomological brethren in Brisbane, whom formerly I knew only by repute. A very interesting morning was spent with Mr. Tryon and Mr. Jarvis at the Department of Agriculture, and an examination made of the departmental collection. Another delightful morning was passed with Mr. White, the Government Botanist, at the Herbarium and Botanical Gardens. Several beautiful orchids were flowering in the open fernery, and gorgeous flowering shrubs everywhere attracted my notice. The enormous bamboos, some 50 or 60 feet in height, with great thick canes in proportion, were a feature of the gardens, and I am told that, when a brake of these gets fired, the noise is deafening, owing to the explosions of the large air-tight compartments between each node.

Mr. Longman, the director, and Mr. Hacker, the entomologist, both contrived to make my visits to the Museum of absorbing interest, and very kindly placed some of the Museum duplicate boxes at my disposal. I was thus enabled to add several very fine Queensland beetles to my collection. The entomological display in the main body of the Museum is indeed a splendid one, and far ahead of anything to be seen in either the Sydney or Melbourne Museums, and testifies to the excellent work done by Mr. Hacker. The reference collections are also very extensive, and particularly rich in some groups. I was also greatly pleased to have an opportunity of meeting Mr. K. Illidge and viewing his extensive collection of Coleoptera. Mr. Illidge's kindly manner instantly puts one at ease, and I learned many interesting facts on beetle life during my conversation with him. He has bred a very large proportion of the specimens in his collection, and consequently so many of them are

in the most perfect condition. His Cerambycidæ are worth going far to see.

After weighing the merits of Mount Tambourine and the Blackall Ranges, Mr. Pottenger and I decided to have a few days' collecting at the latter locality, and started away early one morning for Montville, which is situated at the highest point of the ranges. We travelled by train to Palmwoods, some 60 miles north of Brisbane, and thence by coach. On the train journey up we passed some very fine clumps of cabbage palms growing in their natural surroundings, and several epiphytal orchids, growing high up in the trees, were observed. I noticed that the common Native Shot, or Meat Ant, *Iridomyrmex detectus*, here seemed to construct their mounds much higher than they do in Victoria. This ant is perhaps the most widely distributed of all, as it occurs in all the States of the Commonwealth. Whilst waiting for the coach at Palmwoods I was fortunate in getting a view at close quarters of a Large-headed Shrike-Robin, *Pœcilodryas capito*, Gould. After a six-mile drive up the hills, through beautiful country, we reached our destination, "Elston," from the verandah of which one can gaze across a vast rolling valley, and see in the distance the blue waters of the Pacific. However, admiring views was not the order of the day, so, seizing our collecting kit, we were soon deep in the recesses of the dense tropical scrub, or "rain forest," as Mr. White says it should be called. Much time was spent in beating the various vines that abound in these scrubs, but they did not exactly rain Coleoptera. In this way I collected numbers of the carabs, *Colpodes Lafertei*, Montr., and *Xanthophœa rufescens*, Macl., also two species of Staphylinidæ, one of which was a handsome Pæderus. Amongst the longicorns shaken from the scrub were *Velova sordida*, Pasc., and *Porithea plagiata*, Blackb. Some very fine weevils belonging to the sub-family Cryptorhynchides, and some nice Chrysomelidæ, also fell into our umbrellas. From an old rotten log I dug out a fine example of the huge passalid, *Mastochilus capitalis*, Blackb., and near by secured my first specimen of *Pamborus Guerini*, Gary. Here we came across the only tree-fern seen on the trip—a species of Alsophila. Remembering that weevils belonging to the sub-family Cossonidæ breed in the dead frond-pith of our Victorian Dicksonias, I secured some fronds, but was disappointed to find that they were all hollow. From the under surface of a Polyporus fungus several specimens of the dainty little erotylid, *Episcaphula australis*, Bois., were collected, and another member of the same genus, *E. rufolineata*, Wilson MSS., was shaken from a clump of dead leaves.

(To be continued.)

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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, 10th October, 1921.

The president, Mr. F. Chapman, A.L.S., occupied the chair, and about 80 members and visitors were present.

REPORTS.

A report of the excursion to Boronia (Ferntree Gully line), on Saturday, 17th September, was given by the leader, Mr. F. G. A. Barnard, who reported a good attendance of members. Wild-flowers of any note were scarce, but the party enjoyed a short ramble over some of the foothills of One Tree Hill, and also made a visit to the garden of the Hon. A. E. Chandler, where quantities of the Western Australian boronia and everlastings are grown for market purposes, as also daffodils, which made a very fine display.

A report of the excursion to Werribee Gorge on Thursday, 22nd September (Show Day), was given by the leaders, Messrs. Scott and Tadgell. The former, dealing with the general results of the excursion, said that it was enjoyed by all. The party drove out from Bacchus Marsh to near the junction of the Myrniong Creek with the Werribee, where attention was called to the folding of the Silurian rocks. Proceeding up the latter stream the contact of the granite with the Silurian was examined. Returning down stream an inspection was made of the contact between the glacial deposits and the Ordovician. Later the track to the table-land was followed, and many fine views of the Gorge obtained. Some attention was also paid to botany, Mr. Tadgell reporting that nearly one hundred plants were noted in flower, of which about sixty had been exhibited at the recent wild-flower exhibition, the principal of which were Zygophyllum, sp., *Eucalyptus leucoxylon*, *E. Behriana*; the tree violet, *Hymenanthera Banksii*; *Acacia acinacea*, *A. montana*, *Cassia eremophila*, and *Myoporum viscosum*. The orchids *Caladenia carnea*, *Diuris maculata*, and *Pterostylis curta* were found blooming freely, while six ferns were noted, of which *Pteris arguta* was the rarest. Introduced plants occurred in considerable numbers, *Solanum pseudocapsicum*, with its showy red fruits, being very conspicuous.

A report of the excursion from Mitcham to Ringwood on Saturday, 24th September, was given by Mr. J. Stickland, who said that the outing was well attended, and favoured by a beautiful afternoon. His co-leader, Mr. F. Chapman, A.L.S.,

had given an interesting outline of the physiography of the district from an elevated spot overlooking the Mullum Mullum or Deep Creek valley, and evidences of early life had been found in the mudstone on the banks of the creek. As regards pond-life, in which he was most interested, the results were rather meagre, owing to the absence of permanent pools on the route taken.

A report of the excursion to Bendigo on Saturday, 1st October, was forwarded by Mr. D. Paton, one of the leaders, and read by Mr. C. Daley, who acted as co-leader. Ten members made the 200-mile trip, and were favoured with splendid weather. Flowers were found in large numbers, and, owing to the lateness of the season, many species were obtained which had not been recorded on the previous excursions to the district, at least one hundred species of plants being found in bloom. The entomologists of the party also did well, but birds were somewhat scarce, the most interesting ornithological occurrence being the finding of a fly-catcher's nest containing one egg with a cuckoo's egg in addition.

A hearty vote of thanks was passed to Mr. Paton for the very great trouble he has taken in planning the Bendigo outings, which have become an annual feature in the Club's programme.

ELECTION OF MEMBERS.

On a ballot being taken, Mrs. Mattingley, 42 Canterbury-road, Canterbury; Miss Sybil Llewelyn, "Merton Hall," Anderson-street, South Yarra; Miss Stella Newey, 238 Brighton-road, Elsternwick; and Mr. V. Gray, Harp-road, East Kew, were duly elected as ordinary members of the Club.

PAPERS READ.

The chairman announced that, as the day was the twenty-fifth anniversary of the death of the late Baron Sir F. von Mueller, for forty-five years Government Botanist of Victoria, and an enthusiastic supporter and patron of the Club, the committee had arranged for a series of papers dealing with various aspects of his life.

1. By Mr. C. Daley, F.L.S., entitled "A Sketch of Mueller's Life." The author gave at some length the story of Mueller's achievements, from his early botanical studies at the University of Kiel to his death as one of the most eminent of modern botanists, particularly in systematic work, and one who had made the elucidation of the Australian flora essentially his life-work. [Details of his life will be found in the *Victorian Naturalist* for October, 1896 (vol. xiii., p. 87).—Ed.]

2. By Mr E. E. Pescott, F.L.S., entitled "Notes on Mueller's Published Works." The author remarked that he and others greatly regretted that no published bibliography of Mueller's

writings existed. These were so extensive, and had appeared in so many languages in all parts of the world, that the task was a very difficult one; still, he thought, as a memorial of the greatest of Australian botanists, some effort should be made to compile and publish the story of Mueller's life and works, in view of the centenary of his birth, which will occur in 1925. He said he had devoted some attention to collecting his smaller published writings, and exhibited several of them in illustration of his remarks.

3. By Mr. F. G. A. Barnard, entitled "Mueller's Botanical Exploration of Victoria." The author said that nearly twenty years ago he had given before the Club (*Vict. Nat.*, June, 1904, xxi., p. 17) some account of the three wonderful journeys Mueller had made in 1852–5 through parts of Victoria still almost untrodden, and which he pointed out on the map of the State. The first—in the spring of 1852—traversed the route of the Sydney road to Beechworth, thence to the Buffalo Mountains, Mount Buller, Plenty Ranges, head of Latrobe River, Gippsland, to Wilson's Promontory, estimated at 1,500 miles. The second, in 1853, was to the Grampians, thence to junction of Murray and Darling, up the Murray to the Mitta Valley, thence to Omeo and the Alps, on to the Cobberas, thence to the Snowy River, and back to Melbourne by the main Gippsland road, estimated at 2,500 miles. The third of these wonderful journeys was through the Dandenongs to the Latrobe, thence to the Avon and up to Mount Wellington, thence by the Mitchell and Dargo to Omeo, and on to Mount Bogong, back to Omeo and on to Kosciusko, returning to Buchan, Cabbage-tree Creek, and by the main Gippsland road to Melbourne. This must also have amounted to fully 1,000 miles. He wrote to Sir W. Hooker from Omeo, saying he had "exhausted the alpine flora, and had wandered for days without seeing a new species." No wonder collectors of later years have found it difficult to find a new species. He said it would be impossible to say how many species Mueller added to the flora of Victoria and Australia during these expeditions, which were carried out quite alone, and without any elaborate preparations; but a very low estimate would be at least 1,000 species, a large proportion of which were new to science. Later visits were made to the Genoa River, the Baw Baw Mountains, and to the sources of the Macallister. He had also visited Arnhem's Land (North-West Australia), and twice collected in Western Australia.

Mr. H. B. Williamson gave a description of his first interview with the late Baron and of the encouragement he had received to continue his botanical work.

Mr. F. Chapman, F.L.S., said that the late Baron was also a palæobotanist of high standing, and had determined many specimens for the Geological Survey of Victoria, while Schenk,

in his writings on fossil coniferous woods, had attached his name to a Phyllocladus (*P. Muelleri*) from the deep leads of Ballarat, and exhibited specimens in illustration of his remarks.

EXHIBITS.

By Mr. F. Chapman, A.L.S.—Fossil fruits from the Deep Leads of Victoria, named by Baron van Mueller, including *Pentenne trachyclinis* (Sapindaceæ), *Spondylostrobus Smythi* (Coniferæ), and *Plesiocapparis megasperma* (Capparideæ); copies of decades 1 and 2 of Mueller's "Observations on New Vegetable Fossils": a slab of Middle Cambrian slate showing well-preserved remains of a brachiopod, *Marella splendens*, from Burgess Co., British Columbia, with a recent specimen of Lepidurus (Nat. Mus. Coll.) from Wentworth for comparison.

By Mr. G. Coghill.—Cultivated native flowers—viz., *Grevillea rosmarinifolia*, *Daviesia latifolia*, *Goodia lotifolia*, and *Leptospermum lævigatum*; also herbarium specimens named by Baron von Mueller.

By Mr. A. D. Hardy, F.L.S.—Photograph of Baron von Mueller at 35 years of age.

By Miss G. Nokes.—Flowers of *Eriostemon corrœifolius*, *Dampiera stricta*, *Baeckea diffusa*, *Comespermum ericinum*, *Pimelea axiflora*, &c., from Tooronrrong, Plenty Ranges; *Boronia anemonifolia*, *Calythrix tetragona*, and *Baeckea diffusa*, from Bendigo; *Calochilus Robertsoni* (Father Christmas Orchid), from Rushworth.

By Mr. C. Oke.—Fifty species of Coleoptera from Bendigo excursion, ten of which were ants' nest enquilines, including four species of Articeras, *Paussilinus latericornus*, Lea, and Chlamydopsis, sp. nov.; also two Gecko lizards.

By Mr. E. E. Pescott, F.L.S.—Rare books and pamphlets published by Baron von Mueller; the *Argus* biographical notice of the Baron's death; copy of the hymn-sheet used at the Baron's funeral.

By Messrs. Pescott and French.—List in the Baron's writing of his last exhibits at a Club meeting, September, 1896 (three weeks before his death).

By Mr. F. Pitcher.—Flowering specimens of *Acacia Riceana*, Henslow, grown from seed by Mr. T. S. Hart, M.A., at Scoreshy; on behalf of Mr. J. A. Ross, Nanneella, photographs of Southern Stone-Plover, *Burhinus grallarius*, taken at Rochester, and of Koalas (mother and young) taken at Inverloch.

By Mr J. Searle.—Photograph of Baron von Mueller; larvæ and pupa of Simulium, sp.; larva of aquatic beetle, showing peculiar branchial process (under microscope).

By Mr. J. R. Tovey, on behalf of National Herbarium.—Collection of plants named after Baron von Mueller: also MS. bibliography of the Baron's publications.

By Mr. L. Thorn.—Two species of butterflies and twenty-three species of moths collected during Club excursion to Bendigo, including *Candalides hyacinthia simplexa*; also Little Whip Snake, *Hoplocephalus flagellum*, M'Coy, from Cheltenham.

By Mr H. B. Williamson.—Dried specimens of *Arthrocnemum halocnemoides*, Nees., var. *pergranulatum*, J. M. Black; and *A. leiostachyum*, Nees., two species hitherto regarded as *Salicornia arbuscula*, R. Br.; also *Kochia triptera*, Benth.—all determined by Mr. J. M. Black, of Adelaide.

After the usual conversazione the meeting terminated.

EXHIBITION OF WILD-FLOWERS.

Owing to the regulations under which the Melbourne Town Hall is let, it was impossible to secure it for the annual exhibition of wild-flowers, fixed for Tuesday, 27th September, hence the Club was compelled to make use of the Athenæum Hall. This proved totally inadequate to accommodate either the flowers or those who desired to see them, thus causing considerable disappointment to many who wished to leisurely study the exhibits, besides which the closeness of the atmosphere soon had a very detrimental effect on the flowers.

Her Excellency the Countess of Stradbroke had kindly consented to formally open the display, and the president, Mr. F. Chapman, A.L.S., in welcoming Her Excellency, briefly referred to the aims and objects of the Club.

Lady Stradbroke expressed the pleasure it gave her to be present that afternoon. Since her arrival in Victoria she had been greatly interested in the wild-flowers and the birds, of which she had heard very little in England. The love of wild-flowers ought to be encouraged as much as possible among the children. It was the love of the buttercups and daisies of England which had done so much towards making the Englishman love and be proud of his country, and Australian children should be taught to love and take interest in their birds, their gum trees, and their flowers, and all the blessings which they are privileged to enjoy.

Lady Stradbroke made an inspection of the exhibits, and was presented by Miss W. Chapman with a bouquet of wild-flowers.

A very fine collection of Australian flowers grown at the Melbourne Botanic Gardens was forwarded by the Director, Mr. J. Cronin, F.R.H.S., and, with palm-leaves and ferns, made an attractive feature on the platform. Here were to be seen specimens of the Waratah (N.S.W.), Geraldton Wax-flower (W.A.), Hovea (W.A.), Boronia (N.S.W.), &c.

Cultivated flowers were also shown by Mr. G. Coghill, of

Canterbury; Mr. E. O. Boase, of Ivanhoe; the Burnley School of Horticulture, and others, while Mr. J. H. Maiden, F.L.S., director of the Botanic Gardens, Sydney, forwarded a representative collection of New South Wales flowers.

The display of orchids made by Messrs. E. E. Pescott, F.L.S., and C. French, jun., in which they were assisted by Mrs. and the Misses Coleman, Miss Fuller, Miss B. Pillond, Messrs. F. Taylor, J. Gabriel, G. Coghill, F. Wisewould, and W. H. Nicholls, was a feature of the exhibition. Between forty and fifty species were represented, some of the novelties being *Dendrobium elongatum*, *Sarcochilus falcatus*, *Pterostylis mutica*, *Caladenia cucullata*, *Lyperanthus* (*Caladenia*) *suaveolens*, *Burnettia cuneata*, and *Glossodia major* (white form).

Many districts were well represented. Mr. G. Coghill had scoured the Taradale district, with excellent results; Mr. D. J. Paton forwarded a fine collection from Bendigo; Mr. J. C. Goudie from Maldon; Mr. A. J. Tadgell from Werribee Gorge, &c.

With the view of encouraging the growth of native plants the committee had made arrangements with certain nurserymen for a supply of the more attractive shrubs in pots. These were in great demand, as well as bunches of cut flowers, such as the Bendigo boronia and wax-flower, the lavender Swainsona from Rutherglen, &c. In fact, the demand for flowers was so great that long before closing time the stalls were practically empty. If, as the result of these annual exhibitions, a desire to grow some of our native plants in suburban gardens has been created, then one of the ideals of their promoters will have been accomplished.

Botanical objects under microscopes were exhibited by several members, and proved a great source of interest to numerous visitors, particularly students from colleges and schools, who were present in large numbers.

Through the district foresters, Mr. A. D. Hardy, F.L.S., was enabled to make a display of foliage and flowers of about 40 species of eucalypts on behalf of the Forest Commission.

From Broken Hill came a fine display of Sturt's Desert Pea, forwarded by Dr. Macgillivray, a country member. Western Australia was represented by many attractive species, which had borne the long journey well, while the Adelaide Field Naturalists' Club also forwarded a contribution.

Unfortunately, the hurried manner in which the parcels have to be opened up and staged prevents anything like a complete list of the flowers exhibited being compiled, but it may be safely said that the exhibition compared favourably with any of its predecessors for novelty and variety in the exhibits.

The list of members and friends who forwarded flowers is very incomplete, owing to the fact that many persons omitted to

enclose either the name of sender or where the flowers were collected. The following are the localities and names of senders as far as could be ascertained:—New South Wales.—Mr. J. H. Maiden, I.S.O., Botanic Gardens, Sydney; Mrs. J. Doyle, Northcote-avenue, Sydney Dr. Macgillivray, Broken Hill. South Australia.—Mr. E. Ising, Adelaide. Western Australia.—Mr. ——, per Miss Fuller. Victoria.—Ouyen—Mr. H. B. Williamson; Speed—Mr. G. Arnold; Ultimo—Mr. J. Buckley, Mr. — Baldwin; Stawell—Mr C D'Alton; Mount William, Moyston —Mr. — Fernie; Bendigo—Mr. D. J. Paton, Mr. H. C. James, Mr. J. Semmens, Mr. G. Green; Dingee—Mrs. J. Grylls; Maldon —Mr. J. C. Goudie; Tarradale—Mr. G. Coghill; Chiltern—Miss Boucher; Springhurst, Miss Turner; Moe—Mr. M. A. Ward; Myrtlebank—Miss Warren; Heyfield—Mrs. Best; Nowa Nowa—Mr. D. M'Lachlan; Briagolong—Mr. J. Firth; Dandenong—Mr. H. B. Williamson; Yarram—Mr. A. K. Small; Neerim South—Mr. V. Heyden; Wilson's Promontory—Mr. W. J. Cripps (ranger); Pakenham—Mr. F. Wisewould; Ringwood—Mr. F G. A. Barnard; Evelyn—Mr C. Oke, Mr. Earle; Mount Dandenong —Master M. Metzger; Belgrave—Mr. F. Pitcher; Greensborough —Mr. Ford; Sandringham—Miss Fordyce; Parkdale—Miss Hodgson; Frankston—Mr. J. W. Audas (45 species); Ivanhoe —Mr. A. Blake, Mr. E. O. Boase; Balwyn—Mr. F. Chapman.

The providing of afternoon tea and other refreshments was in the hands of Miss Gabriel and a number of lady friends, resulting in a considerable addition to the financial results. The attendance numbered about 3,000, which will enable a substantial amount to be placed to the credit of the publishing fund.

In order to ascertain the flowers most favoured by the public a vote was taken by means of slips deposited in a box at the door, and, while interesting, it cannot be taken as more than the opinions of a few, for many felt themselves unable to vote with confidence on the question. The result, however, placed the Bendigo Wax-flower, *Eriostemon obovalis*, first, with the Waratah (N.S.W.) second, the Pink-flowered Ironbark (*Eucalyptus leucoxylon*), the orchid *Glossodia major*, the Grampian Myrtle (*Thryptomene*), and Pink Eyes (*Tetratheca*) being equal in popularity. These six flowers are illustrated in the November issue of the *Home Gardener*.

A Mallee National Park.—There seems to be some chance of a sanctuary for animal life and plants being created in the vicinity of Lake Albacutya, about 20 miles north-west of Rainbow, where a tract of land of about 16,000 acres, useless for farming purposes, but eminently suitable for natural history requirements, has been gazetted as a National Park.

AN ENTOMOLOGIST IN SOUTHERN QUEENSLAND.

BY F. ERASMUS WILSON.

(Read before the Field Naturalists' Club of Victoria, 11th July, 1921.)

(Continued from page 56.)

I was not long in that gully before I learnt what lawyer-vine was (I presume so named from the fact that when once you get into its toils you have great difficulty in getting out again). However, after getting my face mixed up with two or three of its saw-toothed tendrils, I learned to pay great respect to this member of the Queensland flora. Seeing a beautiful shrub with leaves some ten or twelve inches in width, I remembered having heard that in Queensland many insects rest on the under surface of large leaves. I was not long in getting my umbrella beneath a branch, and was soon vigorously hammering the tree with my beater. In doing so I brought my bare arm into contact with a portion of the plant, and was thus enabled to establish the identity of still another example of the famous Queensland vegetation, for it was the veritable Giant Urtica, or Stinging-Tree. It set up a violent irritation which lasted for a couple of hours, and recurred every time I washed the affected part for two days afterwards. On raising a stone I found another old Victorian friend in the Bombardier Carab, *Pherosophus verticalis*, Dej., and another stone sheltered a specimen of *Cardiothorax aratus*, Pasc. I was particularly fortunate in obtaining a specimen of *Adelium delicatulum*, Cart., of which Mr. Carter tells me he had only previously seen the two type-specimens. Another very handsome tenebrionid that occurred in this gully was *Scirotrana Mastersi*, Macl., and I also secured a beautiful colour variety of *Licinoma elata*, Pasc.

On the outer edge of the scrub there grew a tree with inconspicuous though sweet-smelling flowers, which yielded splendid results to the collecting umbrella. I was particularly delighted to capture a pair of the rainbow-hued chrysomelid, *Spilopyra sumptuosa*, Baly., a most tropical-looking insect. This tree seemed to be very attractive to the Malacoderm family, the following six species falling into my umbrella:—*Carphurus pallidipennis*, Macl., *C. telephoroides*, Fairm., *Belanophorus rhagonychinus*, Fairm., *Heteromastrix luridicollis*, Macl., *Selenurus*, v. *flavius*, Lea, and *Telephorus flavipennis*, Macl., a wonderful haul from a single small tree. Some richly-coloured Coccinellidæ, or Ladybirds, besides several other interesting though small fry, also awarded our attentions.

One day we set out along the range in a northerly direction. The morning was calm and hot, and as we passed along between the dense thickets of the introduced Lantana we were awe-struck

with the beauty of the butterfly hosts that met our gaze. They were there in thousands, from the busy little Hesperidæ, or Skippers, even up to the gorgeous green, velvet-winged Ornithopteras, or Bird's-wing butterflies. Papilios, or Swallow-tails, were there in force, perhaps the most common being *P. Macleayanus*, a somewhat rare butterfly as far as Victoria is concerned. The whites and yellows were extremely plentiful, and the lycænids or blues were also well represented. I had not conceived it possible that such a wonderful variety, in such numbers, could be congregated into such a small area. Lewin's Honey-eaters were very plentiful in this locality, and looked most graceful as they darted in and out amongst the dainty pink blossoms of the Lantana. Though this plant seems to be a dreadful scourge in Queensland, I was informed that it is fairly easily destroyed, and that the land upon which it has grown is generally considered to have been improved by its presence. On a banksia tree I found a pair of the rather handsome weevil, *Leptops maleficus*, Lea, and, near by, a couple of very nice species of Onthophagus. An old fig log proved to be a happy hunting-ground for Tenebrionidæ, as from it we obtained *Hypaulax ovalis*, Bates, *H. foveatus*, Blackb., *Promethis quadricollis*, Pasc., *Ulodica hispida*, Pasc., and the old familiar *Uloma Westwoodi*, Pasc.

A narrow track leading from the road into the recesses of a dense growth of tropical scrub looked inviting, so, leaving the bright sunlight, we slid down a declivous passage into the darker scrub. Some feet of the nether end of a large, fat snake, disappearing into the thick carpet of fallen leaves, sent an unpleasant feeling down my spine, but I was soon engrossed in log-rolling, and quickly forgot the serpentine presence. A fine carab of the genus Leiadita, which my friend, Mr T. G. Sloane, has been unable to identify for me, was the first catch of note, soon followed by the capture of a particularly large pair of *Pamborus viridis*, which caused us no little excitement. More weevils, staphylinids, and carabs were beaten from the vines, and from beneath a piece of bark I turned out a specimen of *Siagonyx Mastersi*, Macl.

Being by now very thirsty, the sight of the beautiful green foliage of a banana orchard proved attractive, but an investigation yielded nought but two tiny tomatoes, the banana trees being mostly in flower. Leaving the scrub again, we were amused by the antics of a small snake in its endeavours to get out of our path. A near-by orange orchard—the Blackalls are famed for their citrus orchards—with a wealth of golden fruit tempted us to break the fifteenth commandment. We yielded, and it was not long before we were contentedly sucking away at our ill-gotten gains. After I had thus despatched two, I

broke one open, and was horrified to find it contained a mass of maggots of the Queensland fruit-fly, Dacus, sp. We afterwards found out that practically the whole of the local crop was ruined by the ravages of this fly. Oranges, apparently without a blemish, were found to be full of the fruit-fly maggots, which, at the right time, eat their way out of the fruit and pupate in the ground. Some moss was collected from the trunk of a eucalypt, from which I later secured several small forms of beetle life, including a most interesting little weevil with enormously enlarged hind femora. The young eucalypts yielded several species of Chrysomelidæ, most of them belonging to that large genus Paropsis.

One morning I was attracted to an old stump by a loud buzzing noise, and expected to find it tenanted by bees. The noise was certainly hymenopterous, but emanated from a colony of wasps, that were densely clustered around a hole near the ground. Upon my attempting to bottle a specimen most of them retreated inside; but one crotchety member spitefully attacked me, and it required no little skill upon my part in wielding the net to save the day. One of the largest of the Adelinms—*A. striatum*, Pasc.—was frequently found under logs in the open spaces.

Upon two evenings we sallied into the scrub with a lantern, but the nights were unsuitable, and we secured but a few species of moths. A brightly luminous object, certainly much too large for the little phosphorescent malacoderms of the genus Luciola, was seen crossing the gully, floating high amongst the tree-tops. What it could be I cannot conjecture, unless some of our larger Elateridæ are capable of emitting luminosity.

We left Montville early one morning and travelled back to Palmwoods by the coach, and that coach ride will long remain impressed upon my memory. The road down the steep hills consists of a succession of S curves, so acutely formed that, should the horses get much out of a walk, it would be impossible to negotiate them. The curves are cut out of the hillsides, and are bounded on their outer edge by the most precipitous gullies. Our coachman was a grand old chap, but possessed of but a single eye, so that travelling these curves behind a four-in-hand was somewhat of a hair-raising experience. It was State election day, so a halt was made at the local State school whilst my companion exercised his privilege of franchise and I inspected the school museum, stowed away in sundry jam and pickle jars. One exhibit only aroused my cupidity, and that was a fine large specimen of *Batocera Boisduvalii*, Hope. We left our baggage at the Palmwoods hotel and set out along the little narrow-gauge railway line that leads to Mount Budderim. Some wattles yielded a couple of species of Belus,

and a little later I captured a specimen of that curious little carab, *Acrogenys hirsuta*, Macl. A very dainty little Cryptocephalus was taken on the wing, but diligent sweeping of the low herbage yielded nothing. Two examples of the butterfly *Tisiphone abeona Rawnsleyi*, Misk., were netted. This species is a form of our common Victorian Tisiphone, and is only found in a very limited area between the Blackalls and the coast. After travelling two or three miles along the line we came to a crossing over a small creek, and made this our head-quarters for the rest of the day. The creek was an attraction to bird-life, and our camping spot evidently a favoured drinking place of the feathered community. A bevy of Red-browed Finches performed their ablutions without heeding our presence, and a confiding Yellow-breasted Robin reminded us of our Victorian fern-gullies. Black-faced and Leaden Fly-catchers, White-shafted Fantails, Harmonious Shrike-Thrushes, and Black-and-White Fantails all visited the creekside whilst we ate our dinner. On beating the foliage of a large shrub I was greatly surprised to find in my umbrella a number of the beautiful green staphylinids, *Stenus cæruleus*, Waterh., as the Victorian member of the genus, *Stenus cupripennis*, is always found sunning itself on the margins of pools and creeks. I also collected here some weevils, longicorns, and chrysomelids, the most interesting of the latter being a dainty little Aspidiomorpha, a study in green and gold. It is much to be regretted that so many of the Chrysomelids lose their brilliant colouring after death, this little sprite being now merely an opaque yellow hue. From beneath a log out in the open I disturbed a pair of the rather handsome *Notonomus nitidicollis*, Ch. Some long tussocks of sword-grass were cut off near the roots and broken up over our umbrellas. In this way we secured some elaterids, pselaphids, scydmænids, silphids, and also specimens of the red and black *Pæderus maculatus*, Macl. Earlier in the day, Mr. and Mrs. Bromwich, who lived adjacent, had kindly invited us to come and have afternoon tea with them; so we wended our way up a very pretty bush track to the homestead, a typical little Queensland home nestling amongst the gum-trees. Our host and hostess were interested in ornithology, and so a very pleasant hour or so was spent in their company. On the way back, in the twilight—which in Queensland is of very short duration—we collected some Nitidulidæ from a flowering spike of Xanthorrhœa, and also netted a couple of species of Heteronyx. We decided to make for Caboolture, so, collecting our traps, we started for the station to catch the evening train. Around the station lights there were swarms of the little *Aphodius granarius*, Linn., which apparently breeds very prolifically hereabouts.

Reaching Caboolture, we obtained lodgings at one of the local hotels, and, being very tired after our long day, retired early to rest. My companion was such an ardent entomologist, however, that I had barely fallen asleep before I was awakened to examine a very fine large hemipterous specimen that he had secured in his bed. In all, four specimens of this family, belonging to the genus Cimex, were taken, so that our night's rest was a very troubled one. Mr. Pottenger declared that other families of insects were also represented in his bed, but, being utterly worn out by now, I drowsily exclaimed, "Let 'em all bite."

Next morning we made north towards the picturesque Glasshouse Mountains, so called, I believe, by one of our early navigators, who saw in their acute peaks a resemblance to the bottle-shaped chimneys of a glass-manufacturing establishment. Near these mountains several returned soldiers have been settled on pineapple plantations. A nest of the ant *Iridomyrmex nitidus* yielded a staphylinid of the genus Dabra, all the species of which are myrmecophilous. The tea-tree, *Leptospermum flavescens*, was well in flower, and some Diphucephala and a longicorn of the genus Pterostenus were taken. Some very symmetrical white-barked eucalypts invited barking attentions, and rewarded our labours with *Adelioplus obscurus*, Cast., *Agonochila sublævis*, Ch., *Chalcopterus Arthuri*, Blackb., *C. cupripennis*, Hope, and *C. lævicollis*, Bless. A small pond was investigated with the net, and a rather fine dytiscid, with a white stripe near the outer edge of each elytron, was the principal find. Some more flowering tea-tree yielded some small Curculionidæ and a Microthætes. Banksia flowers (as they do in Victoria) gave us a nice little black-and-white weevil of the genus Cydmaea, and I noticed a form of tree locust that constructed for itself a kind of cocoon out of the velvety material that is attached to the core of dead banksia flowers. After securing a nice brenthid, we made our way back to the township, being driven in by the need of liquid refreshment. Later, we made another short excursion in a different direction, securing, amongst other things, a species of Læmosaccus and a nice Scaphid. Wishing to search for ant-nest beetles in a nest of the meat ant, I raked a considerable portion of one nest into my umbrella, and moved it from place to place until most of the ants had crawled off. My only find, however, was a single male of *Articerus Wilsoni*, Lea.

Another very pleasant excursion was made to Goodna, which lies out towards Ipswich. A couple of miles south of the station there is a small patch of the original scrub left, so we made our way towards this, following the sandy bed of a dry creek. The course of this creek was marked by a perfect

blaze of scarlet, as the Callistemons were in full flower. As we passed along we disturbed a Red-tipped Pardalote from her nesting-burrow, and were scolded by many Friar-birds who were feeding amongst the Callistemons. The scarlet flowers, whilst attractive to Hymenoptera, were sterile as far as Coleoptera were concerned. From beneath logs were obtained many specimens of the highly-glossed *Omolipus corvus*, Pasc., and a few examples of a very similar-looking tenebrionid, *Encyalesthus punctipennis*, Pasc. Another beetle that was extremely plentiful behind bark was the dumpy *Amarygmus convexus*, Macl. *Thallis Australiæ*, Lea, MSS., was located in a rotting Polyporus fungus, and I was extremely gratified to find a specimen of the ant nest histerrid, *Ectatommiphila opaca*, Lea. An old Hoop Pine log was attacked with a tomahawk, and a newly-emerged specimen of a handsome elaterid of the genus Alaus unfortunately damaged in the process. Mr. Illidge informs me that larvæ of members of this genus are predaceous, some of them specializing on certain longicorn larvæ. A Cudgerie log, on being split open, was found to contain larvæ and pupæ of a very large longicorn, and I have since been successful in rearing two of the pupæ, which proved to be *Agrianome spinicollis*, W. S. Macl. In this log I also found a few specimens of a very nice little Lemodes. In a dead twig of wood I discovered a perfect though dead specimen of the buprestid *Astræus Masterai*, Macl. In the crevices of the bark of a large Bean-tree were taken a very quaint horned cryptorhynchid, *Glochinorrhinus Doubledayi*, Waterh. On either side of the rostrum, near the apex, there is a horn-like projection, the use of which it is difficult to conceive. A specimen of the rare March Fly, *Tabanus Davidsoni*, was obtained from the trunk of a tree, and from the foliage of a small wattle hundreds of specimens of a small weevil, *Titinia ignavia*, Pasc. I was attracted to the wattle by its moribund appearance, wondering if some borer had attacked its roots. However, the weevils were responsible, as they had devoured the outer skins of nearly every leaf of the tree. A large Xantholinus, probably *torquoni*, Fvl., was turned out from beneath a log. It is very like our common Victorian *X. phœnicopterus*, Er., so frequently found in Melbourne gardens. Near here I was fortunate in locating a nice little chrysomelid, which I have since named *Oomela bicolor* (MSS.) Some bovine remains were judiciously turned over, and rewarded us with two species of Trox, two of the introduced Necrobia, and a particularly large specimen of the silphid, *Necrodes osculans*, Vigors.

Perhaps one of the most interesting beetles secured was the fine large anthribid, *Ancylotropis Waterhousei*, Jek., with its tapir-like snout and long, thin antennæ—much longer than

the beetle itself. Four of them were resting on the limbs of a dead wattle, from which I have no doubt they had recently emerged. Another particularly interesting little beetle, two pairs of which fell to my lot, was a scydmænid, with wonderfully abnormal antennæ. In the sandy bed of the dry creek were obtained numerous examples of *Hycocis pubescens*, Macl., besides many of an anthicid of the genus Mecynotarsus. Another afternoon was spent collecting around Mount Coot-tha, which, the guide-book tells us, signified in the aboriginal tongue "honey." In a gully I found a single example of a Tachys, which Mr. Sloane considers a particularly interesting one, and which he has named after me. The principal finds around the mount were *Pterohelæus cornutus*, Macl., *P. piceus*, Kirby, *Cardiothorax errans*, Pasc., *Adelium porcatum*, Fab., *Metoponcus cyanicipennis*, Macl., and one of the very rare Lymexylonidæ.

On the way home a few days were spent in Sydney, and the opportunity thus afforded taken of visiting the well-known entomologists, Messrs. H. J. Carter and Dr. E. W. Ferguson, with each of whom I spent a very pleasant and interesting evening. Mr. Carter's wonderful collection of Buprestidæ and Tenebrionidæ are an eye-opener, and to view Dr. Ferguson's unique collection of amycterids was a treat indeed. A visit was also paid to the Australian Museum, where I met Mr. Musgrave, the newly-appointed entomologist, who kindly showed me some of the Macleay and King types that are housed in that institution. Two short, though pleasant, collecting trips were taken to Narrabeen and National Park. At the latter place I was pleased to take three species of Chlamydopsis, one specimen of Serricollis, Lea, two of Excavata, Lea, and six (all in one nest) of Epipleuralis, Lea. From Narrabeen I brought home a small limb of a dead Casuarina, from which I later bred out several specimens of the common weevil, *Orthorrhinus cylindrirostris*, Pasc.

This concluded my collecting experiences for the trip, and there only remained the somewhat tedious task of mounting all my captures. In all, several hundreds of specimens were brought home, representing Coleoptera, Lepidoptera, Forficulidæ, Blattidæ, Diptera, Hymenoptera, and Termites. So far three new species of beetles have been named as a result of the trip, and there will probably be several more when all the material has been fully dealt with.

[NOTE.—The following corrections should be made in the first portion of this paper:—Page 55, line 16, for "H. S." Pottenger read "H. L." Page 56, line 31, for "*Velona*" read "*Velora*," and in line 37 for "Gary" read "Gory."]

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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, 14th November, 1921.

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

REPORTS.

A report of the excursion to Paradise (lately renamed Clematis), on the Gembrook line, on Saturday, 15th October, was forwarded by the leader, Mr. J. W. Audas, F.L.S., who reported a good attendance of members. The party walked along the line towards Emerald, then, turning northwards, descended into the valley of the Menzies Creek, and traversed the tourist track, which abounds in vegetation of all kinds, and affords many delightful vistas. The track was followed back to Paradise, where the evening train to town was taken. While a large number of plants and shrubs were noted in bloom, none of the species was of great rarity.

A report of the excursion to Eltham on Saturday, 22nd October, was given by the leader, Mr. E. S. Anthony, who said that the outing had been well attended. The party was met by his co-leader, Mr. W. Tonge, and, favoured by a beautiful afternoon, an enjoyable ramble resulted. The object of the excursion was to see the birds nesting, and, owing to Mr. Tonge's knowledge of the locality, the nests of numerous birds were pointed out, and remarks as to their peculiarities made the ramble most instructive. Afternoon tea was kindly provided by Mrs. Tonge, and all returned to town well satisfied with the outing.

On the motion of Messrs. F. G. A. Barnard and H. B Williamson, a hearty vote of thanks was directed to be conveyed to Mr. and Mrs. Tonge for their hospitality.

A report of the excursion to Healesville on Saturday, 29th October, was, in the absence of the leader, Mr. E. E. Pescott, F.L.S., given by Mr. H. B. Williamson, who said the excursion had been arranged principally for the collection and study of orchids, and of these some twenty-five species were seen or collected. The Giant Moss, *Dawsonia superba*, was found in luxuriant growth at Condon's Gully, where also the orchid *Chiloglottis Muelleri* was noted on the tree-fern trunks; among the other orchids seen were *Diuris punctata* and *Pterostylis furcata*. The party was greatly indebted to Mrs. Coleman, of Healesville, for afternoon tea and for the inspection of her garden, in which a number of our native orchids are being cultivated.

On the motion of Messrs. Williamson and Barnard, a vote of thanks to Mrs. Coleman was carried unanimously.

A report of the excursion to the You Yangs on Cup Day (Tuesday, 1st November) was given by the leader, Mr. C. Daley, F.L.S. The day turned out rather warm, and the five-mile walk to the hills was found rather trying. A visit was paid to the forestry plantation on the western side of the range, where Sugar Gums and the Canary Island Pine were seen to be doing very well. The Snowy Prostanthera, *P. nivea*, one of the characteristic shrubs of the district, was found to be in fine bloom, as also the Late Black Wattle, *Acacia mollissima*, but the range does not possess a very extensive flora. Owing to the heat, few birds of any importance were noted. Mr. L. Thorn, who devoted himself to Lepidoptera, noted eight species of butterflies, securing pupæ of the Scarce Mistletoe Blue, *Orgyris abrota*, and of the Mistletoe Blue, *O. olane*. Among the butterflies taken were the Lesser Wanderer, the Wood White *Delias aganippe*, the Little Copper, *Lucia lucanus*, and the Caper White, *Anaphaeis java teutonia*. Several larvæ of the Australian Admiral, *Pyrameis itea*, were found feeding on the nettles. Mr. C. Oke secured thirty-seven species of Coleoptera, several of which are peculiar to the district.

A report of the excursion to Grice's Creek, *via* Frankston, on Saturday, 12th November, was given by the leader, Mr. F. Chapman, A.L.S., who reported an interesting day. The locality is interesting both physiographically and palæontologically, and on this occasion yielded a fine variety of specimens.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Margaret Guerin, West Bourke Hotel, Queen-street, Melbourne; Mr. E. O. Boase, Ivanhoe; Mr. Arthur Jones, 116 Eglinton-street, Kew; and Mr. A. E. Rodda, Norwood-avenue, Brighton, were duly elected as ordinary members; and Mr. H. M. Collins, "Gracehill," Frankston, as a country member of the Club.

GENERAL BUSINESS.

On the motion of Mr. F. Pitcher, a letter of condolence and sympathy was directed to be sent to Mrs. Drake, of Upper Beaconsfield, on the death of her husband, Dr. Drake, a country member of the Club, to whom the members had been indebted for hospitality more than once when visiting the district.

REMARKS ON EXHIBIT.

Mr. F. G. A. Barnard called attention to an exhibit of a specimen of a European edible frog, *Rana esculenta*, preserved by a special process by Mr. D. M'Alpine, a former member of the Club, when a biological lecturer in Edinburgh, in October, 1881, where it had been used for teaching purposes. A paper

describing the process was read by Mr. M'Alpine before the Club in April, 1886 (*Vict. Nat.*, June, 1886. iii., p. 14), when the same specimen was exhibited. It seemed none the worse for its forty years' wear and tear. this he thought, was sufficient proof of the value of Mr M'Alpine's process, which was not at all difficult to carry out

PAPER READ.

By Mr. H. B. Williamson, entitled "Notes from the Mallee: Botany."

The author, by means of lantern slides, described the principal features of the vegetation in the northern Mallee around Ouyen, Walpeup, Murrayville, and Lake Hattah, also views taken recently of the country between Ultima, Manangatang, Cocamba, and Ouyen. Several of the flowers illustrated seemed worthy of introduction into our gardens, and dried specimens of the more notable species were exhibited.

NATURAL HISTORY NOTE.

Mr. F. G. A. Barnard stated that when passing along the Donnabuang track, between Panton's and the head of the Don, on 30th October, he saw a specimen of the scarce butterfly, *Papilio sthenelus*. The specimen was in good condition, indicating that it must have been bred in the district, which is about 2,000 feet above sea-level. He also mentioned, as a caution to intending tourists, that the track from Millgrove, on the Warburton line, to Ben Cairn Rock is so overgrown and obstructed by fallen timber as to be quite impassable.

EXHIBITS.

By Mr. E. S. Anthony, on behalf of Mr. W. Tonge.—Twelve water-colour drawings of Victorian birds frequenting Eltham district.

By Mr. F. G. A. Barnard.—Specimen of a frog preserved by Mr D. M'Alpin by a simple process of drying in October, 1881.

By Mr. F. Cudmore.—Three cases of Balcombian fossils from Grice's Creek, near Mornington; also case of fossil shells of Upper Cretaceous age replaced by precious opal, from Stuart Range, Central Australia.

By Mr. F. Chapman.—Fossils from Grice's Creek, near Mornington; and, on behalf of National Museum, Cyprid limestone, from Bennett's Tank, near the South Australian border, Mallee, Victoria.

By Mr. M. Moodie.—Geological specimens.

By Miss G. Nokes.—Flowers from Upper Yarra.

By Mr. C. Oke.—Thirty-seven species of Coleoptera from You Yangs excursion, including *Eclatommiphila opaca*, Lea.

By Mr. L. Thorn.—Larvæ and perfect insects of three gum moths—*Nola lugens*, *Ginosanda Boisduvalli*, and *Trichiura mesomelas*.

By Mr. J. R. Tovey, on behalf of the National Herbarium.—Dried specimens of *Aponogeton distachyum*, Thunb., "Cape Pond Lily" (Naiadaceæ), collected at Stony Creek, Lorne, Victoria, by Rev. A. C. F. Gates (not previously recorded as growing wild in Victoria); *Luzula campestris*, D. C., var *australasica*, Buch. (syn. *L. Oldfieldii*, Hook f.) (Juncaceæ), from Bennison's Plain, Gippsland, collected by A. W. Howitt, 1887, Hawkesdale, H. B. Williamson, May, 1899, and Lorne, A. C. F. Gates, November, 1921 (this variety is a native of New South Wales and Tasmania, but has not been previously recorded for Victoria); *Zieria aspalathoides*, A. Cunn., "Hairy Zieria," from Mount Tarrengower (about 1,300 feet), Maldon, Victoria, collected by Rev. W. C. Tippett, October, 1921 (this species has only been recorded from two localities in Victoria—viz., barren ridges near Goulburn River, F. Mueller, and the Grampians, A. Cunningham; the latter specimen is not represented in the National Herbarium).

By Mr. H. B. Williamson.—Dried specimens of wild-flowers from the Mallee, including Asters, Halganias, &c., referred to in his illustrated paper.—*Olearia magniflora*, *O. rudis*, *O. pimelioides*, *Halgania lavandulacea*, *H. cyanea*, *Kochia villosa*, *K. triptera*, &c.

After the usual conversazione the meeting terminated.

Donation to the National Museum.—A valuable collection of Australian Lepidoptera, belonging to the late Dr. W. Elliott Drake, M.A., of Upper Beaconsfield, for many years a member of the Field Naturalists' Club, has recently been presented to the National Museum by Mrs. Drake. The collection, which is in an excellent state of preservation, and carefully labelled, comprises over 5,800 specimens, the great majority of which were collected by Dr. and Mrs. Drake, chiefly at Upper Beaconsfield and Black Rock. It includes the types of a number of new species not previously represented in the Museum collection, and many others which, with the spread of population and the destruction of their natural surroundings, have become rare and difficult to secure.

"Journal of Agriculture of Victoria."—The November issue of this publication contains several articles of more than passing interest to naturalists. Dr. Cherry continues his paper on "The Discovery of Agriculture." An article on "The True Clovers Naturalized in Victoria," by Mr. J. W. Audas, F.L.S., of the National Herbarium, contains, besides an enumeration of the species, a deal of valuable information in a handy form; while Mr. H. W. Davey, F.E.S., gives the first portion of what should be a very useful article on "Weeds and Their Eradication."

THE GIPPSLAND LAKES COUNTRY: PHYSIOGRAPHICAL FEATURES.

By T. S. HART, M.A.

(With plate.)

(*Read before the Field Naturalists' Club of Victoria, 8th August, 1921.*)

IN 1914 the late Dr. T. S. Hall contributed to the Field Naturalists' Club a short sketch of the Gippsland Lakes (*Vict. Nat.*, xxxi., p. 31, with map), based, as he says, on two short visits. Having resided in the district for some time, I would desire to supplement that description and to deal with some points which he left open or had no opportunity of observing. If in certain matters I modify the view taken by him, I do so with full appreciation of much kindly assistance received from him in the past, and with the knowledge that he also would have welcomed further information.

My observations are made from Bairnsdale as a base, and are necessarily fuller as regards that part of the district. Lake Wellington and the head of Lake Victoria I have not yet visited. The older formations lying to the north of the Gippsland Plains include rocks of a variety of ages, dealt with, for instance, in various papers of Dr. Howitt's. For the present purpose it is only necessary to note that they had been planed down to a surface of low relief near the commencement of Tertiary time, and again trenched by steep-sided valleys after elevatory movements.

Tertiary Country.—The lower hills and the plains of Tertiary age are best understood by dividing that time into three parts—a period of deposition, a period of elevation and denudation, and a period of coastal submergence and subsequent modification, including further denudation and new formations.

Deposition of the Tertiaries.—On a surface already of low relief and undergoing deformation, there accumulated the Janjukian series, including both mechanical sediments and limestones. The brown coals further west are no doubt also related to the low relief, for such a surface would allow ready establishment of swampy conditions, especially with slight alterations of shape. Greater deformations allow the great thickness of the brown coals and of the Tertiary series as a whole. The Janjukian series was followed by the Kalimnan marls and other sediments, with which it is convenient for the present purpose to include as a later stage the great accumulation of non-fossiliferous sands, gravels, and clays which follow, just as we can group the yellow sands of Brighton with the fossiliferous rocks below them. These upper beds are predominantly sandy, and usually of little power to resist denudation. The limestones are stronger.

Denudational Phase of the Late Tertiary.—The present sur-

face forms in the Tertiary area show a succession of terraces, the upper ones cut through by the lateral valleys. As change in relative levels of land and sea took place, the land gradually emerging, the weak strata would be exposed to the attack of the waves, and would be partially removed (just as at Beaumaris the upper beds of the Tertiary series are lost—no doubt by marine denudation during emergence).

The higher terraces may be largely due to this action, but with each stage of the elevation of the land the stream would rapidly cut down to base level and widen their plains, and the lower terraces of the Mitchell are clearly related to the existing valley. The terracing is well seen about Bairnsdale, and is substantially indicated in Murray's map of Gippsland (sheet 1) by successively newer Tertiary areas at lower levels along the Latrobe. On the higher terraces north and north-east of Bairnsdale there are quartz gravels of moderate-sized pebbles with a good proportion of smaller material, forming good road gravel, as it sets well. These occur at different levels, and I incline to regard them as concentrates of the coarser material of the Tertiary beds during the formation of these terraces.

The lower terraces are characterized by the presence of a very heavy gravel, aptly called "torrent gravels" by Chapman, who urges their fluviatile character—a conclusion which their whole relation to the valleys amply supports. About Bairnsdale they occur to about 140 feet above sea-level, but up-stream they are found higher, as, for instance, near Lindenow station. The railway follows one of these terraces from Hillside (146 feet) to near Bairnsdale.

The torrent gravels are traceable south of Bairnsdale past Eagle Point, where they form the top of the cliff, and across Newlands Backwater as far as Tom Roberts's Creek, on Lake Victoria. A well-marked lower terrace forms the greater part of Bairnsdale township and the south of the parish of Broadlands. Bairnsdale station is 46 feet, and Nicholson station 48 feet above sea-level. In the Mitchell valley the torrent gravels consist of rocks which are likely to be found higher up the present valley—Devonian sandstones, porphyries, bedrock sandstones, and quartz. Weak and decomposable rocks are few, and the pebbles are well rounded. Silicified wood fragments are occasionally found, and have been derived from older formations—having been silicified before inclusion in the torrent gravels. The Bairnsdale School of Mines has also silicified wood from the Dargo High Plains, which gives a source, no doubt, in association with the volcanic rocks and within the present Mitchell catchment.

The discrepancy between Dr. Hall's determination of the gravels generally as Kalimnan and Mr. Chapman's placing of

the torrent gravels as Werikooian is due to the fact that the observations are on different gravels. Dr. Hall observed the gravels of the Kalimnan series at the Cunninghame Red Bluff, and pebbles occur here also in a bed largely composed of fossil casts above the Arachnoides bed mentioned by Hall. He would have seen the torrent gravels at Eagle Point from the boat; but, though the erosion of the underlying beds is evident, it is not more than could occur during the deposition of one series if a strong current flowed over sand just deposited. It is not evident from this section alone that the torrent gravels are a distinct series, but it is undoubted on a wide view of their occurrence and their relation to the land forms. There are gravels of the earlier accumulatory phase of the Tertiaries, as at Red Bluff and elsewhere, but the torrent gravels are distinct. They are little seen on the Bruthen road, which Dr. Hall traversed, and in passing through them in the train their real relation to the country is not easily seen.

As the main valleys cut deeper, there were left higher-level Tertiary areas between them. Thus, between the Avon and the Mitchell the railway passes over such an area (248 feet at Munro, 272 feet at Fernbank), and through this runs the intermittent stream of Providence Ponds (or the Perry River). In spite of the elevation above the main valleys and Providence Ponds, this area contains numerous swampy flats. The higher-level Tertiaries also occur between the Mitchell and Nicholson and between the Nicholson and Tambo, and beyond the Tambo reach to near the coast. They also flank the higher hills to the north. They are usually well drained, commonly carrying sandy soils, and are forest country naturally with much undergrowth. Parts are now orchards and cultivation land.

The Bengworden road, south-west from Bairnsdale, starting on a torrent gravel area, rises to a higher but similar terrace and then over a projecting tip of the higher-level sandy Tertiaries south-west of the main valley of the Mitchell; then it crosses a plain which continues to near Lake Victoria, and meets the torrent gravel area on the east. This plain is not clearly referable to any of the main valleys, and appears likely to be a marine plain dating from the emergence of this part of the land. It carries many swampy areas, its drainage system not being yet well developed. Across it is the route of the old "Commissioner's Road"—a track from Alberton to Eagle Point, where Tyers had a residence. Portions of this road are still in use. A route from Sale to Bairnsdale *via* Clydebank and Bengworden will soon be available.

It is difficult to say how far gravels may occur under this plain, as natural and artificial sections are rare. Part of it has a clay subsoil, and clay subsoil is also characteristic over the torrent gravel on the plain west of Bairnsdale. Water-

holes are kept shallow both for ease in making and because of the good holding clay. On the edge of the plain, however, near Lake Victoria, the torrent gravels are conspicuous east of Tom Roberts's Creek. There are some finer gravels further west, but I think a marine plain of denudation is most likely. The torrent-gravel terraces and the parts of this plain with clay subsoil are commonly grass land, with scattered trees—Red Gum, Casuarina, &c.—the typical open Gippsland plains. By this series of elevatory movements the land reached a higher level above the sea than now. The valleys again deepened, but, being partly in limestones, the erosion was less easy than in the sands, and these parts of the valleys would be narrower and probably more irregular.

Within the limestone area, as noticed by Clark and Dennant, there are numerous depressed areas, which are no doubt due to collapse over solution cavities in the limestone, the formation of which would be easier at this period of deep valleys. They are seen at many places on the terraces, where, commonly, the limestone is not the surface rock, but occurs below. Some are seen close west of Hillside, on the railway, and others in the Botanical Reserve and the Racecourse Reserve at Bairnsdale. Some of these hollows hold water, some not, according to whether impermeable material occurs in them or not.

The Coastal Submergence.—Coastal submergence then caused the lower parts of the valleys to be placed below sea-level, producing the characteristic deep inlets. Lake Tyers, Lake Bunga (east of Lakes' Entrance), and the North Arm at Lakes' Entrance are mentioned by Dr. Hall as "drowned valleys," but the feature is much more widespread. There are numerous inlets from the Lakes between Kalimna and Metung which are smaller drowned valleys, as well as Newlands Backwater (the estuary of Forge Creek) and Tom Roberts's Creek, at Lake Victoria. Both Hall and Chapman mention the deep silted-up valleys of the Mitchell, Nicholson, and Tambo—valleys whose beds are well below sea-level. It is clear that if the silt could be supposed removed these would be typical drowned valleys of the Lake Tyers type. The three larger rivers have silted up the sunk valleys; the Mississippi Creek and Boggy Creek, flowing into the North Arm and Lake Tyers, but not heading far back, have not been able to do so.

The Mitchell at Bairnsdale, then, being a silted-up, drowned valley, it follows that Lake King, intervening between it and the coast, is the lower part of the combined valleys of the Mitchell, Nicholson, and Tambo. But before drowning it was a valley of a different type, partly as the lowest and earliest-matured part of the valleys, but especially because it is outside the area in which limestones occur at the surface, and widening of the valley is easier. Without any close acquaintance with

Lake Wellington, it seems inevitable to regard it in the same way as the lower valley or plain of the combined Avon and Latrobe, with, of course, the Macalister and Thomson, which have joined the Latrobe above the lake. The difference is not that these lakes are not drowned valleys, but that they are drowned valleys of a different form.

Eastward from Lake Tyers is the long stretch of Ewing's Marsh, with arms extending inland, outlined on maps and suggestive of the Lake Tyers type; and, though I have not been able to visit this area, I am informed that there are limestone banks at some of the edges of the marshlands.

Lake Victoria and the Outer Parts of the Lakes.—The submergence exposed fresh areas to the immediate attack of the waves, and these consisted of feebly-resisting materials. Any sand-hills of the coast immediately before the submergence would be lost, though possibly some older ones further inland might survive. The older dunes, as seen at Sorrento, do not appear to be anywhere mentioned east of Corner Inlet. The cliffs from Cunninghame Red Bluff to Tambo Bluff inside the outer lakes are, then, sea cliffs, as are also the steep banks from Paynesville south-westward inside Lake Victoria and north-westward from Paynesville to Bairnsdale, though these last would be less exposed, and the steepness of some near Bairnsdale may be helped by the fact that there are springs at their base. The present steep cliff at Eagle Point is, however, clearly due to the attack of the river, which here meets the higher land. Sperm Whale Head, south of Lake Victoria, would, then, probably be either an island on the coastal shelf or the end of a promontory—most likely an island, as the natural outlet of the Latrobe would seem to be further west. Such would agree with Hall's observation that at first he was sure that Sperm Whale Head was part of the Tertiary plateau, but further east was dune. I regret that I have not yet been able to visit this area at the head of Lake Victoria. Where the cliffs were capped by torrent gravel, shingle would remain on this coastal shelf.

The Ocean Barrier, or Hummocks.—On the outer edge of this shelf, probably with the help of decrease of depth of water (due to a change in relative level of land and sea, as suggested by Sir Edgeworth David), there accumulated the sand dunes, thus cutting off the gulfs and inner part of the shelf from the sea, and completing the formation of the Lakes. The long stretch of shallow water known as Lake Reeves (parts of which may be dry) is a simple lagoon behind the hummocks.

This sand drift operated outside the line of cliffs, and is not the cause of all the eastward element in the courses of the streams. The Latrobe has a remarkably direct eastward direction from the Moe River Heads to Lake Wellington, as was

noticed by Tyers in 1844, but this is a little obscured by using the name Latrobe for one of the northern heads. South of Trafalgar the sharp rise of the high land is no doubt a fault-scarp, which probably extends into the heads of the Lang Lang also. Further east an old trough is commonly accepted about Morwell, and later movement on the same fault lines would account for the direct course of the Latrobe. The divide south of the Latrobe is called a range by Murray to a point between Lake Wellington and the sea.

The combined valleys of the Latrobe and Avon, with, of course, the Thomson and Macalister already joined to the Latrobe, and Providence Ponds to the Avon, reaching the old coast-line somewhere east of Dutson, may have been deflected north-easterly by the sand-drift and continued along the coastal shelf in what now makes Lake Victoria. In the same way the combined Mitchell, Nicholson, and Tambo valleys, reaching the old coast between Paynesville and Tambo Bluff, have been deflected eastward also along the coastal shelf to the vicinity of the Cunninghame Red Bluff. Here the sand-hills meet the old sea-cliff, and further deflection is blocked. The natural entrance to the Lakes seems to have varied in position in this vicinity. Further east, before Lake Tyers, there is again a line of sand-hills close in front of the cliff. Beyond Lake Tyers the hummocks close the direct mouths of several other streams and affect the mouth of the Snowy River. Lake Victoria and Reeves's River have thus a special character of their own, the main channel of the deflected stream along the coastal shelf.

The idea of a slight emergence of the land, which would evidently facilitate the formation of the hummocks, is also supported by the low plain of Goon Nure, inside Lake Victoria, which may well be regarded as a wave-cut shelf raised a little above water level, on which plain have accumulated sand-hills, part at least wind-driven, marsh deposits, and some sand carried down by a creek which runs then through a series of swamps to Bland Bay (Lake Victoria), though it is said in heavy rains to overflow also by another route. A fine shingle is seen on this plain at Storm Point, which could have been derived from the ordinary Tertiaries without the torrent gravels, which do not reach so far. It is, then, natural to group with this low plain Banksia Peninsula (further north-east) and Raymond Island, both low and sandy, with some heavier shingles on the beach, for the cliff behind Banksia Peninsula is capped with torrent gravels. Both these low areas may rest on shoals carrying pebbles from the heavy gravels, though it is possible also that Raymond Island might be a fragment of the lower terrace of Bairnsdale and Broadlands. The low land near Paynesville also admits both these explanations

There is also low land on the north side of the main channel of the Lakes, at Metung and Nungurner. Opposite Metung is a considerable area of low land connected to the coastal hummocks, and a series of low islands and shoals stretch from Rotuma Island, close to Sperm Whale Head, to the Lakes' Entrance township, itself a low promontory. Some of these may have been formed as accumulations in swamps behind the sand-hills, very like the position of Lake Reeves to-day, and on these more or less drifted sand would pile up. At present the alteration of currents due to the new entrance is cutting away some parts but allowing shoaling, and, indeed, actual filling, east of Lakes' Entrance. No doubt in the past changes in the entrance modified these low lands, and especially would this be the case if an entrance towards Ocean Grange had been blocked and all the western waters sent to Cunninghame. At present wave-action is also affecting the lake shores. It is common to find a shallow water ledge, and the dark soil of Melaleuca flats is seen at places being cut away by the lake.

In the quieter backwaters mud is accumulating, and the visitor needs to proceed with care. Landing in a little creek off Bancroft Bay, our boat had apparently touched bottom, but an oar could be thrust down nearly full length in the mud. You cannot stand on this or swim in it, and a boat stuck in it may be hard to get off. It is well to be careful in recovering a duck, for instance. Jones's Bay, near Bairnsdale, is well known as having a treacherous bottom. Two other dangers are notified to visitors to the Entrance—the ebb tide, which may run seven knots, and the rapidity with which the sea outside can rise sufficient to swamp an open boat.

Among other processes going on in the Lakes is the formation of land with the help of shallow water vegetation—the "rand" formation mentioned by Gregory—as is very likely happening in Jones's Bay. The long silt jetties of the Mitchell are well known, running out as narrow tongues into the Lake for four miles below Eagle Point. These tongues are only the visible top edge of the silt, the little step down on the lake side being due to waves. One of these was cut through in a recent flood. Above Eagle Point the Mitchell silt has cut off a westward bay of the lake, impounding the waters of Cobbler's Creek and forming M'Leod's Morass. Part of this is undrainable, being below lake level; the remainder is liable to flood both from its own catchment and the overflow of the Mitchell. In addition, soluble salts—partly, at least, magnesian—in the soil appear as a white efflorescence in summer, and cause decay of wire-netting in the fences. The little valley of Tyers Creek, at Eagle Point, has also been closed by the Mitchell silt. The Mitchell silt jetties, though indicated by shoal beyond the present mouth, will be hindered from extending to the opposite shore, or prevented, by the necessity for an outlet

for the Nicholson waters. The Tambo has smaller silt jetties. Salt marsh now occurs at many places, as on the shores of Jones's Bay, at Eagle Point Park, at Paynesville, and at Lakes' Entrance township.

Both in the Nicholson River flats, at Sarsfield, and in Clifton Morass, north of Bairnsdale, there occur sulphurous springs. Marcasite, the easily decomposing form of iron sulphide, occurs at Sarsfield, and some drains show barren black banks, as organic matter is abundant in the soil; but the acid waters stop vegetable growth. Yellow patches on this black ground are locally called sulphur, but are really a sulphate of iron (copiapite); a whitish deposit on twigs or other objects in the water is really sulphur. Marsh gas and sulphuretted hydrogen are probably both present.

An explanation may be given for "Mt. Cunninghame," mentioned by Dr. Hall as probably the lowest mount in Victoria, the whole country being not more than 20 feet above sea-level. It is merely a name for a survey station. A main survey line from Mount Taylor to Seacombe trig. station passes over a low hill named as Mount Wrixondale, north of the Lakes, and on the Wrixondale–Seacombe line are formed two triangles—one with its apex at Stockyard Hill, in the coastal hummocks, and the other at "Mount Cunninghame," near Lake Wellington.

Conversations at Lakes' Entrance suggest that there may be room for interesting observations in the changes of the lake fauna, and possibly also water plants, as a consequence of the permanently open entrance. The variety of different types of country on land presents an interesting field for botanical observations, and no doubt also zoological.

I am indebted to Mr. H. D. Bulmer, of Bairnsdale, for the two interesting views reproduced herewith. These were taken from an aeroplane, and graphically illustrate the singular physiographical feature of the eastern portion of the lakes area.

[The paper was well illustrated by maps and photographs of the different features.—ED. *Vict. Nat.*]

EXPLANATION OF PLATE.

FIGURE 1.—AERIAL VIEW FROM LAKES' ENTRANCE

Township in the foreground, looking westward up the Lakes. The North Arm appears to the right of the township, with Jemmy's Point behind it. The main channel, or Reeves's River, is close behind this Point and along the right side of the view close up to the cliffs. The low islands are Rigby, Fraser, and Flannagan Islands, the low land opposite Metung beyond them. To the left, in the distance, is the beginning of the long lagoons behind the coastal hummocks.

FIGURE 2.—THE SILT JETTIES OF THE MITCHELL RIVER MOUTH.

Jones's Bay on the left; Eagle Point Bay on the right. The land beyond comprises the low country between the Nicholson and Tambo Rivers. Eagle Point is a prominent cliff on the Mitchell six miles below Bairnsdale. Eagle Point Bay is on the other side of the park there, and does not connect with the river till the end of the silt jetties.

PLATE III.

FIG 1.—AERIAL VIEW—LAKES' ENTRANCE AND LAKES.

FIG. 2.—MITCHELL RIVER FROM THE AIR.

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, 12th December, 1921.

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

CORRESPONDENCE.

From the Secretary for Lands, stating that, in response to the Club's request, certain portions of Crown lands on the banks of the Menzies Creek, near Emerald, as defined in the *Gazette* notice of 19th October, 1920, had been reserved for recreation purposes.

REPORTS.

A report of the excursion to Tooradin, Western Port, on Saturday, 19th November, was given by the leader, Mr. H. B. Williamson, who said that, though the party was not large, the members taking part in the excursion had a pleasant and interesting outing. One of the so-called Native Cherries, *Exocarpos stricta*, the Pale-fruited Ballart, was noticeable on account of the heliotrope succulent stems of the seeds, usually regarded as the fruit. These were tasted and found to be very similar to the corresponding part of the common Cherry Ballart. The Purple Fringed Lily, *Thysanotus tuberosus*, was numerous along the roadside, while the Golden Spray, *Viminaria denudata*, was quite a prominent feature of the district. Near the township was a tidal creek fringed with mangroves. These trees, with their curious breathing roots, were investigated, and were found to be bearing well-developed fruits resembling broad beans. Just above the mangrove areas, on which no other form of plant life grows, were a number of salt-loving plants, such as the Common Sea-blite, *Suæda maritima*, Swamp Saltbush, *Atriplex paludosum*, and the Creeping Brookweed, *Samolus repens*, with its pretty white flowers. Several rarer plants were noticed here, such as the Sea Lavender, *Statice taxanthema*, Salt Plagianth, *Plagianthus spicatus*, and the Narrow-leaved Wilsonia, *W. Backhousii*. Plants of the trailing Jointweed, *Hemichroia pentandra*, were found affected with a rust (fungus), and were forwarded to Mr. Brittlebank for identification. An invitation to lunch with Mr. Edgerton, an old resident of the district, was accepted, and in the afternoon he intended to pilot us through some

scrub where other plants might have been found, but, rain setting in, this portion of the outing had to be abandoned. Some Black Wattles were pointed out to us which were bearing well-developed pods, which were said to have begun to form in July last, but the trees did not bloom till a few weeks before. On the motion of Messrs. Barnard and Williamson, a vote of thanks was directed to be sent to Mr. and Mrs. Edgerton for their hospitality to the party.

In the absence of the leader, Dr. G. Horne, V.D., a report of the excursion to Altona Bay on Saturday, 26th November, was given by Mr. C. Daley, F.L.S., who said that the party had a very interesting outing. Numerous sites of aboriginal camps were seen, and chips and cutting stones of various kinds were found.

A report of the excursion to Warragul on Saturday, 10th December, was given by the leader, Mr. H. B. Williamson, who said that, owing to an invitation from our co-members, the Misses Currie, of Lardner, about five miles south-west of Warragul, which, however, is easier reached from Drouin, the party returned to that station, and drove out part of the way to Lardner. Then, following a pretty bush road lined with flowering shrubs of various kinds, in due time reached the Currie homestead, in the vicinity of which the rest of the day was spent, walking back to Drouin in the evening. In the garden attached to the house numerous native shrubs and trees were found to be doing remarkably well, also several notable exotic trees. These are the haunts of numerous birds, which are carefully protected, and add interest to the garden. A walk round the farm showed that thoughtful and effective tree-planting has been done. Thus, clumps of tree-ferns left when clearing have been protected by shady trees being planted near them. The caterpillar pest was in evidence in several of the paddocks, and harvest operations were being hurried in order to save as much of the crops as possible. A pair of Kestrels was busily engaged securing caterpillars for their nestlings. Numerous other birds were seen during the ramble. After early tea Miss C. C. Currie accompanied us on our station-ward walk to within a mile of Drouin, her enthusiasm not being damped by a four-mile walk home by herself. All enjoyed the outing thoroughly, having been made so much at home by the members of the Currie family.

PAPERS READ.

1. By Mr. Alfred J. Tadgell, entitled "A Contribution to the Flora of the Victorian Alps."

The author said, as the result of five visits to the Alps in the neighbourhood of Mounts Feathertop and Hotham, he was able

to add 83 species to the 346 species listed in Prof. Ewart's paper, entitled "The Flora of the Victorian Alps," published in the *Naturalist* for October, 1910 (*Vict. Nat.*, xxvii., p. 104). He described in a pleasant way the experience of collecting in the Alps, and the sublime grandeur of the views obtained from the mountain road one traverses at five to six thousand feet above sea-level. He said that it was a pity the paper referred to gave no definition of what was considered Alpine, he had taken 2,600 feet as the limit for Alpine plants. Mr. Maiden, to whom he was indebted for several identifications, had taken 3,000 feet as the Alpine limit in his list of Kosciusko plants.

Several members congratulated the author on the interest of his paper, and gave their impressions of the Alpine regions.

2. By Mr. C. J. Cole, communicated by Mr. C. French, jun., entitled "Notes on the Caper Butterfly."

The author gave some account of the life-history of this butterfly, *Pieris teutonia*, which visited the Wangaratta district in myriads in November and December, 1910. Remarking that the migratory flights for which this butterfly is noted are probably caused by the insects searching for plants on which to deposit their eggs, the Native Caper, *Capparis Mitchelli*, being a comparatively rare plant in Victoria, he said that on this occasion the butterflies made use of the young tips of the orange trees on which to deposit their eggs, but he noted that, though the young larvæ seemed at first to thrive on this food, none of them lived longer than ten days, the same results being noted with regard to larvæ hatched in captivity.

NATURAL HISTORY NOTE.

Mr. C. Oke drew attention to his exhibit of a jumping spider, Attidæ, under the microscope, taken on the Ringwood excursion on 3rd September last. This he stated to be the prettiest spider he had seen, and doubted if any animal to be found around the metropolis was more brilliantly marked or more beautiful than this spider, when alive or freshly killed; unfortunately, some of the colours fade after death. The following is a brief description.—Cephalo-thorax black, with an iridescent purple metallic sheen, with fawn scales, interspersed with black hairs covering apical third. The two pairs of eyes projecting forward are light blue, two pairs on top black. Pedicels are clothed with white and yellow hairs. The abdomen is blackish and is clothed with brilliantly iridescent scales; these are white at base and apex, but the main colour is a beautiful turquoise blue, with a pattern of fawn interminglcd On each side is a semi-circular line, nearly meeting (in some specimens forming a circle, but this is unusual), and a small

crescent in middle of intensely bright red. The legs are fawn and brown.

Miss G. Nokes contributed a short account of the camp-out of the Mount William Tourist League, which members of the Club had been invited to join, held on the southern slopes of Mount William (Grampians) in November last. She reported that the scenery and vegetation greatly resembled other portions of the Grampians, and, when the locality has been opened up by tracks, would doubtless prove a great attraction to tourists, especially if it became possible to establish a hostel in the neighbourhood.

EXHIBITS:

By Mr. H. W. Davey, F.E.S.—Specimens of crustacean, *Phreatoicopsis terricola* (female), from Otway Forest.

By Mr. J. Gabriel. — Flowering branches of Silky Oak, *Grevillea robusta* (New South Wales and Queensland).

By Miss G. Nokes.—Flowering branches of *Kunzea pedunicularis*, from Millgrove ; paintings of orchids, *Pterostylis barbata*, *Lyperanthus nigricans*, and *Cryptostylis longifolia*.

By Mr. C. Oke.—A jumping spider, Fam Attidæ (under microscope).

By Master C. Ralph.—Lepidoptera, collected at Spring Vale, November, 1921.

By Mr. L. Thorn.—Larvæ in various stages, pupa cases, and perfect insects of the Wood White Butterfly, *Delias agamppe*.

After the usual conversazione the meeting terminated.

EXCURSION TO BENDIGO.

The party of ten members who made the trip to Bendigo on Railway Picnic Day (1st October) were favoured with splendid weather, and an enjoyable time was spent. The locality selected for Saturday afternoon's trip lies to the east of the racecourse, at a distance of about two miles from White Hills. Thither we proceeded by char-a-banc, and then, passing through portion of the racecourse grounds and across the golf links, reached the race, where we partook of a belated luncheon. After spending an hour in this interesting locality, the party crossed the golf links to the Fosterville road at Ascot, and thence returned along the road to White Hills. Flowers were abundant. Altogether, seventy-seven species in flower were noted. Amongst shrubby plants, *Prostanthera hirtula*, a blaze of purple, attracted most attention, but numerous others, such as *Hibbertia acicularis*, *Olearia teretifolia*, *Eriostemon obovalis*, *Brachyloma daphnoides*, *Grevillea lanigera*, Leptospermum, and Calythrix were represented. Eleven orchids were collected,

the most notable being *Thelymitra Macmillani* and *Diuris palachila*. For Sunday the party made the trip to Flagstaff Hill, in the Whipstick, about 12 miles north of Bendigo, making a whole-day excursion. This locality is principally noted for an extensive patch of *Phebalium* (*Eriostemon*) *obcordatum*. This plant was, however, distinctly past its best, though fair specimens were still to be seen. A multitude of flowering shrubs, notably *Baeckea diffusa*, *Micromyrtus* (*Baeckea*) *microphylla*, *Calythrix tetragona*, Olearia, *Boronia anemonifolia*, *Eriostemon obovalis*, *Loudonia Behrii*, and *Brachyloma daphnoides*. Seventy-one species were recorded for the day. Several of the party took the opportunity of collecting seedling plants for cultivation. Messrs. Oke and Thorn, who devoted themselves to entomology, reported satisfactory results in their several departments. Not many birds were observed, but a Flycatcher's nest was seen in a small shrub, with one egg and a Cuckoo's egg in addition.

Accounts of previous excursions to Bendigo will be found in the *Naturalist* for November, 1919, and December, 1920. On this occasion, owing to the lateness of the season, a large number of plants not previously seen on these excursions were noted, including the following :—

RANUNCULACEÆ—
f Ranunculus parviflorus.

DILLENIACEÆ—
Hibbertia stricta.

PITTOSPORACEÆ—
b Pittosporum phillyreoides.

RUTACEÆ—
Phebalium obcordatum.

LINACEÆ—
Linum marginale.

CARYOPHYLLACEÆ—
Sagina apetala.

LEGUMINOSÆ—
Pultenæa largiflorens.
Eutaxia empetrifolia.
Templetonia Muelleri.
Swainsona tephrotricha.

ROSACEÆ—
Acæna ovina.

HALORAGEÆ—
Haloragis teucroides.

MYRTACEÆ—
Micromyrtus microphylla.

COMPOSITÆ—
Brachycome exilis.
Vittadinia australis.
Leptorrhynchos squamatus.
Helipterum dimorpholepis.
b Helichrysum apiculatum.
o Cassinia aculeata (var.)
Rutidosis pumilio.
Cotula coronopifolia.

STYLIDEÆ—
Stylidium perpusillum.
Leewenhoekia dubia.

GOODENIACEÆ—
Goodenia pinnatifida.

GENTIANACEÆ—
Sebæa ovata.

ORCHIDACEÆ—
Thelymitra aristata.
antennifera.
Macmillani.
Diuris palachila.
b Calochilus Robertsoni.
b Pterostylis rufa.

LILIACEÆ—
Bulbine bulbosa.
Arthropodium strictum.
Xerotes Brownii

CYPERACEÆ—
Schœnus apogon.
Carex paniculata.

We are indebted to Mr. C. Oke for the following notes about the beetles observed :—" On the last two excursions to Bendigo about 100 species of beetles have been taken. This seems a very small number for six days' collecting. Every method of collecting has been tried, but the greater part of the time has been spent in searching ants' nests for inquilines, which, though not very prolific in species, has yielded some very interesting beetles. Many of the species are common around Melbourne, and have been omitted from list ; others occur near Melbourne, but are fairly rare ; but most of these species are not known around the metropolis. Scarabidæ : Cryptodus piceus, Germ., in nests of Iridiomyrmex detectus and Ectotomma metallicum. Carabidæ : Mecyclythorax lateralis and M. punctatus. Scopodes boops were in dozens under leaves at Flagstaff Hill. Three species of Staphylinidæ in ants' nests. Pselaphidæ : * Articeras curvicornis, West., * A. dilaticornis, West., * A. fortnumi, Hope, * A. cremogastri, Lea, and * A. irregularis (?), Lea. Paussidæ : Arthropterus howitti (?), Macl. (♂ and ♀ in nest of E. metallicum). Histeridæ : * Chlamydopsis, n. sp. Cucujidæ : Nepharis alata, Cast. (with I. nitidus). Ptinidæ * Diplocotes foveicollis, Oll., * Paussoptinus laticornis, Lea, * Diphobia familiaris, Oll. Tenebrionidæ : Chalcopteris minor, Blackb. Curculionidæ : Oxyopes fascicilis, Lea Acantholopus spinniger, Macl., Sclerorinus tuberculatus, Macl. [Those marked by an asterisk were found with small black ants under stones.]"

D. J. Paton.
C. Daley.

EXCURSION TO ELTHAM

In spite of the fact that it was "Henley Day," and that the weather conditions were likely to be unsettled, thirteen members and friends attended the excursion to Eltham on Saturday, 22nd October, 1921. The popular superstition attached to the number thirteen proved to be at fault for once, as in every way the outing was full of profit and pleasure to all concerned. The afternoon train journey of sixteen miles was enhanced owing to the beauty and freshness of the country after the recent warm rains. Wild-flowers were blooming freely, birds were busy with their household arrangements, fields were clad in their spring costumes of green, and gum-tips were glowing with colour Nature was everywhere smiling. It was one of those days that the poet has described—

" When Summer came with lips of flame
The gentle Spring to woo."

The party was met at Eltham by the leaders and took the track that usually crosses the Diamond Creek, but found for once that the order had been reversed, for the creek at flood

height had considerably crossed the track—so much so that the vehicular bridge was submerged and lost to view, and a precarious, frail-looking emergency structure had to be negotiated. In order to avoid trespassing on private property, the hill that rises abruptly on the northern side was climbed, but the excursionists soon descended again to the banks of the flooded stream, and followed its tortuous course for some distance. It was here the beauty of the district appealed to the artistic elements in the party: the park-like glades, the glimpses through the leafy canopy of the township and hills in the distance, the imposing big gums, but, above all, the picturesque windings of the creek, called forth many expressions of pleasure and delight. It must have been such a similar scene that inspired the lines of J. B. O'Hara—

"The winding creek goes singing
By maidenhair and moss;
Along its banks, in rosy ranks,
The wild-flowers wave and toss."

Mr. Tonge, the ornithological leader, deplored the ravages amongst the birds during the nesting season of those two allied pests, the human and the feathered jackass—the first-named represented by boys. Both are ruthless destroyers of the young native birds and eggs. He escorted the party to a number of nests, some used this season and already vacated, some in process of completion, and others still in occupation. The first found was that of the Striated Tit-Warbler, *Acanthiza lineata*, hanging in a branch of a young Red Box tree. The next was a Wattle-bird's, *Acanthochaera carunculata*, built in the centre of a bunch of mistletoe very high up in a White Gum. Near and around the banks of the creek were seen and heard the Fantailed Cuckoo, *Cacomantis rufulus*, Pallid Cuckoo, *Cuculus inornatus*, Sordid Wood-Swallow, *Artamus tenebrosus*, Grey Thrush, *Colluricincla harmonica*, Black-and-White Fantail, *Rhipidura tricolor*, and several species of the honey-eaters, including the White-plumed, *Ptilotis penicillata*, and Yellow-faced, *Ptilotis chrysops*. A nest of that interesting bird, the Tawny Frogmouth, *Podargus strigoides*, was discovered about 25 feet up. The wonderfully symmetrical nest of the White-winged Chough, *Corcorax melanorhamphus*, was also found, containing young birds. It was built in a Stringybark tree. Three eggs of the Black-faced Cuckoo-Shrike, *Graucalus melanops*, were in a nest built in a horizontal fork of a Peppermint. This is a remarkably small nest for the size of the birds, a pair of which were flying about in its vicinity. Parent birds were also watching about the nest of the Butcher-Bird, *Cracticus destructor*, and their rich carolling was frequently heard. The young birds were close by. The Rufous Whistlers, *Meliphaga phrygia*, were everywhere, there being such an abundance of

the cup-moth and other caterpillars, their natural food supply. On arrival at Mr. Tonge's residence the members of the party were entertained at afternoon tea by Mrs. Tonge, and, although several had to hurry away to catch the early return train, the majority remained to spend an enjoyable hour inspecting the leader's collection of nests, photographic bird studies, and, more particularly, a few of his oil and water-colour pictures painted from Nature. In the grounds a Goldfinch's nest, with its clutch of eggs, was viewed in an apricot tree. A Yellow-tailed Tit-Warbler's, *Acanthiza chrysorrhoa*, nest was also noted. Mr. Tonge discovered two eggs therein, and also an egg of a Bronze-Cuckoo; but all had been deserted on account of a young frog finding its way into the nest and sitting on top of the eggs. A Brown Flycatcher, *Micræca fascinans*, was observed sitting on its tiny nest, which contained two newly-hatched young ones. The beautiful Regent Honey-eater, *Meliphaga phrygia*, which frequents the district, was not noted during the visit. On behalf of the visitors, Mr. Keep voiced their appreciation of the efforts of both Mr. and Mrs. Tonge to make the afternoon so pleasant and enjoyable. The excursionists reached Melbourne at 7.45 in the midst of the final Henley Day festivities, thoroughly satisfied with the afternoon's outing.

The following birds, observed by Mr. Tonge during several years in the vicinity of his residence, will give some idea of the ornithology of the district (names according to Leach's "Bird Book," first edition):—

Quail, Stubble.
———, Brown.
———, Painted.
Pigeon, Bronzewing.
oHeron, White-necked.
———, White-fronted.
Coshawk, Australian.
o———, Lesser.
Sparrow Hawk, Collared.
Eagle, Wedge-tailed.
o———, Little.
oKite, Australian Black-shouldered.
Hawk, Brown.
oKestrel, Nankeen.
Owl, Boobook.
*Cockatoo, Rose-breasted.
o———, Gang-Gang.
o———, White.
*Lorikeet, Little.
*———, Musk.
Parrot, Crimson.
———, Rosella.
*———, Swift.
Frogmouth, Tawny.
Nightjar, Owlet.
Kingfisher, Laughing.
———, Sacred.
Cuckoo, Pallid.
———, Fan-tailed.
———, Narrow-billed Bronze.
———, Bronze.
Swallow, Welcome.
Martin, Tree.
———, Fairy.
*Flycatcher, Australian Brown.
Robin, Scarlet-breasted.
*———, Flame-breasted.
*———, Pink-breasted.
———, Hooded.
Tree-Tit, Short-billed.
Fantail, White-shafted.
———, Rufous.
———, Black-and-White.
Flycatcher, Restless.
Ground-Bird (Thrush), Spotted.
Thrush, Australian Mountain.
Chat, White-fronted.
Warbler, Speckled.
Tit-Warbler, Little.
———, Brown.

o Occasional visitors. * Do not nest in district.

Tit-Warbler, Striated.
————, Yellow-tailed.
————, Buff-tailed.
Warbler, Superb.
Wood-Swallow, White-browed.
————, Masked.
————, Sordid.
Magpie-Lark.
Shrike-Thrush, Grey.
Magpie, White-backed.
Butcher-Bird, Australian.
Shrike-Tit, Yellow-breasted.
Whistler, Golden-breasted
————, Rufous-breasted.
Shrike-Robin, Yellow-breasted.
Tree-creeper, Orange-winged.
————, Brown.
————, White-throated.
White-eye.
Flower-pecker, Australian.
Diamond-Bird, Red-tipped.
Diamond-Bird, Orange-tipped.
————, Yellow-tipped.
————, Spotted.
Honey-eater, White-naped.
————, Spinebill.
————, Regent.
————, Yellow-faced.
————, Yellow-plumed.
————, White-plumed.
————, White-cheeked.
Wattle-Bird.
Miner, Noisy.
*Honey-eater, Blue-faced.
♦————, New Holland.
Pipit, Australian.
♦Finch, Spotted-sided.
♦————, Red-browed.
Oriole, Olive-backed.
Chough, White-winged.
Bell-Magpie, Grey.
o————, Sooty.

E. S. Anthony.

EXCURSION TO FRANKSTON.

On Saturday, 12th November, one member and the leader formed the advance guard at Flinders-street. At Frankston four additional members were joyfully recognized. It was proposed to first visit Landslip Point, where Janjukian fossils can be collected from the ironstone, but as the tide was still high we proceeded along the main road towards the farthest objective. A short distance out of Frankston a high cutting on the roadside shows the remains of a raised beach, well above high water mark. Just past the hook bend of the Frankston road we turned down a well-made road past "Trescote," which terminated in a track leading to the beach. Here the red and purple ferruginous sands, apparently unfossiliferous, present a most *bizarre* appearance, being splashed with large patches of whitish "clay-galls" that have been bleached, probably by original organic matter. One member observed how unnatural this would seem if reproduced in a painting; it formed a very vivid break in the placid harmony of the adjacent seascape. In one spot the ironstone was covered with the tracks of fossil worms, showing the conditions at that time to have been inter-tidal. As the day was sultry the walk was taken leisurely, some members going over the cliff, whilst others pushed on along the shore. The party rejoined at Grice's Creek, where the billy was boiled, the intervals being filled in with fossil collecting and a discussion on the relationship of the rocks—bluestone, sandstones, and clays—met with at this

o Occasional visitors. ♦ Do not nest in district.

spot. Mr. A. E. Kitson's report, published in 1900,* was referred to, and the leader remarked how much of his interpretation of this complex is still upheld by investigators, except as to the age of the Balcombian clays and the ferruginous rocks. The large cement-stones commonly met with in the Balcombian beds are here seen in distinct bands marking the planes of bedding. On the return journey the shore was traversed for some distance. The shells left by the receding tide were mostly broken, but the huge quantity of *Mesodesma*, sp., was especially noted, skirting the shore-line for miles. The alien Yellow Horned Poppy, *Glaucium luteum*, brightened up the foreshore with its glaucous-green, great shrubby masses and showy flowers, striking a reminiscent note of wanderings along the shores of Kent and Sussex. Turning inland between Dennant and Bullart Creeks, the Frankston road was rejoined in time for members to catch the 6.48 train to town. The Balcombian clays of Grice's Creek are rich in fossils, and appended is a list of those collected on this excursion by Mr. F. A. Cudmore and the leader:—*Foraminifera*—Miliolina tricarinata, Nodosaria soluta. *Corals.*—Bathyactis lens, Balanophyllia armata, Flabellum gambierense, F. victoriæ, Placotrochus deltoideus, P. elongata, Sphenotrochus australis. *Echinoidea.*—Cidaris (Leiocidaris). *Polyzoa.*—Cellepora tridenticulata, var. nummularia, Lunulites rutella. *Bivalves.*—Amussium zitteli, Arca cainozoica, A. crustata, Cardita delicatula, C. scabrosa, Carditamera alata, Cardium hemimeris, Crassatellites communis, Cucullæa corioensis, Dimya dissimilis, Glycimeris maccoyi, Leda *cf.* apiculata, L. huttoni, L. vagans, Lima bassi, Limopsis maccoyi, L. morningtonensis, Meretrix eburnea, Nucula obliqua, Ostrea hyotidoidea, Pecten yahliensis, Sarepta obolella, Semele krausei, Spondylus pseudoradula, Trigonia tubulifera, Venus cainozoicus, *Scaphopoda.*—Dentalium subfissura, D. mantelli. *Gasteropoda.*—Ancilla pseudaustralis, Argobuccinum pratti, Bathytoma rhomboidalis, Bela (Daphnobela) gracillima, Bullinella *cf.* angustata, B. *cf.* exigua, Calyptræa undulata, Cancellaria varicifera, Colubraria tenuicostata, Columbarium acanthostephes, C. craspedotum, Columbella balcombensis, Conomitra ligata, Crepidula dubitabilis, Cypræa contusa, C. eximia, var. brevis, Erato morningtonensis, Fusus senticosus, Latirofusus aciformis, L. exilis, Lotorium protensum, Mangilia lidens, Marginella inermis, M. propinqua, M. wentworthi, Mitra atractoides, Murex amblyceras, M. lophœssus, M. velificus, Nassa tatei, Natica limbata, N. perspectiva, N. polita, Newtoniella cribarioides, Scaphella maccoyi, Siliquaria occlusa, Trivia avellanoides, Turritella platyspira, Voluta ancilloides, V. limbata, V. strophodon, Volutilithes antiscalaris.—F. CHAPMAN.

* Geological Survey of Victoria—Monthly Progress Report (New Series), No. 12, pp. 3-13 (with map).

A DAY'S BEETLE-COLLECTING AT THE LERDERDERG.

By CHARLES OKE.

(Read before the Field Naturalists' Club of Victoria, 8th August, 1921.)

I HAD often looked at the Pentland Hills on the map, and wished I could get there to do some collecting; it was therefore a great pleasure to me to see the Lerderderg Gorge on the 1920–1 excursion programme for 30th October. Leaving town by the 7.40 train for Bacchus Marsh, we arrived there about nine, and were soon seated in the cab that was to convey us to the Gorge. The road out did not look at all inviting to an entomologist, and gave no indication of what an interesting spot we were going to.

On arriving at the end of our drive of six or seven miles we were only a few hundred feet from the entrance to the Gorge. We walked down to the river, but found it impossible to cross, and at first glance it seemed equally impossible to proceed up-stream on our side of the stream, on account of the steep cliff around which the river flows; but by scrambling up a steep bank we reached a water-race, and then a flume, thirty or forty feet above the water. Fortunately, no water was running in this flume at the time, so we were able to walk along it, around the cliff, to where we could walk along the embankment. I had not gone far along this before I saw some moss growing on the side of the hill. A bag of this was obtained for teasing over white paper at home; but it did not contain anything fresh to me, the only beetles obtained from it being a small common Staphylinid, some small weevils of the genus Mandalotus, and a Pselaphid of the genus Pselaphus. The beetles of this genus are remarkable for the great development of the maxillary palps. In the present species they are very large and sharply elbowed, and are longer than the antennæ, and might easily be mistaken for a second pair of antennæ. The eyes are large, strongly convex, and coarsely fasciated, and under a lens resemble small blackberries.

Amongst some leaves near this moss I found a very small beetle, a Trichopterygid: it is about the size of the head of a very fine pin. Though these beetles are so small, there is no degeneration of their structure. Their anatomy is as complex as is the largest insect's. A peculiarity about them is the bristles on the antennæ, and the wings being fringed. These latter make a nice object for the microscope, under which they somewhat resemble a feather. A little further along the bank I turned over a few stones and found several species of ants had their nests under them, and it was not long before I had made my first good capture for the day—a Pselaphid that was new to me, of the genus Tmesiphorus. In this genus the

palps are well developed, but not nearly so long as in the first-mentioned genus, and the antennæ are distinctly clubbed. This beetle was taken from the nest of *Amblyopone australis*, a slow-moving, yellowish ant, with a very nasty sting. A nest of Pheidole ants contained another Pselaphid, Bryaxis (sp. ?), and it was carefully taken on a wetted grass stem.

I now found that I had been left behind by the rest of the party, and, failing to receive an answer to a couple of "Coo-ees," decided it was no use trying to catch up. Without intending to do so, I was soon climbing up the side of the hill, going from stone to stone, and, though I had intended to keep along the river to where the Gorge opens out a little, the sight of another stone just a little bit ahead kept me going up instead of along. About half-way up I turned over a stone, under which was a nest of *Ectatomma metallicum*. Everybody must know this ant by sight, if not by name. It is about a quarter of an inch long, of a rich metallic purple and green, and is generally called the "Green-head." After watching the nest for a few minutes, I noticed what looked extremely like an ant, slightly larger than the others, but which, unlike the rest of the ants, was keeping still. When I touched it, however, it put out eight legs and ran away. This spider, when at rest, is very like an ant, but when running the resemblance is not so good. I have fairly often seen this spider in ants' nests, but have never seen one out of the nests. Turning over another stone, just a few steps away, I found a nice nest of the "Green-head," and amongst the rubbish in the nest found what I had come to hunt for—a Chlamydopsis. The beetles forming this genus are most remarkable insects. Professor Westwood, who described the genus, considered it the most remarkable he had seen. When at rest they are all "shut up." The head is retracted into the prothorax, the first joint of the antennæ lies around the head (covering the eyes), the small joints are bent, and the club is received into a hollow in the front of the prothorax. So completely withdrawn is the head and its antennæ that it leaves the front of the prothorax quite smooth and perpendicular; and it is only by the aid of a good hand lens that the top of the head can be made out. In some species the legs are received into grooves in the sides of the body. The legs themselves are grooved—the femora to receive the tibiæ, and the tibiæ to receive the tarsi. Another peculiarity about them is that they all have a large depression in the elytra (wing-cases) near its base, and on the sides of this, or near the shoulders, are fascicles of peculiar hairs. What these fascicles are for we do not know, but it is evident that they must be connected with a gland which secretes some substance, which is either a further means of defence or is something the ants are fond of. It is probably the latter; but,

if so, why the remarkable provision for closing up as a means of defence? The species I had taken was *ectatommæ*, so called because it associates with that ant. It is known by the transverse striæ around the scutellar region, with very inconspicuous fascicles.

On the top of the hill, in a "white ants'" (Termites') nest, I found a Pedilophorus, an unusually large specimen. Under the bark of a gum-tree I found a pair of nice Eucnemids and several species of Carabidæ. Over the other side of the hill, in a beautiful old nest of the "Green-head," I took yet another prize—*Chlamydopsis longipes*, Lea. This species, as its name implies, has remarkably long legs—more than twice the length of the body. I worked along the hill a bit, but found it very dry, so decided to go back to the river. On the flat near the river are enough stones to spend weeks looking under, so there was no need to walk far—in fact, for two or three hours I hardly stood upright, the stones being so close that it was only a waste of time to straighten oneself. Here, in the nests of a small black species of Iridiomyrmex, I took a number of Pedilophorus (sp.?)—a small black species covered with rather long hairs. Though Pedilophorus has been taken from ants' nests before, I do not think they are "inquilines." I feel sure the ants use them as food for their larvæ. Their usual habitat is, I fancy, moss, from which I have taken them. I took one from the mandibles of an ant. I had certainly disturbed several nests of these ants, and this ant might have been taking the beetle to a place of safety, but it appeared to me to be coming to the nest from the hills. Here I took two specimens of a Microchestes from nests of "Green-heads." These are peculiar little tufted beetles of the family Byrrhidæ. When resting their heads are bent under the thorax, and the legs are received into grooves in the body. On this little flat I took a second specimen of *C. ectatommæ*, with the humeral region a bright red. There is a lot of mistletoe growing on the trees here, and I noticed it was very much infested with a large scale. There were a fair number of the Wood White, *Delias aganippe*, butterflies, and a few Caper Whites, *Anaphæis java teutonia*, flying about, and I saw a fine specimen of that rare Victorian butterfly, *Papilio sthenelus*, settle on a bush, but, being without a net, could not catch it. A bush of the Native Hop, *Dawsia latifolia*, had a number of that pretty little beetle, Augomela, on it, and it looked very pretty on the bush. A small Staphylinid was taken from an ants' nest, and two other species from amongst some dead leaves on the ground.

Nearly every stone had a nest of some species of ant under it, but inquilines, with the exception of a small Rodwayei, were hard to find. About twenty species of ants were disturbed, the most common being the "Green-heads" and the small

black Iridiomyrmex. I did not see a single specimen of that favourite host of so many beetles, *Iridiomyrmex nitidus*; perhaps if I had tried more amongst the timber I would have come across it. One nest that interested me very much was that of *Leptomyrmex erythrocephalaux*, it being the first time I had seen the nest of this ant. This is a remarkably long-legged species, and gives off an odour something like the meat ant, *Iridiomyrmex detectus*. There were about thirty ants visible when I turned over the stone, and they looked very queer the way they wandered about, some of them standing up as high as their long legs would allow them. Another rarity was a large ant like a "bulldog," black, with red thorax, the nest of which I have not seen, nor have I heard of anyone who has.

About 5 o'clock I found I had forgotten to have my lunch, and the strenuous work of stone-turning had given me a decided hungry feeling so I made back to where I had left my bag—at the first ants' nest met with. After eating a couple of sandwiches I decided it was too dry without a drink, so went in search of a spot where I could reach the water. Scrambling down the embankment, I easily reached the water's edge, and prepared to have my belated lunch, but, noticing ants running in and out of a hole under a stone, I turned it over, and lunch was again put off. Amongst the little black ants I got another Pselaphid, *Articerus curvicornis*, West., and, turning over another, I saw three Articerus, which I took to be the same species, so that when I had caught one, and saw something run under another stone, I did not bother to look at the beetle on my finger for a minute, but when I did I saw it was a very different species, *A. constrictiventris*, Lea, and, though I searched for some time, I searched in vain for the other two. The beetles of this genus (Articerus) are peculiar on account of the antennæ being reduced to a single joint, and having an excavation on the top of the abdomen. This excavation has hairs along its lateral margins, and these are attached to secretory glands. *A. curvicornis* has the antennæ flattened in the middle but round at ends, apex truncate, and large setæ protruding from mouth. What can be the function of this bristle-like projection? In *constrictiventris* the antennæ are circular throughout, while the abdomen is suddenly constricted at base.

Running on the stones were numbers of a pretty little Staphylinid, which I took to be *Paederus cruenticollis*, Germ., and, as this is very common, I only took the one specimen; however, on examination at home it proved to be *P. australis*, Blackb., a much rarer species. Several species of Carabidæ were also found amongst the stones near the water's edge, mostly common things; but I was fortunate enough to secure a single speci-

men of *Tachys monochrosa* and three species of Clivina. Long before I had exhausted the possibilities of this spot I heard the other members of the party returning along the race, and, as they seemed to think it was time to get back for the cab, I had reluctantly to leave, hoping that I might be able to revisit the spot at no distant date.

To Mr. C. C. Brittlebank I owe very many thanks for enabling me to visit so profitable a collecting ground, for, though the number of species collected—forty-one—was not so very many for a day's collecting, the rarity of some of them more than made up for any paucity of numbers.

Lord Howe Island: a Naturalist's Paradise.—According to an article by Mr. Allan R. M'Culloch, in the *Australian Museum Magazine* for August, there is every chance of Lord Howe Island losing its charm for naturalists, and even becoming uninhabitable. He says:—"Two years ago the forest of Lord Howe Island was joyous with the notes of myriads of birds, large and small, and of many kinds. Doves wandered fearlessly around one's feet on the main roads, and the bush resounded with their cooing. Doctor-birds, *Aplornis fuscus*, made their appearance in the garden clearings every evening, and with the Fantails (Rhipidura) even wandered through the houses in search of insects and crumbs. Silver-eyes played havoc in the fruit-trees, while Thickheads and a dozen others added to the general chorus. They were unmolested save by each other, the residents of the island rarely disturbing their harmony. To-day, however, the ravages of rats, the worst enemy of mankind, accidentally introduced, have made the note of a bird rare, and the sight of one, save the strong-billed Magpie and the Kingfisher, even rarer. Within two years this paradise of birds has become a wilderness, and the quiet of death reigns where all was once melody. One cannot see how the happy conditions are to be restored. The very few birds remaining are unable to breed, being either destroyed upon their nests or driven from them by the rats and their eggs eaten. One can scarcely imagine a greater calamity in the bird world than this tragedy which has overtaken the avifauna of Lord Howe Island. With the birds gone, injurious insects have increased unchecked, and are destroying the produce of the island gardens. Fruit-flies have ruined the peaches, and caterpillars of many kinds are stripping the leaves from shrubs and trees. The rats also eat the corn ere it ripens, and extract the pulp from bananas, pomegranates, and other fruits while they are hanging on the trees. Nothing is safe from their rapacity, and dire distress threatens the residents unless some unexpected cause brings about a reduction of the rats and an increase of insectivorous birds."

NOTES ON MUELLER'S LITERARY WORK.

BY E. E. PESCOTT, F.L.S.

(Read before the Field Naturalists' Club of Victoria, 16th Oct., 1921.)

AFTER being a student and collector for nearly twenty years of the written work of the great man who passed away twenty-five years ago to-day, I now find myself quite incapable of, and my powers quite inadequate for, the task of writing a satisfactory appreciation of his literary genius. Hooker called him "the prince of Australian botanists"; J. H. Maiden said "he was the last of the great botanical explorers—one of a peculiarly brilliant trio, the other two members of which were Robert Brown and Allan Cunningham."

Botanical students the world over must feel it a very great loss not to be able to turn to a complete bibliography of this, the greatest botanical worker that Australia has ever seen. Although many suggestions have been made from time to time, nothing whatever has been done to give to the world a complete catalogue of his literary works. When writing an obituary notice, Mr. J. H. Maiden, Government Botanist of New South Wales, said —"In fact, so vast has been the influence of Mueller upon Australian botanical science that a *catalogue raisonné* of his works has become an imperative necessity" (*Agr. Gaz. N.S.W.*, Nov., 1896, pp. 742-745). This "imperative necessity" has never been realized. After twenty-five years we have no published record of the works of this great man.

It is indeed a fortunate circumstance that the Baron was induced to prepare a list of his earlier writings when Joseph Armin Knapp published a biographical sketch of his life in 1877. Knapp's sketch was published in a German publication, and in the German language. It was afterwards reprinted in pamphlet form. I am indebted to Mr. Gerhardt Renner for a copy of this very rare reprint (as well as for others), which is prefaced by a woodcut of the Baron in the prime of his life. The reprint contains a complete list of the Baron's works, including collaborations, translations, and other writings up to the year 1877. From that date there is no published record of his literary work. There is, in the library of the National Herbarium of Victoria, a large folio manuscript book containing a fairly complete record of the Baron's written work. This was compiled by his literary executor, Rev. W. Potter. It is neither thoroughly accurate nor complete, but it is a splendid foundation for some future worker. It contains some hundred or more pages, with lists of Mueller's writings all chronologically arranged in good sequence. Why this bibliography was never published we can merely conjecture. It should

have been done immediately after his death, and the neglect of the performance of such an important duty is a matter for very great regret.

Mueller's literary work was almost wholly confined to Australasian subjects. Before leaving Europe he had compiled a flora of a portion of Schleswig-Holstein. This was written before 1847, but was not published till 1853. On his arrival in South Australia his studies of the flora around Adelaide resulted in several articles appearing in print; and from that date until his death the Baron was a most prolific author. His writings were not alone confined to botany of living plants, for his descriptions of fossil plants and fruits are well known. His versatility is also shown in his historical articles, notably the one on the occasion of the celebration, in the Melbourne Town Hall, of the Columbus jubilee (1492–1892). His "List of Birds Visiting the Melbourne Botanic Gardens" (1869) shows his grasp of other nature subjects than botany.

I think his greatest monumental work—one which will stand above others for all time—is the "Fragmenta Phytographiæ Australiæ." The first part was published in 1858, and the last in 1882. As every botanist knows, there are eleven volumes, all written in Latin, and a fragment, which is rare, being the first part of vol. xii. Here were published very many of his species; new locations and new discoveries are also recorded. It is a classic, and one always necessary to students of Australian plants. Strangely enough, this was, as well, his first among the larger and more important publications. It is, in one way, difficult to understand why Mueller did not continue to issue this valuable work. The final fragment above referred to was published in 1882, fourteen years before his death. Possibly the demand for more "popular" works was the cause of its discontinuance. Only five years previously he had issued what is now considered to be his only "popular" work, his "Introduction to Botanic Teachings in Schools," and this was being largely used and discussed. His "Eucalyptographia" was also running through its ten numbers at this period, to be followed by the Acaciæ, Myoporineæ, and also Salsolaceæ. These valuable works, so freely and accurately illustrated, all tended to make botanical studies popular, and they were then, as they are still, much in demand. J. H. Maiden has said that "'Eucalyptographia' is sufficient to make the reputation of any man." The same might be said of any of Mueller's monographs. These quarto volumes are still standard works of reference on those plants so discussed.

The magnificent quarto volume, "Plants Indigenous to the Colony of Victoria," which was issued as vol. i. in 1860–62, was really the beginning of a work which Mueller wished to

issue as the standard work on Victorian plants. Unfortunately, we only have one volume of this, with the additional volume of plates. Just at this time Mueller was very hard at work, in collaboration with Bentham, on the historic "Flora Australiensis." (Bentham's great tribute to Mueller in the preface of that work stands as a monument to his magnificent unselfishness and devotion.) We can readily, therefore, understand how that Mueller would again give up his own local efforts in order to be of benefit in the wider sphere—a flora of the continent. In 1879 Mueller issued the first part of what, if continued, would have been an invaluable work of reference to students of our plants. This was "The Native Plants of Victoria Succinctly Defined," Part I. It gives in its 190 pages a botanical record of known plants from Ranunculaceæ to Nyctagineæ, including 40 families and 121 genera. The volume is well illustrated with wood-cuts ("xylographic illustrations"), and, if completed, would have been of far greater use than the well-known "Key." But force of circumstances compelled him to abandon this work, along with several others, to carry out other duties under official instructions. The work which went through more editions than any other is the "Select Plants Readily Suitable for Industrial Culture." This work had its genesis in an article of about 30 pages in the Annual Report of the Acclimatization Society of Victoria, 1871; but no doubt, judging from his writings, Mueller had it in mind for many years before this. The "Select Plants" appeared, with additions, in the same publication in the next year; it was also issued in vol. ii. of Mueller's book, "Lectures and Documents on Industrial Research," 1872. A supplement appeared in the Acclimatization Society's fourth report of 1874; but in 1876 it was considered to be of sufficient importance to stand alone. Thence it passed through many editions, the last being issued in 1895. So valuable a work attracted attention right throughout the world; and thus editions for New South Wales (two), United States of America (two), and India were issued. It was also translated into Spanish, French, German, and Italian.

Then we have his two "Census of Australian Plants." The first, issued in 1882, had four additional supplements, while the second was issued in 1889. This, with its literary and regional records, is still our only work of reference as a plant census.

To the early members of this Club must be given the credit for initiating the movement which resulted in the issue of the "Key to the System of Victorian Plants," in two volumes (1885–88). Though the compilation of this work was well known to be distasteful to the Baron, he persevered, and worked, as always, with his usual unselfish patriotism. And

who shall deny its value? What student of to-day can say that it may be done without?

Mueller's shorter articles, which range in content from a few pages down to a dozen lines, it is quite impossible to discuss. They were scattered all over the world by the dozen, in all kinds of publications, obscure as well as prominent, and written in many languages. They total some hundreds. Indeed, I doubt if they can ever be collected into a complete record, and yet each and all are valuable records of travel and investigation.

One aspect of Mueller's writing has before been suggested, but a few words might be said here in regard to that aspect—viz., the modern application of their teachings. Not only his large and important works, but his briefer records and diagnoses, are wonderfully up-to-date. Mistakes there are—of course there must be some errors of judgment in the thousands of pages of literary effort; but in both the foundation and the superstructure of the work of this master mind the works are still valuable as references to to-day's botanical research. His modern trend is clearly shown in the last words of his lecture delivered in June, 1871—50 years ago—on the subject of "Forest Culture." He wrote:—"I regard the forest as an heritage given to us by Nature, not for spoil or to devastate, but to be wisely used, reverently honoured, and carefully maintained. I regard the forests as a gift, entrusted to any of us only for transient care during a short space of time, to be surrendered to posterity again as an unimpaired property, with increased riches and augmented blessings, to pass as a sacred patrimony from generation to generation." I venture to say that were this lecture delivered to-day as it was fifty years ago it would be accepted as quite the modern acceptance of forest culture for Australia.

I must here refer again to the great and unselfish character of the Baron, which was shown in several ways. Reference can only be briefly made to his giving the whole of his private fortune to charitable and publishing objects. If he wanted a work, and the State would not publish it, he would issue it at his own cost. The Melbourne *Argus* estimated that he spent over £20,000 in the cause of science! When his "Select Plants" was issued in the French language, translated by Naudin, the title-page gave the greater credit to the translator than to the author. The book contains a picture of Naudin, *not* of Mueller, the greater mind. Yet he never complained. Again, when Elwood Cooper, of California, issued the work on "Eucalyptus Trees," by *Elwood Cooper* (as the title-page shows), it was merely a reprint of many of Mueller's published works and lectures, with a dozen lines of preface

by Cooper.* I think this is one of the most disgraceful cases of plagiarism on record. Yet Mueller gladly issued copies of this work to his friends. On the other hand, it must be noted that whenever the Baron translated any work, notably Wittstein's "Organic Constituents of Plants," he was always careful to credit the author with the work, claiming merely the translatory efforts.

In concluding this brief sketch, may I be permitted to ask, Are we ever to see a published biography and bibliography of the greatest botanist Australia has ever seen? Surely such a tribute has not been so long delayed as to be considered too late. The centenary of his birth occurs in a few years (1925), and perhaps we may by that time see a realization of the hopes of true lovers of Australian botany and its workers—viz., a commemoration record of life and works of the "Prince of Australian Botanists."

"THE AUSTRALIAN MUSEUM MAGAZINE."—The third number (December) of this new quarterly is to hand, and fully carries out the aim of the editor as set forth in the first number (April). The contents of each number are varied and splendidly illustrated, and it has been so sought after by persons interested in natural history expressed in a popular way that copies of the first number are unobtainable, though an edition of one thousand copies was issued. The articles are by members of the Museum staff, and deal with subjects Australian and extra-Australian. The letterpress is good and the printing of the half-tone blocks excellent, while the price charged (one shilling) is extremely moderate for a publication of such merit. Perhaps the most interesting article in the current issue is the report of a lecture delivered at the Museum by Dr. W. K. Gregory, Curator of Comparative Anatomy in the American Museum of Natural History, New York. The lecture was entitled "Australian Mammals, and Why They Should be Protected." The report is splendidly illustrated, and the comparisons drawn between our marsupials and the animals of other countries are most instructive and interesting. Speaking of the enormous numbers of 'possum skins sold in the United States yearly, obtained mainly from Queensland, he points out that the animals, instead of producing a monetary return, must soon become extinct, and those depending upon their capture must turn their attention to something else.

* There must be more than one edition of this work, for Mr. J. H. Maiden refers to a copy in which there is a brief lecture by Cooper, prefacing the Mueller reprints. Mr. Maiden does not look on this as plagiarism, as he considers that Mueller gave Cooper the necessary permission to reprint.—E. E. P.

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, 16th January, 1922.

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

WELCOME.

The chairman welcomed to the meeting Mr. A. H. S. Lucas, M.A., of Sydney, an honorary member of the Club, one of the early presidents of the Society, and the first editor of the *Naturalist*. Mr. Lucas expressed his pleasure at being able to be present at a Club meeting, though naturally he missed many of the faces he was accustomed to see at the early meetings of the Club.

NOTES ON EXHIBITS.

Mr. J. A. Kershaw, F.E.S., drew attention to a collection of plants made by himself during a brief visit to Ooldea, on the Transcontinental Railway, about 350 miles west of Port Augusta, in July last. The species had been determined at the National Herbarium, and particulars will appear in the next *Naturalist*.

Mr. A. J. Tadgell gave some particulars about a series of plants collected during the Christmas holidays in the Victorian Alps, when he was able to add eleven species to the list of the Victorian alpine flora, as well as several introduced plants.

[Mr. Tadgell's remarks appear as an addendum to his paper published in this issue.—ED. *Vict. Nat.*]

Mr. E. E. Pescott, F.L.S., called attention to his exhibit of a specimen showing the fructification of the fungus *Polyporus mylittæ*, usually known as "Blackfellows' Bread." This stage of the fungus is rarely met with, and for a long time was quite unknown.

PAPER READ.

By Mr. F. Chapman, A.L.S., entitled "Notes on the Geology of the Mallee."

The author, by means of lantern slides, gave an interesting account of the geological formation of the north-western portion of Victoria familiarly known as the Mallee, once a waste of sand and scrub, now one of the leading wheat-producing districts of the State. This change had been brought about mainly by the subterranean exploration carried out in seeking for artesian water, and this water, which had been struck in the majority of the bores, had added increased fertility to the soil and enabled cultivation to take the place of the natural vegetation. The borings revealed the fact that the older rocks

(Metamorphic, Ordovician, and Devonian) were worn down by atmospheric action and river agency to base level in pre-Miocene times. Over the great pene-plain thus formed were spread estuarine mud-flats, with much accumulation of timber and leaves (Banksia and Waratah) from the vicinity. The subsidence was greater than the deposition could cope with, and the sea invaded the land. The general subsidence seems to have been about 100 fathoms in Janjukian times. Then oscillation took place. By erosion and current action the continental shelf was formed, frequented by sharks and crabs (Kalimnan). The coastal geography then assumed variations between shore-line and swamp, making accumulations between 100 and 250 feet thick. These superficial deposits took on the nature of travertin, ironstone, cyprid limestone, estuarine mud with foraminifera, and rolled and wind-worn sand-dune formations.

EXHIBITS.

By Mr T. S. Hart, M.A.—Blooms of *Epacris microphylla*, from Botonia, near Ferntree Gully, 14th January, 1922.

By Mr. J. A. Kershaw, F.E.S.—Dried plants from Ooldea, South Australia (Transcontinental Railway), collected by exhibitor, July, 1921: on behalf of National Museum, meteorite from Roper River, Northern Territory.

By Mr. C. Oke.—Spikes of orchid, *Spiranthes australis*, "Austral Ladies' Tresses," from Caulfield—a new locality, and nearest yet recorded to city.

By Mr. E. E. Pescott.—Fungus, *Polyporus mylittæ*, "Blackfellows' Bread," showing fructification; *Hibiscus Farragei*, F. v. M., collected at Bolton (Mallee) by F. W. Holt, December, 1921, new for Victoria (recorded also from W.A., S.A., N.S.W., Q., and N.T.)

By Mr. A. J. Tadgell.—Forty-one species of alpine plants from Mounts Feathertop and Hotham, including *Acacia penninervis*, var. *linearis*, Hickory, *Aciphylla glacialis*, Snow Aciphylla, *Astelia alpina*, Astelia, *Helichrysum rosmarinifolium*, var. *ledifolium*, *Olearia flavescens*, Yellowish Aster, *O. subrepandra*, Wrinkled Aster, *Orites lancifolia*, Alpine Orites, *Podocarpus alpina*, Alpine Podocarp, *Trochocarpa pumila*, Dwarf Wheel Heath, *Thamnolia vermicularis* (lichen), *Uncinia compacta*, Mountain Hook Sedge; living plant of *Nertera depressa*, in berry; also a micro-fungus, *Fabræa rhytismoides*.

By Mr. H. B. Williamson.—Flowering and fruiting specimens of *Eucalyptus neglecta*, Maiden; also samples of bark and timber and photographs of trees a rare species from Spring Creek, near Cobungra, 18 miles from Omeo, collected by exhibitor, January, 1922. The first specimen brought to Melbourne since its discovery by Mr. A. W. Howitt, F.G.S., in 1882.

After the usual conversazione the meeting terminated.

A CONTRIBUTION TO "THE FLORA OF THE VICTORIAN ALPS."

BY ALFRED J. TADGELL.

(*Read before the Field Naturalists' Club of Victoria, 12th Dec., 1921.*)

IT was not with any intention of reading a paper before the Field Naturalists' Club of Victoria that I made my collection of Victorian Alpine plants—in fact, I did not expect to make any material additions to the scientific records of species that had been collected by other enthusiasts; nor had I seen the paper by Prof. Ewart entitled "The Flora of the Victorian Alps," accompanied by a botanical report by Mr. J. W. Audas, which appeared in the *Naturalist* for October, 1910 (vol. xxvii., p. 104). I had made my own collection and my own list, which included heights and actual collecting-places, as I had done under similar circumstances in other hunting-grounds. How could I expect to add to the collections of such ardent botanists as the late Baron von Mueller, Messrs. Walter, Stirling, Maiden, French, Barnard, Sutton, and Weindorfer, or, indeed, of so many who had from time to time sent specimens to the National Herbarium?

However, after reading the 1910 list, for the first time, a few months ago, and having had five pleasant outings in the Alps, each extending to about a fortnight, and ranging from early December to the end of March, running up one side of that 40 miles long horseshoe; from Harrietville to the St. Bernard Hospice, diverging to fossick on the steep slopes of Mount Smyth opposite, along and on top of The Twins, thence to Mount Freezeout, then down the valley of the Dargo River, and into the valley called by Mr. Stirling "Flora Valley"; then, resuming the circular bend of that horseshoe route, over windy Mount Blowhard and down the deep valley below it, traversing Mount Hotham in many directions, on its slopes, into Loch Glen, delving into the Diamentina River bed, and backwards and forwards along the Razorback to Mount Feathertop; again, living in solitude at the rest house near the last-named mount on two occasions, continuing down the side of this elephantine monster on its one side, or along its other side, so like one of the Pyramids, and finally down the opposite leg of the giant horseshoe for eight miles into Harrietville—I thought that surely my collection might bear comparison with the 1910 list.

Professor Ewart strongly urged that botanists make full use of the National Herbarium, since alpine collections often yield undiscovered treasures or vary from type. I had already experienced the help and kindness of Mr. J. R. Tovey, the

principal assistant at the Herbarium, so decided to refer and compare the many species I had collected. I therefore gratefully acknowledge my debt to that gentleman and to his able assistants for their trouble, as well as to Dr. R. S. Rogers, of Adelaide, and Mr. J. H Maiden, of Sydney, for my many references to them

Our work has been rewarded by increasing the 346 plants recorded in the 1910 list by 83 natives—an increase of over 25 per cent.; by seventeen further varieties; and an addition to the introduced aliens of eleven plants, making a total of 111 additions to the list. Some of the plants in the 1910 list appear as doubtful records, so I have been able to specifically confirm four at least of the rarer ones by actual specimens collected, and to assign to them a definite locality. Places where collected, and heights, are given for all of the plants in my list. The Herbarium has retained most of the additions mentioned in this review, as well as others that were included in the 1910 list, but for many of which no altitude or collecting-ground had been given previously.

I can only reiterate the Professor's hope that the present list will be of use to visitors desiring to botanize amidst the magnificent scenery of the Victorian Alps: and here I may add, for information of at least a few, that one is handicapped by the want of suitable accommodation, for, except an old-fashioned hostelry that did service in the day of the late Baron von Mueller, whose name I found inscribed in the visitors' book, there is no accommodation for another 30 miles than the St. Bernard Hospice, situated about 14 miles from Harrietville, save what the Mount Feathertop rest house affords, or unless sleeping bags are taken.

Of course, the outings one gets in such high altitudes, and under the seasonal and climatic conditions of these alpine regions, have other compensations than botanical ones. In one's retrospects amusement is afforded from one's experiences, to say nothing of the feeling of being right away from one's fellow-beings or of being among great snow accumulations in midsummer, and even frost on Boxing Day (26th December). There is the experience of getting into three thunderstorms in one day; being wet through, and the irony of knowing you are seen by the blind eye given you of a passing motor-car bound for the same destination; yet, though one is dripping wet, one feels too proud to beg a lift. Then there is the being pulled up by a blinding flash, and to hear the simultaneous crash of the heavenly artillery; or, again, of that peculiar sensation in the ears that driving rain gives, as it sizzles against the tree boles and creates a white froth at their bases, the rain meanwhile pouring down on one in one's helpless, unprotected,

and forlorn condition, with still eight miles to walk before one can shelter and get a change of clothing.

If the day be not too hot, as some of you know, the walk from Harrietville to St. Bernard, of fourteen miles, is along a splendid road, that rises—sharply at first—from 1,400 to 5,060 feet, with streams *en route* at which to lave or quench the thirst. Plodding along, with eyes ever on the look-out for botanical prizes, half-way is reached, and one sees at the closing in of the long Ovens Valley, at the river's source, the aptly named Hospice perched aloft, and one's destination for the night, but for a long time it does not appear to come perceptibly nearer. One's eyes light on a beautiful valley of eight or ten miles wide on the left hand, and, beyond it, one sees, like a pencil line in an artist's picture, to-morrow's road, cut out of the mountain crest. This is followed with interest for some five miles or more in the parallel walk on the opposite spur. Ever and anon one's eyes are raised to the skyline to see this pencillar road and Mounts Blowhard, Hotham, and Feathertop. At last the sight of Mount Smyth, like a crouching lion, tells of one's approach to St. Bernard, and one retires to one's room and takes the evening meal in bed, while wet clothes are dried at the kitchen fire. One's wetting is soon forgotten on the following day, for it is "Excelsior!" A belated warning to "hold on to your hat" is received when passing the goose-neck at 5,500 feet at Mount Blowhard, and, as one finds it necessary to go back to pick up the headgear, the lesson is learned why the mountain gets its name.

There is such sublime grandeur on this highest of roads that one never tires of it. It is not until Mount Hotham has been crossed that the road is left, as it falls towards Cobungra and Omeo. To return to St. Bernard, one crosses Hotham as a high plateau (6,100 feet) and rambles over its flat-topped surface and finds the road again, where it crosses the mount on the level at its highest part. Here, on one occasion in December, the remains of a large fire was seen, built by a motor party in the endeavour to melt the snow sufficiently to allow the party to proceed to Omeo. Snow and wood remained for many days after.

There are many rambles to be made over Mount Hotham, which is eight miles from St. Bernard or eight miles from Feathertop—rambles that please lovers of the spectacular in nature quite as much as the scientific botanist. The snow in the distance looks like a flock of dun-coloured sheep, and it remains often till after Christmas and New Year, in large, deep drifts of nearly a quarter of a mile long by a quarter of a mile wide, when not exposed to the wind, giving it the appearance, at a closer view, of a glacier river shooting into the valley below.

while the snow particles tossed up by the walker look like beautiful diamonds in the sunlight. Nor are evidences wanting of the snow having lain long during the winter, as there are numerous barren and coarse stony spaces where the surface soil has been washed away into the valley as the snow melted: yet, where the snow is melting lower down the slopes, the runnels are being transformed into tiny mountain creeklets. Here are to be found many of the gems of the alpine flora. Those of you who have found the Alpine Marsh Marigold, *Caltha introloba*, with its flowers the size of a half-crown or of a five-shilling piece, or the infrequently met with *Astelia alpina*, both of which revel in the melting icy waters, will understand the flower-lover's enthusiasm when these beautiful flowers are met with in their homes.

One is down on hands and knees, then plunging through morasses, then over rocky ravines, now skirting a declivity with uncertain foothold, and later holding on to a grass tussock, so as to draw nearer to some floral treasure. One soon finds oneself unconsciously descending the deep valleys that fall away from Mounts Hotham and Feathertop, and it is hard to resist the temptation of seeking one's treasures further. There is the Alpine Senecio, *Senecio pectinatus*, with its large yellow and beautiful single flowers, so hard to resist, down that awkward slope. One looks up and then down; the hold is precarious. "*Facilis est descensus Averno*," and to slip over that precipice would be easier than to regain the summit. One forgets, in the lure and fascination of these beautiful alpine gems, that one is alone on the mountain side or deep down in the shaded valley, and what a slip might entail.

If so many of the native flowers are rare, the Alps are not without the introduced weeds, and it is surprising what impish delight is felt in cutting deeply into the roots of such as the Common Dock, seen in several places. With Emerson, one thinks of the definition of a weed as so pretty in its place, but so scorned when out of it. On the mountain tops the Common Sorrel is almost as plentiful in places as is the St. John's Wort in the Ovens Valley lower down. There are, however, no rabbits to be seen on the Alps. Hurdle yards of the shepherds remind one of a visit made in the year of the great drought, when impoverished sheep were driven from the Riverina plains to depasture on the exposed mountains. It was no wonder that harsh feed and exposure at an altitude of 5,000 to 6,000 feet resulted in dead sheep almost anywhere, and in an afternoon's walk at least six or seven dying sheep might be counted. Polluting the streams, they doubtless were the means of increasing the number of alien plants: and the crows—how they revelled! Nor do you wonder at the imprecations hurled

at these hideous, white-eyed scavengers as they circled in a flock of over 100 on the summit of Feathertop. One thought of a leg broken and the eight miles from human companionship.

Beautiful sunsets one is able to see almost any day at a low altitude, but the sunrises from Feathertop at 6,306 feet above sea-level are almost incomparable—next only to Kosciusko itself. What is there about the "miracle of the day" that is so awe-inspiring? A lunar eclipse from this height is unique, but it is the sunrise that appeals to the senses. One rises before the lark in preparation for a sunrise, and stumbles over the loose stones in the darkness. There is the patient wait at the cairn, with just a race to be in time, sometimes. The lee side is sought from the cutting wind, which always seems more penetrating at the break of day; and, though one rises in the dark, virtue does not always bring its reward, and a disappointing walk of a mile along the track does not dispel the scud clouds or fog at times, and the masses of mist roll and obscure everything. But one essays again on the morrow, and is compensated by the observation of a glorious mystic lake, with imaginary islands in the storm-tossed sea. One March morning, as the sun rose, the light struck the cairn and projected a dark, uncanny, thin line across the clear valley for 50 miles to and far beyond the Buffaloes. It was like the black shade one sees on a foggy night when standing under a street lamp. As the shadow shortened, and was about to be lost at the foot of the mount, a false sun phenomenon appeared at the point of contact. It was like a sunset throwing its expanding rays for half an hour, but without the rays of light. This atmospheric effect was seen by the observer at a similar height at Kiandra, near Mount Kosciusko, on a previous occasion, but at sunset.

One's experiences as a nature-lover can only be narrated in part, for, standing on Feathertop—almost our highest Victorian mountain—means looking over a world of high mountains, the many successive chains following each other like the waves of the ocean. A fall of snow in March gave zest to an early morning outing. Such an event added the charm of icicle-like flags from the bushes, and a white mantle covering the country around. How fortunate it is that one is not a fauna observer as well as a botanical enthusiast, and so to weary you by setting down what one sees of birds, insects, and animals! It is sufficient to relate to one's fellow-naturalists that the butterfly man would enjoy seeing his fairies floating gracefully on a breezeless day over his head on Feathertop or The Twins at an altitude of 5,000 to 6,000 feet, while his companion, the entomologist, would find a slaty, armour-coated, lazy grasshopper moving amongst the rocks. The bird-lover would make

friends with the Robin-like bird that builds in the doorway of the cabin, and is not disturbed by his passing to and fro; he would talk back to the inquisitive Jay, with his head on one side, who seems to say "Well?" as he stands in the same doorway of the shelter house, with large eyes staring at the intruder. There are great Eagles, floating Hawks, gorgeous Mountain Parrots, Thrushes, Tree-creepers, for the bird enthusiast, and an Owl who perches overhead in the dusk and seems to look ugly at one for daring into his ancient domain. Then Master Reynard, but a few yards away, is there with his fine brush, consuming the remains of one's bully beef, or the mouse and rat caught overnight in one's cabin.

Genuine regret that one's trip must come to a close is experienced after doing fourteen days' solitary, and one would think that to walk along the track, falling from 6,000 to 1,400 feet, down the mountain side would be comparatively easy; but the muscles of one's legs contract most painfully, and seem to knot, necessitating lying full stretch at times, till the Harrietville road is reached and normal conditions again prevail. But how that walk down has been compensated for! At the rest house on Feathertop one had, night and morning, a single Lyre-bird to serenade one, but now there are at least four birds lustily singing at the same time, their clear whistling and mocking notes accompanying one as a last echo from the charms of the bush. Must I forget, in conclusion, the botanist's useful impedimenta, of the ample supply of paper for his specimens, or the inconvenience caused to porter and coachman, and the question, often asked, "Did his travelling bags contain bricks?"—for surely their weight justified the belief.

I subjoin the names, situations, and heights where collected of my additions to the 1910 list. And here again I would say how great is my appreciation of the trouble taken anent my specimens, and all I owe to Messrs. Rogers, Maiden, and Tovey. Mr. Maiden's splendid contributions to the Mount Kosciusko flora made me feel the possibility of finding, amongst our alpine plants similar material to that described in his first and second "Contributions."*

Several plants have yet to be definitely determined, and I am hoping to be able shortly to procure further material. For instance, a marsh perennial species of Brachycome, with white flowers, is still in question. Again, the Bristle Grass, *Trisetum subspicatum*, though a very striking grass in the Alps, is confounded with *Calamagrostis quadriseta*, var. *montana*.

* "A Contribution towards the Flora of Mount Kosciusko," by J. H. Maiden, F.L.S., Government Botanist of New South Wales, Department of Agriculture—Miscellaneous Publications, No. 241 (July, 1898), and "A Second Contribution," &c., Mis. Pub., No. 331 (October, 1899).

I have found glabrous as well as pubescent forms, the former appearing to warrant further investigation.

Regarding the orchids, Dr. Rogers, of Adelaide, is characteristically thorough and unboundedly courteous. He examined my more difficult species. A very fleshy form, that I regarded as an alpine form of *Caladenia carnea*, was submitted. Of it he said the labellum has four rows of calli and is devoid of the transverse bars of *carnea*. It has also a wider leaf, and is more hairy. As it does not fit comfortably under any of Fitzgerald's species, or of any other description, for the present it is placed as *Caladenia carnea* var. *quadriseriata*. Of a double-flowering specimen of the same species (being teratological) the Doctor gave a very lucid and full account, and was sufficiently interested to ask if he might retain it. A form of *Prasophyllum Suttoni* was interesting. This species is restricted to our highest mountains, and was collected by Dr. Sutton at the Buffalo Mountains. It is described as a slender white and green species, although the colour was too faded to definitely see its actual colouring at the time Dr. Rogers described it, and it was dry. The lateral sepals are free in the described specimen. I took some notes of the specimens I collected. The plant is robust, its six flowers being distinctly pale reddish, and the lobes are marked with five red lines, except the lower calyx lobes, which are concave and greenish. Even the white petals are red-lined, and this I pointed out to Dr. Rogers. In naming it, the Doctor said that the main criteria of *P. Suttoni* are that it has the petals longer than the lateral sepals, and he pointed out that my specimen differed from the type in the lateral sepals all being connate, and the dorsal sepal longer. As we know, colour is not constant as a determining factor in orchids. For instance, during this past week I had some beautiful spiders, *Caladenia dilatata*, sent to me. Usually the colour of the labellum is rich chocolate, with dark calli on the posterior portion, and few, if any, on the front or curved part. One sent me was a beautiful vieux-rose red on the front, and white posteriorly; the other was yellowish-white entirely. Both had yellow and brown calli, and one had calli on the curved part of the labellum. These colours are most unusual, and result from light, sugar excess, or temperature. A form of *Prasophyllum Frenchi* from the Alps also proved interesting to Dr. Rogers. He was pleased to honour me by associating my name with it. It differed from the usual form, as the lateral sepals were connate, a feature not hitherto observed in the species.

ADDITIONS TO NATURAL ORDERS OF NATIVE PLANTS ON PAGE 110 OF *Vic. Nat.*, Oct., 1910.

Boraginaceæ, 1; Caprifoliaceæ, 1; Caryophyllaceæ, 3; Cras-

sulaceæ, 1; Compositæ, 16; Cyperaceæ, 9; Epacridaceæ, 3; Euphorbiaceæ, 1; Filices, 2; Geraniaceæ, 2; Gramineæ, 8; Haloragaceæ, 3; Juncaceæ, 1; Labiatæ, 1; Lycopodinæ, 1; Liliaceæ, 1; Leguminosæ, 4; Lichens, 1; Muscæ, 3; Myrtaceæ, 1; Orchidaceæ, 4; Oxalidaceæ, 1; Plantaginaceæ, 2; Proteaceæ, 1; Rosaceæ, 2; Ranunculaceæ, 3; Rubiaceæ, 3; Urticaceæ, 1; Umbelliferæ, 3. Total, 83.

ADDITIONS TO THE LIST OF "THE FLORA OF THE VICTORIAN ALPS" IN THE *Victorian Naturalist* OF OCTOBER, 1910, PAGE 107.

ABBREVIATIONS.

BHARD.	Mt. Blowhard, half-way between St. Bernard and Mt. Hotham.
DARGO TK.	Narrow valley of the Dargo River, behind St. Bernard, towards Freezeout.
FREEZE.	At and towards Mt. Freezeout, 3 miles from St. Bernard Hospice.
FTOP.	Mt. Feathertop, about 8 miles from Harrietville and 15 miles from St. Bernard.
DIAM.	Diamentina or Kiewa River, rising at Mt. Hotham.
HOT.	Mt. Hotham or "Baldy," 7 miles from St. Bernard Hospice.
HVILLE.	Harrietville, about 16 miles from Bright Railway Station.
SMY.	Mt. Smyth opposite and close to St. Bernard Hospice—1 mile.
TWNS.	The Twins Mounts, about 3 miles behind St. Bernard Hospice.
ST. B.	St. Bernard Hospice, about 14 miles from Harrietville.
RAZ. BK.	Razor Back, the long ridge connecting Mt. Hotham with Mt. Feathertop, for about 8 miles.
TO.	Towards.

The limit of alpine flora is taken at 3,000 and over (feet above sea).

The following plants are not included in the *Naturalist* list of October, 1910, and have been collected by A. J. Tadgell during five collecting trips between the months of December and March.

V indicates varieties: * indicates introduced aliens.

Aster (see Olearia).

Ajuga australis.—To. St. B. (3,000 to 4,000), also to. Ftop (4,000 to 5,000 ft.)

Acæna ovina.—Dargo Tk. at 4,000 ft.

Agrostis scabra (distinct from Deyeuxia scabra).—Hot. (6,000), Dargo Tk. (5,000), St. B. (5,000).

A. venusta.—Ftop. (6,100 ft.), also Dargo Tk. (4,500). (Collected also by Walter on Buffalo.)

Asperula scoparia, var. conferta.—Mt. Hot. (6,100), Ftop. (6,300).

*Andropogon halepensis.—Slopes of Feathertop (6,000).

Agropyrum scabrum.—To. Ftop (4,000 to 5,000), Twins (5,500), Dargo (4,500).

Azorella Muelleri.—Hotham (6,100).
Acrotriche serrulata.—Towards Feathertop (2,600 to 4,000).
Brachycome decipiens.—Towards Freezeout (4,500).
B. stricta.—Towards Feathertop (4,000 to 5,050).
Brachycome (nov. sp. ?)—Hotham (6,100).
vB. ciliaris, var. robusta.—Twins (5,500), Bhard (6,000), Raz, Bk. (6,000), Ftop. (6,200).
Blechnum (Lomaria) fluviatile.—Dargo Tk. (4,000).
Brutelia affinis (moss).—Ftop. (6,300), Hot. (6,100).
Calamagrostis æmula (Agrostis Solanderi) (Deyeuxia Forsteri).—Dar. Tk. (5,000), St. B. (5,000), Ftop. (6,200).
C. minor, var. densa (Agrostis densa).—To. Ftop. (3,000).
C. nivalis.—Hotham (6,100).
vC. rudis, var. contracta (syn. Deyeuxia scabra, var. contracta).—Towards Feathertop (3,000).
vCaladenia carnea, var. quadriseriata.—Raz. Bk. (5,600), To. Feathertop (5,000).
Colobanthus Billardieri.—Hot. (6,100), under Ftop. (6,100).
Clematis aristata.—To. St. B. (4,000), to. Ftop. (over 4,000).
*Cerastium vulgatum.—Raz. Bk. (6,100), Ftop. (6,300).
Crassula (Tillea) Sieberiana.—Hot. (6,100), Ftop. (6,300).
Coprosma pumilo.—Diam. (6,000), Hot. (6,050).
Carpha alpina.—Diam. (6,000), Hot. (6,000), Raz. Bk. (6,100), Ftop. (6,300).
Carex Gaudichaudiana (cæspitosa).—Diam. (6,000).
vC. Gaudichaudiana (dwarf form).—Hotham (6,000).
C. chlorantha.—Hotham (6,000).
C. breviculmis.—Hotham (6,000).
Cyanoglossum australe.—Hotham (6,000).
vDanthonia penicillata, var. pilosa.—Smyth (5,050).
vD. penicillata, var. pallida.—To. St. B. (3,000).
vD. penicillata, var. alpina.—Bhard. (5,800), Hut. (6,100). Ftop. (6,300) : syn. D. semiannularis.
vD. pauciflora, var. alpina.—Hotham (6,000).
Diuris sulphurea.—Towards Feathertop (4,500).
Didiscus humilis.—Hotham (6,100).
Dichelachne sciurea.—Towards Feathertop (2,600).
Erechtites quadridentata.—Towards Feathertop (4,000)
vEuphrasia collina, var. alpina.—Hotham (6,000).
Galium Gaudichaudiana.—To. Ftop. (4,000), Dargo (5,000).
Glyceria dives.—Feathertop (6,000).
Glycine clandestina.—To. St. B. (4,000–5,000)
G. Latrobeana.—Towards St. Bernard (4,000).
Gnaphalium collinum, var. radicans.—Hotham (6,100).
vGrevillea australis, var. montana.—Feathertop (6,200).
Geranium (pilosum) dissectum.—To. Hot. (5,100), to. Ftop (4,000–5,000), Ftop. (6,200).

vHelipterum incanum, var. alpina.—Hotham (6,100).
Helichrysum cuneifolium.—Dargo Tk. to. Freezeout (5,000).
H. scorpioides.—To. Ftop. and Hot. (4,000–5,000).
vH. rosmarinifolium, var. ledifolium (H. ledifolium).
vH. rosmarinifolium, var. intermediate form.
vH. rosmarinifolium, var. thyrsoideum.
Haloragis micrantha.—Hotham (6,000).
H. teuchroides.—Dargo Tk. (4,500), Hot. (6,000).
H. depressa.—Dargo Tk. (4,500), Diam. and Hot. (6,000).
Hydrocotyle laxiflora.—Towards Feathertop (5,000).
*Hypochæris radicata.—Ftop. (6,200), to. St. B. (4,000), Raz. Bk. (5,100), to. Ftop. (3,000–5,000).
Juncus prismatocarpus.—Dargo Tk. (4,800).
Lycopodium selago.—Mount Hotham (6,100).
Lomandria (Xerotes) longifolia.—To. St. B. (4,000), to. Ftop. (4,000–5,000).
Leucopogon lanceolatus, var. gelidus.—To. Ftop. (4,000–5,000).
L. Hookeri (differs from Lissanthe (Styphelia) montana)—Feathertop (6,200); collected also by Walter.
Leptorrhynchus squamatus.—Twins (5,500), Bhard (5,500), to. Freeze. (4,000), Hot. (6,000), Raz. Bk. (6,000), to Ftop. (4,000–5,000), Ftop. (6,200).
Leptospermum lanigerum.—To. Freeze. (4,000), to. Ftop. (5,000).
Lomatia Fraseri.—To St. B. (4,000), Dargo Tk. (4,000), to. Ftop. (4,000–5,000).
*Murrubium vulgaris.—Towards St Bernard (5,000).
*Mentha pulegium.—Towards Feathertop (4,000–5,000).
Microceris Forsteri.—To. Ftop., Twins, Dargo Tk., Bhard., Hot., Raz. Bk., Ftop.
Olearia Frostii.—Dargo Tk. (4,800), Bhard (5,500), Hot. (6,000), Raz. Bk. (6,000), to. Ftop. (5,000), Ftop. (6,200); see also Ewart, Roy. Soc. Proc., March, 1916.
O. flavescens.—Dargo Tk. (4,500).
O. subrepandra.—Ftop. (5,800).
O. alpicola.—Dargo Tk. (4,500).
Oxalis corniculata.—To. St. B. (4,000), to. Ftop. (5,000).
Oxylobium ellipticum.—To. St. B. (5,000), Twins (5,000), Dargo Tk. (4,800), Bhard. (5,500), Hot. (6,000), Raz. Bk. (6,000), Ftop. (6,200).
vPoa cæspitosa, var. latifolium.—Hot. (6,000), Ftop. (4,000–5,050); collected also by Walter.
Pultenæa juniperina, var. planifolia.—To. Ftop. (4,000–5,000); see Williamson's revision also.
*Picris hieracioides.—To. St. B. (4,500), to. Ftop. (4,000).
vPimelea hgustrina, var. hypericina (P. hypericina).—To. St. B. (5,000), Twins (5,000), Dargo Tk. (4,000), Hot. (6,100), to. Ftop. (5,000).

Poranthera microphylla.—To. St. B. (4,000–5,000). Raz. Bk. (5,500), to. Ftop. (4,000-5,000).
Polypodium australe (mountain form).—Hotham (6,100).
Pelargonium australe.—Dargo Tk. to. Freezeout (4,500).
Plantago Tasmanica.—Hotham (6,000), Feathertop (6,200).
P. varia.—Blowhard (5,500).
Polytrichum Sullivani (Moss).—Hotham (6,100).
Parmelia physodes, var. pulverata (Lichen).—Hot. (6,100); associated with Scleranthus.
vPodolepis longipedata, var. robusta.—Hotham (6,100), Feathertop (6,200).
Prasophyllum Frenchii, var. Tadgellianum (Rogers).—Hotham (6,000).
P. Suttoni.—Ftop. (6,200); collected also by Dr. Sutton, Buffalo.
P. brevilabre.—To. St. Bernard (4,000).
Ranunculus rivularis.—Dargo Tk. to Freezeout (4,500).
R. hirtus (plebius).—Diam. (6,000).
Rubus parvifolius.—To. St. B. (4,000), Dargo to Freeze. (5,000), to. Ftop. (5,000).
*Rumex acetosella.—Raz. Bk. (6,000), Blowhd. (5,500), to. Ftop. (5,000), Ftop. (6,300).
*R. conglomeratus.—Raz. Bk. (6,000), to. Ftop. (5,000), on Ftop. (6,000).
Senecio velleyoides.—Smyth (5,100).
S. odoratus.—Dargo Track (4,800)
S. lautus.—To. Ftop., Hot., and Twins (5,600).
Spergularia rubra.—Hotham (6,100), Feathertop (6,300).
Sphagnum cymbifolium. (Moss).—Hot. (6,100), Diam. (6,000).
Scirpus cernuus (riparius).—Hotham (6,000).
S. inundatus.—Hotham (6,100), Ftop. (6,200).
S. setaceus.—Diam. (6,000).
S. cartilagineus, var. alpina.—Diam. (6,000).
Sambucus Gaudichaudiana.—To. Ftop. (2,600)
Scleranthus diander.—Raz. Bk. (6,000), Ftop. (6,300).
*Trifolium pratense.—Dargo Track (4,500).
*Trifolium repens.—Bhard. (6,000), to. Hot. (5,000), Ftop. (6,300).
vTrisetum subspicatum (glabrous form).—App. to Ftop. (5,000).
Uncinia compacta.—Hotham (6,100).
*Urtica dioica.—To. St. Bernard (3,000–4,000).
U. incisa.—To. Feathertop (2,600).

The additions are :—

Species (also varieties not recorded)	83
Varieties (of species recorded)	17
Introduced aliens	11
Total	111

It is perhaps unfortunate—but it may have been for economy of space—that the 1910 list appearing in the *Naturalist* does not record heights and localities to guide collectors of the flora of the Victorian Alps, as Mr. Maiden's list of the flora of Mount Kosciusko does, but we may be able at a later date to assist in such a compilation. Mr. Maiden's list commences with plants found at a height of 3,000 feet, but there is nothing to guide us as to a minimum of height in listing our Victorian alpine flora. The ascent of our Alps commences, in my opinion, at about 1,800 feet, or at the Harrietville State school.

In my list of additions I have taken 2,600 as the alpine limit of height, as it is approximately about there that the climatic conditions begin to assert themselves, owing to the proximity of the higher elevations, and it is from there that the rise becomes pronounced towards the higher mountains. My heights to Feathertop were verified by aneroid and with the assistance of the local schoolmaster, Mr. Bennett, while those on the St. Bernard slopes were given me by Mr. Bibby, at that time mine host of the Hospice, and a former road contractor, who would in all probability receive them from the local shire engineer.

SPECIMENS COLLECTED BY A. J. TADGELL, PREVIOUSLY ONLY DOUBTFULLY RECORDED (*vide* WILLIAMSON'S LIST No. 2, *Victorian Naturalist*, vol. xxxvi., p. 18, May, 1919).

Scleranthus uniarioides.—Feathertop, summit (6,300 feet).

Azorella Muelleri.—Hotham (6,100 feet).

Oreomyrrhis pulvinifica.—Hotham (6,100 feet), Diamentina (6,000 feet).

Lycopodium selago.—Hotham (6,000 feet); collected also on Baw Baw—National Herbarium.

ADDENDUM.—Since reading the foregoing paper I had another opportunity of securing specimens of our alpine plants and making a few additional notes as to habits, &c. During the Christmas holidays Mr. A. G. Hooke, of this Club, accompanied me from Bright to Mount Feathertop and along the Razor Back to Mount Hotham, Mr. Hooke continuing to the St. Bernard Hospice and over Mount Freezeout to Treasure's run, on the Dargo High Plains, a further distance of about thirty miles. He secured a fine series of photographs illustrating the grandeur of the scenery of this portion of Victoria. In our numerous excursions we were very much struck with the rapid increase of aliens among the alpine plants. At one time stray plants of sorrel, dock, thistles, or even goosefoot, might be seen here and there, but now acres are taken up by docks, sorrel, flatweed, hogweed, and other lowland stock-brought undesirables. Needless to say, we did a little eradica-

tion where we could. In the 1910 list only eleven aliens were named. I added an equal number in my paper, and now we have added six more, making a total of 28 weeds which have intruded among their alpine congeners; however, it is not the number of species, but the quantity, that hurts. This increase has doubtless been caused by the larger number of sheep and cattle now sent to the alpine heights for sustenance during the summer season. We found the season rather backward on Hotham (6,100 feet), but slightly better on the Razor Back and Feathertop, especially on the western or warm side; but in this region, where a plant runs a quick course, a week or two makes a wonderful change. Thus, by the end of January the Alps would soon fill a botanist's vasculum with rare and beautiful plants and flowers. Among orchids we found the white form resembling *Caladenia carnea* (which Dr. Rogers has since determined as *C. angustata*, previously recorded by Mr. Pescott from Boort, N.W. Victoria, and the Grampians). It occurs on the summit of Hotham, on Feathertop (at 6,200 feet), and also near the rest house (at 5,100 feet), but is not by any means numerous. I had noted it on previous trips, but had regarded it as a variety of *C. carnea*. We also found *Thelymitra aristata*, the Potato Orchid; *Gastrodia sesamoides* (in large numbers), and a Prasophyllum not yet in flower; the latter occurs in quantities on Mount Hotham, growing in lawn-like plots of *Poa cæspitosa*, the leek-like flower-spikes, not yet fully developed, looking like a miniature onion field. We had an echo of the late Baron von Mueller's enthusiasm to Sir Wm. Hooker in 1854, when he discovered that handsome shrub, *Grevillea victoriæ*, which was seen by us at its best. Amongst my exhibits to-night is a living plant of *Nertera depressa*, Banks (*Coprosma nertera*, F. v. M.), which grows only at about 6,000 feet, generally in spongy morasses or near dripping water. A visitor to our hut was so struck with it and its pretty little red fruits that he asked if we had found a tomato. Change of environment, sea-level, and greater warmth have caused this depressed little plant to alter its nature so that the close-set foliage has become elongated, covering both flowers and fruit. Another cushiony, depressed plant found at 6,000 feet was *Hypericum japonicum* (mountain form), a relative of the dreaded St John's Wort. A micro-fungus found on *Cotula filicula*, an alpine composite, has been identified by Mr. C. C. Brittlebank as *Fabræa rhytismoides*. This gave the host plant quite a fern-like appearance, and not unlike fern-spores on the surfaces of the leaves. The plants exhibited to-night are mostly un-get-at-able species to the ordinary tourist, and are shown as an example of what the alpine flora is like, unfortunately, owing to our meeting being a week later than usual, they are

not in as good condition as I would have wished. In turning over some loose rocks we disturbed thousands of Bogong Moths, *Agrotis infusa*, which made a loud buzzing noise with their wings as they sought another spot in which to shelter. Continuing on towards the summit, a worm-like snake, about twelve inches long and an inch in diameter, was seen. This snake I have seen on several occasions on Mount Hotham, but have never been prepared to bring back a specimen for identification. On arrival at the summit of Feathertop we did an obvious duty in replacing the cairn, which had been demolished, whether by weather or vandals we were not sure; but as the highest point of the double summit of the mount is so difficult to determine at first glance, the cairn should not be allowed to disappear. By this visit we have added the following eleven species to the list of alpine plants, making a grand total of 418 species, with 30 varieties and 28 aliens, all found at over 3,000 feet.

FURTHER ADDITIONS TO THE ALPINE FLORA (FEATHERTOP AND HOTHAM), COLLECTED AT OVER 3,000 FEET, JANUARY, 1922.

NATIVE PLANTS.

Acacia penninervis, var. linearis.—To. Ftop. (3,500–4,500 ft.)
Caladenia angustata.—To. Ftop. (5,100–6,200).
Dryopteris punctata, var. rugulosa.—To. Ftop. (5,000).
Hypericum japonicum.—Towards Feathertop (6,000).
Lagenophora Billardieri.—Ftop., ubiquitous to 5,800 feet.
Lepidosperma concavum.—Near rest house, Ftop. (5,100).
Lomandra filiformis.—To. Ftop. (3,000–4,000).
Mentha laxiflora.—To. Ftop. (4,000–5,000).
Plagianthus pulchellus, var. tomentosa.—To. Ftop. (3,500–4,000)
Senecio vagus.—Towards Feathertop (3,500–4,000).
Thamnolia vermicaulis (lichen).—Ftop., near summit (6,200).
Thelymitra aristata.—Towards Feathertop (4,000).
Trochocarpa pumila.—Mt. Hotham (6,000 ft.)

ALIEN PLANTS.

Crepis tectorum.—Towards Feathertop (3,000–4,000).
Poa annua.—Towards Feathertop (5,050).
Polygonum aviculare.—To. Ftop. (5,050), also Raz. Bk. (5,600).
Sonchus oleraceus, var. asper.—To. Ftop. (3,000–4,000).
Taraxacum officinale.—Diamentina (6,000).
Vicia sativa.—Towards Feathertop (5,050)

SUMMARY.

Class.	1910 List.	Tadgell, 1921.	Tadgell, 1922.	Total.
Natives—species	324	83	11	418
,, varieties	11	17	2	30
Aliens	11	11	6	28

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FIELD NATURALISTS' CLUB OF VICTORIA

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

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

REPORTS.

A report of the visit to the Zoological Gardens on Saturday, 21st January, was forwarded by Miss R. Currie, who reported a good attendance of members. The director, Mr. D. Le Souëf, C.M.Z.S., was unable to act as leader owing to the excessive heat of the day, but had deputed one of his assistants for the duty. An inspection of the principal birds and animals was made, and much interesting information afforded to the visitors regarding them. The young hippopotamus, the second born in the Gardens, appeared to be thriving in confinement. The feeding of the carnivora was watched with interest. A visit to the giraffe (now about thirteen feet high) gave rise to some interesting questions put to our guide. The Brush Turkey's mound, made entirely by the male bird, was a source of wonderment, and the explanation given of its actions during the incubation of the eggs excited considerable interest. The inspection of the birds, animals, &c., was rather hurried, owing to the heat, and an adjournment was made to the shady lawn at the Curator's residence, where Mr. Le Souëf had kindly provided afternoon tea, which was greatly appreciated. Here Mr. Le Souef afforded some further information about several of his charges, and then invited his guests to a brief inspection of his private museum, which contains a large collection of natural history specimens and curios of all kinds. The very hearty thanks of the visitors for the extremely interesting afternoon were tendered to Mr. Le Souëf before leaving.

A report of the week-end excursion to Walhalla and Moe on the Foundation Day holiday (28th–30th January) was given by the acting leader, Mr. F. G. A. Barnard, who said that nine members and friends had made the 200-mile journey. Though the time available for rambling was very brief, the scenery of the latter part of the journey was so delightful that none of the party regretted taking the trip. Sunday was spent on the banks of the Thomson, where the typical vegetation of the district, including nearly twenty species of ferns, was seen to advantage. Unfortunately, rain greatly marred this portion of the outing. Returning to Moe on Monday morning, it had been intended to visit the Morwell coal mine, but, rain again setting in, the majority of the party returned to town. How-

ever, the leader and two others risked the chance of the weather clearing up, which it did, and had an interesting afternoon viewing the location of the great electricity works in course of construction at Yallourn, 7½ miles from Moe, and the open cut on the bank of the Latrobe River where a face of eighty feet of brown coal is being mined. The deposit exists below the floor of the cut for a further depth of ninety feet, which will be mined and converted into electric power by the new works and transmitted to Melbourne and other centres for industrial and other purposes. Some examples of imperfectly converted wood were secured, which probably represent a species of Cypress. During the stay at Walhalla the party was greatly indebted to Const. Rawlings, secretary of the local Tourist Association, for guidance and information regarding that one-time phenomenal goldfield, where £2,500,000 worth of gold was taken from the celebrated Long Tunnel mine, now abandoned.

A report of the excursion to Lilydale on Saturday, 11th February, was given by the leader, Mr. F. Chapman, A.L.S., who said that a good party visited Ruddock's Quarry, where, notwithstanding considerable heat, great enthusiasm was shown in securing fossils from the deposit of Yeringian mudstone exposed there. Quite a large number of fossils, representing many distinct forms of animal life, were obtained.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. H. J. Cruickshank, Railway Offices, Spencer-street, Melbourne, was duly elected as an ordinary member, and Mrs. E. A. Tavaré as a country member of the Club.

GENERAL BUSINESS.

The chairman announced that two members of the Club, Mr. J. H. Young, of Meredith, and Mr. Frank S. Smith, of Noorat, had recently passed away. Both had been enthusiastic naturalists, the former being a keen geologist and the latter an ornithologist of wide experience among the birds of the Western District. Unfortunately, neither of them had contributed to the Proceedings of the Club. He also referred to the recent death of Mr. J. F. Mulder, of Geelong, who, as a member of the Geelong Field Naturalists' Club, had been a leading authority on the natural history of Geelong and its surroundings.

On the motion of the chairman, it was decided to send letters of condolence to the relatives of the deceased gentlemen.

The chairman announced that it had been decided to hold an exhibition of specimens, to be open to the general public, in the Athenæum on 20th June next, and desired members to make as fine a show as possible.

PAPER READ.

By Messrs. J. R. Tovey and F. F. Morris, entitled "Notes from the National Herbarium."

The authors described a new Brachycome, *B. Tadgellii*, named after Mr. A. J. Tadgell, of this Club, who had obtained it at Mount Hotham, Victorian Alps, at 6,000 feet above sea-level, on several occasions. They also recorded *Hibiscus Farrangei* as a new Victorian plant, having been found recently in the Mallee, at Bolton, N.W. Victoria; recorded also from all the Australian States.

HOLIDAY NOTES.

Mr. E. Cox gave some account of a fishing trip to the Dargo River, North Gippsland.

EXHIBITS.

By Mr. F. G. A. Barnard.—Partly-carbonized wood from Moe coal mine, probably a species of Cypress.

By Mr. F. Chapman, A.L.S.—Yeringian fossils, from Lilydale excursion (see report in this issue).

By Master J. Pescott.—Portion of fossil Trilobite, *Goldius Greenii*, obtained at Ruddock's Quarry, near Lilydale.

By Mr. J. Searle.—Exhibited under microscope.—A rare flea, probably *Echidnophaga ambulans*, Oliff, taken on a Porcupine Ant-eater, *Echidna histrix*, at Bairnsdale, by Mr David Williams. The only other specimens known are in the Australian Museum, Sydney, having been taken in that State.

By Mr. A. L. Scott.—Fossiliferous rocks from Kangaroo Island, S.A.; schist from Second Valley, S.A.; and gneiss and pegmatite from Broken Hill, N.S.W.

By Dr. C. S. Sutton.—Photographs of plants and plant-formations from Cradle Mountain, Tasmania, and specimens of the four cushion plants from same locality—viz., *Raoulia Mereditha*, *Pterygopappus Lawrencei*, *Donatia novæ-zealandiæ*, and *Dracophyllum minimum*; also yellow specimen of *Blandfordia marginata*.

By Mr. H. Whitmore.—Altered mudstone from Long Tunnel mine, Walhalla: fruit of *Lagenaria Patersoni*, from North Queensland.

By Messrs. Tovey and Morris, on behalf of National Herbarium.—*Brachycome Tadgellii*, Tovey and Morris, sp. nov., from Mount Hotham, Victorian Alps (6,000 feet), collected by Mr. A. J. Tadgell, and *Conospermum amœnum*, Meissm., from Western Australia, in illustration of paper.

By Mr. H. B. Williamson.—Dried specimen of *Onopordon acanthium*, L., the Heraldic Scotch Thistle, collected at Omeo by exhibitor, January, 1922.

After the usual conversazione the meeting terminated.

EXCURSION TO LILYDALE.

SEVENTEEN members and friends availed themselves, on Saturday, 11th February, of the opportunity of visiting Ruddock's Quarry, near Lilydale, one of the best localities for Yeringian fossils near Melbourne. Despite the prediction of a hot day, which was fulfilled to the letter, the excursion was enjoyed by all, and in a measure due to the kindness of Mr. S. R. Mitchell, who, with his car, helped several members along the three Irish miles between the station and the quarry. It was noticed with sorrow that a short cut across the last paddock was entirely spoilt from our point of view by having been ploughed into deep furrows. The song of the hammer was soon audible, and the leader had nothing to regret regarding the enthusiasm of the members. Specimens were named on the spot, and it is safe to say that in a few cases, at least, they were also forgotten on the spot. Amongst the corals the rugose, conical form of *Streptelasma* was found more than once; the genus *Romingeria* turned up in some abundance, a form almost restricted to North America; the curious little parasitic *Pleurodictyum*, an aberrant, tabulate form, also occurred. Worms were represented by the tube-building *Trachyderma*, whose soft gill-plumes have been found at Keilor and South Yarra. Crinoid stems were very abundant, usually preserved as limonitic casts and moulds. Some of the slender forms here found seem related to *Myelocrinus*, with its remarkably twisted and coiled stem; whilst the thicker stems resemble those of the *Taxocrinus* type, but may well be any other genus having closely-set stem-joints of considerable width. An aberrant thickening in one crinoid stem seemed to indicate a kind of "gout" produced by a parasite. Brachiopods, or lamp-shells, were found by the score. Amongst the genera noticed were *Stropheodonta*, with its toothed hinge-line; *Chonetes*, with tubular spines on the ventral border; *Orthis*, with cosmopolitan species; the little obese *Gypidula*; the crispate and sulcate *Spirifer*; and the hairy *Nucleospira*. Of bivalves we saw *Paracyclas*, with its delicate concentric ornament, and the curiously-keeled *Mytilarca*. The gasteropods found were the screw-like *Loxonema*; the ornate *Cyclonema*, a genus also found at Cave Hill; and the operculated *Hyolithes*. Amongst cephalopods, *Cyclocerus* and *Orthoceras* were noted. In regard to trilobites, we were not so fortunate as usual, the only representative, a tail of *Goldius Greenii*, having been found by one of the younger members. A short address, alluding to the past history of this highly fossiliferous mudstone deposit, was given by the leader, who pointed out its relationships to similar occurrences in North America, England (Shropshire), and Scandinavia (Island of Gotland). Reasons were given for the conclusion that several of our Victorian Silurian fossils

indicate that the palæozoic mud-line of the old Australian continent was the primal home of widely-distributed life-forms. After boiling the billy by the wayside, the return to Lilydale was made, and an agreeable hour was passed over the tea-table at the township, the 7.55 train being caught for home.

F. CHAPMAN.

THE LATE MR. JAMES HAY YOUNG.—The late Mr. Young was a resident of Meredith, and was elected as a country member of this Club in May, 1916. He was an ardent naturalist for the greater part of his life. His attention was first directed to the collection of geological specimens and freshwater shells by the late Mr. Sowerby, a scion of the famous family of English conchologists, and was then about twelve years of age. He had come to Australia from his native town of Kilmarnock, Scotland, at the age of one, about 67 years ago. By exchanging with many of the leading museums Mr. Young gathered together a valuable reference collection. He was most generous with his rare or unique specimens, always being anxious to present them to the National Museum. One of these fossil specimens, an interesting palæozoic worm, was donated, and named after its discoverer, *Cornulites Youngi*. Many rare fossils from the Victorian Tertiaries were also placed in the Museum collection, and one of these, *Plicatula Youngi*, will shortly be described. By Mr. Young's discovery of a curious limestone replaced by ironstone, a typical Miocene fauna was shown to exist on the Mornington Peninsula, and this helped to fix the age of the lower ironstone series. One greatly admires the intelligence and kindly disposition of our late friend, who in the face of many rebuffs in life, pursued his even course of pleasurable geological work, and left a fine record of perseverance and success in his favourite studies.—F. C.

THE LATE MR. FRANK SPENCER SMITH.—Mr. F. S. Smith, who passed away on the 4th February, at the age of 52, was elected a country member of the Club in April, 1914. He was then a resident of Noorat, in the Western District, where he was recognized as an enthusiastic ornithologist. His love of nature, and especially of birds, was followed up under circumstances which to many persons would have been insurmountable. He had been stricken with paralysis at an early age, and all his outings were made in a pony phaeton. For years he contributed a fortnightly column, entitled "Bush Notes by F.R.," to the *Australasian*, and had readers and correspondents all over the continent, but few were aware of the disabilities under which he wrote. His knowledge of Western District birds was very extensive, and if a selection of his writings were published it would doubtless have a ready sale. Though a member of the Club for so many years, he never contributed to its Proceedings.

THE GEOLOGY OF THE MALLEE.

By F. CHAPMAN, A.L.S., Palæontologist, National Museum, Melbourne.

(*Read before the Field Naturalists' Club of Victoria, 16th Jan., 1922.*)

The Fertile Mallee.—About thirty years ago the Mallee area of Victoria was chiefly inhabited by dingoes and rabbits. To-day it is the third largest wheat-producing area in Victoria. The yield per acre is variable, owing to the uncertain rainfall, but averages about eight and a half bushels per acre. In 1917 it ran as high as 12 bushels to the acre.

Seeing that the wheat yield is largely dependent on rainfall and other water supply, the question of artesian or sub-artesian water is one of vital interest to the farmer in the Mallee; and the factors determining these conditions are mainly geological. Although much of the good work has been carried out up to the present with great success by the Commissioners for Water Supply and Mr. A. S. Kenyon, there is still greater scope for their activities in the future. It is interesting to note that, speaking of Victoria as a whole, in 1919 there were 103 Government bores put down, 100 of which struck fresh water at depths varying between 150 and 700 feet. The water rose from 200 to 7 feet below the surface, and in three cases the water was artesian, and rose 4 feet to 17 feet above the surface.

The Geological Aspect of Water Supply.—The explanation of the underground conditions regulating water supply is obviously a geological question, for we must know the underlying geology before we can be certain of striking a favourable area, unless, of course, we are contented with haphazard "stabbing"—a term applied to the methods of many so-called "oil-finders." And not only are general geological principles involved in the favourable location of water bores, but there is also the palæontological side, since fossils are an index of age and superposition of the strata. Thus, for example, an engineer from New South Wales was recently making inquiries in Melbourne as to the prospects of striking water in a partly-worked bore, bringing with him a few shells from the lowest bed struck. These shells, when examined by an expert in fossils, proclaimed the exact position with regard to the water-bearing strata, and he went on his way, like the enlightened eunuch, rejoicing. So much for the "cranks" who study shells.

In the following cursory sketch of the geology of the Mallee we shall do well to examine it by the Lyellian or kindergarten method, so to speak, of treating the familiar surface first, and then diving beneath that surface for evidence from borings, at the same time making use of comparative evidence from other sources—thus gleaning, by successive steps, some ideas of the

various—and, at first thought, almost incredible—changes which this part of the earth has undergone since the foundation-stones of the older rocks were laid down.

Suffice it now to say, in a word, about these borings, that in this systematic study, probably one of the most detailed yet carried out in regard to any borings, the opportunity was afforded the writer of examining all the material obtained from a series of bores numbering I–II. These were received in August, 1908, and sytematically studied at the National Museum for a period of nearly eight years.* Under the direction of Mr. A. S. Kenyon, C.E., these bores were made in a straight line, starting from the South Australian border at Pinnaroo, to Kow Plains and beyond, at intervals of two to four miles. The water in these borings was met with at 170–250 feet from the surface, and in most cases rose to within 10 to 70 feet of the surface. The samples of rock were procured by the twist bit or shell auger, and the harder rock by the Victoria percussion drill.

Surface Geology.—The modern accumulations of the Mallee to be seen on the surface are brown loamy sands with rootlets, more or less soapy clays (probably derived from decomposing granite), and ferruginous sands. Deposits formed previously —Pleistocene in age—jut out beyond the surface, such as the pink travertin limestone, ironstone "pan" or concretions, ironshot gravel, and sometimes blocks of fresh-water limestone crowded with the remains of little crustaceans that swarmed in myriads in the old surface lakes. These minute organisms belong to the genus *Cypris*, of a species allied to the living *C. mytiloides*. Besides the above deposits there are the enormous accumulations of gypsum or copi and of rock salt, the latter forming in some of the pink lakes of the district.

Pliocene Deposits.—Sands with red jaspery particles and pebbles of hornstone or lydite, and even old sand-dune formations, were met with. In some of the bores estuarine accumulations were noticed, which indicate the proximity of tidal waters. These brackish water-beds were often crowded with countless numbers of the shells of Foraminifera, such as *Rotalia beccarii*, an accompanying fossil in many sinking estuarine areas, and not unknown as the source of oil in the Caspian Basin.

Lower Pliocene to Upper Miocene.—A blue clay-band was present in most of the bores, which is full of sea-shells of a fairly shallow water habitat. This bed, probably extending through the greater part of the Mallee, tends to hold up the brackish water on account of its impervious character. Oft-

* See "Cainozoic Geology of the Mallee and other Victorian Bores," F. Chapman, Rec. Geol. Surv. Vict., vol. iii., pt. 4, 1916.

times beneath this lies a sandy deposit full of tiny little casts of shells, in a substance called glauconite. This is a bluish-green to brown deposit of hydrous silicate of iron, alumina, and potash, found infilling the tests of Foraminifera. It generally indicates current action in the locality of deposition, with a fair depth of water. It is often associated—as, indeed, in this case—with the remains of whales, sharks, and crabs, and this accumulation often results in the formation of valuable deposits of rock phosphate.

With regard to the soil contents and deficiency of phosphoric acid in Victorian soils, the writer holds a theory, well supported by facts, that the Mallee's shortage in this respect is probably due to long sealing-up of the underground supply usually found in Tertiary districts. On the other hand, in England and elsewhere, the crustal rocks are more irregularly broken up, chessboard fashion, so that somewhere or other these phosphate-bearing rocks have been subjected to meteoric weathering, hence the higher percentage of this necessary substance in the soil. We may further assume that by using the water obtained from the deeper strata gradual improvement may be looked for in our subsoils, notably in the Mallee district, for the underlying enriched beds must part with a certain amount of soluble material. Time will prove whether my theory is correct. Capillarity, by the sun's rays, is doing a good deal in producing soil circulation, but sub-artesian water boring may do still more.

In these impervious deposits in the Mallee the brackish water is held up. The true water-bearing strata are those described below.

Miocene.—The middle or major portion of the Cainozoic series deposited in and around the Murray Gulf, and extending over the Eucla Basin to the Nullarbor Plain and Albany, belong to the important series known as Tethyan, found along the ancient Mediterranean belt, from the West Indies through Southern Europe, India, Java, and New Guinea. This belt branches off to Japan and New Zealand respectively, and also winds round to Southern Australia. In this geosyncline most of the Tertiary oil-fields are found.

In the case of the Murray Gulf, alas! the rich polyzoal beds, replete in animal remains, seem to have suffered rapid decay by bacterial action, or perhaps the deposit, being porous, was ever open to their inroads.

In this polyzoal series flints are found, which in every way resemble the European chalk flints, excepting that they are younger in age.

These beds constitute the true water-bearing strata of the Mallee, and are the vehicle of the subterranean stream by

which an enormous amount of water is lost to Australia in the Southern Ocean.

Basal Miocene.—Beneath these polyzoal beds there is evidence in many parts, as in the outcrops at Anglesea, Victoria, in the bores at Moorlands, in South Australia, and at Tiega and Yatpool, in Victoria, of old estuarine deposits, in places filled with leaves and woody *débris*, forming lignite, which represents a base-levelled country filling up the underlying crags of older rocks belonging to the Lower and Upper Palæozoic and the Mesozoic, the slates and the lake sandstones of the earlier geological history of Victoria. The Tiega bore shows 274 feet of the lignitic beds.

Bed Rock.—There appear to be only two records in Victoria of basal rocks older than Tertiary—at Nhill, where "bed-rock" was struck at 1,172 feet, and Netherby, where "porphyry" was found between 2,175 and 2,200 feet. This latter rock may be comparable with the quartz porphyry of the Grange Burn, Hamilton, which has been regarded as of Lower Devonian age.

Potentialities.—The economic resources of the rocks underlying the Mallee must be enormous, judging from data obtained in the past, and until a systematic survey of a few deep trial bores is made very little progress can be predicted on that scientific basis which is so much needed at the present time.

SUMMARY OF ANCIENT MALLEE GEOGRAPHY.—The Mallee area in early Tertiary times was part of a great river-sculptured plain, into the lower regions of which the vegetable *débris* was washed. Local lignite fields in the Miocene point to the existence of certain parts of the country which were then dominated by a rich and luxuriant growth of timber and scrub. The genera of plants found show that there was a sandy drift already developed in these and adjacent parts, as witnessed by the remains of the Native Honeysuckle (*Banksia*). Other plant remains go to prove that the climate was a little warmer than at present—that is, warm temperate. Evidence of plant accumulation about this time is also strong in the Anglesea district, where the land surface was becoming unstable and allowing inroads of the sea: consequently shallow-water deposits were formed containing foraminifera like *Cyclammina*, a shell also found associated with the carbonaceous beds of the Mallee.

After this episode there was a gradual subsidence of the Mallee area, together with that part of the country to the south of the "Dundas Peninsula," known as the "Great Valley of Victoria." Into this subsiding region flowed the deep sea,

forming the "Murray Gulf," where polyzoa lived that indicate at least 100 and sometimes as much as 600 fathoms. In this sea swam strange sharks and toothed whales, as well as larger developments of the well-known fishes of to-day. After as much as 600 to 2,000 feet of chalky limestone had been accumulated, the sea-bed seems to have gradually been on the up grade, becoming shallower and more subjected to currents, as shown by the quantity of greensand formed in these marine muds. This was in Lower Pliocene times. Following upon this, the land gradually emerged from the sea, and dune, lake, and swamp prevailed. Much of the material is wind-worn, showing a certain amount of desert condition. Evidence is not wanting that there was, even in Older Pleistocene times, a fairly copious rainfall, the water circulating in the layers above the Kalimnan marine beds that acted as an impenetrable floor to the old gulf. This underground water supply was brought up by capillarity, and the minerals, as gypsum, salt, limestone, and ferruginous deposits, were left as intercalated or superposed encrustations as we see them on the surface at the present day.

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

OOLDEA PLANTS.

BY J. A. KERSHAW, F.E.S.

DURING a visit to Ooldea, on the Transcontinental Railway, about 350 miles west of Port Augusta, in July last, I took the opportunity to collect a number of the more conspicuous plants and shrubs found within a radius of about seven miles of the station, but no systematic plant collection was attempted. The locality is almost on the eastern edge of the Nullarbor Plains, and consists of sand-hills with very sparse vegetation. The specimens have been kindly identified for me by Mr. J. R. Tovey, of the National Herbarium, and it was thought that the publication of the full list might be of advantage to some student of the flora of that portion of South Australia. The list is as follows:—

ACACIA ANEURA, F. v. M., Common Mulga.—Two forms—one with broad and the other with narrow, cylindrical phyllodes.

ACACIA LIGULATA, A. Cunn.—A long, narrow-leaved Acacia, in full flower.

ACACIA RANDELLIANA.—Common form. Beautifully-shaped trees, from 6 to 8 feet high, and in full flower.

ACACIA RANDELLIANA, W. V. Fitzg.—A form with almost cylindrical phyllodes and bright yellow flowers.

ACACIA RIGENS, A. Cunn.—Locally known as "Dead Finish," because of its dense needle-like leaves. Very common.

ADRIANA HOOKERI, Mueller, "Water-bush."—A shrub about 3 feet high. Only seen near Ooldea Soak, and said to indicate the presence of water.

ATRIPLEX SPONGIOSUM, F. v. M., Spongy Salt-bush.—Very small plants, growing plentifully on edge of a dry salt lake near Ooldea Soak.

BASSIA SCLEROLÆNOIDES, F. v. M., Woolly-fruit Salt-bush.—Common on Nullarbor Plain. Said to have a certain fodder value.

CALANDRINIA POLYANDRA, Benth., Parakeelya.—Common in sand-hill country, with small white flowers.

CALOTIS MULTICAULIS, Black, Feather Burdaisy.

CASSIA ARTEMISIOIDES, Gaud., Wormwood Cassia

CASSIA EREMOPHILA, Cunn., var. PLATYPODA.—In full flower.

CASSIA STURTII, R. Br., Dense Cassia.

CEPHALIPTERUM DRUMMONDII, A. Gray.—This everlasting was extremely common on sheltered flats between the sand-hills, and made a pleasing picture.

EREMOPHILA ALTERNIFOLIA, R. Br.—In sand-hills, about 6 feet high, in full flower.

EREMOPHILA LATROBEI, F. v. M.—Plentiful around Ooldea; 4 to 5 feet high.

EUCALYPTUS INCRASSATA, Lab., var. GONIANTHA.—Common among sand-hills.

EUCALYPTUS PYRIFORMIS, Turcz.—Isolated patches among sand-hills, growing about 20 feet high, and laden with clusters of huge seed-pods. Flowers about 2 inches in diameter, in two colours—crimson and creamy-white.

EUCALYPTUS TRANSCONTINENTALIS, Maiden, Grey Mallee.—Common among sand-hills, in flower.

FUSANUS ACUMINATUS, R. Br., "Native Peach" or Quandong.—Very numerous in sand-hills. Well-shaped bushes laden with fruit.

FUSANUS SPICATUS, R. Br., Sandalwood.—Common in places, but of stunted growth, and laden with small, round fruit.

GOODENIA PINNATIFIDA, Schlech., Cut-leaf Goodenia.—Very plentiful among Blue-bush and Salt-bush on Nullarbor Plain.

GREVILLEA STENOBOTRYA, F. v. M., Beefwood-tree.—Fifteen to twenty feet high, with flattened seed-pods. Only seen in sand-hills near Ooldea Soak.

GYROSTEMON RAMULOSUS, Desf., "Christmas Bush."—Twelve to fifteen feet high. Only found in sand-hills near Ooldea Soak. Wood soft, very brittle, and extremely light in weight when dry. Mr. Tovey remarks:—"This plant was

looked upon by Giles, Warburton, and other explorers as being poisonous or highly injurious to their camels. So far as we know, no poisonous properties have been extracted from the plant."

HELICHRYSUM LAWRENCELLA, Lindl., var. DAVENPORTII, F. v. M.

HELIPTERUM ROSEUM, Benth., var. PATENS (Ewart), Black.

KOCHIA SEDIFOLIA, F. v. M., Dense Blue-bush.—Characteristic of the great plain, and has a fodder value.

KOCHIA TRIPTERA, Benth., var. ERIOCLADA, Benth.—On sandy patches near Ooldea. Stated to appear only after heavy rains.

LEPIDIUM ROTUNDUM, D. C., Veined Pepper Cress.

LEPTOSPERMUM LÆVIGATUM, F. v. M., Coast Tea-tree.—Common in sand-hills.

LORANTHUS EXOCARPI, Behr., on *Acacia rigens*, and laden with small, bright red fruit.

LORANTHUS PENDULUS, Sieb., Hanging Mistletoe.—Common on Grey Mallee.

MELALEUCA PARVIFLORA, Lindl., "Moonah" (native name "Wilvillah").—Collected near Ooldea Soak.

MINURIA LEPTOPHYLLA, D. C., Silky Minuria.

OLEARIA MUELLERI, Benth., Dusky Daisy Bush.

PITTOSPORUM PHILLYRÆOIDES, D. C., "Weeping Pittosporum."—On Nullarbor Plain, about 6 feet high.

SALICORNIA AUSTRALIS, Banks and Sol., Beaded Samphire.—Edge of dry salt lake near Ooldea Soak.

SENECIO GREGORII, F. v. M., Fleshy Groundsel.—Only a few of these bright yellow flowers were seen.

SISYMBRIUM ORIENTALE, L., Indian Hedge Mustard.—An introduced plant.

SWAINSONA LESSERTIIFOLIA, D. C., Purple Swainsona.—In flower on Nullarbor Plain, near Watson.

WAITZIA ACUMINATA, Steetz, Orange Immortelle.—A very striking yellow everlasting, not found commonly around Ooldea.

ZYGOPHYLLUM FRUTICULOSUM, D. C., "Shrubby Twinleaf."—Isolated patches on edge of sand-hill country.

"VIEWS OF THE GRAMPIANS."—A recently-issued collection of pictures illustrating scenes at the Grampians, one of our most popular tourist resorts, will be handy for sending to friends abroad to show them that Victoria is not behind other countries in its scenic beauties. Mr. E. E. Pescott, F.L.S., has contributed a short introduction, in which he touches on some of the wild-flowers and beauty spots of the district. Most of the pictures are from views taken by the late Mr. A. J. Relph, well known for his enthusiasm about the Grampians.

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, 13th March, 1922.

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

CORRESPONDENCE.

From Miss Florence Smith, acknowledging, on behalf of her father, brothers, and sisters, the Club's message of sympathy on the death of her brother, Mr. Frank S. Smith.

From Tasmanian Field Naturalists' Club, inviting members to take part in the Easter camp-out at Adventure Bay, Bruni Island.

REPORTS.

A report of the excursion to Black Rock on Saturday, 20th February, was given by Mr. J. Stickland, who acted as leader in the unavoidable absence of the appointed leaders, Messrs. J. Shepherd and J. Searle. He reported a good attendance of members. The tide, unfortunately, was not suitable for extensive collecting. However, an interesting afternoon was spent, and much information relating to the common objects found on the seashore was exchanged.

A report of the visit to the Enid Nursery, Ivanhoe, on Saturday, 11th March, was given by the leader, Mr. E. E. Pescott, F.L.S., who said that a large party of members attended. The members were conducted through the greater part of the nursery by the proprietor, Mr. G. M. Duncan, who is an enthusiast regarding the growing of native shrubs and trees. It came as a surprise to members to see about 20,000 Australian trees and shrubs, &c., in pots ready for sale; naturally, eucalypts and acacias bulk largely in these figures, some thirty species of the former and seventy-five of the latter being included in the plants grown. Many rare Australian specimens were seen in various stages of growth, among them the rare palm, *Livistona mariæ*, F. v. M., from the Macdonnell Ranges, Central Australia, its only habitat, remarkable for the red colour of its leaves. The party had been entertained at afternoon tea by Mr. Duncan, and, before leaving, the president, Mr. F. Chapman, expressed the pleasure of the members at the great revelation to them of the enterprise of Mr. Duncan in his efforts to popularize native vegetation.

On the motion of Messrs. Pescott and Barnard a vote of thanks was directed to be forwarded to Mr. Duncan for his

kindness in allowing a visit to be made to the nursery and for his hospitality.

ELECTION OF MEMBERS.

On a ballot being taken, Miss M. Sheperd, 175 Hotham-street, East Melbourne, and Mr. Alan Allaway, Leeds-street, Footscray, were duly elected members of the Club.

GENERAL BUSINESS.

Mr. C. L. Barrett, C.M.Z.S., referred to the proposal of the Fisheries and Game Department to allow shooting of ducks, &c., for market purposes during the close season. He moved that a letter of protest be sent to the Department, which was seconded by Mr. E. E. Pescott, F.L.S., and carried unanimously.

PAPER READ.

By Messrs. C. Daley, F.L.S., and H. B. Williamson, entitled "A Trip to the Sources of the Murray River."

The geographical and physiographical features of the country between Omeo and Forest Hill were dealt with by Mr. Daley, who exhibited a large number of rock and mineral specimens in illustration of his remarks. The botanical results of the trip were commented on by Mr. Williamson, who exhibited about fifty specimens of the rarer alpine plants noticed.

The paper was well illustrated by a large series of photographs.

NATURAL HISTORY NOTE.

Mr. A. J. Tadgell drew attention to a number of marine shells, &c., from Cowes, Phillip Island, and read some notes by Mr. J. A. Kershaw, F.E.S., regarding them.

He also called attention to the remarkable longevity possessed by *Lobelia simplicicaulis* after being picked, the specimens exhibited having been collected on 31st January, and were still fresh, and further flowers expanding, on 13th March.

EXHIBITS.

By Miss Rose Currie.—Kopi, from Cowangie, N.W. Mallee, Victoria.

By Miss K. Currie.—Flowers of Murray Lily, *Crinum pedunculatum*, a native of New South Wales, grown by exhibitor at Lardner, Gippsland.

By Mr. C. Daley, F.L.S.—Rocks and minerals from the Omeo and Cobberas districts in illustration of paper, including Older Basalt from Cobungra, at 5,000 feet above sea-level, and porphyry from the summit of the Cobberas (6,030 feet), black marble from Native Dog Creek, and cassiterite (tinstone) from Glen Wills.

By Mr. J. E. Dixon.—Coleoptera recently collected in Victoria.

By Mr. E. E. Pescott.—Flower of Garland Lily, *Calostemma purpureum*, grown from specimens obtained at Lake Hattah, N.W. Mallee, by Mr. J. E. Dixon.

By Mr. J. Stickland.—Egg-case of a mollusc from Black Rock (portion exhibited under microscope).

By Mrs. E. Tavaré.—Grape-like galls on a leaf of *Eucalyptus pauciflora*, Snow Gum, from Mount St. Bernard, Victorian Alps, the galls being soft, like a grape, and each containing a small brown larva of a hymenopterous (?) insect

By Mr. A. J. Tadgell.—Marine shells, &c., from Cowes. Specimens of *Lobelia simplicicaulis* in illustration of notes.

By Mr. H. B. Williamson.—Dried specimens of about fifty alpine plants, also photographs in illustration of paper.

After the usual conversazione the meeting terminated.

BOOK NOTICES.

NEW ZEALAND FERNS, by H. B. Dobbie. Auckland: Whitcombe and Tombs Ltd. Pp. 394 (5½ x 8¼). 160 plates. 35/-.

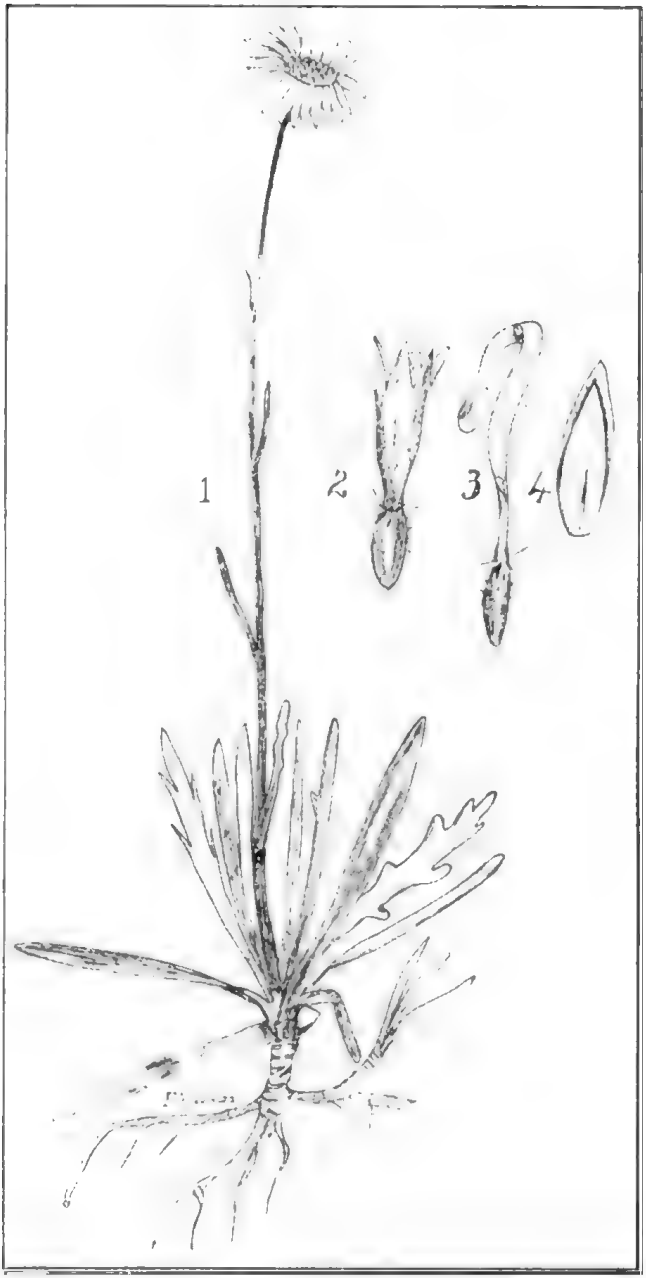
In this handsomely-produced volume, which, the author says, has "no pretension to being a scientific work," the whole of the recorded ferns of New Zealand are dealt with in a popular way, written so that the merest tyro can understand. That the author is an enthusiastic lover and grower of ferns is seen in every page. Every species and all well-marked varieties are illustrated by direct photographs from selected typical specimens, the size of the original being given in every case. In addition, with regard to many species, enlarged drawings are given of the position of sori or spore-cases on the fronds, so as to help in the identification of species. The author prefaces his descriptions with a few notes on the cultivation of ferns, and to a non-resident of New Zealand it seems that Auckland must possess an ideal climate for fern-growing, for no less than twenty species appeared as self-sown plants in the author's fernery. This, by the way, seems to have been constructed of tufa blocks in terraces, on which the ferns grew luxuriantly. He gives the total number of New Zealand ferns as 134 species and 24 well-authenticated varieties belonging to 34 genera, of which 44 species and 13 varieties are found only in New Zealand. The majority of the species are common to both islands, but the North Island has 17 species and 3 varieties not found in the South, which has only three endemic species. The islands off the coast possess eight species

and three varieties not found on the mainland. Of the species recorded, about 38 are also found in Victoria and several others in Tasmania, New South Wales, and Queensland, while, of course, others extend to other parts of the world. The ferns of New Zealand contain many handsome and graceful species. The genera containing the most species are Hymenophyllum, 19, and 2 varieties; Lomaria, 14, with 1 variety; Asplenium, 12 species and 8 varieties; and Polypodium, 10 species and 3 varieties. The work is a notable addition to the fern literature of the world.

"The Wild-Flowers of Western Australia." By Emily H. Pelloe. Melbourne: C. J. De Garis Publishing House, 1921. 124 pp. (8½ x 11), with 7 coloured plates and illustrations in the text (by the author). 21/-.

Mrs. Pelloe is to be congratulated on having produced a volume which deals with the more striking flowers of that portion of Western Australia south of Shark's Bay in such a manner that the mere flower-lover will be able to follow her remarks, and doubtless derive much information from them. At the same time, the scientific interest of the flowers has not been forgotten, and readers at a distance will be able to get a very good idea of the character of the flora of "Swanland," as Professor Griffith Taylor has termed that portion of our continent. A useful introduction explains the scope of the volume, and in so doing emphasizes many of the fundamental facts of botany. Then four chapters are devoted to a kind of calendar of the flowering times of the flowers dealt with, the year being treated in four sections, January to June—the slack season—forming the first, the remaining six months being in three sections of two months each. By this means a collector can get a very good idea of what his plant may be by noting in which month it was found in bloom. A brief description of each species mentioned appears at the end of each chapter. Then a section is devoted to "Families and Genera," which is more scientific, giving concise descriptions of the various genera mentioned, and a statement of the number of species occurring in each Australian State. An appendix—"Biographical Notes."—follows, containing the names of notable persons after whom the plants have been named by various authorities. A glossary of botanical terms and a very full index complete the volume. Mrs. Pelloe is to be congratulated on her drawings, but in the case of some species the printers have failed to get the right tone in the coloured plates; however, the volume should prove of great service, and were there a volume on similar lines for Victoria it would prove a boon indeed.

PLATE IV.



BRACHYCOME TADGELLII. TOVEY AND MORRIS. sp. nov

NOTES FROM THE NATIONAL HERBARIUM OF VICTORIA, INCLUDING A DESCRIPTION OF A NEW SPECIES OF BRACHYCOME.

(WITH PLATE.)

BY J. R. TOVEY AND P. F. MORRIS.

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

THESE notes contain—(*a*) a description of a new species of Brachycome from the Victorian Alps; (*b*) a record of *Hibiscus Farragei* as an addition to the list of the native flora of Victoria; (*c*) a supposed new species, *Conospermum suaveolente*, Herbert, is reduced to a synonym of *C. amœnum*, Meissn., there being insufficient specific distinction between them. The remainder are chiefly records of the distribution of plants.

BRACHYCOME TADGELLII, Tovey and Morris, sp. nov.

Herba perenne glaberrima; foliis 2"–5" longis, polymorphis linearis-integerrimis spathulatis ad crenatis, pinnatisectis Capitulis magnis; bracteis linearis; acheniis obovatis, oblongis–ellipticiis, non alatis; pappo brevissimo coronatum.

A tufted perennial with creeping rhizomes, 6–12 inches high. Scape with 3 to 5 pinnatifid or entire leaves. Leaves 2–5 inches long, varying from quite entire, spathulate to crenate, lobed, pinnatifid or pinnatisect. Lower leaves fleshy, crowded at the base, spreading, basal leaves decaying. Capitulum large, involucre ⅝ inch in diameter. Ray florets white, numerous, about 30, much longer than the bracts. Margins of style slightly rough. Bracts linear, slightly margined with purple; achene very variable, from obovate to oblong-ellipsoid, without marginal wing, but having in many cases a glandular pubescence on the edges; tipped with a glandular or bristly pappus half as long as achene.

Mount Hotham, Victoria, 6,000 feet. A. J Tadgell, December, 1913, December, 1921

Its nearest affinity is *B. radicans*, from which it differs in having more fleshy, broader, and pinnatisect leaves; the scape bearing 3–5 leaves; the bracts and margins narrower; the achenes without broad crenate margins, and having in many cases a glandular pubescence on the margins.

Explanation of plate—1. Whole plant, about natural size; 2, Disc floret and achene; 3, Ray floret and achene; 4, Bract with margin. 2, 3, and 4 much enlarged.

Hibiscus Farragei, F. v. M. (Malvaceæ), Frag., viii., 241 (1874).

Bolton, Victoria, F. T. Holt, Jan., 1922 (per Botanic Gardens).

This plant, which was previously recorded from New South

Wales, Queensland, North, South, and Western Australia, has now been found in Victoria, and must therefore be added to the list of Victorian flora.

Conospermum amœnum, Meissn. (syn. *Conospermum suaveolente*, Herbert).

In the *Journ. Roy. Soc. of W.A.*, vii. (1921), Mr. D. A. Herbert described a new species (*C. suaveolente*). He stated that it differed from *C. amœnum*, Meissn., in the longer and more slender terete leaves, the dilated leaf bases in the upper ends of the branches, and the length of the spike. The flowers were axillary along the stem, and do not show the same tendency as in *C. amœnum* to cluster at the top. On examination of the material of *C. amœnum* in the National Herbarium, we find that a specimen (Preiss, No. 745) has the flowering spike just as long as in that of *C. suaveolente*, and has also the dilated leaf bases. The leaves of Drummond's No. 583 are as long and as slender as those of the new species (these two are evidently Meissner's types). There are also intermediate forms showing gradations between the long flowering spike and the ones with the flowers clustered at the top; the leaves are of various lengths, and several with dilated leaf bases. The differences between Mr. Herbert's species and *C. amœnum* are therefore not sufficient to constitute a specific distinction. *C. suaveolente*, Herbert, must therefore be reduced to a synonym of *C. amœnum*, Meissn.

Brachypodium distachyum, Beauv., "False Brome Grass" (Gramineæ).

Preston, Victoria, C. H. F. Baker, November, 1921.

A native of the Mediterranean regions and the Orient. A new locality in Victoria for this grass, it was previously recorded from Dooen, North-West Victoria. It appears to be permanently establishing itself in the Preston district.

Calamagrostis filiformis (Forst.), Pilger (*Avena filiformis*, Forst., 1786), (*Calamagrostis æmula*, Steud., 1821), (*Deyeuxia Forsteri*, Kunth., 1833).

Under the laws of botanical nomenclature, Forster's original specific name has priority over that of Steudel's.

Carduus arvensis, L., "Perennial Thistle" (Compositæ).

Hillend, 18 miles from Moe, Victoria, W. Burrage, January, 1922.

A form with white flowers.

Cyperus vegetus, Willd., "Umbrella Sedge" (Cyperaceæ).

Yannathan, Victoria, R. Poole, December, 1921.

This South American sedge is often grown in gardens, and, thence escaping, it is now growing wild in many parts of Victoria, and may be considered naturalized.

Pelargonium graveolens, L'Herit., "Scented Pelargonium" (Geraniaceæ).

Geranium Springs, Grampians, Victoria, J. W. Audas, December, 1921.

A new locality in Victoria for this South African plant, which is evidently in the process of naturalization.

Phalaris paradoxa, L. (Gramineæ).

Mildura, Victoria, per G. H. F. Baker, November, 1921.

A native of the Mediterranean regions and the Orient. Not previously recorded as growing wild in Victoria.

Potentilla erecta, L., "Erect Potentil" (Rosaceæ).

Warragul, Victoria, P. J. Wolfe, January, 1922.

A native of Europe and Asia, previously recorded in Victoria for the North-Eastern and South-Western districts.

Sesuvium portulacastrum, L. (Aizoaceæ).

Carington's Landing, Macarthur River, Northern Territory, G. F. Hill, No. 591, 20th September, 1911.

This was recorded as *Aizoon zygophylloides*, F. v. M., on page 106 of the "Flora of the Northern Territory," by A. J. Ewart and O. B. Davies, which was apparently an error in identification. There being no authentic specimens of Aizoon from the Northern Territory, the genus Aizoon will therefore have to be deleted from the list of that flora.

MOUNT GAMBIER, S.A.—The recently-issued volume of the *Transactions and Proceedings of the Royal Society of South Australia* (vol. xlv., 1921) contains an interesting paper by Dr. Charles Fenner (D.Sc.), entitled "The Craters and Lakes of Mount Gambier." Like Dr. Fenner's previous work on the Werribee River, the paper is a most comprehensive and informative one, well illustrated with diagrams, maps, and a plate depicting two of the lakes. The author reviews previous writings on the area, and summarizes his conclusions on the origin of the craters and lakes, which are not geologically old. To anyone visiting this interesting district Dr. Fenner's paper should be of great service.

THE LATE MR. J. F. MULDER.

By the death of Mr. John Frederick Mulder, of Geelong, on 27th December last, at the age of 81, Victoria has lost one of her keenest naturalists. Though not a member of the Field Naturalists' Club of Victoria, he was so well known to many of its members that an appreciation of his work in these pages will not be out of place. Mr. Mulder was a native of Kent, England, and arrived in Geelong with his parents when about seven years of age. He seems to have been an observer from his earliest years. In those days aboriginals were not uncommon in the Geelong district, and as a boy he made friends with them, becoming acquainted with their ways and learning about their implements, of which in later years he possessed a fine collection. The birds of the district naturally attracted him, and on taking up the business of a taxidermist he became interested in other forms of Nature. He made collections of the local beetles and butterflies, becoming also an authority on the plants of the district. He also turned his attention to fossils, and *Cypræa Mulderi* was named in his honour by the late Prof. Tate, of Adelaide. With these inclinations he naturally had a wide circle of friends, of whom may be mentioned Baron von Mueller, Dr. T. S. Hall, J. Bracebridge Wilson, John Dennant, and A. B. F. Wilson. When the Geelong Field Naturalists' Club was founded in 1880, shortly after the Melbourne society, he became a prominent member, and was always ready to assist budding naturalists, whatever their leanings might be. He contributed many papers to the Club on a wide range of subjects, which duly appeared in the *Geelong Naturalist*. Of his collections, which were very considerable, the bulk of the fossils are now in the Melbourne Museum, where some new forms will be worked out as opportunity offers. Other portions were purchased by leading citizens of Geelong and presented to the local museum, of which he had been curator for a number of years. That he was a remarkable man is shown by the fact that he found time to act as a bandmaster, and was an adept at almost any instrument. The memory of the good work that he did and the influence he exerted will not readily be forgotten in the district in which he spent so many years of a useful life.

Local Handbooks.—The South Australian branch of the British Service Guild proposes to publish a series of handbooks dealing with the various branches of natural history in that State. Already six have been arranged for. They are to be illustrated, and should fill a long-felt want. Similar series for other States would be of great value.