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VICTORIAN NATURALIST:

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OF THE

Field Naturalists' Club of Victoria.

VOL. XX.

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

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

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The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 20th April, 1903. The president, Mr. T. S. Hall, M.A., occupied the chair, and about fifty members and visitors were present.

REPORTS.

A report of the excursion to Sydenham on Saturday, 14th March, was given by the leader, Mr. T. S. Hall, M.A., who said that there had been a good attendance of members, who spent a very pleasant afternoon in examining the extremely fine basalt columns on the Saltwater River (*Victorian Naturalist*, xvii., p. 120). Some fine photographs taken on the occasion were exhibited.

A report of the excursion to Heidelberg on Saturday, 28th March, in the absence of the leader, Mr. J. Shephard, was given by Mr. W. Strickland, who said that, notwithstanding the very unpropitious weather, the members had been successful in securing specimens of the Rotifer, Pedalion sp., which was the principal object of their search.

The hon. librarian reported the receipt of the following donations to the library :—"Geological Survey of Victoria," New Series, vol. i., part 1, from Department of Mines, Victoria ; *The Emu*, vol. ii., part 4, April, 1903, from the Australasian Ornithologists' Union ; "Proceedings Linnean Society of New South Wales," vol. xxvii., part 4, from the society ; "Forest Flora of New South Wales," part ii., by J. H. Maiden, F.L.S., Government Botanist, from the author ; "Critical Revision of Genus Eucalyptus," part i., by J. H. Maiden, F.L.S., from the author ; "Sydney Botanic Gardens — Biographical Notes concerning Officers in Charge," parts i. to iv., by J. H. Maiden, F.L.S., from the author ; *The Agricultural Gazette of New South Wales*, March, 1903, from the Department of Agriculture, New South Wales ; "Proceedings Royal Society of Queensland," vol. vii., part 2, from the society ; *Nature Notes*, February and March, 1903, from the Selborne Society, London ; *Knowledge*, March, 1903, from the proprietors.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Maud M. Clark, "High Wycombe Lodge," Fernhill-road, Sandringham ; Messrs. E. A.

Anderson, "Clovelly," Kintore-street, Camberwell; W. F. Coles, 33 Little Smith-street, Richmond; J. F. Corben, State school, Moonee Ponds; B. Nicholls, 80 Story-street, Brunswick; and J. B. Swan, "Alma," Selborne-street, Coburg, were duly elected members of the Club.

PAPERS READ.

1. By Mr. D. M'Alpine, entitled "On the So-called Petrified Mushroom."

The author described an object which was recently found at Bridgewater, Western Victoria, and regarded locally as a petrified mushroom. In general appearance it somewhat resembled a mushroom, even to the stalk. However, after a microscopical examination, he had decided it to be a woody excrescence, popularly known as a burr, gnaur, &c., found on various kinds of trees.

The president, Mr. T. S. Hall, was of opinion that the specimen was a root of Kelp, which, when dry and exposed, becomes extremely hard, and the tissue of which closely resembles that of wood.

Mr. H. T. Tisdall agreed with the opinion expressed by Mr. Hall, and stated that he had seen pieces of the root of Kelp almost identical with the specimen dealt with.

Mr. R. A. Bastow stated that he had recently seen large numbers of pieces of Kelp roots at Flinders, which were very similar to the one dealt with by Mr. M'Alpine.

2. By Mr. T. S. Hall, M.A., entitled "An Extinct Cuttlefish."

The author described a very rare fossil Cephalopod, "Spirulirostra," which he found at Torquay, near Geelong, and, with a view to making his remarks more easily understood, gave a general outline of the Cephalopoda, both recent and extinct, aided by several large diagrams and specimens of typical and well-known genera of this group.

He was thus able to clearly demonstrate its affinities with the better-known species of both living and extinct Cuttlefishes. The only other representative of the genus, the author stated, was found in the Miocene at Turin, Italy, and is extremely rare.

The author's remarks were listened to with much interest, and discussed by Messrs. O. A. Sayce, F. Wisewould, J. H. Gatliff, D. Le Souëf, and G. Coghill.

NATURAL HISTORY NOTES.

Mr. F. C. Christy contributed a lengthy note dealing with the protection of the Black Duck, in which he advocated an extension of the period (1st February) during which the ducks are protected.

Mr. G. A. Keartland, whilst endorsing some of Mr. Christy's statements, pointed out that 1st February was practically a com-

promise arrived at by the late conference of sportsmen, field naturalists, &c., and was at all events an improvement on 21st December.

Mr. D. Le Souëf, C.M.Z.S., called attention to the Pacific Gulls in the Zoological Gardens, which at present showed their different stages of plumage.

EXHIBITS.

By Mr. F. G. A. Barnard.—Pot-grown orchid, *Pterostylis grandiflora.*

By C. French, jun.—Orthopterous insect, *Acridopeza reticulata*, from Hamilton district; also set of three eggs of Rainbow Pitta, from Port Darwin, showing blotches of brown colour, instead of the ordinary markings.

By Mr. C. J. Gabriel.—Shells, *Dolabella gigas* and *D. rumphii*, from Mauritius; *Ischnochiton conspicuus*, North America; and Victorian species of the family Naticidæ, from Western Port.

By Mr. T. S. Hall, M.A.—Specimens of recent and fossil Cephalopoda, including a Spirulirostra from Torquay, in illustration of his paper.

By Mr. G. A. Keartland.—Skins of *Nanodes discolor*, *Glossopsittacus pusillus*, *G. porphyrocephalus*, *G. concinnus*, *Ptilotis flava*, *Meliphaga phrygia*, and *Melithreptus lunulatus*, all shot from one tree, near Eltham. The first-named Lorikeet is a very young specimen, thus indicating that these birds probably breed in the district.

By Mr. D. M'Alpine.—Specimen of the so-called Petrified Mushroom, in illustration of his paper.

By Mr. F. M. Reader.—Fourteen species of dried plants, showing normal and abnormal types, with short explanatory notes, viz.:—*Cassinia aculeata*, R. Br., var. *adpressa*; *Cyperus vaginatus*, R. Br.; *Distichlis maritima*, Rat.; *Polygonum minus*, Hinds.; *Stackhousia flava*, Hook.; *Carduus lanceolatus*, L.; *Deyeuxia forsteri*, Kunth.; *Hypochœris radicata*, L.; *H. glabra*, L.; *Plantago major*, L.; *Polygonum aviculare*, L.; *Rumex acetosella*, L.; *Sonchus oleraceus*, L.; *Verbascum blattaria*, L.

By Mr. C. Walter.—A new species of Acacia, *A. d'altoni*, Walter, from the Wimmera district, collected by Mr. St. Eloy D'Alton, of Dimboola; and *Acacia sclerophylla*, Lindley, for comparison.

After the usual conversazione, the meeting terminated.

Correction.—The letter "S." (south) should be substituted for "N.W." in Mr. Walter's exhibit in April *Naturalist.*

It is announced that the control of the Government Botanist's branch (Victoria) has been transferred from the Chief Secretary to the Minister of Agriculture.

AMONG THE ALPINE FLOWERS.

By F. G. A. Barnard and C. S. Sutton, M.B.

(*Read before the Field Naturalists' Club of Victoria, 9th March*, 1903.)

Ever since hearing Mr. C. Walter's paper on his trip to the Alps and Buffalo Mountains (*Vict. Nat.*, xvi., p. 18), and the concluding sentence of Mr. J. H. Maiden's paper on his visit to Mount Hotham, &c. (*Vict. Nat.*, xvii., p. 47), in which he urged every Victorian botanist to visit the Alps, and thereby gain expansion of ideas, we had longed for the opportunity to follow in their footsteps.

This came at Christmas time, when our fellow-member, Mr. G. Weindorfer, asked us to join him in a short holiday in the Alps. We therefore left town on Christmas Eve, fully equipped for four days' collecting in the Bright district. Reaching Bright in the small hours of Christmas morning, we had a few hours' rest, and then started on the sixteen-mile drive to Harrietville, the first stage on the way to the Alps.

Of course the first plant to attract our attention was the introduced plant St. John's Wort, *Hypericum perforatum*, Linn., which, escaping from a cottage garden, has overrun the district, and in many parts entirely taken possession of the soil. Along the water-races for mining purposes, so numerous in the district, was noticed a tree acacia, *Acacia pravissima*, F. v. M., somewhat like *A. armata*, R. Br., bearing large quantities of seed-pods. Some fine plants of *Typha angustifolia*, L., were passed, and near Stony Creek some fine bushes of the Prickly Box, *Bursaria spinosa*, Cav., in full bloom.

The vegetation along the road was of the ordinary stringy-bark ranges character, and it was not until we left Harrietville, and commenced the ascent of the range leading to Mount St. Bernard, that we began to find a somewhat different flora. A twelve-mile walk was now before us. By mistake we passed the turn-off of the Omeo-road, so took a short cut straight up the spur. Here *Persoonia confertiflora*, Benth., *P. chamæpitce*, Shot., and *P. juniperina*, Lab. (in fruit), formed our first specimens. Fine spikes of *Lomatia ilicifolia*, R. Br., were fairly abundant, and the orchid, *Dipodium punctatum*, R. Br., was also noted. Making for the old (upper) road, we passed numerous leguminaceous shrubs, but all past their flowering period.

An elevation of some 3,000 feet is gained in the first three miles of this road, and we were not sorry to reach a spring by the roadside, which made a welcome halting place for our mid-day meal. Continuing on, numerous familiar plants were seen growing in the roadside cuttings. At about six miles we reached a small quartz battery connected with a mine upon the hillside. Here there was another welcome spring. From here the vegetation began to improve, from a botanist's point of view.

The Native Pepper, *Drimys aromatica*, F. v. M., and *Persoonia arborea*, F. v. M., were obtained as fruit specimens. Presently we were attracted by the bushes of *Helichrysum stirlingii*, F. v. M., bearing their corymbs of pure white flowers—a really handsome shrub, but its viscid leaves make it an awkward plant for the collector. *Helichrysum rosmarinifolium*, Less., was also an attractive shrub, laden with masses of small white flowers, densely crowded into compound corymbs like so many miniature snowballs. Near here specimens of *Gaultiera hispida*, R. Br., one of our only two representatives of the true heaths (Ericaceæ) was obtained in fruit; these when ripe are snowy-white. Now the hillside was covered with *Veronica derwentia*, Little, interspersed with *Pimelea linifolia*, Smith, both in full bloom, while another white-flowered shrub, *Aster megalophyllus*, F. v. M., was also very attractive. Presently the splendid orange pea-shaped flowers of *Oxylobium alpestre*, F. v. M., were very prominent amongst the vegetation lining the road. The Blue-bell, *Wahlenbergia gracilis*, D. C., was abundant, but much larger and of a deeper blue than in the lower country. The flowers of the Trigger Plant, *Candollea* (*Stylidium*) *serrulata*, Lab., were of the deepest shade of pink—in fact, they might have been termed crimson. Down in the valley towards the Ovens an occasional tree fern, *Alsophila australis*, R. Br., could be seen rearing its head above the undergrowth, while in the road cuttings *Aspidium aculeatum*, Swartz, was the dominant fern, only a few *Lomaria discolor*, Willd., being present.

The scenery as we ascended was very fine. The road is cut along the eastern side of the range, which runs almost due north and south. Far down in the valley was the Ovens, while on the other side about four miles away is another parallel ridge known as the "Razorback," connecting Mounts Feathertop and Hotham, both of which were now in view, but considerably higher. Presently, from the end of a spur jutting out somewhat further than usual, we got our first glimpse of Mount St. Bernard, our destination for the day, but still some miles away. *Goodenia hederacea*, Smith, with deep orange flowers, is noticed trailing over the rocks, and *Arthropodium paniculatum*, R. Br., with pale lilac flowers, is added to our list. The eucalypts met with have been dealt with so fully by Mr. Maiden in his paper that it is not necessary to say much now; however, we could not help noticing a change in the tree vegetation which occurred about half a mile before reaching the hospice, when the tall straight stems of *Eucalyptus amydalina*, Lab., gave place to the several twisted and spreading stems of *E. coriacea*, A. Cunn., known as the Snow Gum, and probably marking the limit of the winter snow line. These trees have very white bark, and grow up the hillside at the back of the hospice, and all over the summit of St. Bernard.

The last mile of the road was both steep and rough, but we thoroughly enjoyed our walk, which had taken us just six hours, the invigorating nature of the mountain air making the task an easy one. After tea, arranging the specimens in blotting paper and tracing out the unfamiliar ones by the aid of the "Key" occupied the greater part of the evening, and, the air being sharp and bracing, we enjoyed a good night's rest.

During an early morning ramble next day we visited the spring just below the hospice, which forms the source of the Ovens River, and collected fine specimens of the little fern, *Lomaria alpina*, Spreng., with its spore fronds. Here also were fine bushes of *Helichrysum rosmarinifolium*, Less., laden with flowers, as also *Leptospermum myrsinoides*, Schlecht., and *Pimelea ligustrina*, Labill.

After an early breakfast we started off for Mount Hotham (locally known as "Baldy"), some five miles distant, and about 1,100 feet higher. Just past the hospice a road descends on the right into the Dargo Valley, and so on to Gippsland, but our road was along the main ridge of the Alps in a north-easterly direction. The views as we proceeded were very fine, now down into the Ovens valley, then down into the Dargo, and so on.

We soon began to add to our botanical collections. Our friend of the lowlands was here, *Euphrasia brownii*, F. v. M., but so much larger and whiter. Of that aromatic shrub, *Drimys aromatica*, F. v. M., our only representative of the Magnoliaceæ, we were destined to see several forms during the day. Colour was lent to the scene by quantities of the orange *Oxylobium alpestre*, F. v. M., another solely N.E. plant. Just below the road grew magnificent specimens of *Craspedia richea*, Cass; some of the flowers must have been at least an inch and a half across, and of the deepest orange colour. In contrast to them were the deep blue flowers of *Dianella tasmanica*, J. Hook. The daisies, *Brachycome scapiformis*, D. C., and *B. ciliaris*, Less., grew on the slopes. The fern *Aspidium aculeatum*, Swartz, grew in quantities in the crevices of the rock cuttings as we ascended, while *Helipterum incanum*, D. C. (var. *auriceps*), was abundant.

On a hillside grew *Daviesia ulicina*, Smith, well known on the heath ground at Sandringham, but as vigorous as ever here over 5,000 feet above sea-level. Two shrubs, peculiar to the N.E., now attracted our attention, growing among the rocks and seeming to cling to them for protection from the strong wind so prevalent in this region. The one, *Boronia algida*, F. v. M., crowded with pretty pink flowers; the other, *Westringia senifolia*, F. v. M., with white or very pale lilac labiate flowers.

We now came to Mount Blowhard, and from our experience on a comparatively calm day we can quite understand how the

mount got its name, for the wind seemed to rush up out of the valley at a great rate, and the Snow Gums are bent over at a very sharp angle with the hillside. The road used to go round the Gippsland side of the mount, and was then very exposed, but a new road has been cut out of the northern face, the silurian rocks, here of a very slaty character, easily splitting into very thin layers. On the southern slope of the mountain were growing numbers of an herbaceous aster, *Aster celmisia*, F. v. M., with large, handsome daisy-like white flowers and silvery leaves, forming a very attractive sight. Among them grew *Stackhousia linarifolia*, Cunn., and a few specimens of the curious umbellifer, *Aciphylla glacialis*, F. v. M.

Further on a slight soakage below the road was gay with Everlastings, Daisies, Blue-bells, Craspedias, &c. Passing a patch of dwarf eucalypts, we came upon some fine masses of *Orites lancifolia*, F. v. M., a proteaceous shrub restricted to the N.E., bearing masses of sweet-smelling creamy-white flowers, somewhat resembling a Grevillea. This was sufficiently abundant in places to make patches of pale yellow on the distant hillsides. Another shrub attracted us by the colour of its buds, which were of a deep maroon colour, gradually becoming lighter as the flowering time approached. This completely puzzled us, but we afterwards learned that it was a dwarf form of *Helichrysum rosmarinifolium*, Less., which we had admired so much on the road to St. Bernard.

Finally, turning a corner, the bold mass of Mount Hotham loomed up before us, with a large flock of travelling sheep feeding on its grassy slopes. We made a slight detour to a spring in Glen Loch, one of the sources of the Dargo; here among the moist rocks were the ferns *Aspidium aculeatum*, Swartz, and *Lomaria alpina*, Spreng., while around on the adjacent slopes grew fine specimens of *Pimelea ligustrina*, Labill., *Aster celmisia*, F. v. M., &c. A curious form of *Drimys aromatica*, F. v. M., grew here also. The different forms some plants assume in these high regions are very confusing to the collector on his first visit.

Returning to the road, we followed round the northern face of the mountain, getting a fine view of the "Razorback," Mount Feathertop, and the Diamentina Spring, the head of the Kiewa River. Conspicuous among the flowering shrubs, towards the summit of the mountain, was *Kunzea muelleri*, Bentham, a myrtaceous shrub with pale yellow flowers, growing in large hummocky masses. *Eriostemon myoporoides*, Candolle, and *Epacris serpillifolia*, R. Br., were also collected here.

We were now within a few hundred yards of the cairn marking the highest part of mountain (6,100 feet above sea-level), which without the cairn would be difficult to locate, owing to the slightly rounded form of the summit. Leaving the road, we

wandered over the treeless bald top of the mount, little thinking, as we afterwards learned (Lendenfeld, "An Exploration of the Victorian Alps," Reports of Mining Registrars, Victoria, March, 1886) that we were traversing one of the oldest land surfaces on the earth. The panorama from the cairn was magnificent, and surely must be hard to beat in Australia. Mountains of all sizes and shapes in every direction. The peculiar peaks of Mount Buffalo away to the north-west at once attracted attention, while the bold mass of Mount Kosciusko was plainly visible about 75 miles away to the north-east. What must have been the feeling of our late patron, then Dr. F. Mueller, when he stood on this mount nearly fifty years before, the first white man to tread its grassy top and gather specimens of its singular alpine flora.

Round about us grew the rare umbellifer, *Aciphylla glacialis*, F. v. M., and the pincushion-like patches of the Victorian Edelweiss, *Leontopodium catipes*, F. v. M.; but what a tiny flower in comparison to the European Edelweiss, the delicate daisy-like headlets only about $\frac{3}{16}$ of an inch across. The wind was very boisterous on top of the mount, and made collecting very unpleasant; we therefore made our way down the southern slope to the highest source of the Dargo, trying to find a sheltered spot in which to boil our billy, but finally had to make for the spring we had visited in the morning. Near the higher spring we collected *Epacris heteronema*, Lab., *Styphelia montana*, F. v. M., and *Brachycome nivalis*, F. v. M. Fine patches of *Oxylobium alpestre*, F. v. M., grew around on the hillsides, brightening the scene with its orange flowers. Among other plants collected in this vicinity were *Cardamine dictyosperma*, Hooker; *Epilobium glabellum*, L. (very fine specimens); also *Epacris mucronulata*, R. Br.; *Styphelia macraei*, F. v. M.; and *Gnaphalium alpigenum*, F. v. M., all N.E. plants.

We returned to the hospice late in the afternoon, thoroughly pleased with our first visit to the Victorian Alps, greatly regretting that our brief holiday would not allow of further exploration round about. The rocky pinnacle of Mt. Smyth close at hand, or the deep gorge of the Wongungarra on the Gippsland side of St. Bernard, seemed to offer opportunities to the botanical collector, but we could not avail ourselves of them. The evening was again spent in arranging the plants, and as we had to leave soon after daylight in the morning, in order to catch the coach from Harrietville at 9 a.m., it was necessary to make up our packages as far as possible overnight.

Leaving the hospice at the early hour of 5.30 a.m., we had a glorious walk down the road, but our packages were heavy and needed frequent adjustment, and little could be done in the way of collecting, except to secure a few seed specimens of shrubs as we passed. These were principally acacias, including *A.*

penninervis, Sieber, *A. amœna*, Wendland, *A. alpina*, F. v. M., *A. prominens*, and *A. vermiciflua*, Cunn. *Acacia alpina*, F. v. M., was obtained at Mt. Blowhard. We did not see any grasses in bloom. We were back in Bright by mid-day, and late in the afternoon got a conveyance to drive us out to Porepunkah, from which we intended to visit Mount Buffalo. Making Manfield's Temperance Hotel, within sound of the Eurobin Creek, our headquarters, we were soon enjoying a dip in the clear stream, and admiring the bushes of *Beckea crenatifolia*, F. v. M., covered with sprays of beautiful white flowers, along the banks of the creek—a shrub well worth trying in the Botanical Gardens, if not already there. *Lomatia longifolia*, R. Br., was found in full bloom, as also *Leptospermum attenuatum*, Smith.

Next morning during an early stroll we were delighted to find growing in a boggy piece of ground only a few yards from the house a splendid spike of the somewhat rare orchid, *Spiranthes australis*, Lindley, its delicate magenta and white flowers being particularly attractive. Careful search revealed two others, but not quite so fully in bloom as the first. These were carefully placed in blotting paper before starting on our hill-climbing.

The Buffalo Mountains, which do not belong to the Alps proper, were first seen and named by Hume and Hovell, on their memorable exploring trip to Port Phillip in December, 1824. This range presents greater difficulties to the tourist than the Alps, and the usual route for the ascent, known as "Staker's Track," is a good test of one's athletic powers. For the first mile or two the track is very steep, with no reward for the botanist—that is, nothing uncommon, if we except a fine specimen of *Exocarpus stricta*, R. Br., then bearing its pale lilac fruits, just at the foot of the track.

In about two miles we passed from the silurian to the granitic formation, which was immediately marked by a change in the flora. *Lomatia ilicifolia*, R. Br., was very fine, and at the first water, one of the sources of the Buffalo Creek, we collected specimens of *Astrotricha ledifolia*, D. C., *Hibbertia billardieri*, F. v. M., *Grevillea parviflora*, R. Br., and the fern *Cheilanthes tenuifolia*, Swartz.

The track now takes a north-westerly course for some distance, finally turning up the gorge between the main range and the False Buffalo, winding about between huge blocks of granite. *Trachymene billardieri*, F. v. M., was very plentiful here, and is a pretty little umbelliferous shrub. A solitary specimen of the fern *Davallia dubia*, R. Br., was noticed growing in a crevice of the granite. A little further on we came to a spring, which we named "Osmunda Spring," from the characteristic feature of its vegetation. A few hundred yards further *Gleichenia circinata*, Swartz,

occurred in sufficient abundance to give its name to another spring. Some beautiful specimens of *Goodenia elongata*, Labill., grew alongside the track. The next spring we have called "Grevillea Spring," on account of the bushes of *Grevillea parviflora*, F. v. M., growing alongside. We then came to a little flat, which bore quite a crimson tinge from the quantities of *Candollea serrulata*, Lab., growing on it; in fact, so plentiful was this plant that we considered the spot well worthy of the name "Candollea Flat." *Bossiæa foliosa*, Cunn., a brilliant-flowered species, grew here also in quantities, along with *Gompholobium huegelii*, Bentham, and altogether the scene was very gay. When the tourist reaches this flat he can consider his troubles nearly over, for in another hundred yards the top is reached, when, though you may have read all the guide-book descriptions of the scene, you are quite unprepared for the sight which bursts suddenly upon you. At Christmas we seemed to emerge suddenly upon an apparently grassy meadow, dotted with everlastings and daisies of different hues, here and there brilliant flowering shrubs, with a deep, clear stream winding through it. On the further side is Carlisle's Buffalo Hospice, backed up by the singular pile of rocks known as the "Look-out," while all around is a sort of enclosing wall of granite rocks, among which grow numerous eucalyptus trees.

Descending a little on to this plateau, as it were from the edge of a saucer, we leisurely made our way to the far-famed gorge, admiring the many floral novelties alongside the path. The view from the gorge must be seen to be understood, and as it was now past midday we determined to have lunch and admire the view at the same time, and botanize afterwards. We were here about 4,500 feet above sea level, or about 3,500 feet above our starting point in the morning. The highest peak of the Buffalo, known as the "Horn," about five miles to the south-west, rises to the height of 5,645 feet, and affords a magnificent view of the surrounding country. This also Dr. Mueller, as he then was, was the first to ascend, early in 1853. But one requires to spend at least a couple of days on the summit to visit all the curious rocks, and climb the Hump and the Horn, and see the other notable sights. The mountain has a grandeur of its own totally different to any other range in Victoria. We were pleased to find, on returning to town and referring to the parish plan (Wandiligong), that 2,880 acres, including the Eurobin Falls, the Gorge, "Look-out" rocks, and the meadow-like depression mentioned, have been permanently reserved as a National Park.

Now for some of the botanical treasures within easy reach of a one-day visit. Close by the gorge, growing in every crevice of the granite where there was a little soil, was the pretty pink and white everlasting, *Helichrysum leucopsidium*, D. C., while

Oxylobium alpestre, F. v. M., seemed more brilliant than ever. Not far away we secured a great rarity in *Prostanthera walteri*, F. v. M., curious on account of its large greenish flowers. This shrub had only been recorded twice before, originally by Mr. C. Walter, on Mount Ellery, East Gippsland, and subsequently in New South Wales. *Kunzea muelleri*, Bentham, was here much finer than on Mount Hotham, probably through not being so exposed to the wind. Only one or two plants of *Kunzea corifolia*, Reich., with purple flowers, were met with ; this has not previously been recorded from the N.E. Another yellow-flowered shrub was *Eriostemon alpinis*, F. v. M., while *Comesperma retusum*, Lab., was much dwarfer and of a deeper magenta than *C. ericinum*, D. C. The curious Epacrid, *Richea gunnii*, J. Hooker, with singular yellowish-white flowers, grew in large patches in the swampy ground. A large composite, *Podolepis longipedata*, R. Br., was not quite open. The rare *Veronica nivea*, Lindley, with pale lavender flowers, was not very plentiful. Perhaps one of the most charming flowers met with on the summit was *Epacris heteronema*, Lab., with clusters of flowers of the purest white ; this grew principally along the banks of the stream. *Sprengelia incarnata*, Smith, was quite at home in the boggy ground. The Eriostemons, *E. trymalioides*, F. v. M., *E. phylicifolius*, F. v. M., and *E. myoporoides*, F. v. M., were all met with ; but then more than half our Eriostemons are found in the N.E. division, while several are peculiar to it only. *Bæckea gunniana*, Schauer, with minute flowers, and *B. diffusa*, Sieber, the leaves of the former having a very pleasant odour, were added to our list. *Gaultiera hispida*, R. Br., was found in fruit. The umbellifers, *Oreomyrrhis andicola*, Endlicher, and *Daucus brachiatus*, Sieber, were found in fruit only. *Scævola hookeri*, F. v. M., belonging to the Goodeniaceæ, was fairly common. A very small plant was *Pultenæa fasciculata*, Benth. Amongst the orchids were found *Prasophyllum fuscum*, R. Br., *P. patens*, R. Br., *P. alpinum*, and *Thelymitra longifolia*, Forster. The only Drosera found was *D. peltata*, Smith. *Claytonia australasica*, Hooker, was growing almost in the water. The leaves only of *Caltha introloba*, F. v. M., a beautiful member of the Ranunculaceæ, were found, also a yellow-flowered variety of *Dianella revoluta*, R. Br. Diligent search was made in the numerous depressions containing water for specimens of pond life for absent members of the Club, but nothing was found visible to the naked eye.

Having spent a most enjoyable afternoon wandering about this botanist's paradise, about five o'clock we commenced the descent, which was accomplished much more quickly than our climb in the morning, and soon after seven we were having our final dip in the Eurobin. Tea having been disposed of, it was necessary

to pack up and make our way back to Porepunkah township, in order to catch the 5 a.m. train on Monday morning, reaching Melbourne again about mid-day, after an absence of almost five days, during which we had covered nearly 500 miles.

Regarding the bird and insect life met with during the trip we have little to say, as our time was so fully occupied by the flowering plants. However, among birds, an Eaglehawk was seen soaring some hundreds of feet above the summit of Mt. Hotham, and several King Parrots were seen between Harrietville and St. Bernard. Some fine specimens of Orthoptera, belonging to the Locustidæ, were noticed at Mounts Blowhard and Hotham, but were, unfortunately, not fully developed, so were not collected. A collector of this order should do well there about March.

If it were possible to arrange for one of the periodical extended excursions of the Club to be held in the Buffalo Mountains, we feel sure that no member who took part in it would ever regret the expenditure of time and money necessary for the outing. We have not attempted in this paper to describe the scenery of the district; that must be seen to be understood, but from the maps and photographs exhibited to-night some idea may be gained of its character.

In conclusion we may say, for the benefit of future visitors, that our expenses for the trip did not amount to £4 per head, and then, owing to the holidays, we were obliged on three occasions to hire special conveyances. From a health-giving point of view, our trip was delightful, and we returned to town greatly invigorated by the pure mountain air.

BOOK NOTICE.

Nests and Eggs of Birds Found Breeding in Australia and Tasmania.—Another part of this catalogue, issued by the Trustees of the Australian Museum, Sydney, has just been published. In this, the third part, the author, Mr. A. J. North, C.M.Z.S., deals with the greater part of the family Muscicapidæ, and in the course of 80 pages deals with some 45 species of Fantails, Fly-catchers, Robins, Scrub-Tits, and Bush-Warblers. Several exquisite drawings are inserted in the text, and three full-page plates are given, depicting the nest and eggs of the Rose-breasted Robin, the nest of the Yellow-breasted Robin, and the nest of the White-throated Bush-Warbler, each of which are excellent reproductions.

The retirement of Sir James Hector, K.C.M.G. (hon. member F.N.C.), from the directorship of the Geological Survey of New Zealand and of the Colonial Observatory is announced. Sir James retires on a pension, after a long period of service in various scientific positions.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 11th May, 1903. The president, Mr. T. S. Hall, M.A., occupied the chair, and about thirty members and visitors were present.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. P. C. Cole, Napier-street, Fitzroy, and Mr. O. A. Thiele, Williamstown, were elected as ordinary members, and Mr. E. H. Lees, M.I.C.E., F.R.A.S., "Fairhaven," Mallacoota, and Mr. J. R. Murdoch, Mortlake, were elected as country members of the Club.

GENERAL BUSINESS.

Nominations for office-bearers for 1903–4 were received, and Messrs. D. Best and A. D. Hardy were elected to audit the accounts for the past year.

The president mentioned with regret the death of Mr. Neville Cayley, of Sydney, well known to ornithologists as one of the most successful delineators of Australian bird-life.

PAPERS READ.

1. By Mr. C. Walter (communicated by Mr. C. French, jun.), entitled "A New Variety of *Acacia montana*, Benth."

The author stated that, on examination of specimens of this shrub received from Mr. D'Alton, of Nhill, he at first came to the conclusion that it was a new species, and exhibited it as such at the April meeting of the Club. He was led to this conclusion by the fact that *Acacia montana*, Benth., is placed by Baron von Mueller, both in the "Key to Victorian Plants" and the "Census of Australian Plants," in the section "Uninerves," while the specimens under notice are distinctly "Plurinerves." On further consideration, however, he decided that it should be recorded as a variety of *A. montana*, with the name of *d'altoni*, after the original finder. Specimens of this and allied species were exhibited for comparison.

2. By Messrs. Chapman, F.R.M.S., and H. J. Grayson, entitled "On Red Rain, with Special Reference to its Occurrence in Victoria. With a Note on Melbourne Dust."

The authors, in an exhaustive paper, described the phenomenon known as "red rain," and mentioned its occurrence in various parts of the world. The origin of the recent falls in Victoria was discussed, and details given of the microscopical examination of the sediment collected, as well as the chemical analysis and results of a bacteriological examination. A note on Melbourne

dust from the roof of the National Museum was appended for the purpose of comparison. The paper was well illustrated by a series of lantern slides.

A short discussion ensued, in which the president, Messrs. Barnard, Hardy, Walpole, and Keartland took part.

On the motion of Messrs. J. Stickland and Barnard, a vote of thanks was accorded to Mr. J. Searle for again placing his lantern at the service of the club.

Owing to the lateness of the hour, Mr. G. Weindorfer's paper, "The Physiognomy of the Australian and European Alpine Floras Compared," was postponed until next meeting.

EXHIBITS.

By Mr. F. G. A. Barnard.—Fertile frond of Elk-Horn Fern, *Platycerium alcicorne*, of Queensland.

By Messrs. F. Chapman and H. J. Grayson.—Lantern slides, photographs, microscopic slides, and red-rain sediment, in illustration of their paper.

By Mr. A. Coles.—A young Wombat.

By Mr. J. A. Kershaw.—A "twin Mushroom," found at Mordialloc by Mr. F. W. Baillie.

By Mr. F. M. Reader.—Dried specimens of the following plants:—*Aira minuta*, Loefl., and *Trifolium parviflorum*, Erh., naturalized and new for Victoria; also, specimens of the Egg-plant, *Solanum melongera*, L.; Safflower, *Carthamus tinctorius*, L.; and Cape Gooseberry, *Physalis peruviana*, L., grown in the Wimmera.

By Mr. G. Sweet, F.G.S.—Red rain, caught on sheets of paper at Brunswick, 28th March, 1903.

By Mr. C. Walter.—*Eucalyptus hemiphloia*, from Somerton district, previously recorded from N.W. and E. of Victoria; *Persoonia chamæpeuce*, from Dandenong Ranges, previously recorded from N.E. and E. of Victoria; also, in illustration of paper:—*Acacia microcarpa*, F. v. M., Wimmera District, October, 1900; *A. stricta*, Willd., Watts River, August, 1899; *A. leprosa*, Sieb., Dandenong Ranges, October, 1900; *A. montana*, Benth., Bacchus Marsh, September, 1899; *A. montana*, Benth., var. *daltoni*, Wimmera District; *A. sclerophylla*, Lind., Wimmera District.

After the usual conversazione, the meeting terminated.

ON THE SO-CALLED PETRIFIED MUSHROOM.

By D. M'Alpine.

(*Read before the Field Naturalists' Club of Victoria, 20th April*, 1903.)

In January of this year I received from Mr. M. B. Gray, of Hamilton, a specimen supposed to be a petrified mushroom, and

on that account was asked to report upon it. It certainly somewhat resembled a hardened mushroom, consisting of a stalk and an expanded cap-like portion; but appearances are often very deceptive, and in this case it proved to be so.

The specimen was found at Bridgewater, Western Victoria, about a mile from the local hotel, between the beach and the cliffs, on a kind of irregular path frequented by numerous visitors. The whole is of a brownish-black colour, and the cap-like portion is roughly round, measuring 4¼ in. in diameter, convex and broken up into numerous blunt tooth-like parts, somewhat resembling the overlapping scales of a pine cone. On the under surface it is slightly concave and relatively smooth compared with the upper, which has evidently been the side most exposed to weathering. The stalk is inserted in the centre rather obliquely, more or less compressed, and tapering slightly towards the base, being a little over 3 in. in length and 1–1½ in. across. It is very rough, and has a dark ashy-grey aspect. The whole weighs 8¾ ozs., and was certainly of a sufficiently striking character to be picked up as a 'curio.' In order to get at its true nature, it is essential to see the interior and make, say, a longitudinal section right through the centre of it, but as the finder wished it to be preserved intact, that could not be done. However, by a lucky accident, the stalk was broken across near the base, and the woody core was revealed, of a creamy colour, while the outside was dark-coloured and very irregular. Professor Gregory, of the Melbourne University, to whom the specimen was submitted, had determined it as a woody callosity, and not a fossil at all.

I had already examined the woody portion under the microscope, and found it to consist, not of fungus filaments, but of cellular tissue. Hence the specimen could not possibly be a fungus. A small portion was also thoroughly soaked with iodine and then treated with sulphuric acid, when it became of a deep blue colour, thus giving the well-known cellulose reaction. This proved that the substance had neither become petrified nor fossilized, but was perfectly normal. In some portions of the woody tissue there was found a perfect network of fungus filaments — elongated, branched, and closely septate. These filaments were the only traces of fungi found, and were probably parasitic. Thus the specimen turned out to be interesting —not, however, as a petrified mushroom, but as one of those peculiar excrescences found on various trees, and known as "burrs," "gnaurs," "wens," or "exostosis." These excrescences are usually very irregular and woody, with gnarled and warted surfaces. They occur on a number of different trees, very commonly on the elm, and vary in size from that of a pea to that of a cocoa-nut or larger. It has been as-

certained that they are not due to insect agency, and they may start from old tree trunks, or where a branch has broken off, and probably arise from clusters of adventitious buds. A bud under these circumstances tries to develop a shoot, but owing to imperfect nourishment it soon dies at the top, then new buds at the base of this repeat the process next year, and so on until quite a cluster is formed. This compact mass of suppressed shoots may form a hard, rounded boss-like structure, and become more or less disconnected from the parent trunk.

Berkeley — in the *Gardeners' Chronicle*, at p. 756 (1855) — states that gnaurs occasionally, though freely developing above, may adhere by a strong peduncle or stalk of the wood, and this leads us to consider the form of the present specimen. We may imagine that the cluster of buds grew out at first as a relatively slender projection, owing to a scarcity of nutriment; then, subsequently, there was sufficient nourishment provided to enable the expansion to take place at the top. However this may be, there is no doubt of the woody nature of the specimen and of its being one of those *lusus naturæ* so frequently met with in different departments of science. Every credit is due to Mr. Gray—or rather, I am informed, to Mrs. Gray, who actually picked up the specimen—for bringing it under notice, and this short account of an interesting form may be the means of leading field naturalists to observe any examples of such excrescences on our native trees. No doubt the size, the shape, and the situation all tended to suggest the idea of a mushroom, and when we remember that Bridgewater—on the coast, about nine miles from Portland—is noted for the natural curiosity known as the "petrified forest," we can easily understand how this hard, woody, mushroom-like body came to be regarded as a petrified mushroom, although, of course, the meaning intended is lignified rather than petrified.

It would be interesting to visit the locality and explore it for one's self, in order to see if any similar specimens may be found still attached to their parent trees.

THE *Agricultural Gazette of New South Wales* for April contains several articles of interest to naturalists. Mr. W. W. Froggat, F.L.S., Government Entomologist, contributes some notes, with illustrations, on the Cicadas, "Locusts," and their habits; also on the Potato Moth, *Lita solanella*, Boisd. Another interesting article by Mr. C. T. Musson, of the Hawkesbury Agricultural College, shows how the rainfall often varies in adjacent localities, and, as the result of practical experiments, shows the variations recorded by a series of rain-gauges set about 70 yards apart, each representing an area of one acre.

ON "RED RAIN," WITH SPECIAL REFERENCE TO ITS OCCURRENCE IN VICTORIA. WITH A NOTE ON MELBOURNE DUST.

By F. Chapman, F.R.M.S., and H. J. Grayson.

(*Read before the Field Naturalists' Club of Victoria*, 11*th May*, 1903.)

Introductory Remarks.—Natural phenomena, meteoric or otherwise, which happened to be beyond the common order of things were regarded by our forefathers with mingled feelings of awe and superstition. Many of the mysterious phantasies of the past have been dissipated by the growth of accurate knowledge, and not least among these is the phenomenon, common enough in certain districts, and under peculiar conditions, of the so-called blood-rains. This appearance, which was regarded by the credulous and unscientific mind in a more or less literal sense, and presaging calamity in one form or another, is to us merely a dust-laden shower, brought about by the rain falling during a dust storm.

Although showers of red rain, when particularly dark in colour, are referred to as blood-rain, it is rare to find the colouring material so vivid as to cause the name to be merited, mud-rain being often more appropriate.

Other similar appearances, produced in a different way, and by the agency of Protophytes, are variously known as "gory dew" (*Palmella cruenta*), found on damp walls, and resembling in colour coagulated blood; and the "red snow" found in the arctic and alpine regions colouring extensive tracts of country, which is either a species of Palmella or possibly a Protococcus. These latter appearances, however, are distinctly due to organic growth, and have nothing in common with red rain.

The "yellow rain," or "sulphur showers," which, by the way, are not due to sulphur, are frequent in some countries, and not confined to any in particular. They are caused by an exceptional quantity of pollen, chiefly coniferous, being included in the condensing moisture and brought down with the rain.

The physiographical conditions required for the production of mud-rains are, obviously, a desert tract of country, where fine impalpable dust may be caught up by the wind, and the inclusion of this dust in a moisture-laden stratum of air. The result is a shower of muddy rain, which often takes place at distances far removed from the source of the dust. It is possible that the process of condensation may be hastened by the presence of dust particles, as seems to be the case during volcanic outbursts.

In many regions dust storms are so generally prevalent as to result in the deposition of layers of fine sediment, which mantle

everything, and eventually form strata of very great thickness. A notable example of such a deposit is the Loess of China and Central Asia, which is an accumulation of blown dust often as much as 1,000 feet in thickness. In this way the ancient cities of Nineveh and Babylon have probably been covered up. Showers also might occasionally fall in these districts, often as mud-rains, and this moisture would furnish the necessary conditions of life for the land and marsh-loving shells which are often met with in great abundance in these subaërial deposits.

The phenomenon of mud showers frequently observed in connection with volcanic eruptions is obviously related to that of red rain, differing only in the source and nature of the dust. The sediment in the former consists usually of crystalline particles and triturated volcanic material, whilst that of the latter contains both mineral and organic particles. Upon both the winnowing action of air currents may be observed, the finer and lighter portion naturally being carried farthest from its source.

The terrigenous deposits which occur off the west coast of Africa, notably round Cape Verde, and contain much fine sandy material, may in a large measure owe their origin to dust storms, which carry a burden of fine material off the land, as exemplified in the "sea dust" often collected from the decks of vessels in that part of the Atlantic.

The Red Rains of the Mediterranean Area and Their Composition.—In the Mediterranean area showers of red rain are very frequent, the south wind or sirocco bringing dust with it from the Sahara Desert and meeting with the moist air of the Mediterranean. In Sicily, around the harbour of Messina, a curious illusionary effect is sometimes seen, which, according to some writers, appears to be directly connected with the advancing dust-laden clouds. It is known as the Fata Morgana, and supposed by the Sicilians to be the work of the fairy Morgana. It presents the appearance of a screen extended over the still, clear water, and reflections of edifices and other objects are seen against it to a height of about 30 feet above the water's level. (For sketches of this phenomenon, see *Nature*, 26th February, 1903, p. 394.)

The colour of the sediment from the red rain of the Mediterranean coast regions and elsewhere is mainly due to the ferruginous constituents of the soil which yields the dust, and it varies greatly in degree according to its source.

The composition of the sediment of red rain is often largely silicious, due to the large proportion of quartz particles, and this is frequently considerably increased by the presence of the silicious frustules of diatoms which have been caught up from freshwater lakes, or even from sub-fossil deposits which lay in the path of the wind. This latter feature in the constitution of red

rain was pre-eminently brought under notice by the elaborate work of Dr. Ehrenberg, published in 1847.* That author gave a detailed account of the falls of blood-rain or sirocco dust at Genoa, Lyons, and elsewhere, and of the "sea dust" collected near the Cape Verde Islands by Darwin and Lyell ; all of these contained many species of diatoms, chiefly of freshwater habitat. Ehrenberg also recorded the contents of sediment from a "red snow fall" in the Tyrol, which appears to be of the nature of red dust, in which he found numerous diatoms, sponge spicules, some doubtful forms of foraminifera, pollen of Pinus and spores of ferns, vegetable fibres and hairs, and fragments of insects. There is also in this work an historical record of falls of red rain, amounting in all to 340, up to the date of the publication of Ehrenberg's memoir. In addition to silicious particles in the sediment there will naturally be a variable quantity of desiccated material derived directly from the soil, the result of the decomposition of basalt and other rocks lying in the track of the wind.

To take one or two recent instances of red rain falling in the Mediterranean area, we may refer to Prof. Judd's examination† of some sediment collected by Prof. Sir A. W. Rücker, at Taormina, Sicily, which fell during March, 1901, and was noticed as far north as Hamburg. This material, Prof. Judd says, contained "chips of quartz, micaceous and other minerals. A few diatom frustules, but these were not so common as in that which was examined by Ehrenberg in 1847."

Referring to the same series of showers, M. Stainslaus Meunier‡ gave the composition of red rain which fell in Palermo on the night of the 9th to 10th of March, 1901, as follows:—

In 100 parts of powder—

Water	5.20
Organic matter	3.17
Sand	59.14
Carbonate of lime	23.91
And by difference—clay	8.58

The sand referred to would be chiefly silicious; its percentage is curiously identical with that determined for Victoria by Mr. Walpole (see p. 29).

An analysis by M. Barac of red rain sediment which fell at Fiume, Hungary,§ shows a great variety of substances to be present, which were due to local conditions. The presence of

* "Passatstaub und Blutregen," Abhandlungen K. Akad. Wiss. Berlin, pp. 269–460, 6 plates.

† *Nature*, 28th March, 1901, vol. lxiii., p. 514.

‡ *Nature*, 18th April, 1901, vol. lxiii., p. 604.

§ *Ibid.*, 1901, vol. lxiv., p. 489.

soot, for instance, would be accounted for by the proximity of manufactories. The material in this instance consisted of coloured particles (mainly irregular), angular fragments, mineral particles, silicious organisms, particles of soot, rhombohedra of calcite, and cubes of salt. The quantitative analysis given by M. Barac is as follows :—

Silica	49.49
Iron sesquioxide	9.96
Alumina	12.10
Manganese peroxide	1.99
Lime	11.46
Magnesia	0.40
Carbonic acid	8.96
Organic matter	5.48
Traces of soda, sulphuric acid, Hydrochloric acid, &c.	0.16

Red Rain in England.—The mud-rains so frequent in the Mediterranean area occasionally extend, as we have seen, far into Europe. It is extremely rare, however, in the British Islands, so that it is the more interesting to note its occurrence in January of last year in the neighbourhood of the Bristol Channel. This fall occurred in the night or early morning of the 22nd and 23rd at Chewton, Henbury, and Lawrence Western,* and it appears, according to some authorities, to have had a quite local origin in that part of the south-west of England. It has been suggested by Clement Reid that the dust of this particular fall of mud-rain originated in the alluvial flats of the Cornish area.†

Occurrence of Red Rain in Australasia.—When we turn to Australasia we find nearly similar conditions prevalent to those on the coastal areas of the Mediterranean. The hot, dry north wind, passing over the sterile region of the centre, frequently brings down a great quantity of dust across the southern states. These dust clouds mix with the southerly moist winds, and in some measure, as already remarked, assist in the condensation of the moisture, which results in a downfall of khaki-coloured rain. These showers are recorded from time to time, and form one of the ordinary features of the Australian climate, although they are not of great frequency, for very often the dust subsides before it is caught by a moist stratum of air.

A note on a shower of red rain was published in the Field Naturalists' journal in 1897,‡ in which the writer, Mr. C. C. Brittlebank, mentions that he had observed diatoms in the red

* *Nature*, 1902, vol. lxv., p. 317.
† *Ibid*, p. 414.
‡ Vol. xiii., p. 125.

rain which fell over a large area of Victoria on the 27th December, 1896.

Towards the end of last year a few local showers were recorded in Victoria from the districts of Heathcote, Traralgon, and Cunninghame, bringing down a quantity of fine red dust, which formed a coating of mud upon everything on which it fell, leaving mud-stains on people's clothes and contaminating the domestic water supplies.

A further sample of rain sediment, collected in South Gippsland by Mr. W. H. Ferguson of the Mines Department, has been kindly placed at our disposal by Prof. Gregory, F.R.S. We found it differed only slightly from the material obtained by us, and mainly in that it contained a rather larger percentage of mineral matter, principally of quartz fragments. Mr. Ferguson, we are informed, secured the sediment toward the end of last year, and was careful to form an estimate of the total fall per square mile from data available, and this amounted to 50 tons.

A similar estimate made by us with respect to the fall on 28th March gives an approximation to over 35½ tons per square mile for 1 inch of rainfall; or, more precisely, 20 grains per square foot for 1 inch of rainfall. Of this total about 397 lbs. would consist of the frustules of diatoms, to which we shall presently refer.

One of the recent widely-spread dust storms has been noticed in *Nature** by Mr. W. A. Dixon, of Sydney, namely that of 11th, 12th, and 13th November, which visited New South Wales, Victoria, and Tasmania. That writer remarks on the obscuring of the sun by the great quantity of dust present in the air, whilst the sea had a peculiar leaden colour. The latter appearance he compares with the blue colour of the New Zealand hot lakes, and supposes it to be due to a like cause, that of fine particles in suspension.

From Tasmania Mr. H. S. Dove† described the dust storm on the afternoon of 12th November, 1902, when the sky to the north and north-east was of a chocolate-brown tint. The whirled-up dust was afterwards caught by the rain, which, when it fell, discoloured people's clothes. This writer compares the appearance of the sky during the dust storm with that of "Black Thursday," when the fearful bush fires raged over so great an extent of country.

This same occurrence took the form of a very dense dust storm in Victoria, which lasted during the greater part of the day, and in some places necessitated the use of lamps in the daytime, on account of the darkness.

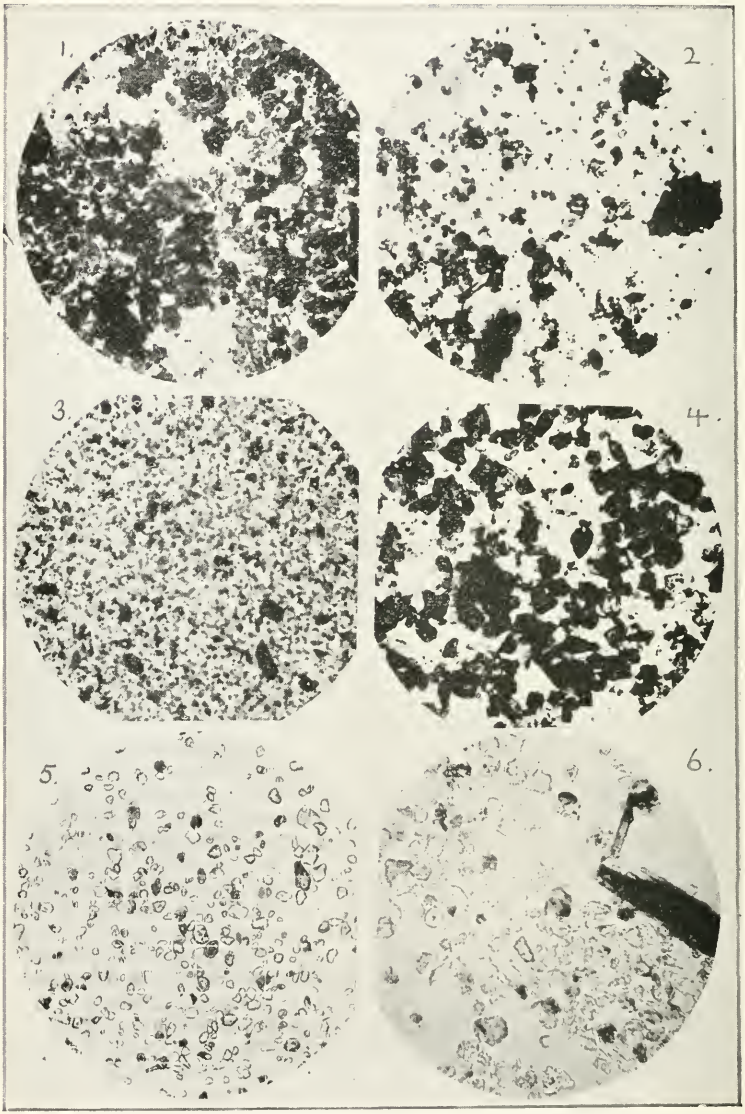
* 1st January, 1903, vol. lxvii., p. 203.
† *Loc. supra cit.*

One of the most remarkable, perhaps, of red-rain showers, as regards the quantity of sediment brought down, occurred in Victoria and parts of the neighbouring States on 14th February, 1903. Early in the day the weather was fine and bright, but a northerly wind springing up caused the streets in Melbourne to be partly obscured by dust. The warm and oppressive north wind continued steadily blowing until about 3.45 p.m., and the suspended dust at last imparted a copper colour to the sky. The highest shade temperature in Melbourne was 91.6. At the time mentioned an instantaneous change took place, the wind quickly veering round to the south-west, and in a moment a cool, damp, and almost icy wind from the Southern Ocean took the place of the oppressive north wind which had until then been blowing. The south-west wind blew with increasing force, and at one time had a velocity of 67 miles per hour. The change in the direction of the wind was emphasized by a sudden darkening of the sky, and far above in an east and west direction the dust clouds could be seen as a dense purplish bank being driven northward, followed by patches and flecks of snow-white clouds marking the progress of the south wind, which was forcing its way beneath and against the heated dust cloud. At this time it was so dark as to make it necessary for lamps to be lighted to enable one to read. At 5 p.m. rain, saturated with fine dust, commenced to fall, colouring everything upon which it fell of a chocolate tint. Upon holding out a sheet of writing paper the rain would quickly discolour it with reddish-brown spots. We collected the sediment from this fall for detailed microscopic examination, at Camberwell, 5 miles east of, and at St. Kilda, 4 miles south-east of Melbourne respectively. Five fluid ounces of rain were collected by one of us at Camberwell, and this yielded 17 grains of dry sediment.

This cyclonic disturbance appears to have spent its force mainly on the coastal areas, and does not seem to have gone far beyond the Divide.

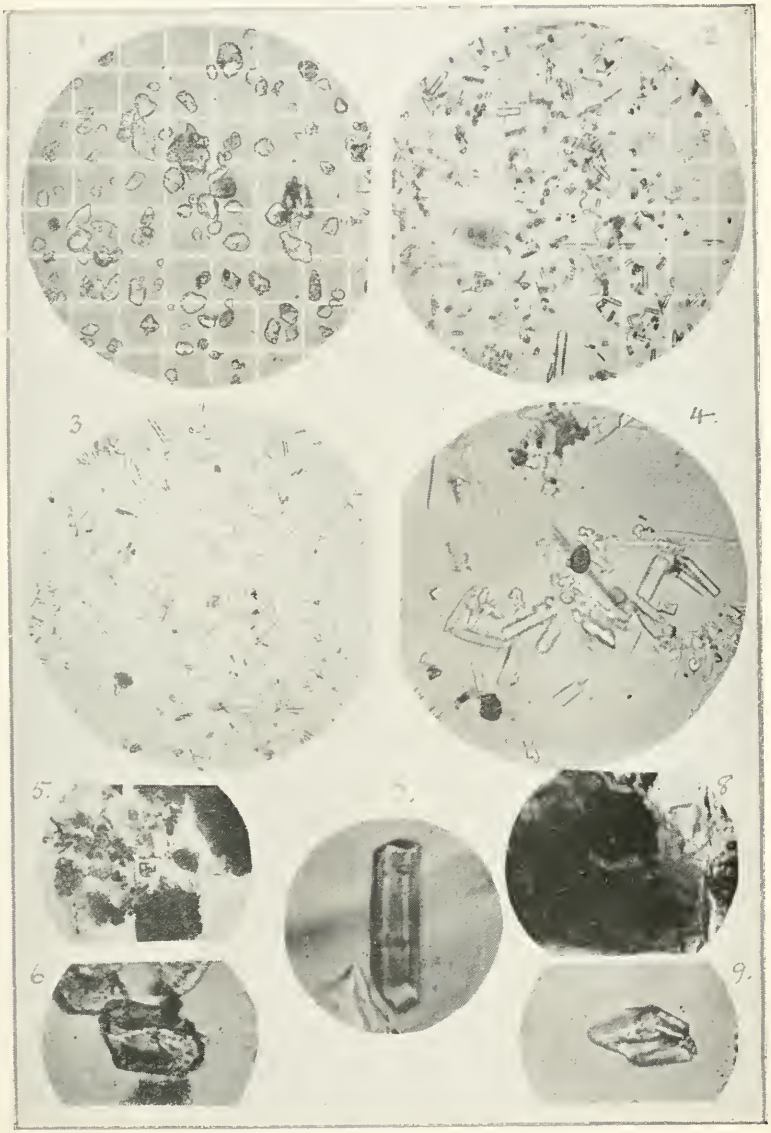
Still more recently, on 28th March, a red-rain fall occurred, on a Saturday as in the previous instance, and at nearly the same time; emphasizing the general rule that a cycle of weather in Victoria takes about 7 to 9 days to complete. Material from these two falls yielded both diatoms and various minerals, and these will be presently enumerated and described. We have already referred (see p. 21) to the probable amount of sediment which fell per square mile on this particular date.

It may be mentioned incidentally that on the 15th of February a storm of hail passed over Camberwell, the hail-stones having a curious shape, like a depressed mushroom. One of their surfaces was convex, the opposite conical, and having a short stalk; the



H. J. G. *Photo.* *Process Block*, TRIUMPH ENG CO.

SEDIMENTS AND SILICIOUS RESIDUES FROM RED RAIN.



H. J. G. and F. C. *Photo.* *Process Block*, TRIUMPH ENG. Co

RESIDUES, DIATOMS, AND MINERALS FROM RED RAIN.

periphery was acute. Both surfaces were rough and pitted, as though etched in a regular manner and having relation to some inherent crystalline strain. These hail-stones averaged 10 mm. in height.

In connection with the following notes on the sediment of the red rain an opportunity has been taken to examine a sample of dust which had drifted on to the skylight of the National Museum, Melbourne. The material, in some respects, was comparable with the ordinary sediment of the mud-rain, but of a somewhat coarser nature, the greater part being mineral grains, and only a few fragments of diatom frustules were seen. It differed also in containing minerals of a distinctly local character, presumably derived from the powdering of the road metal in the district, such as basalt and limestone.

The Minerals found in the Two Samples of Red-rain Sediment.

Sediment in the mass reddish-brown.

Quartz.—This is by far the commonest mineral in both samples of red-rain sediment. The particles are usually quite angular, a small proportion only being sub-rounded; and these latter are not so smooth and polished as in the case of the desert sands of the interior, typical examples of which, obtained during Professor Gregory's recent expedition to Lake Eyre Basin, we have compared for the purpose. Some of the grains from the sediment are indeed sharply angular as if freshly crushed or broken, as would be the case if some of the material were derived from dried tailings and sluicings, such as occur abundantly in the mining areas to the north and north-west of Victoria.

The thickness of the quartz grains may be judged by their polarization colours ranging from iron grey to straw yellow of the first order of Newton's colour scale. Some of the quartz fragments are clear, but the majority are more or less crowded with cavities and bubbles.

Opal is represented by a flake of a pale-brownish colour giving a dark extinction cross, due to inherent strain.

Orthoclase felspar is rather rare; some perfect crystals, however, were met with, one being twinned on the Carlsbad type. A good specimen of a zoned Orthoclase occurs in the St. Kilda sediment. Fragments of larger crystals of Orthoclase are fairly abundant, showing schiller structure developed normally to the pinacoid faces.

Sanidine is frequent in the St. Kilda material (28th March).

Albite is not common, but occurs in small angular chips in both samples (from St. Kilda and Camberwell).

Anorthoclase is rare in the St. Kilda sample (28th March). It

gives the characteristic extinction-angle measurement on the face 001.

Augite.—Fairly frequent in both samples as broken crystals or shapeless fragments. A few perfect crystals were found, which give oblique extinction, are feebly pleochroic, and show the approximate right-angled cleavage. Usually of a pale or dull green colour, but sometimes greenish to smoky-brown.

Actinolite.—A crystalline aggregate of this mineral, which approaches Tremolite in its pale colour, was found in the St. Kilda material. It is fibrous, pale green, and faintly pleochroic.

Tourmaline.—This mineral occurs in both samples of the sediment, and the crystals are frequently perfect and doubly terminated. They are easily recognized by their strong absorption and straight extinction. One crystal from the Camberwell fall is of a pale indigo-green; the others are usually smoke-brown to greenish-brown.

Olivine is somewhat frequent in the St. Kilda material of 28th March. The grains are sharply broken, and show a conchoidal fracture. Amongst other characters their polarization colours serve to distinguish this mineral from quartz.

Garnet.—A single isotropic granule of a pale pink colour occurred in the St. Kilda sample of 14th February.

Cordierite.—An angular piece of this mineral species was found in the St. Kilda sample, and is the only specimen met with after a careful search. It gives the characteristic colours of blue to yellow when examined with the polarizer only. It is met with in both granites and gneisses in Victoria.

Rutile.—Occasional, in the St. Kilda material. Crystals somewhat rare, varying from dark yellowish-brown to deep red-brown. No twinned forms observed.

Zircon.—A rounded crystal of colourless Zircon, measuring .04 mm. in length, was found in the Camberwell sediment. Found more commonly in the St. Kilda material.

Apatite.—A crystal measuring .06 mm. in length occurred in the Camberwell sediment.

Epidote.—A doubly-terminated crystal from the Camberwell fall, measuring .09 mm. in length; viewed through axis **c** it gives greenish-brown. Also strong refraction, with edges in high relief. Incipient fractures nearly at right angles to ortho-diagonal.

Natrolite (?).—A fragment of a radially-grouped mineral, from St. Kilda, giving straight extinction, and resembling Natrolite in its general characters.

Limonite.—Numerous rounded flakes of a reddish-brown or yellow colour are seen to be disseminated through the mounted material, and to which, together with the more powdery or

amorphous brown particles of a similar nature, the brown colour of the sediment is apparently due.

A possible explanation for the presence of much of the Limonite may be due in this instance to the fact that in the process of denudation and weathering of the tertiary basalts the iron usually leaches out and forms extensive concretionary or cemented gravelly deposits, locally termed "buck-shot gravels." The auriferous drifts also from the north-western districts supply a large proportion of limonitic or other ferruginous material. Associated with the minerals described above there is also a flake of amber-brown glass, with numerous gas-cavities, from the Camberwell sample.

The mineral fragments and crystals from the Victorian red-rain sediment, as recorded above, have undoubtedly been derived from the disintegration of the rocks ordinarily met with in the Victorian area in the country to the north and west. The mineral constituents of Dolerite and Basalt, which are so much in evidence in the Melbourne dust, are not at all common in the red-rain sediment, the latter material presumably originating farther to the north. The accessory silicates and the other rarer and heavier minerals were most likely derived from granitic and gneissic rocks, and from the disintegration of lodes and veins.

We may mention, *en passant*, that in his examination of the *sirocco dust* Prof. von Lasaulx noticed that the mineral constituents consisted of the ordinary rock-forming minerals, with the addition, curiously, of metallic iron particles. These latter he refers to a terrestrial origin.

Prof. Silvestri, of Catania, found not only metallic iron in the Sicilian sirocco dust, but also nickel and various silicates and phosphates such as are found in meteorites, which led him to believe that a portion of the dust was either derived from the abrasion of those bodies or existed as cosmic dust, which was attracted to the earth on penetrating the atmosphere.

The terrestrial origin of the sirocco dust is now admitted on nearly all sides. Prof. Tacchini, who also supports this view, found the specific gravity of the dust to vary from 2.31–2.71, and due to the invariably large proportion of silica in its composition.

In addition to the diatoms, to be presently dealt with, there are numerous pieces of vegetable tissue, more particularly fragments of leaves and stems, and also numerous traces of the silicious elements present in grasses, sedges, and other plants structurally allied. Besides these there were numerous spore-like bodies and pollen grains in samples from both localities. The most striking and abundant plant remains are, however, the silicious valves and frustules of the Diatomaceæ. Their presence has been recorded in Australia on several occasions previously, as we have already incidentally stated, more particularly in the

red rain of 1896, by several observers, but as the sediment was almost invariably collected on the roofs of greenhouses or from the channelings of dwellings, positions in which it was very liable to contamination, it was not clearly demonstrable that they had been carried and deposited by atmospheric agencies. This element of doubt has been eliminated in the case of the deposits under review, as they were collected in perfectly clean vessels at stated intervals, and as all the glassware, chemicals, and water used in the subsequent cleaning processes were certainly free from similar organisms, the possibility of their accidental introduction need not be entertained.

The number and variety of these organisms is fairly considerable, though to obtain this distinction they need not, and in fact do not, form any very large percentage of the total sediment. Certainly it would be well within the mark to state that they do not represent more than one-half per cent. Yet in a sample of dried material weighing not more than 20 grains they number many thousands.

Fragments of sponge spicules, probably of Spongilla, are not infrequent in most of the samples collected.

Dried remains of the lorica of a rotifer, probably of the genus Euchlanis, were occasionally met with, and the wing of an insect occurred in that from Camberwell.

The Diatoms in the Red-Rain Sediment.

The generic and specific forms present are in the main representative of freshwater types. Species usually found only in brackish water occur, but not to the same extent, while the occurrence of purely marine and estuarine representatives of the group is extremely rare, only one example of the former having been noticed, namely, a species of Cymbosira, from the fall at Camberwell.

The number of the Diatomaceæ known and described is so enormous, and the literature concerning them so voluminous and scattered, that any attempt to enumerate all the specific forms present is next to impossible to any but specialists in this group. We have consequently only endeavoured to draw up a provisional list of some of the more prominent species. This, of course, might be greatly extended and modified by more complete examination and research.

List of Diatomaceæ from Red Rain collected at St. Kilda 28th March, 1903.—*Amphora*, sp., *Cymbella*, sp., *Encyonema lunula*, Grunow, *Navicula nobilis*, Ehr. (fragments), *N. major*, Kutz. (fragments), *N. lata*, W. Smith, *N. borealis*, Ehr. (not quite typical), *N. brauniana*, Grunow, *N. termes*, Ehr., var. *stauronei formis*, *N. commutata*, Grunow, *N. ambigua*, Ehr., *N.*, sp., *Stauroneis acuta*, W. Smith, *Stauroneis*, sp., *Amphicampa mirabilis*,

Epithemia zebra, Ehr., *Eunotia*, sp., *Synedra*, sp. (fragments), *Peronia*, sp., *Diatoma*, sp. (some examples still showing the gelatinous envelope), *Hantzschia amphioxus*, Grunow, *Hantzschia*, sp., *Nitzschia*, sp. (several), *Melosira*, sp. (several).

The question of the derivation, as also the destination, of so many species of diatoms, and other organisms much more potent in their consequential effects, and such as it appears must be regularly carried by these periodic cyclonic storms, is one of great interest. This is so, not merely because of its bearing upon the distribution of one particular group of microscopical plants through a given area, but rather because of its relation to questions affecting the welfare of communities separated by hundreds of miles of land and sea. For it must be perfectly clear that if individual organisms so large as the frustules of the diatoms we have enumerated can be carried from the northern areas of Victoria to New Zealand, of which more anon, it is equally clear that the organisms in their embryonic state, infinately smaller, but more potent in their effects upon other organisms—to wit, ourselves—may be, and indeed are, carried in the careering dust storms with which the Melbournians are, alas! only too familiar.

In order, if possible, to derive definite information upon this point, we submitted samples of the material obtained to Dr. Bull, Lecturer on Bacteriology at the University, who generously undertook to prepare cultures from the several tubes of sediment. Unfortunately these could not be immediately dealt with; so that, according to Dr. Bull's appended report, only the more resistant organisms were capable of development. In addition to the saprophytic and allied organisms alluded to by Dr. Bull, numerous protozoan forms of life, chiefly of the flagellate type, quickly developed out in a tube of material left for a few days exposed to the light. Of course the usual precautionary measures to ensure isolation and freedom from contamination other than such as was unavoidable at the time of collection had been taken.

REPORT ON THE BACTERIOLOGICAL EXAMINATION OF TWO SPECIMENS OF "RED-RAIN" WATER. BY DR. R. J. BULL.

The samples were labelled as under:—

1. "Red rain," collected St. Kilda, 14/2/03.
2. "Red rain" ,, ,, 28/3/03.

Mode of Examination.—Small measured quantities of the turbid water (from $\frac{1}{50}$ to $\frac{1}{10}$ cubic centimetre) were inoculated into plates of sterile gelatine and tubes of nutrient agar, and the colonies of bacteria present were studied as they developed.

Results.—No. 1, although containing more than twice as much sediment as No. 2, contained considerably fewer micro-organisms.

No doubt this result is in part due to the length of time elapsing before a bacteriological examination was undertaken.

The majority of the micro-organisms growing in sample No. 2 consisted of a rapidly liquefying bacillus, which slowly produced a green pigment (*Bacillus fluorescens liquefaciens*). This organism is commonly found in fresh water.

Sample 1 differed from 2 in containing considerable numbers of white and green moulds (*Oidium albicans* and *Penicillium glaucum*). There were also present a few members of the "Hay bacillus" group, and a very limited number of *Bacillus fluorescens liquefaciens*, the pigment in this case being produced more slowly than in sample 2.

Each sample also contained a few members of the "colon" group.

Remarks.—It is characteristic of the common "air organisms" that many of them produce varieties of red, pink, yellow, and brown pigments. It is noteworthy that these pigment-producing bacteria were entirely absent from the sample examined, and this fact would seem to indicate that the atmospheric dust on the occasions of the "red rain" phenomenon was not of the character usually found. This abnormality was further indicated by the presence of the colon group in each sample. Extensive laboratory experiments have shown that the colon bacillus is rarely found normally in the atmosphere.

As to the origin of solid material in the samples, the bacteriological results in the case of sample 2 would seem to indicate that the locality had not been subjected to drought of a recent date, owing to the numerous water bacteria present. Such, however, does not appear to be so markedly the case in sample 1.—R. J. Bull, M.D.

We had, however, no particular desire to endeavour to discover what might be present in an "everyday" sample of Melbourne dust, though that is by no means unimportant. Hence we purposely waited until the whole of this had been swept away in order that our sample might contain only material carried from afar. It would, we think, be safe to say that none of the material we are describing had been derived from an area within 30 miles north or west of Melbourne. It would be equally safe to affirm that much of it was derived from areas ranging from that distance up to 300 or more miles north and west. The Diatomaceæ were most probably mainly carried from the low-lying swamps and salt lakes which fringe the River Murray and other waterways throughout northern and north-western Victoria, and beyond the South Australian border. That they live and grow in profusion under conditions such as are known to obtain within the area in question is a matter of observation. During abnormal seasons of drought, such as have

unfortunately of late been prevalent, the waters of the marshes and billabongs are often completely evaporated, and the accumulated sediments, full of diatom valves, are quickly dried to an almost impalpable powder, which is readily gathered up and carried by the wind at a considerable elevation for hundreds of miles.

We have in this instance been so fortunate as to receive confirmatory evidence from New Zealand that red rain, which is beyond doubt identical with the samples we are describing, fell at Otakia, in Otago. A slide of this material has been kindly placed at our disposal by Professor Gregory. We find it only differs from ours in that the dust particles, as may be seen by reference to the photographs, are smaller than the bulk of the material collected by us. This, as may be supposed, is no doubt due to the larger mineral fragments having been filtered out by gravitation in transit. But the diatom valves, owing to their greater superficies as compared with their specific gravity, are present in abundance, and serve to place the identity of the deposit beyond question. We have, therefore, in this circumstance undoubted proof that relatively large objects—for some of the valves are 0.1 mm. long and proportionately wide—are carried by atmospheric agency considerably over 1,000 miles. In all probability they would be conveyed over still greater distances by varying air-currents, provided they were not thrown down by condensation in the form of rain.

Analysis of the Victorian Samples of Sediment.

It was deemed desirable to have an analysis made of one of the samples, and as the amount of material forwarded by Mr. Ferguson was sufficient for this purpose it was handed, by the courtesy of Professor Masson, to Mr. G. S. Walpole, of the Chemistry Department, Melbourne University, who very kindly undertook the work, and whose report is subjoined :—

"The analysis of samples of dust from red rain collected by Mr. Ferguson, of the Mines Department is as follows :—

"The dust was passed through a sieve (80 meshes to the linear inch), whereby some small pieces of straw, &c., were removed, and then dried at 100° C. for 6 hours. Finally it was dried for one hour at 200° C. Two analyses of the material were made, one by fusion and one by the hydrofluoric acid method.

"$Si O_2$	59.23
Loss on ignition	10.28
$Al_2 O_3$ (containing $Zr O_2$)	14.01
Total iron weighed as $Fe_2 O_3$ ...	7 68
Ca O	2.40
Mg O	1.91
	95 51

Alkali metals ... Trace only, not determined"

The sediments from red rain were collected at St. Kilda 14th February and 28th March, 1903, and at Camberwell 14th February, 1903.

Samples collected at St. Kilda, 14/2/03 :—

No. 1.—Obtained at 4.30 p.m., rain having been falling over 20 minutes. Lower atmosphere clear, with low drifting clouds. Wind about due west, and blowing strongly.

No. 2.—Collected at 6.30 p.m.
No. 3 ,, at 7.30 p.m. } Conditions as above.
No. 4 ,, at 7.45 p.m.

No. 5.—Collected at 8.30 p.m. Rain falling steadily. A further sample obtained after 9 p.m. contained no appreciable sediment.

Sample collected 28th March, St. Kilda (one only), treated for Diatomaceæ.

Sample collected at Camberwell, between 6.15 p.m. and 7.15 p.m., examined especially for minerals, but diatoms as numerous as at St. Kilda.

With respect to the series of sediments obtained on 14th February, those collected between 4.30 p.m. and 6.30 p.m. were found to contain the largest proportion of mineral and organic material, and do not differ appreciably from a sample secured on 28th March under almost precisely similar conditions. This latter sample was preferably treated for Diatomaceæ alone, as the total amount of sediment was somewhat greater than that collected on the first-named date. As the February samples were obtained at definite intervals they afford a comparison both as to the amount and nature of the sediments. They also point to a gradual diminution in the size of the contained particles. This is first noticeable in the 7.45 sample, while that obtained at 8.30 p.m. is almost entirely free from the coarse grains characteristic of the earlier gatherings. Most of the sediment collected from 8.30 p.m. on to past 9 p.m. was so fine as to remain in suspension for some hours. From this it would appear that the heavier particles are carried down during, say, the first two hours' rain. After this, assuming a continuation of similar conditions, the amount of sediment is greatly reduced, and consists only of particles in a minute state of subdivision.

Minerals in the Melbourne City Dust from the Roof of the National Museum.

Quartz.—Numerous sub-angular chips.

Orthoclase rare ; frequently schillerized ; one minute crystal showing twinning on the Carlsbad type.

Sanidine variety rare, in clear fragments ; one specimen with characteristic cleavage cracks.

Albite rare, with fine repeated twinning.

Labradorite frequent, with extinction angle about 32°.

A fragment of *Anorthite* was found having a maximum extinction angle of 58°.

Augite.—A pale green variety very common; the majority in fragments, but several perfect crystals present. Two pieces of brown Augite with inclusions of magnetite crystals, showing the occurrence of parallel grouping of octahedra. One Augite crystal of a purplish-brown colour.

Tourmaline. — Common. Some good slender prismatic crystals.

Olivine.—Irregular granules, with rough surfaces and strongly refractive edges, very common.

Garnet very rare. Pink, isotropic granules.

Rutile.—Frequent, generally fragmentary or in short rounded crystals; also as included crystals in quartz.

Cassiterite (?).—Cleavage fragments yellow or yellowish-brown, and showing an anomalous interference figure, are frequent. They agree most in character with the above mineral. The fragments, when imperfectly cleaved, show a curious rippling of the surface, like that of amethystine quartz. Their colouration is too strong for citrine.

Zircon.—Frequent, more or less rounded.

Epidote.—As an alteration product in felspars, frequent.

Zoisite.—Penetrating fragments of felspars as Labradorite.

Calcite in rhombs, rare.

Magnetite.—Irregular granules frequent.

Limonite.—In less proportion than in the red rain sediment; also as included crystals of octahedral form in Augite.

Besides the minerals enumerated, occasional examples of opaque spherical bodies were met with, resembling those found in deep sea deposits, and referred to as cosmic dust.

There were also numerous translucent greenish-brown glassy spheres, with granular inclusions and bubbles. These latter measure about .05 mm. in diameter.

Numerous particles of soot were present, undoubtedly of local origin.

By far the larger part of the Melbourne dust consists of particles having a distinctly local origin. Among the minerals the constituents of basalt and other rocks, and possibly limestone, are very much in evidence.

Among the organic constituents remains of rotifers and a few broken valves of diatoms of the larger species were noticed.

A Distribution Table of the Minerals Recorded Above.

Name.	Camberwell, 14/2/03.	St. Kilda, 14/2/03, 4.30 p.m.	Ditto, 6.30 p.m.	Ditto, 7.15 p.m.	Ditto, 7.40 p.m.	Ditto, treated with H_2SO_4	St. Kilda, 28/3/03.	Roof of National Museum.
Quartz	f.	c.	v.c.	f.	c.	v.c.	c.	v.c.
Opal	v.r.	...	...	...	...	...	...	...
Orthoclase	r.	f.	...	...	r.	f.	...	r.
Sanidine	...	...	...	...	...	...	f.	r.
Albite	...	...	...	...	...	r.	r.	r.
Anorthoclase	...	...	...	...	...	...	r.	...
Labradorite	...	...	...	...	...	...	...	f.
Anorthite	...	...	...	...	...	...	...	v.r.
Augite	r.	...	f.	...	...	...	f.	v.c.
Actinolite	...	...	...	...	...	...	v.r.	...
Tourmaline	v.r.	...	...	...	v.r.	r.	v.r.	c.
Olivine	...	...	...	...	...	...	f.	v.c.
Garnet	...	v.r.	...	...	...	...	...	v.r.
Cordierite	...	...	...	...	...	...	v.r.	...
Rutile	...	...	...	...	...	f.	...	f.
Cassiterite (?)	...	...	...	...	...	...	...	f.
Zircon	v.r.	...	...	...	...	f.	...	f.
Apatite	v.r.	...	...	...	...	...	...	...
Epidote	v.r.	...	...	...	...	...	...	f.
Zoisite	...	...	...	...	...	...	...	r.
Calcite	...	...	...	...	...	...	...	r.
Natrolite (?)	...	...	v.r.	...	...	...	...	...
Magnetite	...	...	...	...	...	...	...	f.
Limonite	c.	c.	c.	c.	c.	...	c.	r.
Opaque spheres	...	...	...	...	...	...	...	f.
Glassy spheres	...	...	...	...	...	...	.	f.

Explanation of Plate I.

Fig. 1. Red-rain sediment, Camberwell, 14/2/03. ×70.
,, 2. Ditto, St. Kilda. ×65.
,, 3. Ditto, Otago, N.Z. ×65.
,, 4. Dust from roof of National Museum. ×65.
,, 5. Silicious residue from red-rain sediment, St. Kilda. ×34.
,, 6. Ditto, containing silicious vegetable tissue. ×70.

Explanation of Plate II.

Fig. 1. Silicious residue of red rain, St. Kilda. Scale, 0.1 mm. ×65.
,, 2. Diatoms from red rain, St. Kilda. Scale, 0.1 mm. ×63.
,, 3. Diatoms from red rain, St. Kilda. ×63.
,, 4. Diatoms from red rain. ×140.
,, 5. Zoned plagioclase felspar from red-rain sediments. ×500.
,, 6. Augite, Melbourne dust, National Museum. ×500.
,, 7. Tourmaline from red-rain sediment, St. Kilda. ×500.
,, 8. Magnetite in augite. ×500.
,, 9. Cordierite. ×332.

The Victorian Naturalist.

Vol. XX.—No. 3. JULY 9, 1903. No. 235.

FIELD NATURALISTS' CLUB OF VICTORIA.

The twenty-third annual meeting of the Club was held at the Royal Society's Hall on Monday, 15th June, 1903. The president, Mr. T. S. Hall, M.A., occupied the chair, and about forty-five members and visitors were present.

REPORTS.

A report of the Club excursion to the Clifton Hill Quarries on Saturday, 10th May, was furnished by the leader, Mr. G. B. Pritchard. The Club members were joined by the field geology students from the Working Men's College, making altogether a party of twenty-eight. The general geological features of the neighbourhood were first pointed out by the leader, and a summary of the minerals obtainable, with their mode of occurrence, was given. The quarries were then inspected, and very fair examples of Phacolite, Mesolite, and Phillipsite, all members of the Zeolite group, were obtained. Among other minerals noticed were Calcite, Arragonite, Magnesite, Vivianite, Psilomelane, and Halloysitic Clays. Some of the party then proceeded further up the Merri Creek for a closer investigation of the interesting geological features displayed in its valley.

The hon. librarian reported the receipt of the following donations to the library :—"Records of the Geological Survey of Victoria," vol. i., part 2, from the Department of Mines, Melbourne; *Journal of Agriculture*, Victoria, May, 1903, from Department of Agriculture, Melbourne; *Agricultural Gazette of New South Wales*, April, May, and June, 1903, from Department of Mines and Agriculture, Sydney; "Annual Report, Department of Mines, New South Wales," 1902, from the Department; "Forest Flora of New South Wales," part iii., and "Critical Revision of Genus Eucalyptus," part ii., by J. H. Maiden, F.L.S, Government Botanist, New South Wales, from the author; "Notes on the Natural History of Western Australia," by M. A. C. Fraser, F.R.G.S., from Dr. A. Morrison, Government Botanist, Perth; "Annual Reports Smithsonian Institution," 1900 and 1901, from the institution; "Proceedings Nova Scotia Institute of Science," vol. x., part 3, from the institute; "Proceedings Academy of Sciences, Philadelphia," vol. liv., part 2, from the society; *Nature Notes*, April and May, 1903, from the Selborne Society, London; *Knowledge*, May, 1903, from the proprietors.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Emily M. Fisher, "Wyoming," Lisson-grove, Hawthorn, and Mr. H. Dowling, 20 Gellibrand-street, Kew, were duly elected as ordinary members, and Mr. John S. Kitson, Branjee, Euroa, as a country member of the Club.

ANNUAL REPORT.

The hon. secretary, Mr. J. A. Kershaw, F.L.S., then read the twenty-third annual report for 1902-3, which was as follows:—

"To the Members of the Field Naturalists' Club of Victoria. Ladies and Gentlemen,—Your committee have much pleasure in presenting to you the twenty-third annual report, embracing the work of the Club for the year ending 30th April 1903.

"It is a source of much satisfaction to us that we are able to report that the condition of the Club is most satisfactory, while the prospects for the future are decidedly encouraging.

"The membership of the Club is still on the increase, 37 new members having been added to the roll during the year, while 20 names have been removed on account of resignations and death, leaving us with an increase of 17 over that of the previous year.

"The total membership is now 181, comprising 9 honorary, 2 life, 157 ordinary, and 13 country members.

"Our usual monthly meetings continued to attract good attendances, and there is no evidence of the interest in them falling off, while the exhibition of specimens, which have been good and varied, continues to be a source of much interest to members generally. This feature of the Club's programme might, with advantage, be still further extended, and your committee would urge individual members to assist in adding to the interest of our meetings by bringing forward such objects as would tend to increase our knowledge of the various forms with which we are surrounded.

"The papers read show a slight increase, numerically, over those of the previous year, and the subjects are well distributed over the various branches of natural history. These have, in most instances, been well discussed, while several have been illustrated with lantern views. Thirty-three papers were read, of which 17 related to zoology, 6 to botany, 3 to geology, 3 to general subjects, and 4 to trips. Of the zoological papers, 3 were devoted to birds, 2 to fish, 1 to reptiles, 1 to molluscs, and 9 to insects.

"The authors were Messrs. E. Anderson, F. G. A. Barnard and Dr. C. S. Sutton, M.B., F. L. Billinghurst, A. G. Campbell, J. H. Gatliff, D. Goudie, E. Green, F.E.S., T. S. Hall, M.A., R. Hall, A. D. Hardy, J. F. Haase, G. A. Keartland, J. A. Kershaw, F.E.S., D. Le Souëf, C.M.Z.S., S. A. Le Souëf, F. Madden, M.L.A., D. M'Alpine, A. J. North, C.M.Z.S., G. B. Pritchard, F.

M. Reader, Miss G. Sweet, M. Sc., and Messrs. J. G. O. Tepper, F.L.S., S. P. Townsend, and G. Weindorfer.

"In addition to these, articles were contributed by Messrs. J. C. Goudie, A. J. North, C.M.Z.S., D. Le Souëf, C.M.Z.S., and H. B. Williamson, which were printed in the *Naturalist* without being read.

"The 19th volume of the Club's journal has been completed and duly distributed, and the thanks of the Club are again due to the editor, Mr. F. G. A. Barnard, for the large amount of valuable work which he has devoted to the successful issue of the journal.

"The fourteenth conversazione of the Club was held in the Athenæum Hall on Tuesday and Wednesday, the 23rd and 24th of September last, and proved a decided success, both financially and as an illustration of the nature of the Club's work. The fine display of natural history objects was probably better than that of any previous event of the kind, and taxed the capacity of the large hall. An interesting feature in this event was the introduction of wild flower exhibits, and the fine collection shown spoke well for the energy and enthusiasm displayed by the exhibitors. The attendance, particularly of the outside public, was large during both evenings, and the great interest taken in the various collections well repaid the trouble attached to such an undertaking. The proceedings were opened by the president, Mr. T. S. Hall, M.A., in the unavoidable absence of His Excellency the State Governor, Sir George S. Clarke, K.C.M.G., F.R.S. During the course of the conversazione interesting lecturettes were delivered by Professor W. Baldwin Spencer, M.A., F.R.S., and Mr. D. Le Souëf, C.M.Z.S., both of which were illustrated by lantern slides, and attracted large attendances.

"The series of short excursions have been fairly well attended, but it is to be regretted that more of our members do not avail themselves of these advantages to do more active field work. The programme embraced two extended excursions, one of which was held at Launching Place, from Saturday to Monday, 24th to 26th January, where some interesting field work was accomplished, particularly in botany. The other, which was held on 7th to 10th November, took the form of a camp-out at Shoreham, the scene of the camp held on the previous Easter. The splendid results achieved on the earlier visit to this fine collecting ground was no doubt responsible for the large attendance on this occasion, when some equally good work was accomplished, as shown by the report published.

"As stated in our report for last year, a sub-committee appointed by you submitted a list of suggestions for the guidance of the Minister of Public Works when amending the *Game Act.*

"This report, as already stated, was submitted to a conference consisting of representatives of the Royal Agricultural Society,

sportsmen, bird dealers, and fruit-growers, together with the Club's representatives, when the list and suggestions were adopted. It was finally arranged, at the instance of the Club, that a deputation should wait on the Minister to present the report. The deputation was well received by the Minister, who promised to favourably consider the recommendations made, and we are pleased to state that the alterations suggested have since been adopted.

"At the ordinary meeting in May last a communication was received from the Inspector of Fisheries regarding the wholesale destruction of native birds through eating poisoned grain laid for the destruction of rabbits, and asking for the Club's opinion on the matter. A sub-commiitee was appointed by you to furnish a report, which was later on submitted to and approved by you and forwarded on to the inspector.

"The thanks of the Club are due to the various authors of papers, leaders of excursions, and others who have helped in a practical manner to forward the work of the Club. To Mr. E. H. Swan, of the Triumph Engraving Co., the Club is much indebted for continuing to gratuitously provide process blocks as required for illustrating our journal; as also to Mr. J. Searle, who has been ever ready to place his lantern and services at our disposal. Our hearty thanks are also due to Messrs. T. R. B. Morton and G. Coghill, who have again most generously placed their office at the disposal of your committee, a concession which is highly appreciated.

"The hon. librarian reports that the Club's library has been considerably increased during the past year, both through exchanges and donations, while several useful works have been added by purchase. These include such works as the Cambridge Natural History Series, "The Introduction to the Study of the Foraminifera," by Chapman, Kerner's "Botany," &c. Members have made fair use of the books and periodicals at their disposal, but not to the extent that might be expected. Some progress has been made during the latter part of the year in rearranging the books on the shelves, with the object of completing the data for the introduction of a card catalogue. The binding has been well advanced, but it will probably be necessary to increase this expenditure in the near future, so as to allow of all the Australasian scientific periodicals on the shelves being bound, to preserve them from injury.

"Regarding the financial position of the Club, we were pleased in our last report to show a substantial balance to our credit; this year we are in a still happier position. Starting the year with a credit balance of £21 7s. 3d., we conclude with one of £41 14s. 3d., with all accounts paid. The receipts amounted to £153 17s. 5d., while the expenditure was £133 10s. 5d.

"In conclusion, your committee, while congratulating you on

the number and value of the papers read during the past year, would take this opportunity to again urge more of our members to come forward and give some of the results of their observations. Our knowledge is growing, and the number of workers is increasing, but there is plenty of scope for further hands to help in forwarding the objects of our Club.

"T. S. HALL, *President.*
"J. A. KERSHAW, *Hon. Secretary.*

"Melbourne, *1st June*, 1903."

The report having been received, Mr. D. Best congratulated the members on the satisfactory position of the Club and the value of the work accomplished during the year, and, on the motion of Messrs. C. Coles and R. A. Bastow, the report was adopted.

FINANCIAL STATEMENT.

The hon. treasurer, Mr. J. F. Haase, read the financial statement for 1902–3, which was as follows :—

RECEIPTS.

To Balance, 30th April, 1902						£21	7	3
,, Subscriptions			£107	18	6			
,, *Victorian Naturalist*—								
Subscriptions ...	£5	16	8					
Sales	0	14	3					
Reprints	1	0	6					
Advertisements ...	11	5	0					
				18	16	5		
,, Sale of Club's Badges ...				1	8	0		
,, ,, Tickets, Conversazione ...				25	14	6		
						153	17	5
						£175	4	8

EXPENDITURE.

By *Victorian Naturalist*—								
Printing	£75	10	7					
Reprints	1	7	6					
				£76	18	1		
,, Rooms—Rent and Attendance ...				8	5	0		
,, Library—Books ...	7	9	11					
Periodicals ...	4	8	6					
Binding ...	3	7	0					
Insurance ...	0	6	6					
				15	11	11		
,, Postages, &c. ...				11	15	3		
,, Expenses Conversazione ...				21	0	2		
						£133	10	5
,, Balance carried forward						41	14	3
						£175	4	8

J. F. HAASE, *Hon. Treasurer.*
20th May, 1903.

Audited and found correct.
D. BEST,
A. D. HARDY, } *Auditors.*
29th May, 1903.

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

ASSETS.

Balance in hand	£41	14	3
Arrears of Subscriptions (£42 7s. 6d.), say	27	0	0
Library and Bookcases	120	0	0
	£188	14	3

LIABILITIES.

Subscriptions for 1903-4 Paid in Advance	£3	6	0

In moving the reception of the statement, Mr. D. Best spoke highly of the work of the hon. treasurer, which he considered reflected great credit on Mr. Haase, and his remarks were endorsed by Mr. A. D. Hardy. It was pointed out that the services rendered by Mr. J. Gabriel during the last conversazione had materially reduced the expenditure on that occasion, and on the motion of Messrs. Best and Shephard a special vote of thanks was accorded to him, and on the motion of Messrs. Shephard and J. Stickland the financial statement was adopted.

The opportunity was taken by Mr. O. A. Sayce to refer to the valuable services rendered to the Club by the hon. librarian, Mr. S. W. Fulton, who had devoted a considerable amount of his spare time to the rearrangement of the library, with a view to the compilation of a card catalogue.

OFFICE-BEARERS FOR 1903-4.

The following office-bearers were duly elected, being the only nominations received :—President, Mr. O. A. Sayce ; hon. treasurer, Mr. J. F. Haase ; hon. librarian, Mr. S. W. Fulton ; hon. editor, Mr. F. G. A. Barnard ; hon. secretary, Mr. J. A. Kershaw, F.E.S. ; hon. assistant secretary and assistant librarian, Mr. C. L. Barrett.

On a ballot being taken, Mr. F. G. A. Barnard and Mr. D. Le Souëf, C.M.Z.S., were elected as vice-presidents for the ensuing year.

A ballot for five members of committee resulted in the election of Messrs. G. Coghill, J. Gabriel, T. S. Hall, M.A., G. A. Keartland, and J. Shephard.

A vote of thanks to the retiring office-bearers was moved by Mr. G. Coghill and seconded by Mr. F. Pitcher, and was carried with acclamation, the hon. secretary briefly returning thanks.

NATURAL HISTORY NOTES.

An interesting note relating to the destruction of Vine Moths by cats was read by Mr. F. Chapman.

Mr. J. Shephard recorded the finding of an interesting Rotifer at Heidelberg which seems to be new to Victoria.

PRESIDENT'S ADDRESS.

The retiring president, Mr. T. S. Hall, M.A., then delivered an address, taking for his subject, "Whence Came our Australian Animals?" of which the following is an abstract :—

One very striking feature of the Club's work is the publication of lists of animals and plants from different districts. We recognize the fact that there are changes in the life of different localities. The inhabitants of the Keilor Plains show a marked contrast to those of Oakleigh or of the valley of the Watts. These differences are due to various factors, an important one being rainfall. However, when we turn our gaze further afield we see differences that cannot be explained by climatic influences. With a similar rainfall and temperature, Western Australia and Victoria yet show many points of divergence in their plant and animal inhabitants. The West has no Platypus and no Native Bear or Lyre-bird in its forests, and no Eel or Blackfish in its streams, while we have no Banded Ant-eater or Tarsipes and no Spotted Emu in the East.

When we glance at the rest of the world we find in the same way great differences, and we are able to divide the land areas into regions marked by the groups of animals they contain. Australia and its adjacent islands, in its great wealth of Marsupials, in its Platypus and Echidna, its Honey-eaters, Birds of Paradise, and Mound-builders, as well as in the almost entire absence from it of mammals higher than Marsupials, of Vultures and many other widely-spread birds and animals, differs so markedly from the rest of the world that we might divide the earth into the two regions, Australian and non-Australian. What is true of the fauna is to a certain but much smaller extent true of its flora.

The success that has attended the efforts of man to transfer animals from one country to another, as in the case of horses, cattle, and sheep, shows us that climatic influences are not the main ones that lead to the differences in distribution, and we are bound to ask why the differences exist. Why, for instance, are there no Kangaroos in Asia? Why are there Tapirs in Malaysia and in South America, and nowhere else? Why are there Bears throughout the Northern Hemisphere and none in Southern Africa? Did Tapirs come into existence twice over? Did those most gorgeous of all birds, the Trogons, spring into existence in tropical America, Africa, and India? Now, one of the fundamental truths that modern biology insists on most strongly is that close agreement in structure means relationship—means blood relationship and descent from common ancestors. All the Tapirs and the Trogons sprang from the same stock, and must have migrated from a common centre, and have died out in the

intervening tracts, and it is one of the tasks of the modern zoogeographer to trace out not only the route by which they spread, but the date of their march.

Some groups of animals are ancient, others are young. The Pigs are old, but full of vigour, while the Tapirs are also old, but dying out, while, on the other hand, the perching birds, or Passerines, are still in their vigorous youth. The connecting links are still so abundant that we see relationships for every bird in half a dozen different directions, and this it is that makes the successful classification of the group such an insoluble puzzle.

The grouping of the lands of to-day is but a passing phase, and geologists talk freely of land-bridges across what is now deep sea, and of deep and wide seas extending over what is now dry land. Mammal and bird, snail and earthworm, frog and fresh-water crayfish, all find the sea, even a narrow strait, an impassable barrier ; yet they are found in all lands, for

> "He hath made the deep as dry,
> He hath smote for us a pathway to the ends of all the earth."

We ought, then, by a study of the present distribution of animals, and without the aid of geology to be able to plot the outlines of many of the ancient continents with a considerable amount of accuracy. Merely by studying the animals and plants of Tasmania, we can assert with confidence the presence of a former land-bridge, which recently, as geologists regard it, allowed a free intermingling of all forms of life. Comparing again our fauna with that of Southern Asia, we can assert, though with less certainty, that there was a connection, but that it broke down before the present Australian animals could spread into Asia, or Asiatic into Australia.

Seeing, then, that these land connections formerly existed in various places, we may consider the relationships of our fauna to that of the rest of the world. One of the earliest facts that struck botanists when they began to investigate Australia was that the floras of Australia, South Africa, and South America are but divided parts of one whole. This points to a former land connection between the parts and isolation from the rest of the world. The animals tell the same tale, though perhaps not so plainly. Marsupials are now found only in America and Australia, and the American opossums are so closely allied to the family containing our native cats that their separation as a distinct family is but barely justifiable. Extinct marsupials have been found in Patagonia, which emphasize the relationship to our fauna in a marked degree. Then an extinct horned lizard has left its remains in Queensland, Norfolk Island, and Patagonia. The group of Cystignathid Frogs, which comprises our Sand Frog (*Limnodynastes*), the Burrowing Frog of Central Australia, and others, is elsewhere found only in South America.

Among insects the Buprestidæ and Longicorns are more extensively developed in these two countries than elsewhere. The freshwater crabs and crayfish tell the same tale of alliance with South America and distinctness from Asia. On the other hand, the evident alliances with Asia are practically confined amongst mammals to the rats, which seem capable of finding their way almost anywhere.

It has been objected that if there was this former connection, the agreement between Patagonian and Australian animals should be greater than it is, for there are many groups represented there which are absent here. The explanation given, the truth of which is vouched for by many independent lines of research, is that the central and northern part of South America, which then contained these forms, was divided from the south by a sea, which was only bridged after the connection with the now vanished "Antarctica" had broken down.

The present address professes only to give in rough outline, with the omission of the large number of small facts which afford cumulative proofs, and which exigencies of time and space forbid my quoting, the now generally accepted idea that the bulk of the Australian fauna reached us by way of South America from an almost vanished equatorial continent where it had its origin.

Messrs. F. G. A. Barnard, J. Shephard, and F. Pitcher congratulated Mr. Hall on the interesting character of his address, and after he had replied to several questions a vote of thanks, moved by Mr. D. Best and seconded by Mr. C. M. Maplestone, was accorded to him and carried by acclamation.

The newly-elected president, Mr. O. A. Sayce, then took the chair, and in welcoming him to the position Mr. Hall referred to the sound scientific work which Mr. Sayce had been carrying on for some time past.

EXHIBITS.

By Mr. G. Coghill.—Specimens of *Banksia collina* (flowers) and *Lycopodium densum*, from Warburton.

By Mr. A. Coles.—Three specimens of young opossum taken at Woodstock from the pouches of three females on 1st June, the first day of the open season.

By Mr. C. Coles—Pink-breasted Robin, *Petrœca rhodinogastra*; Olive Thickhead, *Pachycephala olivacea*; Yellow-eared Honeyeater, *Ptilotis lewini*, from the fern gullies on the Don Valley, Launching Place.

By Mr. C. French, jun.—Specimens illustrating the life-history of the moth *Eulechria melesella*, Newm., from Oakleigh, a destructive pest to lawns, &c.; also, Native Cucumber, *Melothria muelleri*, collected near Laverton, new for southern part of Victoria, and only previously recorded from the N.W. of Victoria.

By Mr. C. J. Gabriel.—Shells from N. America, including *Fasciolaria distans*, *Fasciolaria tulipa*, *Cypræa spadicea*, *Oliva litterata*, and *Chorus belcheri*.

By Mr. J. Gabriel.—Cuckoos' eggs, with those of the foster parents :—Brush Cuckoo and Rose-breasted Robin ; Bronze Cuckoo and Superb Warbler ; Bronze-Cuckoo (two eggs) and Superb Warbler ; Narrow-billed Bronze-Cuckoo and Superb Warbler ; Pallid Cuckoo and White-eared Honey-eater ; and Fantail Cuckoo and White-fronted Sericornis.

By Mr. A. D. Hardy.—Blackfellow's tomahawk and splitting wedge, from near Casterton.

By Mr. D. M'Alpine.—A new Gastromycete, *Anthurus sepioides*, n. sp. ; and, on behalf of Mr. W. S. Brownscombe, drawings in oil of the same.

By Mr. J. Stickland.—A fungus, apparently a species of Lysurus, from Hawthorn.

After the usual conversazione, the meeting terminated.

Birchip Heterocera.—In my "Notes on the Larvæ and Pupæ of Birchip Heterocera," published in the *Naturalist*, vol. xix., p. 132, the species spoken of as *Destolmia lineata*, Walk., should be recorded as *Capusa senilis*, Walk. I am indebted for this correction to Dr. Turner, of Brisbane, who states he has received many specimens under the former name, and it is probable that the moth which has been taken near Melbourne is also referable to *Capusa senilis*.—D. Goudie, Birchip.

Red Rain in Victoria.—In our paper on the above subject in the last issue of the *Naturalist* (vol. xx., p. 17), we inadvertently omitted to refer to the paper on "Red-Rain Dust," by Mr. Thos. Steel, F.L.S., F.C.S., read before the Sydney meeting of the Australasian Association for the Advancement of Science, 1898 (see "Report," vol. vii., p. 334). The paper contains an analysis of some sediment which fell in the Moonee Ponds district on 27th December, 1896, and agrees in the main with the results given in our paper, but shows a higher percentage of silica. Mr. Steel also directs our attention to papers in the *Chemical News* bearing on this subject, one of which, by Dr. T. L. Phipson, vol. lxxxiii., 1901, p. 159, is based on an examination of some red-rain sediment collected at Melbourne, 12th December, 1896, in which Dr. Phipson expresses his opinion that, owing to the presence of nickel in his sample, "this dust is partly, if not wholly, of cosmic origin, and not merely desert sand uplifted by the wind." It has, however, been shown by means of spectroscopy that nickel is present in minute quantities in ordinary atmospheric dust of undoubted terrigenous origin.—F. Chapman and H. J. Grayson.

A Rotifer Record.—On the occasion of the recent trip to "Springbank," near Heidelberg (28th March), the material brought from the lagoon there furnished a Rotifer of the genus Brachionus of very striking character in the form of the lorica. As is common in the principal species of this genus, the spines are conspicuous features, and in the species found on this occasion there were two pairs of great length projecting fore and aft respectively, the hinder pair curving round like the handles of a pair of watchmaker's pliers. It was rather a coincidence that by the mail arriving the week of the excursion the writer received from Mr. C. F. Rousselet, F.R.M.S., London, some specimens for comparison which failed to present any discoverable disagreement with the Springbank form. The specific name was *B. falcatus*, and the specimens were from Hungary. This is a curious example of wide distribution, and perhaps suggests incompleteness of knowledge of the occurrence of these little animals. However, for the present the record for this species is Victoria and Hungary.—J. Shephard.

An Enemy of the Vine Moth.—Among the agents which help to keep down the destructive *Agarista glycine* may be numbered the "harmless, necessary cat." Last summer my son frequently noticed one of our cats, a tabby, lying in ambush in our garden, and pouncing on the Vine Moths as they fluttered by. After giving them a pat, and playing a little, the cat would eat them. This character for sport was also shown by its mother. Another cat of the same brood, mainly white, with a little tabby marking, early evinced a preference for milk, and does not share to such an extent in the carnivorous habits of her sister. As the moth-hunting cat is a tabby it would be interesting to know whether such show a stronger sporting tendency than those less appropriately marked.—F. Chapman, A.L.S.

A Giant Mushroom.—Mr. W. A. Luhrs recently found at Netherby, in the Wimmera district, a large Mushroom, which weighed 13½ lbs. The diameter of the pileus was 18 inches, and its thickness 4¼ inches, while the stem was 8 inches in diameter.

Personal.—Mr. Robert Hall writes from Japan, reporting an interesting trip so far. He had spent fourteen days in Ceylon, a similar period at Singapore, and a week each in Japan and Corea, and, when writing, expected to reach Vladivostock, Siberia, in the course of a couple of days. The full account of Mr. Hall's trip will, no doubt, be interesting reading.

National Forests Protection League.—Through the enthusiasm of Mr. J. Blackburne, late Chief Inspector of Forests for Victoria, a league has been formed at Maryborough, with Mr. Blackburne as its secretary, for the purpose of bringing before the people of Victoria the urgent necessity for taking greater interest in the forest lands of the State, and securing the permanent

reservation and proper scientific management of such areas. To carry on its work and keep its aims before the public money is needed, and all nature-lovers are invited to become members of the League, the annual subscription to which is one shilling. The hon. secretary of the Field Naturalists' Club has expressed his willingness to receive and forward subscriptions and donations from sympathisers, and we hope that members will do all in their power to further the objects of the League.

Records of the Geological Survey of Victoria.—The second part of this new publication of the Victorian Department of Mines, edited by the Director, Professor J. W. Gregory, F.R.S., D. Sc., is devoted to a "Catalogue of the Described Species of Fossils (except Bryozoa and Foraminifera) in the Cainozoic Fauna of Victoria, South Australia, and Tasmania," by Messrs. J. Dennant, F.G.C., F.C.S., and A. E. Kitson, F.G.S. The species are grouped under the three headings—Eocene to Oligocene, Miocene, and Pliocene and Pleistocene, for the first of which thirty-four localities are given, and about 1,100 species listed, but why on the map appended the numbers of the localities do not agree with the numbers in the lists, or why the reference list to the map itself is not arranged numerically, instead of alphabetically, and so help a worker at a distance who is ignorant of the geography of South-Eastern Australia, is one of those puzzles which authors so often set the general student. Under Miocene nearly 400 species are listed, and about 250 under Pliocene and Pleistocene. A good bibliography of the published papers, &c., is included, in which the late Professor Ralph Tate, F.G.S., naturally figures largely. In a brief introduction the authors state their reasons for the grouping adopted, but these are completely nullified by the editor's footnote:—"The classification and correction in the Catalogue are the authors', and not necessarily to be generally adopted for the use of the Geological Survey.—J.W.G." Such a note seems out of place in an official publication. No mention is made of any plant remains in the catalogue.

"Journal of Agriculture of Victoria."—This publication was resumed with the May number as the first part of the second volume, and is now edited by Mr. D. M'Alpine, the Government Vegetable Pathologist. Among other articles it contains a report on the St. John's Wort pest by Mr. C. French, F.L.S., who states that about 8,500 acres are more or less overrun with the plant. Mr. French also furnishes an article on one of our insectivorous birds, the Babbler, *Pomatorhinus temporalis*, Vig. and Hors., which is illustrated by a coloured plate drawn by Mr. C. C. Brittlebank. Mr. D. M'Alpine contributes an article on an injurious fungus, known as the Tomato-leaf Spot, *Septoria lycopersici*, Speg., which is also illustrated by a coloured plate by Mr. Brittlebank.

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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 July, 1903. The president, Mr. O. A. Sayce, occupied the chair, and about fifty members and visitors were present.

REPORTS.

The hon. librarian reported the receipt of the following donations to the library :—"Proceedings Royal Society of Tasmania," 1902, from the Society ; *The Emu*, vol. iii., part 1, July, 1903, from the Australasian Ornithologists' Union ; "Bulletin of American Museum of Natural History," vol. xvi., 1902, from the Museum ; "A Biological Reconnaissance in the vicinity of Flat-head Lake, U.S.A." by Morton J. Elrod, from the author ; *Knowledge*, June, 1903, from the proprietors.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. S. Cooper, 113 Coppin-street, Richmond, was duly elected a member of the Club.

GENERAL BUSINESS.

Mr. T. S. Hall, M.A., brought under the notice of the meeting the destruction of our forests, and called attention to the recent founding of the National Forests Protection League, having for its objects the protection of our forests, the encouragement of tree planting, &c. He pointed out the results likely to ensue from the indiscriminate cutting up and throwing open of our forest reserves, and thought that this ought to be rendered impossible, except by a special Act of Parliament, and said that, as this Club is specially concerned in the preservation of the indigenous fauna and flora, members should individually give all the practical assistance in their power in forwarding the objects of the League. He suggested that the hon. secretary might receive and forward subscriptions from members who desired to help in the movement, and in conclusion moved—"That the Club express its sympathy with the objects of the National Forests Protection League, and the co-operation of the members in forwarding its aims be invited."

Mr. F. G. A. Barnard seconded the motion, which was strongly supported by Messrs. D. Best, J. Shephard, and F. Wisewould, and carried unanimously.

PAPERS READ.

1. By Mr. G. A. Waterhouse, B.Sc., B.E., F.E.S. (communicated by Mr. G. Lyell), entitled "Descriptions and Notes of Australian Hesperidæ, Chiefly Victorian."

The author described a new species of "Skipper" butterfly from Cairns, North Queensland, and the female of *Telesto monticolæ*, Olliff, from Walhalla, Victoria, hitherto unrecorded. He also gave some notes on the synonymy of *Trapezites maheta*, Hew., with descriptions of two well-marked varieties of that butterfly.

Mr. J. A. Kershaw, F.E.S., congratulated the author on the excellent work he is doing in Australian butterflies, and alluded to some of the recent work done in the Skippers, particularly by Messrs. E. Meyrick and O. Lower, whose monograph on the Hesperidæ will form a valuable foundation upon which future workers could base their studies. He thought, however, that *Euschemon rafflesiæ*, notwithstanding its possession of a frenulum, should still be included at the end of the family.

2. By Mr. W. Hopkins (communicated by Mr. T. S. Hall, M.A.), entitled "Notes on Eels."

The author related a number of circumstances in connection with eels which had come under his notice during a residence of several years in the Winchelsea district, and made several suggestions as to where eels breed.

Mr. T. S. Hall, M.A., said the notes by Mr. Hopkins were of interest as raising again the whole question of eel-breeding, which, despite what has been done, cannot be regarded as definitely settled. It has long been known that no sexually mature eels have been found in fresh water, and since the days of Aristotle, and probably before, the question as to how they bred has been a mystery. It was known that eels at certain seasons went out to sea, and that young eels a couple of inches long passed up the rivers from the sea, and the natural assumption was that breeding took place in the sea. But what is the young eel like when it is less than a couple of inches long? This question appears to have been settled by Professor Grassi in papers published some time ago (Proc. Roy. Soc. Lond., Nov., 1896, and Quart. Jour. Micros. Sci., vol. xxxix., p. 371). Briefly, sexually mature eels—that is, the common river eels of Europe—have been caught off Messina at a depth of about 300 fathoms. Their ova produce ribbon-shaped transparent fish, which grow to a couple of inches in length. These had long been known as Leptocephali, and are deep sea forms, only reaching the surface by accident. These change into elvers, or young eels, actually decreasing in bulk during the process. In this form we know them well, and now see why elvers under a couple of inches are unknown: there are none. Professor Grassi's work appears to be

beyond cavil, but the difficulty is that there seems to be a steady supply of eels in inland places to which it is difficult to imagine elvers or more fully grown eels are able to find their way. Mr. Hopkins gives some instances which have come under his own notice. Dr. Imhof (*Nature*, June, 1896, p. 134) gives a more remarkable case. Eels were introduced into some Alpine ponds over 3,000 feet above sea level, where none were known previously. In some ponds all died, while in others they flourished. The ponds are fed by springs, and have no apparent outlet. The eels were put in in 1882 and again in 1887, so that at the time of writing the youngest of the original eels must have been 8 or 9 years old, and some of them are over 4 feet in length. Yet in 1895 young eels were found in the lake. Evidently we require further information on eel-breeding. Can anyone produce a sexually mature eel from land-locked waters, and what is the size of the smallest eel known from such a spot? I hope that the remarks of Mr. Hopkins will lead to careful attention being paid to the question, and that we may soon be in a position to speak definitely on a point which should be capable of elucidation.

Mr. F. Wisewould mentioned that on one occasion, when the mouth of the Powlett River was blocked by a sandbank from communication with the sea, the water at the mouth of the river was alive with eels, evidently prevented from continuing their journey to the open sea. He also mentioned the occurrence of large numbers of young eels in the waterholes about 3 or 4 miles from Cardinia Creek. These, he thought, came from the Koo-wee-rup Swamp into the Cardinia Creek, and then followed up the low-lying swampy country between the hills. He had never found eels in the waterholes on the hills.

Mr. J. Shephard stated that eels were very frequently taken out of the water fittings of the Metropolitan Board of Works, notwithstanding that strainers are placed at the commencement of the reticulation pipes, showing that the eels must get into the pipes when of very small dimensions. One specimen taken from a pipe at Albert Park, he stated, was quite as large as a man's forearm.

The president, Mr. O. A. Sayce, and Mr. G. A. Keartland also spoke on the subject.

3. By Mr. G. Weindorfer, entitled "Some Comparison of the Alpine Flora of Australia and Europe."

The author pointed out the characteristics of an Alpine flora, and stated that, though the European Alps are 10 degrees further removed from the equator than the Australian Alps, the tree-growth extends to much higher altitudes there than here, probably due to the marked difference in the prevailing vegetation. The European Alps are also much richer in the number of orders and genera represented, and the flowers generally are of a more brilliant character.

NATURAL HISTORY NOTES.

Mr. A. Mattingley mentioned that a number of Echinoderms collected by Mr. A. G. Campbell at King Island, Bass Straits, had been handed to him for identification. They all proved to be common forms on Victorian shores, and are probably common on Tasmanian shores also. They comprised representatives of the Phanerozonate and Cryptozonate groups of the Asteroids, distinguished respectively by the large marginal plates, or the absence or inconspicuousness of the marginal plates. Belonging to the former were *Asterina calcar* and *A. gunnii*, while *Stichaster polyplax*, some specimens being only three-rayed, represented the latter group.

Mr. A. G. Campbell drew attention to his exhibit of the flowering branches of a Red Gum tree, *Eucalyptus rostrata*, gathered in May last on the Werribee Plains. The branches were covered with immense numbers of red and green coloured galls, which gave the trees the appearance of being heavily loaded with fruit of some kind. On some trees about 80 per cent. of the flower buds were turned to galls, while on others not a single normal bud could be found. Each gall is found to contain about ten or twelve larvæ, probably of some hymenopterous insect. As is well known, the Werribee Plains are of basalt formation, and not adapted for tree-growth, the gum trees being confined to a few depressions where water lodges in wet seasons, consequently the production of seed by the trees in any quantity would be wasted energy, hence the flower buds become the homes of insect larvæ.

EXHIBITS.

By Mr. R. A. Bastow.—Two specimens of Hepaticæ, *Trigonanthus dentata*, Spruce, and *Zoopsis argentia*, Hooker, f. et Tayl., both plants in fruit, collected at Macedon, November, 1902.

By Mr. A. G. Campbell.—Specimen of *Eucalyptus rostrata* with normal buds, and others showing galls formed by hymenopterous insect.

By Mr. A. G. Campbell, on behalf of Mr. A. W. Milligan, Perth.—Two new birds, described in the last number of the *Emu*, *Xerophila castaneiventris*, Mill., seemingly a Western representative of *X. leucopsis*; and *Acanthiza robustirostris*, Mill., a very distinct and interesting Tit. Both species are from the Murchison district of Western Australia, and are the property of the Perth Museum.

By Mr. Perceival C. Cole.—Four "Churinga" or Bull-roarers from Western Australia, North-West Australia, North Australia, and Central Australia respectively.

By Mr. A. Coles.—Spiny-cheeked Honey-eater, *Acanthogenys*

rufigularis, shot at Ascot Vale ; also specimen of African Box Thorn, seeds of which were found in its gizzard.

By Mr. C. French, jun.—Two fine specimens of Obsidian (volcanic) bombs from Hamilton, Victoria.

By Master C. French.—Orchids—*Pterostylis parviflora*, with two stems of flowers, and one stem showing basal leaves, on the one plant, from Sandringham ; *Pterostylis reflexa*, showing basal leaves, from South Gippsland.

By Mr. C. J. Gabriel.—Shells, *Tellina staurella*, from Mediterranean.

By Mr. A. D. Hardy.—*Loranthus celastroides*, growing as a parasite on *L. pendulus*, which in turn is parasitic on *Eucalyptus sideroxylon*, Ironbark, from Whroo, Victoria.

By Mr. A. Mattingley.—Echinoderms from King Island, Bass Strait—*Asterina calcar*, *A. gunnii*, and *Stichaster polyplax*.

By Mr. F. M. Reader.—Dried specimens of *Xerotes elongata*, Benth., new for Victoria, from Little Desert, Lowan, 10/10/97 ; and *Trifolium fragiferum*, L., from Wimmera, 21/10/95. Naturalized, and new for Victoria.

After the usual conversazione the meeting terminated.

NOTES ON EELS.

By W. Hopkins.

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

(*Read before the Field Naturalists' Club of Victoria*, 13*th July*, 1903.)

The statement was made some little time ago that eels breed only in the sea. As I think this is incorrect so far as our Victorian eel is concerned, I purpose putting on record a few facts which have come under my observation during recent years.

The Angahook River, which flows into Airey's Inlet on the eastern side of the Otway peninsula, has a sand-bar across its mouth for from six to ten months in the year, the water soaking through the sand and flowing into the sea at about the level of high tide. There are plenty of eels in the river, and it seems to me that if eels breed in the sea there should be at times numbers of eels waiting to get out, and later on trying to get back to the river; also young eels should be observed endeavouring to get in from the sea. Now, I have had occasion to be there at all times of the year, and have never seen an eel trying to get in or out, nor yet young eels in the sea. There is a shallow bay just at the mouth of the river, in which fish can easily be seen.

A few years ago we drained a swamp at Gherang. When the water ran out, large numbers of young eels a few inches long went down the drain. As this swamp had not overflowed for several years, these eels must have been bred in the swamp.

Again, we are told that eels with ripe ova have never been obtained in rivers, and if they don't breed in the sea, where do they breed? The answer must be either that they have no ova like fish, or else that they retire somewhere at a certain period to breed.

When a large swamp goes dry we find regular patches of eels occurring in burrows several yards in length, and you can dig out a patch of burrows, generally getting one to three eels in each burrow, with a total of five or six dozen in the patch. Then for some distance there will be no eels, then another patch, and so on. Now it seems most likely that the eels breed in these burrows.

On draining a swamp near the Barwon River, a lot of weeds were put in the drain to keep back the fish, etc. At the end of the swamp were found a few very big eels, and a large number of white, worm-like things just about an inch in length and about as thick as a thread. These were very eel-like in their movements, and though I am not sure that they were eels, still it is possible that they were the second stage of an eel's life.

There is another phase of the eel question which puzzles me. Many years ago my attention was drawn to the presence of eels in waterholes difficult of access from any river. The explanation usually given is that eels leave the streams and go across country at night to the waterholes; but to prove that this view is incorrect I wish to record the following facts :—

Near Airey's Inlet there is a swamp, which I happened to visit when overflowing. A man had fixed an eel net across the overflow, and at the sides stakes laced with brushwood, so that no eels could get by. He caught large numbers of eels in the net, but none came up the overflow, which ran across loose sand, and only a small portion of it reached the river. Some years later this swamp was cleared out. The last time it overflowed was seven years ago, when the water ran into the sand and did not reach the river. When that swamp went dry last summer one man dug eighty eels out of their burrows in one day, while others got large numbers. Now, how did these eels get there?

On the plains on the west side of the Barwon River, over tens of thousands of acres, eels are found in nearly all the waterholes, and these holes are in all sorts of situations. For eels to go across country to all these holes thousands of eels would be necessary, and numbers would be stranded in small swamps and crab-holes. I have had occasion to ride over this country before, and just as these holes were drying up, and except just near the overflow of a waterhole I have never seen an eel so stranded. Many people whom I have questioned tell me the same thing.

Lake Murdeduke, in the Winchelsea district, has an area of about 2,800 acres, and has not overflowed for at any rate two

generations. The water is salter than the sea, and in a wet season large numbers of eels are washed into it from neighbouring waterholes, and die there. How did these eels get to the holes they had just left ?

All over the parts of the Murdeduke and Turkeith estates that have tanks and dams flowing into the lake on the south-west side eels are found, but farther on to the west, on the Mount Side estate, no eels are found.

Now, I think we can take it as proved that eels must either go overland in some form that we do not recognize, or else they must be carried as ova or young in the mud on the feet of birds. Just close to the southern corner of Lake Murdeduke are a series of dams, which, though dry of late years, were for years before fully stocked with eels, and there is every indication that eels bred there. Birds coming from the lake would generally make to these holes, especially at night, and would then go on to other holes, and, if they carry eels, might in this way distribute them to various holes. I may mention that a small hole was excavated near these dams, and two years later no less than four dozen young eels were found in it.

Another curious fact is that whenever a hole goes nearly dry the young and half-grown eels invariably bury themselves in the mud, as also do most of the large ones, but there are always a few large eels which seem unable to do this. Has this anything to do with the breeding question ?

On one dam built on the end of a swamp, when the water got low the eels retired as usual. The eels left in the water were taken out, but every day or so a large eel seemed forced to make back into the water again. While standing on the bank I saw a large eel act in a singular way. It rushed across the water, seemed dazed, lashed the water with its tail, and tried to swim on when it got to the bank ; after a while it turned and rushed to the opposite bank, then in a little while seemed to calm down, and swam slowly into the centre of the water. On one occasion lime was put into a hole which contained a great many eels, the water being fairly low. After a while an eel just showed itself ; next day this eel was found lying on the bank, exposed to a hot sun, gazing at the water. On cleaning out that hole a few weeks later large numbers of eels were found in the mud.

On the Murdeduke estate it was decided to excavate a tank on a site where there was a small hole about three feet six inches in depth, which for two years had never had more than a few inches of water in it, and which of course soon dried up, yet in making the tank the men found numbers of eels at a depth of about six feet in solid clay, all standing straight up, with their tails downward, all seemingly in good condition.

In Queensland stockmen are in the habit of driving cattle

into waterholes when they are only a few feet deep, and, keeping the cattle a short time in the water, they stir up the mud, and cause the fish to come to the surface, when the men can catch as many as they want. I have forced eels to come to the surface in the same way by making a hole muddy, and it can be seen that the places eels would prefer for their burrows would be where the water was salty, so that it would not carry mud in suspension, or else in sandy soil.

The Wurdieboluc Swamp had been dry for some time, but after the first rains thousands of young eels appeared in the swamp. In another swamp close by eels grow to a large size, and several over seven pounds in weight have been taken in the overflow.

DESCRIPTIONS AND NOTES OF AUSTRALIAN HESPERIDÆ, CHIEFLY VICTORIAN.

By G. A. Waterhouse, B.Sc., B.E., F.E.S.

(Communicated by G. Lyell.)

(*Read before the Field Naturalists' Club of Victoria, 13th July*, 1903.)

In offering this paper to the Field Naturalists' Club of Victoria I have to thank Mr. G. Lyell for the loan of the Victorian species under consideration.

From the following remarks two conclusions will, I think, be obvious. Firstly, that in the Hesperidæ the spots of the fore-wing are far from being numerically constant. Secondly, that no author should sink a species as a synonym without indicating his reason for so doing, or, at least, quoting the description of the species sunk. In further support of the first conclusion I may say that I have examined over one hundred male specimens of *Telesto donnysa*, Hew., in which I found a range of from *four* to *nine* spots on the fore-wing, while in males of *Mesodina halyzia*, Hew., I have found specimens with one and sometimes even two sub-apical spots.

Telesto monticolæ, Olliff.—*Hesperilla monticolæ*, Oll., Proc. Linn. Soc. N.S.W., 1889, p. 624; *T. monticolæ*, Meyr. and Lower, Trans. Roy. Soc. S.A., 1902, p. 63.

Male, 11-12 mm. Head, thorax, abdomen, and palpi above dark brown, below yellowish. Antennæ above very dark brown, below yellow. Fore-wing with costa straight; outer margin convex; apex acute; inner margin straight. Hind-wing rounded.

Upper side.—Fore-wing dark brown, basal area suffused with yellowish, a small orange spot at end of cell, three imperfectly divided sub-apical yellow spots, differing in size in all three specimens; discal stigma short, whitish surrounded by black,

from sub-median to end of cell, outwardly from its upper end a small elongated orange spot, in one specimen (and also in type) a smaller spot below this last. Cilia brownish-yellow spotted with dark brown. Hind-wing dark brown, basal area yellowish, an indistinct orange spot at end of cell in one specimen; in all specimens a broad orange suffusion beyond end of cell, below which are two oval orange spots, separated by second median nervule. Cilia as in fore-wing, longer and paler.

Under side.—Fore-wing with basal two-thirds of costa and whole of cell orange-yellow, apical area brownish-yellow, rest of wing almost black, spots of upper side reproduced, but much larger, sub-apical paler, rest darker. Cilia long, as on upper side. Hind-wing with a conspicuous broad longitudinal yellowish band through cell, interrupted near end of cell by a dark brown spot, in some specimens centred with yellow, and again by a brown bar near outer margin, below middle of this band two pale yellow oval spots, reproductions of those above, and above it a pale yellow patch; abdominal area pale yellow; anal area dark brown; rest of wing lighter brown. Cilia as on upper side.

Female, 12 mm. Shape much as in male, with apex rounder. Head, thorax, abdomen, palpi, and antennæ as in male.

Upper side.—Fore-wing dark brown, somewhat lighter than male; the spots of male all present, but larger, the discal series consisting of four yellow spots—first and second elongated, third smaller, lowest large, wedge-shaped, just above sub-median. Cilia long, yellowish, spotted with brown. Hind-wing dark brown, with a large cartridge-shaped yellow spot just beyond end of cell, below which are two similar but smaller darker yellow spots, divided by second median nervule. Cilia as in fore-wing.

Under side.—Fore-wing with basal two-thirds of costa and whole of cell rich yellow, spots of upper side reproduced, larger, and, with the exception of sub-apical series, darker; on outer margin below apex a pale yellow suffusion; rest of wing dark brown. Cilia as on upper side. Hind-wing as in male.

Locality.—Near Walhalla, Victoria (3,000 feet). Captured in February by collector (Mr. H. Jarvis) of Mr. C. French, F.L.S.

This species is compared by Olliff to *Hesperilla* (*Cyclopides*) *cynone*, Hew., and by Meyrick and Lower to *Trapezites* (*Pamphila*) *gracilis*, Tepper, which are undoubtedly conspecific. Both former descriptions were taken from the co-types (two males) in the Australian Museum, from Moonbar (3,000 to 3,500 feet), near Mt. Kosciusko, N.S.W. These specimens are faded, and not in the best condition, which accounts for the spots being described as white. This species bears a general resemblance, on the upper side only, to *Telesto crypsargyra*, Meyr., from New South Wales, which is also a mountain butterfly.

This constitutes a new record for Victoria, and the female (now

for the first time described) in the collection of Mr. G. Lyell is the only known specimen.

TELESTO MELANIA, sp. nov.

Male, 15 to 17 mm. Head, thorax, abdomen, and palpi above blackish-brown, below whitish. Antennæ above black, club below yellowish-white. Fore-wing with costa straight, except just at base and apex; apex acute; outer margin slightly convex, inner margin straight. Hind-wing rounded.

Upper side brownish-black, without markings; discal stigma, from below sub-median nervure to lower end of cell, narrowly whitish, bordered with black Cilia of fore-wing dark brown, of hind-wing white, spotted with dark brown.

Under side.—Fore-wing brown, lower portion of cell much darker, inner marginal area much lighter; usually without any spots, but sometimes a small whitish spot just beyond lower end of cell. Cilia brownish. Hind-wing light brown, often suffused with grey, usually with a curved discal series of seven whitish interneural spots (sometimes absent). Cilia whitish, spotted with brown.

Female, 17 mm. Head, thorax, abdomen, palpi, and antennæ as in male. Shape nearly as in male, with outer margin of fore-wing more convex.

Upper side.—Fore-wing dark brown, with a discal white spot just above second median, and in some specimens another below it. Cilia dark brown. Hind-wing uniformly dark brown. Cilia dark brown.

Under side.—Fore-wing as in male, with spots of upper side reproduced. Cilia brown. Hind-wing as in male, but the discal series very often wanting. Cilia brown.

Locality.—Cairns, Queensland. Captured by Mr. R. E. Turner, who has sent me specimens for description, the males being in perfect condition, the females slightly rubbed.

This species is allied to *T. bathrophora*, Meyr. and Lower, but is considerably larger, darker above and lighter below; the male has a longer and narrower discal stigma, and in the female the three sub-apical spots are absent. It has somewhat the appearance of an unmarked *Erynnis fuliginosa*, Misk., but the narrower fore-wing and the conspicuous pure white cilia of the hind-wing are marked features of the latter species.

TRAPEZITES MAHETA, Hewitson.—*Hesperia maheta*, Hew., Ann. Mag. Nat. Hist., 1877, p. 80, male; *Telesto praxedes*, Plötz, Stett. Ent. Zeit., 1884, p. 379, male; *Tel. phlaa*, Plötz, Stett. Ent. Zeit., 1884, p. 378, female; *Trap. maheta*, Meyr. and Lower, Trans. Roy. Soc. S.A., 1902, p. 89, male and female.

This variable species shows such constant differences in various localities that a description of the varieties appears necessary;

also a note on the synonymy, which has not been made clear by Meyrick and Lower.

Hewitson's description refers undoubtedly to a male ; he gives the under side as—" Pale rufous grey, except the lower half of the anterior wing and anal angle of posterior wing, which are dark brown. Posterior wing marked by four silvery white spots—two before the middle and two below these, one of which is minute—and by a less distinct white spot and several brown spots. Habitat, Queensland. Exp., $1\frac{3}{10}$ inch" (= 32 *mm. double measurement.—G. A. W.*)

Plötz describes the under side of his *Tel. praxedes* as—" Reddish-grey. Hind-wing with four white spots encircled with black, two close together in central cell and cell 1*c*, the other two in cells 1*c* and 2, towards the outer margin, a black dot in cells 6 and 7. 16 mm. Port Jackson."

These descriptions agree with Meyrick and Lower's male *T. maheta,* excepting only that they make seven silvery spots on the under side. This is a form very rarely met with, the four conspicuous spots being usually present, and the other much smaller ones being represented by dark dots, and only very rarely by silvery spots.

Meyrick and Lower sink *Tel. praxedes* under *Trap. symmomus,* Hübn., without assigning any reason for so doing. This cannot be correct, for *T. symmomus* could scarcely be described as " reddish-grey on the under side," and has more large spots than given by Plötz ; the size also is a telling character, being the same as given by Plötz for *ornata,* and less than that given by him for *picta, iacchus, dirphia,* and *peronii* ; so Meyrick and Lower could only be correct on the very unlikely supposition that Plötz had in his possession only a remarkably undersized specimen of *symmomus.*

Again, Meyrick and Lower sink *Tel. phlœa* under *Trap. phigalia* (= *Trap. phillyra*), and here again they must be wrong. Plötz describes *phigalia* with references to Hewitson's description and Herrich-Schaeffer's figure on the same page with his description of *phlœa.* The sexes of *phigalia* are anything but markedly different, so I cannot believe that Plötz would give descriptions of both, on the one page, as separate species ; besides, his description of *phlœa* agrees very well indeed with the female of *maheta.* Plötz describes his specimen as a female, 17 mm. ; locality, Melbourne.

There is no doubt that Meyrick and Lower are quite correct in assigning the name *phigalia* to Miskin's species *phillyra,* as can be at once seen by an examination of Hewitson's description and Herrich-Shaeffer's figure.

It is not quite easy to decide which of the many forms is the typical *T. maheta,* but as Hewitson describes the under side as

"reddish-grey," I conclude it to be the form extending from Twofold Bay, N.S.W., to somewhat north of Brisbane, with a slight variation as we get farther north to Cairns, where a whitish suffusion extends over the under side in the male—the only sex of the Cairns variation I have yet seen.

I consider the following forms worthy of separate varietal names :—

Trapezites maheta, var. phigalioides, var. nov.

Male, 15 to 16 mm. Shape much as in typical *T. maheta*, but with outer margin distinctly more convex.

Upper side with the spots arranged as in *maheta*, except that the lowest sub-apical spot is only half the size of the other two, and is placed beyond them towards the apex ; the colour is less shining, and the cilia of hind-wing are grey, spotted with brown at termination of veins.

Under side with apical area of fore-wing and hind-wing greyish, sometimes faintly tinged with brown, the spots of fore-wing as on upper side, but larger, the spots of hind-wing as small brown rings, never centred with silver. Cilia grey, spotted with brown.

Female, 16 mm. Shape as in typical female, *T. maheta*.

Upper side as in *T. maheta*, except that the lowest sub-apical spot is nearest apex and the orange band of hind-wing is broader.

Under side as in *T. maheta*, except that the apex of fore-wing and whole of hind-wing are greyish. Cilia grey, freely spotted with brown.

Locality.—Gisborne, Toora, and Wandin South, Victoria.

This variety is described from types (male and female) in the collection of Mr. G. Lyell, from whom I have received duplicates. It is superficially very like the allied species *T. phigalia*, which, however, is of different shape, and always has the cell of fore-wing on under side orange. It can be easily recognized by the peculiar position of lowest sub-apical spot in fore-wing, and the absence of silver spots on the under side of hind-wing. Had Plötz mentioned in his description of *phlœa* the misplacement of the lowest sub-apical spot in fore-wing, and had he not described the colour as "reddish-grey," *phlœa* might have been considered as indicating this variety, which is figured in Anderson and Spry's "Victorian Butterflies," p. 119, under the name of *T. phigalia*, but that name rightly belongs to the species figured there as *T. phillyra*.

Trapezites maheta, var. iacchoides, var. nov.

Male, 17 mm. Shape as in male *T. maheta*, but apex of fore-wing very acute, and outer margin quite straight.

Upper side as in typical male *T. maheta*, with the band of hind-wing broader and deeper orange. Cilia greyish.

Under side with the reddish-grey replaced by salmon colour, and the silver spots of hind-wing (usually six in number) of moderate size, that of apex being equal in size to that of anal angle. Cilia yellowish, spotted with brown.

Locality—Como and Blue Mountains, N.S.W. (F. Brown). Type in author's collection.

The colour of the under side readily distinguishes this variety. I was at first inclined rather to think it a hybrid of *iacchus* and *maheta*, but now that several males have been taken in two localities it is best regarded as a marked variety.

THE BLACK "EMEU."—Mr. Graham Renshaw, M.B., who has on several occasions contributed articles to the *Zoologist* on rare animals, &c., which are known only as museum specimens, devotes the latest of his essays, in the March (1903) number, to *Dromæus ater*, the extinct emu of Kangaroo Island. Mr. Renshaw, after diligent search, can record only six specimens, but the whereabouts of three of these is at present unknown. He figures the only stuffed specimen known, that in the Jardin des Plantes Museum, Paris. It will be remembered that an account of the finding in the Florence (Italy) Museum of a skeleton of this bird appeared in the *Victorian Naturalist* (vol. xvii., p. 114) some time ago, and gave rise to the query (*Naturalist*, vol. xvii., p. 128) as to whether any remains of the extinct Tasmanian Emu survive in museums, so far with no response. Mr. Renshaw regards *Dromæus ater* as one of the rarest of the rare birds, but expresses no opinion as to whether it and the Tasmanian are distinct or identical species. This is a point which seems to require clearing up, for, if the same, it is rather singular that the same bird should exist on two islands at least 500 miles apart with no trace of the species, or of a connecting link, on the mainland of Australia, from which the islands are separated, in the case of Kangaroo Island by a strait of only 10 miles across, and Tasmania of 135 miles. Dr. Latham, the eminent ornithologist, in his "General History of Birds," published in 1822, mentions having seen a pair of "Van Dieman's Cassowary," one of which he figures under the specific name of *D. ater*, but as these are now among the missing specimens, it seems impossible to be certain as to the identity of the Emus of the two islands.

THE DAISY.—Mr. R. L. Praeger writes in *Knowledge* for July on wild flowers of the most familiar and best-loved kinds, among them the Daisy, of which he says :—"The yellow button-like *disk* is composed of a myriad of small perfect flowers, with yellow five-cleft tubular corolla, and ring of fused stamens surrounding the pistil. Of calyx we find hardly a trace ; the close packing of the flowers leaves no room for it, and renders it unnecessary as a protective structure. In the Compositæ the calyx is

usually reduced to a few hairs, which often play a valuable part in aiding seed-dispersal, as we shall see, by growing as the fruit ripens into a feathery plume or *pappus*, which acts as a parachute. The marginal or *ray* flowers of our Daisy have no stamens—are female ; and their corolla is white, and greatly expanded in an outward direction—the only direction in which there is room for expansion. These ray flowers, in fact, are largely useful in *advertising* the otherwise inconspicuous flower-head. Similar devices we have already noted in the wild Guelder-rose ; and we may compare with these such flower-heads as those of the little Cornel, *Cornus suecica*, and the Astrantias, in which the flowers are surrounded by a ring of coloured *leaves*, which serve the same purpose. Finally, our Daisy head is surrounded by a close-fitting double ring of small leaves, the *involucre*, which encloses the whole in bud, and plays the part that a calyx usually plays in a single flower. . . . It is perhaps among some of the larger members of the Daisy group that the composite inflorescence attains its greatest beauty and perfection. Examine such a flower-form as the Ox-eye Daisy. First we have the close-lapping scales of the involucre, securely enclosing the whole, and protecting it when in bud. Then the splendid ring of ray-flowers, whose object is to render the inflorescence more conspicuous. Thus we find these enormously expanded corollas often assuming a tint other than that of the main mass of flowers—white when the disk is yellow, as in the Ox-eye ; in other species blue, or purple, or yellow, accompanying a yellow or greyish disk. These ray-florets have sacrificed their perfection as flowers for the purposes of advertisement, and are usually devoid of stamens, or sometimes devoid of both stamens and pistil. Finally we have the dense mass of disk-florets, all perfect, producing a quantity of minute fruits. As for the fruit of the Corymbiferæ, a large number rely on wind carriage, and the calyx-segments take the form of hairs, which grow into a more or less perfect parachute to aid in transporting the comparatively large fruit to pastures new."

Boys' Field Club, South Australia.—We have received a 48-page pamphlet recording the doings of the above club during the years 1893 to April, 1902. This society, which owes its foundation to the enthusiasm of Mr. W. C. Grasby, its present president, was founded in August, 1887, has for its motto—"The naturalist loves life," and its objects—(1st) to encourage nature study, and (2nd) to provide healthful recreation. The members are principally boys of 10 to 18 years of age. Regular meetings and excursions are held for purposes of study, but the great feature of the club has been the Easter encampments, of which thirteen have now been held, lasting from seven to nine days each. These camps are usually attended by some thirty to fifty

boys ; in fact, so eager are the boys to take part in these outings that restrictions have had to be made, so that members must qualify for the right to attend. The work of the members is chiefly in geology, botany, and conchology, and several new or rare specimens have been secured in the latter department, and the club has a cabinet of type specimens. The pamphlet is illustrated with numerous camp scenes, and is well worthy of perusal by all interested in directing the attention of young people to nature study.

"THE EMU."—The current (July) number of *The Emu*, forming the first part of the third volume, is to hand, and contains a number of interesting articles bearing on bird life in its various aspects. "A Trip to the Stirling Range, W.A.," by Mr. A. W. Milligan, of Perth, is well illustrated, but the palm in the way of illustrations must be given to our old friend Mr. E. M. Cornwall's photograph of a rookery of the Sooty Tern, *Sterna fuliginosa*, on the Upolu Bank, Great Barrier Reef. This has been excellently reproduced, and affords one of the finest pictures of an animated scene it is possible to conceive. In his notes on his visit Mr. Cornwall remarks :—"I have often wondered how, on a great rookery like this, the birds are able to identify their eggs, and after carefully watching for a considerable time have come to the conclusion that they are not at all particular whose egg they sit on. Although the rookeries of different varieties are well defined, the whole are so jumbled together that along the fringes where two varieties meet the eggs are much intermingled, and in very many cases Sooty Terns had taken possession of Lesser Crested Terns' eggs and *vice versâ*." This remark is in opposition to the ideas usually associated with bird rookeries, and seems to be a probable explanation of the doubts which have arisen in many people's minds as to the birds' knowledge of their own nests in such gatherings. In Mr. Thos. Carter's notes from South-Western Australia is included the following note about a tame Emu, communicated to him by Mr. R. Gale, of Fairlawn :—"The bird was allowed its liberty on the Margaret River estate, and apparently formed an attachment for a horse there, for when Mr. Gale drove this horse from Margaret River to his house near Busselton, a distance of 40 miles, the Emu arrived early the following day, in spite of having had to traverse cross roads and negotiate several fences of barbed wire and post and rails. Did the bird follow the horse by scent?" The part contains many items of interest to bird-lovers.

"NOTES ON THE NATURAL HISTORY, &c., OF WESTERN AUSTRALIA."—This volume consists mainly of the scientific chapters contributed by specialists dealing with the geography, geology, climate, flora, fauna, &c., published from time to time in the Western Australian Year-Book. These have been collected into

one volume by Mr. Malcolm A. C. Fraser, the Government Statistician, and with the addition of maps and illustrations form an excellent handbook to the natural history of Western Australia. The maps comprise a general map, and one combining the rainfall records and the zoo-geographical divisions N., N.W., S.W., and C. (central or desert). The chapters deal with—1. Physical Features; 2. Geography; 3. Geological Features, with a census of the Minerals, the South-west Cave District, &c.; 4. Climate; 5. Aborigines; 6. Fauna, including lists of Mammalia, Birds, Reptilia, Batrachia, and Pisces; 7. Entomology; 8. Flora, with a list of plants; 9. Forest Resources; 10-13. Scientific Institutions; and 14. Report on the Lake Yanchep Caves.

"Agricultural Gazette of New South Wales."—In the May (1903) number Mr. W. W. Froggatt, F.L.S., Government Entomologist, contributes an article on "Some Wood-boring Beetles and Their Habits," in which four minute but destructive beetles are dealt with. A plate is given showing the insect natural size and greatly enlarged. Mr. Froggatt continues his notes on the Cicadas ("Locusts") and their habits, mentioning eight species and giving figures of six, and concluding with a good bibliography. In the June number Mr. Froggatt writes on "Insects that Damage Wheat and other Foodstuffs," in which he briefly describes nine beetles and five moths, all of which are very destructive in grain stores, &c. Seven of these are illustrated, natural size and enlarged. References to literature complete the paper.

Present-day Cave-Dwellers.—In an article published in *Knowledge* a few years ago, Mr. Lydekker drew attention to the evidence in favour of an Asiatic origin for the aborigines of Australia, whose nearest relatives then appeared to be the Veddas of Ceylon. "In a letter from Macassar," says that monthly, "the Messrs. Sarasin, who are travelling in Celebes, announce the discovery in the mountains of that island of a primitive people —the Toala—presenting a remarkably physical resemblance to the Veddas. Although these people have now been considerably influenced in the mode of life by contact with the Buginese of the coast districts, there is decisive evidence that a short time ago they were cave-dwellers (as indeed are some of their number now), while within a century or so ago they were in the habit of using chipped stone arrow-heads and other weapons and implements. There can be little doubt that the Toala were the primitive inhabitants of Celebes, and that they were driven to take refuge in the mountains by the Malay invaders, with whom, however, they now hold a certain amount of intercourse. Assuming their affinity to the Veddas to be true, and it is scarcely likely that such a remarkable resemblance can be merely accidental, we have much stronger evidence than before as to the probable Asiatic origin of the Australian aborigines."

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 10th August, 1903. Mr. F. G. A. Barnard, one of the vice-presidents, occupied the chair, and about 65 members and visitors were present.

CORRESPONDENCE.

From the National Forests Protection League, thanking the Club for the support given by members, and urging unrelaxed attention to the reservation of timber country.

REPORTS.

In the absence of Mr. D. Le Souëf, C.M.Z.S., Mr. F. G. A. Barnard gave a short report of the Club's visit to the Zoological Gardens on Saturday, 18th July, when there was a good attendance of members and friends, who availed themselves of the opportunity to inspect the various animals, birds, &c., under the guidance of the Director, Mr. D. Le Souëf, C.M.Z.S.

Additional interest is given to these visits by the information imparted by the Director concerning many of the animals on view. Among other items of interest may be mentioned the Black Swans, some of which were then sitting on their eggs, while several young ones were seen running about. The Emu was also sitting on her nest, containing several eggs. Altogether a very pleasant afternoon was spent, and members left well pleased with their visit.

GENERAL BUSINESS.

Mr. A. J. Campbell drew attention to the destruction of game on Lake Moodemere. He explained that the lake was reserved some years ago as a resort for wild fowl, but, owing to the drought, the sheet of water has been somewhat reduced, and the waterfowl are therefore congregating more in the limited area, and so offering greater facilities for their destruction. Under cover of shooting foxes and other vermin unscrupulous persons are also destroying the ducks, &c. He therefore moved—"That the attention of the Minister of Public Works and the Rutherglen Shire Council be directed to the destruction of game on Lake Moodemere."

Mr. G. Coghill, in seconding the motion, stated that some years ago the attention of a former Minister had been successfully directed to the matter.

The motion was carried unanimously.

Mr. J. Stickland drew attention to the necessity of again taking some action for the protection of the wattles. Mr. J. Shephard also spoke on the subject, and the Chairman undertook to send a letter to the newspapers drawing attention to the matter.

PAPERS.

1. By Miss K. Cowle, entitled "Notes of a Visit to Mount Roland, Tasmania."

In an interesting paper the authoress mentioned the various specimens of natural history met with during her visit, and gave some account of the geology of the district. A number of the botanical specimens collected were exhibited, together with photographic views and other objects of interest from the locality.

Mr. T. S. Hall, M.A., congratulated Miss Cowle on the interesting and useful work she had accomplished during her visit. Messrs. R. A. Bastow, G. Coghill, and F. Wisewould spoke on the paper, and the latter mentioned the difficulties to be met with in collecting in such rough country.

2. By Mr. J. H. Gatliff, entitled "Additions to the List of Victorian Marine Mollusca."

This paper consisted of a list of additional species of Victorian Gastropod shells, which have been identified during the publication of the "Catalogue of Marine Shells of Victoria," by Messrs. G. B. Pritchard and J. H. Gatliff, in the "Proceedings of the Royal Society of Victoria." The author explained in detail certain characters in several species of shells, by which they could be readily identified, and illustrated his remarks with specimens of the shells.

Mr. T. S. Hall, M.A., in complimenting the author on his work, mentioned that Mr. Gatliff, in conjunction with Mr. G. B. Pritchard, had been working for some time on a "Catalogue of the Marine Shells of Victoria." They had finished the Gastropods, and were now working on the Lamellibranchs. He spoke of the close resemblance of many of the shells exhibited by Mr. Gatliff to fossil species, and stated that their work will throw much light on the identification of our tertiary fossil shells. He stated that there were now about 800 recent Victorian shells described, while of our tertiary shells there were quite 800 described, and yet not half had been dealt with.

NATURAL HISTORY NOTES.

Mr. T. S. Hart, M.A., writing from Ballarat, says :—"It may interest some of the members of the Field Naturalists' Club to know that the rare orchid *Prasophyllum archeri* was collected in flower about 1st May by Mr. R. Copeland in the Ballarat New Cemetery, Ballarat North. I only remember it being recorded in Victoria from near Maryborough, though, of course, it may be

commoner than I supposed. A Pterostylis, apparently *præcox*, is now flowering in the ranges south of Amherst."

Mr. G. Coghill stated that *P. archeri* had been found at Ringwood by Miss S. W. L. Cochrane. Mr. C. French, jun., stated that he had collected it at Oakleigh.

Mr. G. A. Keartland mentioned, as a result of protection, that kangaroos were greatly increasing in numbers in the country around Whittlesea.

Mr. J. A. Kershaw, F.E.S., made some remarks on his exhibit of Australian Lycænid butterflies, chiefly Victorian, which were labelled in accordance with Mr. G. A. Waterhouse's recent revision of the family, in order to call attention to the many changes proposed in the nomenclature. In referring to many of Mr. Waterhouse's determinations chiefly concerning the Victorian species, he drew attention to that author's remarks expressing his doubt as to the correctness of Messrs. Anderson and Spry's record of March for the time of appearance of *Una agricola*. Mr. Waterhouse says that he has "caught many hundreds near Sydney, but none later than November." Mr. Kershaw stated that he has a specimen taken as late as 30th January.

Mr. F. Spry, in speaking on the subject, stated that the record of March for this species published by Mr. Anderson and himself was quite correct.

Mr. T. S. Hall, M.A, referred to the spread of the Cape irid, *Romulea bulbocodium*, at Inverleigh, and stated that members would be interested to learn that the White Cockatoo, *Cacatua galerita*, had discovered that the bulbs afforded excellent food.

Mr. F. Chapman, A.L.S., remarked on an exhibit of a valve of a Diatom (Arachnoidiscus) which he obtained from the oldest tertiary strata (Thanet beds) of Pegwell Bay, England. The peculiarity of this fossil lies in the fact of its replacement, by iron pyrites, of the original silica; the surface markings of the valve are also faithfully reproduced. These pyritized Diatoms were first discovered by W. H. Shrubsole in the London clay of Sheppey, and one of the reasons for exhibiting the specimen was to draw the attention of microscopists to the possibility of their occurrence in the Victorian tertiary clay beds where iron pyrites is found replacing fossils.

EXHIBITS.

By Mr. R. A. Bastow.—Two Ophiuroids and *Asterias calamaria* from the Ninety-mile Beach, Victoria, and a King Crab from Singapore.

By Mr. F. Chapman, A.L.S.—A valve of a tertiary fossil Diatom, Arachnoidiscus, replaced by iron pyrites, from Pegwell Bay, England.

By Miss S. W. L. Cochrane.—Wild flowers from Sandringham.

By Mr. P. C. Cole.—Two specimens of the fruit of the Baobab

tree, *Adansonia gregorii*, showing aboriginal carved designs, from North-Western Australia.

By Mr. A. Coles.—Specimen of Little Falcon, *Falco lunulatus*.

By Miss K. Cowle.—Photographs, botanical and rock specimens, &c., from Mount Roland, Tasmania, in illustration of her paper.

By Mr. C. French, jun.—Life-history of Longicorn beetle, *Strongylurus cretifer*, which is very destructive to the Native Cherry trees in Victoria ; also, aboriginal stone knives (polished), from Swan Hill, Hamilton, Heidelberg, &c.

By Mr. J. H. Gatliff.—Marine shells from Victoria, including *Modiola victoriæ*, Prit. and Gatl. (type) ; *Zenatia victoriæ*, Prit. and Gatl. (type) ; *Chione strigosa*, Lamk. ; *C. scallarina*, Lamk. ; and 41 additional Victorian marine shells referred to in his paper.

By Mr. A. D. Hardy.—Two specimens of Hepaticæ—*Riccia natans*, a floating plant, from Bulleen, and *Fimbriaria australis* (in fruit), a terrestrial plant, from Malvern.

By Mr. J. A. Kershaw, F.E.S.—Case of Australian Lycænid butterflies, including type of *Miletus meleagris*, Waterh.

By Mr. F. M. Reader.—Dried specimens of *Brachycome ciliaris*, Less., var. *glandulosa*, Benth., new for Victoria ; and specimens of the rare coniferous shrub, *Pherosphæra fitzgeraldi*, F. v. M., hitherto found at the Katoomba Falls only. Collected by the Rev. W. W. Watts at Leura Falls, Blue Mountains, N.S.W.

By Mr. F. Spry.—Case of Victorian Lycænid butterflies.

By Mr. J. Tarrant.—Specimens of the bark of the Paper-barked Ti-tree, *Melaleuca squarrosa*, Donn., Gippsland.

After the usual conversazione the meeting terminated.

SOME COMPARISON OF THE ALPINE FLORA OF AUSTRALIA AND EUROPE.

By G. Weindorfer.

(*Read before the Field Naturalists' Club of Victoria, 13th July*, 1903.

The remarks which I purpose offering under the above title are based upon observations of the Alpine flora of Victoria and the Eastern Alps of Europe, the altitudes of which are practically alike.

Whoever has once ascended a mountain cannot fail to have observed how the vegetation gradually changes, so that the tourist presently finds himself amidst new and strange surroundings, in which the vegetation of the lowlands is replaced by one of a totally different appearance. It is well known that in the

upper regions of the mountains the tree-growth ceases, and a belt of stunted bushes and herbs continues, occasionally covering large areas with unbroken vegetation, or forming patches amongst rocks. The term generally applied to this region is the "Alpine region," and the vegetation thereon is known as the "Alpine flora." This paper deals exclusively with the "Alpine flora" and not with the "flora of the Alps," by which expression a flora is understood which would comprise plants growing in all elevations of the Alps in question. It must not be understood, however, that the Alpine flora forms a distinct geographical or systematic class of vegetation, for this is not the case in either of the Alpine flora.

It is generally accepted that the lower border of the Alpine regions is formed by what is known as the tree-line; but, clear as this definition may appear, it cannot be strictly accepted as such, for the following reasons:—The tree-growth does not cease abruptly, but gradually becomes more and more stunted, and in the shade of these bushes grow plants which decidedly belong to the Alpine flora. In every case there is a considerable overlapping of the Alpine and the lowland flora.

The most important characteristic of an Alpine flora in general is therefore to be found in its habit—its physiognomy—which is the product of many and varied factors, such as soil, temperature, air, moisture, situation of mountains and their incline, and other influences.

A striking difference between the Australian and European Alpine vegetation is noticed as regards the tree-line. Careful examinations and records have established the tree-line of the Eastern Alps of Europe at 5,700 feet approximately (in the western part of the Alps even 6,400 feet), whereas, in my estimation, the tree-line in the Victorian portion of the Australian Alps is at 5,300 feet approximately—that is, 400 feet lower than in the Eastern Alps of Europe. Mr. J. H. Maiden, F.L.S., Government Botanist of New South Wales, in his pamphlet, "A Second Contribution towards a Flora of Mount Kosciusko" (1899), says:—"The height of the tree-line is fairly constant (about 6,500 feet)." I have taken the tree-line in the Victorian portion of the Australian Alps to be where the normal growth of forest trees ceases, at 5,300 feet, and have not taken into consideration the dwarfed tree-growth into which the normal growth is transformed. Mr. Maiden, however, does not explain in his pamphlet the basis adopted by him for his statement. No doubt the greater height and possibly more favourable conditions in the Kosciusko group may explain the difference in the tree-line.

The difference between the European and the Victorian Alps is all the more striking when we consider their respective geographical positions. The high plains of Bogong and Omeo

are situated under the 37th degree of south latitude, while the Eastern Alps of Europe lie in 47 degrees north latitude. The last-named mountain-chain is therefore ten degrees further removed from the equator than the first-named, and must, therefore show a proportionate decrease in the yearly temperature, yet the tree-growth extends to higher altitudes in the European Alps than is the case in our Alps.

An explanation of this fact may be that in the European Alps the forests consist, in the higher elevations, exclusively of Conifers, whose dense growth resists more effectively the encroachment of the heavy snowdrifts, and thus affords more protection than is the case with the Australian forest, where the Eucalyptus trees, with their high, slender trunks and open crowns, are further apart, thus providing no mutual protection against the ravages of wind and snow storms. It is this general external difference in the forests which undoubtedly contributes a great deal to the changed characters of the respective floras. Let us further take into consideration the meteorological conditions in both Alpine regions. Mr. James Stirling, F.G.S., F.L.S., in a paper—"The Physiography of the Australian Alps"—read before the Australasian Association for the Advancement of Science, held at Sydney in 1889, says:—"Snow falls at heights above 2,000 feet, but at the lower levels seldom remains longer than a few days, thawing quickly as it falls unless in the shaded hill sides, where the frost hardens the crust." The height at which snow remains during the winter months begins with 5,000 feet. From here upward the first snowfall appears about the month of April, and melts in the month of November. The snow, therefore, remains in these elevations during a period of seven months, thus leaving a vegetative period of five months. In contrast to this are the meteorological conditions of the European Alps in question. There snow melts, at the same altitudes as in the Australian Alps, about end of May, in less favourable situations not till the end of July. The snowfall commences often in the middle of October, thus giving the vegetation a winter rest of 7½ to 9½ months, and a vegetative period of only 2½ to 4½ months.

A similar difference will be observed in the respective temperatures. The average mean summer temperature of Mount Hotham is 55° F., in the European Alps it is 59° F., while the average mean winter temperature for the Australian Alps is 41° F., and for the Eastern European Alps 30° F. According to these records there is in the Eastern European Alps a shorter time available for the development of plants, though with a greater range of temperature than in our Alps.

The result of this short vegetative period is that in neither of the Alps can annual species find the favourable meteorological

conditions necessary for their growth, for it is obvious that such plants would absorb so much time in forming their stalks and leaves that the time of flowering and maturing the seed would be so close to the commencement of the cold season as to endanger their chances of reproduction.

The number of annual species in the European Alps is therefore limited to a great extent; besides this, all the annual species show a very diminutive growth, being almost without stalks and leaves, in order to use as little time as possible for the development of their structure, and to have the use of the warmest days for the development of their flowers and fruit.

Although the plant-growth in the Australian Alps extends over a considerably longer vegetative period than in the European Alps, annual species seem to be entirely wanting. Mr. J. H. Maiden remarks in the abovementioned paper :—"Without going so far as to say that there are no annuals growing in the upper regions of Mount Kosciusko, I do not call to mind any plants from the tree-line upward that are not perennials."

However, it must not be forgotten that the relative frequency of the species in the two floras is 1 to 10; that is to say, there are ten times more species in the European than in the Australian Alps. If, therefore, in our Alps some annuals may exist, their number will consequently be very few. I may mention that during a short visit to the Alps last Christmas time in company with our fellow-members, Dr. Sutton and Mr. Barnard, we did not observe any annuals at the elevations in question. In the European Alps it is not uncommon for plants which are annuals in lower levels to turn, in ascending to higher altitudes, into perennials.

A further peculiarity of Alpine plants in Europe is the development of the flowering organs before the leaves appear. There the plants must make the most of the short vegetative period, and in order to mature the fruit without loss of time, have to start flowering immediately after the melting of the snow. During the flowering time the old leaves play an important part as reservoirs of foodstuffs. During winter stiff and leathery, and filled to repletion with nutriment, they provide the flowering part of the plant with the necessary food, and dry up on the budding of the new leaves, which take over the same *rôle* as their predecessors. In the Australian Alps, with a longer vegetative period, there is no such necessary hurry, and the plants, without the danger of losing time, may, in most cases, after the snow melts, start with the formation of their stalks and leaves.

The number of species with bulbs in the European Alpine flora is limited to two, belonging to the order Liliaceæ. In the Australian Alps bulbiferous plants are entirely missing. This fact may be explained as follows :—In the sphere of the Alpine

flora, for want of sufficient warmth during its short vegetative period plants cannot devote their time to building up bulbs, for which purpose, on account of the necessary chemical changes and transformations, a high degree of warmth is required. The *rôle* which bulbs play with plants in lower elevations is in Alpine plants taken over by their leaves, which, as before mentioned, serve the plants as reservoirs of foodstuffs for the coming season. All characteristic Alpine plants therefore show, as a peculiarity, the thickness of their leaves, and are consequently greatly in contrast with their nearest relations of the lowlands. In the Australian Alps we may observe this fact in certain plants, as *Eucalyptus coriacea*, the Acacias, many Compositæ, *Drimys aromatica*, *Pimelea ligustrina*, *Dianella tasmanica*, *Orites lancifolia*, *Westringia senifolia*, and others.

A special mark of Alpine plants is their dense hairiness, the purpose of which is exclusively to protect the plants against extensive evaporation. I am under the impression that the number of species with vestitures is proportionally greater in the European Alps than here.

A further peculiarity in Alpine plants is in the crowded grassy growth, with little stalks and small leaves. This circumstance is explained by the fact that the plants of high mountains commence with their vitality at a time when daylight already lasts from 15 to 16 hours. Now, as plants assimilate during daytime and grow during the night, there is more time available for assimilation, and plants with greater dimensions will therefore not have such favourable chances; in addition to this, of course, lower temperature and other different circumstances, as wind and poor soil, play an important part. As examples of this may be mentioned *Stackhousia pulvinifera*, *Scævola hookeri*, *Leontopodium catipes*, *Gnaphalium alpigineum*.

For the same reason lofty trees in Alpine regions are entirely absent. On the other hand, the branches of the low Alpine shrubs are, by the weight of snow masses, mechanically pressed down on the soil, an appearance which is especially characteristic in the European Alps. To take one instance, the depressed bushes of *Pinus mughus*, or the Knee-wood of the European Alps, with which *Eucalyptus coriacea* of our Alps may be compared.

Climbing plants, also, cannot find the necessary conditions for their life, for the production of tendrils would occupy too much time, which could be more profitably utilized for the production of seeds. Of this kind of plant the European flora has only one representative (*Atragene alpina*), while in the Australian Alps climbing plants are entirely wanting.

We have now arrived at a feature by which Alpine plants are mostly distinguished from the related species of the lowlands—

that is, the colour and the perfume of their flowers. Without a doubt the plants of the European Alps are, in this respect, in advance of those of the Australian Alps, and once more I quote Mr. J. H. Maiden's words:—"A greater brilliancy and size of the flowers has been observed in the European Alps. I do not think that is specially true in regard to Mount Kosciusko plants, perhaps because of the inferior height of the latter mountain. The increased brilliancy of the flowers would certainly, I think, apply to some species of Ranunculi, which are so brightly yellow that one cannot fail to remark it. As will be seen presently, there is not that variety of colour in Mount Kosciusko flowers that obtains in the European Alps. If we consider the plants I have enumerated from tree-line to 7,000 feet, we find the colours of the flowers distributed approximately as follows:—White, 36; green and inconspicuous, 10; yellow, 13; dull yellow, 6; purple and pink, 7; blue, 1. (Restiaceæ, Cyperaceæ, Gramineæ, &c., have been excluded.)" According to this, the red and violet colours among flowers are not to be found in our Alps; on the other hand, the blue colour, with one, and the pink colour, with seven, are very poorly represented. This want of contrasts in colour (which want is also found with regard to perfume) is no doubt due to the already mentioned unequal proportion of the species represented in both Alps. It is sufficient to point out that the European Alpine flora possesses 63 orders and 280 genera (Phanerogamæ and Acotyledoneæ—vasculares), while the Australian Alps have only 37 orders and 75 genera.

A striking feature of the Australian Alps is the deficiency of insect life, which is of such great importance as an agent in the fertilization of phanerogamous plants. This will probably account for the want of variety in colour and perfume.

Further, let me allude to some other peculiarities which both Alpine floras have more or less in common, as compared with the flora of the lowlands. With the proportionate paucity of larger animals in Alpine regions is going hand in hand the deficiency of spinescent plants, which find it necessary to protect themselves against the extensive attacks of herbivorous animals. There are in the European Alps only a few species, belonging to the genera Rosa, Rubus, Cirsium, and Juniperus, with spines, but the armature of these is not of a very formidable character, while in the Australian Alps this class of plant is represented by *Hymenanthera dentata* (Mount Kosciusko) and *Daviesia ulicina* (Mount Hotham).

Finally I would refer to the richer green of foliage, and the tendency to form rosettes of leaves, and with this I think that I have mentioned most of those peculiarities by which both of the Alpine floras determine their physiognomic character.

In conclusion I would say that, although the Alpine flora of Australia does not compare in beauty with that of the European Alps, yet it presents its visitor with an indelible picture, which every Australian may justly regard with pride and speak of as "the Alpine flora of Australia."

NOTES OF A VISIT TO MOUNT ROLAND, TASMANIA.

By Miss K. Cowle.

(*Read before the Field Naturalists' Club of Victoria, 10th August*, 1903.)

The following notes of a visit to Mount Roland in January last may be of interest to members of our Club. The mountain is a familiar landmark to everyone living in and around Devonport, on the north-west coast of Tasmania. It stands away in the south, distant some twenty miles from the coast, and forms the south-eastern boundary of the great bend at the Mersey.

Mount Roland is bold and rugged, its northern end being an almost perpendicular escarpment; its height is 4,047 feet, and in winter it is often snow-capped. The northern and eastern sides are composed principally of an ancient conglomerate, the pebbles, milky white and water-worn, being embedded in a reddish-coloured matrix. Some of the boulders at the foot of the mountain are smooth and rounded, and look like inlaid work. This smoothing of the rocks may have been the work of an ancient sea, which left in the lower levels, between the base of the mountain and the sea coast, the upper Paleozoic marine beds, in which occur fossils, such as Spirifers, Aviculopectens, &c. We did not find any traces of fossils in the stones brought from the mountain.

For the first thousand feet the track winds up through a forest composed of such trees and shrubs as the Stringybark, *Eucalyptus obliqua*, L'Her., Peppermint Gum, *E. amygdalina*, Lab.; Dogwood, *Pomaderris apetala*, Lab.; Musk. *Aster* (*Olearia*) *argophylla*. F. v. M.; Silver Wattle, *Acacia dealbata*, Link; River Wattle, *A. discolor*, Willd.; the Prickly Acacias, *A. diffusa*, Edw., and *A. verticillata*, Willd.; Prickly Box, *Bursaria spinosa*, Cav.; Sassafras, *Atherosperma moschatum*, Lab.; Stinkwood, *Zieria smithii*, Andr.; Honeywood, *Bedfordia salicina*, D.C.; *Cassinia aculeata*, R. Br.; Mint-tree, *Prostanthera lasiantha*, Lab.; Tea-tree, *Leptospermum rupestre*, H.; and Guitar Plant, *Lomatia tinctoria*, R. Br. Among these were such smaller plants as Pimeleas, *Clematis aristata*, R. Br.; the Purpleberry, *Billiardieri longiflora*, Lab.; the Blueberry, *Dianella longifolia*, R. Br.; and the beautiful White Iris, *Diplarrhena morea*, Lab.

Our first halt was near a spring, in the shade of some fine specimens of the Valley Tree Fern, *Dicksonia billardieri*,

F. v. M., whose brown trunks were covered with masses of the little filmy fern, *Trichomanes venosum*, R. Br. Other ferns noted were *Lomaria capensis*, Willd., *Lindsaya linearis*, Swartz, *Pteris tremula*, R. Br., and the Oak Fern, *Pteris incisa*, Thun. The rocks were covered with many beautiful mosses and lichens, the most conspicuous mosses being—*Bryum altisetum*, C. M.; *Leucobryum candidum*, Hampi; *Dicranium billardieri*, Bridel; *Hypnum cupressiforme*, Simm.; *Lepidozia ulothrix*, Hook; and *Ptychomnion aciculare*, Labill.

The last two thousand feet are climbed up a ravine, over a sort of cataract of loose blocks of reddish sandstone, the walls on either side being masses of conglomerate some hundreds of feet high, and on one side almost perpendicular. This ravine had evidently been an ancient watercourse, but all that was left of the stream was a small spring which trickled from under the moss-covered boulders, into a sort of basin, and disappeared again under the rocks.

From here to the top of the mountain we added to our collections the Gordon Lily, *Blandfordia marginata*, Herb.; the singular epacrid, *Richea gunnii*, H.; the Solomon's Seal or Turquoise Berry, *Drymophila cyanocarpa*, R. Br.; the Swamp Tea-tree, *Melaleuca ericifolia*, Sm.; the Native Pepper, *Drimys aromatica*, F. v. M.; the Snowberries, *Gaultheria hispida*, R. Br., and *G. lanceolata*, H.; the Asters, *Olearia* (*Eurybia*) *ledifolia*, Benth., *O. pinifolia*, Benth., and *O. gunniana*, H.; *Sprengelia incarnata*, Sm.; and the Golden Rosemary, *Oxylobium ellipticum*, R. Br.

From the top of the mountain there is a fine view of the surrounding country and hills, and even the most ardent botanist or geologist must pause to admire it, with that silent outreach of the soul towards eternal beauty. The surface geological formations can almost be traced by the vegetation, especially where the decomposition of the tertiary basalt has resulted in rich agricultural land, with its fields of green potato-tops or golden corn, backed up by virgin forest.

The centre of the mountain is flat, and around the edges are great masses of stone, to the south all sandstone, contorted and tilted almost perpendicularly. This sandstone is composed of rounded grains of ancient rocks, and contains much iron, the protoxide and peroxide compounds colouring the rocks various shades of green and red.

Among the trees and shrubs growing on top of the mountain may be mentioned *Eucalyptus gunnii*, H.; Honeysuckle, *Banksia marginata*, Cav.; dwarf specimens of the Beech, *Fagus cunninghami*, H.; the Purple Bottle-brush, *Melaleuca squamea*, Lab.; the Native Heath, *Epacris impressa*, Lab.; *E. longiflora*, *Boronia gunnii*, H.; *B. rhomboidea*, H.; the Purple Heath, *Tetratheca*

gunnii, H.; the Artichoke, *Astelia alpina*, R. Br.; *Bœckia gunniana*, Schau.; *Gentiana saxosa*, Forst.; the Eyebright, *Euphrasia brownii*, F. v. M.; the Yellow Thyme, *Hibbertia serpillifolia*, R. Br.; *Celmisia longifolia*, Cass.: with the Coral Fern, *Gleichenia dicarpa*, R. Br., and a Lycopodium.

Of animal life we have but a poor record. A Black Snake caused some excitement by crossing the track between our party. We saw a few parrots and robins. Two long-haired caterpillars attracted attention, one chestnut-brown with a golden band round the middle, the other dark brown with golden spots.

On the 28th of March we again visited the top, but encountered a terrific thunderstorm. The thunder echoed from crag to crag with a deafening roar, the rain came down like a torrent, and in the dense mist we lost the track coming down, and so missed all the specimens we had gathered and put in the shade when going up. At that time *Gaultheria hispida* was looking beautiful with its clusters of snowberries.

I should advise anyone intending to visit Mount Roland to go the day before to the little village called Sheffield, which is some five or six miles from the mountain; or to Mr. Perkins's farm at the foot of the mountain. Our party will never forget the kindness and hospitality of Mr. and Mrs. Perkins.

I am greatly indebted to Messrs. J. G. Luehmann and R. A. Bastow for the identification of some of my specimens.

The late Mr. H. P. C. Ashworth.—It is with very great regret that the death of Mr. H. P. C. Ashworth, a former hon. secretary of the Field Naturalists' Club, is recorded. Owing to want of space, an account of his work in the interests of natural science must be held over for the next *Naturalist*.

Personal.—During the month the editor received a characteristic memo. on a post card from Mr. Robert Hall, as follows:—"Yakutsk, Siberia, 30/6/03. I have truly set foot in the wonderful tundra country; full of birds, teeming with mosquitoes, and covered with flowers. Every place greets my eyes with a new plant; first a field of forget-me-nots, as large as those we cultivate, then a paddock of Iceland poppies. Our common onion occupies swamps, and most lovely orchids border them. Buttercups and blocks of ice line the banks of the Lena River, and flowering willows densely cover the numerous islands of the broad stream. Everything is done on a grand scale, and Nature in May wakes quickly from her snowed repose. Insects are varied and numerous. The whole is a wonderland and a surprise."

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 14th September, 1903. The president, Mr. O. A. Sayce, occupied the chair, and about 100 members and friends were present.

REPORTS.

A report of the Club excursion to Greensborough on Saturday, 15th August, was read by the leader, Mr. G. Coghill, who stated that over twenty members and friends attended. The main object of the visit was to see the Silver Wattles, *Acacia dealbata*, in bloom, and members were not disappointed, for many lovely specimens were seen along the banks of the Plenty River. Masses of *Clematis microphylla*, in full bloom, festooned the smaller shrubs, &c., and added beauty to the scene. The Mistletoe, *Loranthus pendulus*, was found in bloom on many of the gum-trees, and closer examination disclosed several seeds just germinating on the branches of the trees. Though the district is not a particularly good one from a botanist's point of view, still several interesting species of plants were met with, among which may be mentioned *Grevillea rosmarinifolia*, somewhat rare on the rocky banks of the river; *Hovea heterophylla*, *Styphelia serrulata*, *Veronica calycina*, and *Aster stellulatus*. The fern, *Woodwardia caudata*, was also obtained.

A report of the excursion to Cheltenham on Saturday, 29th August, was given by Mr. G. Weindorfer, who acted as leader of the botanical section. He stated that, being early in the season, only about twenty species were obtained in bloom. Of these, *Euphrasia brownii*, *Acacia oxycedrus*, and *Sprengelia incarnata* were in the most perfect condition. The country was very swampy, and prevented much investigation. Mr. J. Stickland reported that the pond-life section of the party obtained a fair variety of species characteristic of the district, but one rotifer obtained does not seem to have been recorded before, and will probably prove new to science.

A report of the excursion to Ringwood on Saturday, 12th September, was given by the leader, Mr. C. French, jun., who reported a good attendance of members. A number of interesting plants were met with, such as *Ophioglossum vulgatum* (in fruit), *Phylloglossum drummondi*, *Utricularia dichotoma*; the orchids *Caladenia deformis*, *Pterostylis barbata*, *Diuris maculata*, and the rare *Prasophyllum archeri* (in seed). *Acacia myrtifolia* was beautifully in bloom, and a novelty in *Wurmbea dioica*, with pink

flowers, was secured. A number of micro-fungi were also collected. Both birds and insects were scarce, only a few common species of the former being seen. About forty species of plants in bloom were collected.

The hon. librarian reported the receipt of the following donations to the library :—" Bulletin of the Geological Survey of Victoria," No. 1, and "Reports of Geological Survey of Victoria, No. 1 : The Chiltern Goldfield," from the Department of Mines, Victoria ; *Journal of Agriculture, Victoria*, vol. ii., part 2 (July, 1903), from Department of Agriculture, Victoria : *Agricultural Gazette of New South Wales*, vol. xiv., part 17 (July, 1903), and "Geological Reports, No. 3 : Kerosene and Shale," from the Department of Mines and Agriculture, Sydney ; "A Critical Revision of the Genus Eucalyptus," part 3, and "Forest Flora of New South Wales," part 4, by J. H. Maiden, F.L.S., Government Botanist of New South Wales, from the author ; "Proceedings of Linnean Society of New South Wales," 1903, part 1, from the Society ; "Proceedings of Royal Society of South Australia," vol. xxvii., part 1, from the Society ; *Minnesota Botanical Studies*, part 2 (July, 1903) ; *Nature Notes*, June and July, 1903, from the Selborne Society, London ; and *Knowledge*, July, 1903, from the proprietors.

GENERAL BUSINESS.

Mr. D. Le Souëf, C.M.Z.S., mentioned that a Natural History Society had been formed in Perth, Western Australia (with which was incorporated the Mueller Botanical Society), under the title of the West Australian Natural History Society. He desired to move—"That the Field Naturalists' Club of Victoria congratulates the West Australian Natural History Society on its formation, and wishes it a successful career."

The motion was seconded by Mr. T. Wisewould, and carried unanimously.

PAPERS READ.

1. By Professor Baldwin Spencer, M.A., F.R.S., entitled "Across Australia."

The author, who has made several visits to the centre of Australia, first gave a general account of the geography and physical features of the central portion of the continent, illustrating his remarks with a fine series of lantern slides of the more striking scenes. Some notes of the zoology and botany met with during his expedition with Mr. F. Gillen to study the habits and customs of the natives in the country north of the Macdonnell Ranges were also given, as well as a brief account of the natives and their habits, each being fully illustrated by lantern slides.

Mr. J. Searle again kindly placed his lantern and services at the disposal of his fellow-members.

NATURAL HISTORY NOTES.

Mr. G. A. Keartland explained, in connection with his exhibit of specimens of the White-backed Swallow and their eggs, that although these birds are so frail in structure, they tunnel from 2 to 3 feet into the wall of a sandbank to breed. The eggs exhibited were taken from a hole 2 feet 6 inches in the bank of the Finke River, which required over an hour's hard work with a large screw-driver to dig out.

The President drew the attention of members to the Mueller medals exhibited on the table, which are to be awarded by the Australasian Association for the Advancement of Science.

EXHIBITS.

By Mr. E. E. Barker, F.R.M.S.—Two nests of living Bull Ants, *Myrmecia fortificata* and *M. sanguinea*.

By Mr. P. C. Cole.—A small ornamented "Churinga" from North-Western Australia, and a pair of Corrobboree Sticks from the Western District, Victoria.

By Miss K. Cowle.—The following fossils from New South Wales:—*Spirifer duodecimcostatus*, Black Head; *Spirifer convolutus*; Martiniopsis, sp.; Platychisma, Permo-carboniferous, Black Head; Terebratula, sp., Permo-carboniferous, Black Head; *Mourlonia pleurotomata*, Permo-carboniferous, Black Head; *M. morrisii*, Permo-carboniferous, Black Head; Stenopora, sp., Permo-carboniferous, Black Head; Fenestella, sp.; Glossopteris, sp., Permo-carboniferous coal measures, Belambi; Halysites, sp., Silurian Limestones, at Molong; Stomatopora, sp.; petrified wood, New South Wales, and Caulfield, Victoria; and Tasmanian aboriginal flints.

By Messrs. J. E. Dixon and C. French, jun.—Fungus (Microcera), parasitic on Mussel Scale Insects (Mytilaspis, sp.), on *Hymenanthera banskii*, Yarra River, near Fairfield Park.

By Mr. C. French, F.L.S.—Butterflies—*Morpho rhetenor*, Peru; *M. aurora*, Bolivia; and *M. adonis*, Amazons—not previously exhibited in Victoria.

By Mr. C. French, jun.— Aboriginal stone tomahawk, measuring 8½ inches long, ploughed up at Warragul, Gippsland; also, a stone found under the skull of an aboriginal, from near Hamilton. These stones are fairly common in the Hamilton district. This specimen is peculiar, being hollowed on both sides; usually only one side is hollow.

By Mr. C. J. Gabriel.—Marine shells, *Ranella albi-varicosa* and *R. spinosum*, from South Sea Islands.

By Mr. G. A. Keartland.—A pair of White-backed Swallows and eggs, from Finke River, Central Australia.

By Mr. A. Mattingley.—An aborginal message-stick, from North-Western Australia.

By Mr. B. Nicholls, on behalf of Mr. Knight.—Four snakes, including two White-lipped Snakes, *Hoplocephalus coronoides*, Günth., from Thornton, Vic.

By Mr. F. M. Reader.—Dried specimens of *Erysimum repandum*, naturalized and new for Victoria; and a series of dried mosses from Westland, New Zealand, from the herbarium of and collected by Mr. T. W. Naylor Beckett.

By Mr. A. O. Thiele.—An Obsidian Bomb, from Balmoral, Vic.

By Mr. H. B. Williamson.—Dried plants, *Lepyrodia scariosa*, new for Victoria, from the Grampians, January, 1902; *Gratiola nana*, from Hawkesdale, Vic., 1885, new for S.W. of Victoria; and *Rumex pulcher*, Linn., introduced from Europe, naturalized in Victoria, from Curdie's River, January, 1903.

[Correction.—The plant exhibited as *Xanthosia atkinsoniana* (misprinted *atkinsonia*) recorded in *Vict. Nat.*, xix., p. 136, proves to be a form of *Xanthosia dissecta*, J. Hooker.—H.B.W.]

After the usual conversazione the meeting terminated.

ACROSS AUSTRALIA.

By Professor Baldwin Spencer, M.A., F.R.S.

(*Delivered before Field Naturalists' Club of Victoria, 7th Sept.*, 1903.)

[The following is an outline of Prof. Spencer's remarks, delivered *vivâ voce* in explanation of a large series of lantern slides.—Ed. *Vict. Nat.*]

To many present there will be little new in what I have to tell you to-night, but as in many minds there is a vague uncertainty as to what the centre of Australia is like, I propose, with the aid of the lantern slides, to give you some idea of the appearance of the country passed over by Mr. F. Gillen and myself during our journey from south to north, which occupied slightly more than twelve months, in 1901–2.

After a three-days' train journey north from Adelaide the traveller reaches Oodnadatta (688 miles), the present terminus of the proposed transcontinental line. Further travel northwards depends entirely upon the nature of the season. In the central part of the continent you are very liable to meet with bad seasons. In fact, it is sometimes quite impossible to travel with horses, and camels must then be taken.

On our expedition we were able to get right through with horses, of which we had twenty with us—eight for use in the dray, and the rest as riding and pack horses. We sent ahead supplies of food, &c., to last a year, to certain depôts, and picked these up as we advanced, always carrying a working supply with us in the dray, as well as various articles to barter with the natives. The journey is very monotonous and uninteresting, from a scenic point of view, but there is really no serious difficulty in crossing the continent.

Some notes on camel travelling may be interesting. Of course the great advantage of camels is that they can go for so long without water, whilst carrying a supply of this for the travellers. A record of 24 days without water is, I believe, the longest one in Australia. The camels always travel in single file, tied together by a string from the tail of one to the nose of the one following, and so on. An ordinary loading camel only travels about three miles an hour, but a good, well-trained riding camel is just as pleasant to ride as a good riding horse. In regard to the comfort of riding there is just as much difference between camels as between horses. The camel moves both legs on the one side at the same time, which gives a pleasant ambling motion, and gets along at a rate of about ten miles an hour. A camel when angry is very vicious, and has a happy knack of reserving its breakfast for you, and spitting this out when you come within range. It also contrives by some means or another to force air in behind the uvula so as to form a bladder, which comes out at the side of the mouth. The beast makes a bubbling sound, while the bladder grows larger and larger until it is as big as its head, after which it is gradually withdrawn.

Regarding the physical features of the central area of the Continent, the following are briefly the more important ones. North from Adelaide there runs a range of hills reaching in parts an elevation of nearly 3,000 feet. Its course is at first parallel to the eastern shore of the Spencer Gulf. From the head of this it is continued northwards as the Flinders Range, and then branches off to the north-west, separating the basin of Lake Torrens from that of Lake Eyre. The railway crosses this range into the Lake Eyre basin, running along close to the southernmost point of the lake, where it is actually 39 feet below sea level. From this point the land gradually rises until in the centre there is a plateau 2,000 feet high, forming the higher steppes. Across this plateau run the Macdonnell Ranges, which have the form of a series of parallel, rugged, mainly quartzite, ridges, and stretch almost due east and west for between 300 and 400 miles. The rivers which drain southwards from them into Lake Eyre actually take their rise to the north of the ranges, and cut their way through them by means of deep and often narrow gorges, which afford the only means of traversing the ranges. The highest peaks have an elevation of slightly under 5,000 feet above sea level. To the south-west of these central ranges lies a smaller basin centering in Lake Amadeus. North of the Macdonnells is the Burt Plain. To the north of this again the country is crossed here and there by unimportant ranges, but, on the whole, gradually falls from an elevation of 1,800 feet to one of 700 feet at Powell Creek. Approaching the coast it once more rises, but only slightly, as the highest point of the watershed, where we crossed it on our way

to the Gulf of Carpentaria, was only 1,000 feet. We have thus to the north of the Macdonnell Ranges a great inland basin, bounded eastwards and northwards by the coastal ranges.

In the Amadean basin there are practically no streams other than very short ones, which soon become lost in the sandhills and flats. In the northern inland parts there are only a few comparatively small streams, the most important being represented by an irregular series of watercourses, draining during flood time into the so-called Lake Woods, which is really only the overflow of Newcastle Waters. In the Lake Eyre basin the streams are larger, and we have definite watercourses, draining, as in the case of the Warburton, Barcoo, Macumba, and Finke Rivers, a very wide extent of country, but these streams only actually flow at rare intervals, such water as they contain being met with, under ordinary conditions, in scattered waterholes, which, in dry seasons, may be very few and far between, or practically absent.

Leaving Oodnadatta, we travelled slowly northwards, gradually rising over the steppes into the central districts of the continent, across flat and stony country; but in the rainy season this part becomes so covered with herbage that one wonders where it all comes from. Here and there are low-lying, flat-topped hills, composed of sandstone with a thin capping of hard quartzite, the breaking down of which gives rise to the stones which cover the surface of the stony plains. Further north the country consists of flat, open, thinly-grassed plains, where the flies are often a great nuisance. They are very troublesome, to the eyes especially, and their bites often cause the eyelids to swell to a great size, giving rise to what is locally known by the expressive term of "bung-eye." So great a nuisance were they that we had to make smoke-fires to keep them away while we loaded the horses, who at times were nearly driven mad by their pertinacity.

Travelling north for about 200 miles we came to the Charlotte Waters telegraph station. Here, during the greater part of the year, the country is barren, but during the rainy season it has a slight growth of herbage.

Getting towards the Finke River there are a few picturesque spots, where the rocks have weathered into fantastic shapes, resembling ruined castles, &c., or stand out above the surrounding sandhills in column form. At last we reached the river, which in its course has cut through the distant Macdonnell Ranges. The banks are lined with gum-trees, and the country, which in the dry season is almost impassable for want of water, is at rare intervals almost as impassable on account of floods; for the waters rise very rapidly among the ranges in the centre, and come down in tremendous quantities, spreading far and wide over the low-lying lands.

The animal life here is very interesting, on account of its methods

of adaptation to climate. In the dry season one would imagine that no animal or plant life could exist, but immediately rain falls animal life seems to spring from the ground. The natives will soon initiate you into the manner in which the animals live. The frogs, for example, dig into the ground and make a coating of earth around themselves, which hardens, and thus closes them in. In this they wait until the rain falls, when they come out and gorge themselves with a stock of food and prepare for the next time they will be closed up. When the rain is disappearing they fill themselves out with as much water as possible and go into the holes which they make. The natives are aware of this habit, and, if thirsty and unable to obtain water otherwise, will obtain the frogs and get the water from them. Each frog contains about half a wineglassful.

Going westward into the Amadeus basin we have only a very few small streams, which generally run out from low ranges on to the plains and get lost in the sand. The lake itself for the greater part of the year is perfectly dry, and its bed is coated with pure white salt. A large extent of this country is covered with Porcupine Grass, which grows in large tussocks, from one to three or four yards in diameter. This grass forms one of the greatest obstacles to travelling, owing to its being armed with spikes, which tear your horses and yourselves. A special form of the She-Oak (*Casuarina decaisneana*) grows here, and affords the only shelter which can be obtained from the heat of the sun, which is often intense.

On the southern side of the lake, Ayers Rock, which rises precipitously to a height of 1,100 feet, is a prominent feature in the landscape. Its surface is covered with small holes, one above the other, which must have been formed by the water as it descends during the rainy season in cascades down the steep sides. Some twenty miles further away to the west is situated Mount Olga, a group of bare, bold, rounded masses, rising to a height of 1,500 feet above the level plain.

Leaving the Amadean basin and travelling north, we come to the Macdonnell Ranges, with their intricate gorges. These are often very narrow and almost impossible to traverse, owing to there being either water or dense scrub in them. Some are very picturesque, the rocks being a red quartzite, and clothed with a greater variety of vegetation.

At one spot, and one spot only, we meet with a palm (*Livistona mariæ*), discovered by the explorer Giles in 1872. It is closely allied to the Cabbage-tree Palm of eastern Australia, but is known only in the one locality, where probably not more than two hundred plants exist. It grows to the height of perhaps 80 feet, and is the only palm you will see during the whole journey to the Gulf of Carpentaria.

Further north the scenery is very monotonous. On the hills we often met with a curious gum-tree (*Eucalyptus terminalis*), remarkable on account of its dazzling white stem. The whiteness is due to a peculiar powdery surface on the bark, which the natives use for powdering their head-bands and other ornaments.

We now travel north over the Burt Plain, the country sloping gradually in the direction we are going. A prominent feature here is Central Mount Stuart, which, as nearly as possible, occupies the very centre of Australia. The early explorers had great difficulty in getting through this country, owing to the Mulga scrub (*Acacia aneura*) being armed with very sharp thorns or spikes, which, when they prick your hands or body, are apt to cause a disagreeable sore. Now, owing to the space cleared for the telegraph line, it is quite a simple matter.

Barrow Creek Station, our next stopping place, about 1,200 miles north of Adelaide, was, some thirty years ago, soon after the telegraph line was opened, the scene of the only attack ever made by the natives on the telegraph officials. North of this we meet with the Bean-trees (*Erythrina vespertilio*), the wood of which the natives use for making shields, &c., while the trees themselves are used as resting-places for the bodies of the dead until the time arrives for burying them.

The whole surface of the country is covered with the hillocks of the White Ant, giving it a peculiar appearance, while here and there are ranges of granite hills, the stones of which, in many places, have weathered into perched boulders.

At Powell's Creek, 250 miles further north, we meet with the Bauhinia trees for the first time. This tree also belongs to the Leguminosæ, and extends to Northern Queensland. A eucalyptus, *E. platyphylla*, in this neighbourhood is remarkable for the size of its leaves when in the sapling stage ; they are fully a foot in length and four to five inches in width. In the full-grown tree the leaves are of the usual size.

The northern part of this country was extremely disappointing, as we had expected to meet with at least semi-tropical vegetation towards the Gulf country ; but there was nothing of the kind, only poor gum scrub, with Bauhinias and India-rubber trees, the latter so-called because when the bark is cut there exudes a white fluid which hardens to about the consistency of india rubber. Water lilies grow in the pools, and are very beautiful when in bloom. To the natives they are very useful as articles of food, the stems being eaten raw, while the roots are roasted and treated much in the same way as we use potatoes. A tree which is of great service to the natives in this part of the country is the Paper-bark, *Melaleuca leucodendron*. When we were there the trees were covered with beautiful pendent spikes of blossoms. The bark is used by the natives for wrapping around various objects. In

some parts, called Blue-bush swamp country, there are great deep cracks in the soil, which make it very difficult to travel over, the horses being liable to step into the cracks and so break their legs.

In the Gulf country the temperature rises to between 100° and 115° in the shade in the hottest part of the day. At night time the atmosphere is very still, and the mosquitoes are a great trouble. Every morning about ten a breeze springs up, and you have a good warm breeze for the rest of the day until six, when it dies away.

Regarding the features of the natives, they are much the same over the whole continent, the only important difference being in the amount of hair on the face. As they grow up their whole appearance changes. In the Arunta tribe as a boy approaches manhood he puts his hair up, and the binding is so closely tied that it must be very painful, the skin being drawn up off the forehead. In certain tribes, as the natives get older, they pull the hair out, not being allowed to cut it.

The girls and women change in their appearance very much more than the men, but it is very difficult to obtain a good photograph of the children, as they become so very solemn when being photographed, although very jolly at other times. The women cut their hair off, and must present it to certain persons. As they become older they get more ugly-looking. It has been stated that the women are brutally treated by the men, but this is not the case. They are certainly marked with scars, which is due to the fact that when a relative dies they cut their bodies to show their grief.

In the Warramunga tribe when a woman's husband dies she cuts her head open with a tomahawk, and sears the wound with a red-hot fire stick. In the southern parts the women, and sometimes the men, have pipeclay thickly smeared over their heads to indicate mourning. Many of the men bear marks on the thighs, self-inflicted, as signs of mourning.

The method of fighting—*i.e.*, single combat—is very curious. They take it in turn to hit or cut at one another until the old men consider they have had enough, and when once a fight is over they are perfectly friendly with each other.

They have a great idea of enjoying themselves as much as possible, and lying about seems to be the acme of enjoyment. Sometimes you will find them grinding down grass seed, out of which they make dampers. The seeds are placed on a large, flat stone, and pounded and crushed with a smaller one held in the right hand. Water is poured on, so as to form a dark, gritty paste, which is then baked in ashes. Making string out of fur, hair, or the bark of trees is a favourite occupation. The bark is torn into strips, and then rolled by hand on the thigh. They

make much use of stone weapons, and the preparation of these takes up considerable time. A suitable piece of stone, such as diorite, is obtained, and chipped away by a piece of quartzite, then finally it is ground smooth on an ordinary grinding stone, fine sand and water being sprinkled on the stone during the process.

The natives are very fond of paying visits to friends, though very often the visits end up in fights, but these are generally more rowdy than dangerous.

The greater part of the native's life is devoted to holding ceremonies. Great preparations are made for the corrobborees, which sometimes occupy the evenings of a fortnight or longer. Helmets are made out of twigs, tied on to the head with human-hair string. Grass-seed down is then fixed on with human blood, drawn from the body by cutting a vein with a sharp stone or piece of glass.

Knocking out one or two of the upper incisor teeth is a common practice, and is done by means of a pointed stick and stone, one blow being often sufficient for the operation. In the Warramunga tribe they go into the water before the operation, the object being to numb the gums so that the pain may not be so great.

Finally, there are the sacred ceremonies, which are not allowed to be seen by the woman and children ; should they see them, they are likely to be blinded or killed. During these sacred ceremonies the persons taking part are not allowed to be seen by the uninitiated. The decorations used during some of the ceremonies are very elaborate. Thus, men are decorated to represent an emu or a wild cat, or a design will be constructed on the ground, such as a wavy line, indicating an old ancestor who was a snake-man.

The illness of a blackfellow is attributed to some external cause ; thus, in one case the medicine-men decided that a man was suffering from the bone of a dead blackfellow, which had gone inside him, as well as the gnarled knot of an old gum-tree. They said they got the bone out and the knot as far down as the stomach, when they tied a string tightly round to keep it from getting back, but without avail. The man died, and his body was at once carried off and placed on a platform in a gum-tree, where it would remain for a year, the widow and other relatives cutting themselves and wailing.

At the end of a year three men go to the tree and rake the bones out into a bark dish. They then smash the skull, and bury all, except one arm-bone, in an ant-hill. The arm-bone is brought into the camp and handed to an old woman. Finally, after the conclusion of a special ceremony, the women are summoned to the ceremonial ground, and bring the bone with them

in a paper-bark covering ornamented with yellow ochre and black. The bone is then taken from the women and broken with a stone axe and buried in the ground.

THE LATE MR. H. P. C. ASHWORTH.—Mr Ashworth, whose death, at the age of thirty-two, was briefly recorded in the last *Naturalist*, was a close and enthusiastic observer in several departments of natural science, and was ever ready to lend his aid in the furtherance of nature work. He filled the position of hon. secretary of the Field Naturalists' Club from January, 1894, to May, 1896, when, owing to failing health, he had to refuse re-election. In November, 1894, he accompanied Mr. D. Le Souëf on a visit to the Hunter Group and Albatross Island, off the north-west coast of Tasmania, where they made several interesting observations on the bird life of the islands, which were embodied in a paper published in the *Naturalist*, vol. xi., p. 134. This was illustrated by a plate from a photograph by Mr. Ashworth. He again showed his powers of close observation in an interesting paper, "On the Dispersal of the Mistletoe," *Vict. Nat.*, xii., p. 51, in which he described the habits of the little Swallow Dicæum, or Mistletoe-bird, *Dicæum hirundinaceum*. In October, 1895, he repeated his visit to Albatross Island, this time in company with Mr. J. Gabriel, an account of his trip appearing in the *Naturalist*, xiii., p. 3, illustrated by a plate from a photograph of the Shy Albatross and nest from Mr. Ashworth's camera. This visit led to an exhaustive paper on a difficult subject—"The Flight of the Albatross"—*Vict. Nat.*, xiii., p. 11, in which he referred to the various theories as to the flight of birds, and offered the opinion that too little consideration had been given to the power of the birds to take advantage of the various inequalities in the wind to gain in velocity relatively to the surrounding air. Besides being a good naturalist, he took a leading position in his professional work in the Victorian Railways Department, and, jointly with a fellow-officer, secured the first prize for the design of the Central Railway Station, now being erected at Flinders-street. After he was unable to follow active work, in conjunction with his brother, Mr. T. R. Ashworth, M.L.A., he brought out a work on "Proportional Representation," which has been favourably criticised in political circles. Mr. Ashworth was of a very genial disposition, and many members of the Club regretted that, owing to the short notice of his death, they were unable to follow his remains to their last resting-place in the Boroondara Cemetery, at Kew, on Thursday, 20th August.

A GRANITE MONOLITH.—A huge block of granite, measuring 120 feet in length, 45 feet in width, and 18 feet in depth, estimated to weigh about 6,000 tons, was recently shifted from its bed at the Harcourt quarries, near Castlemaine, by a single charge of 25 lbs. of powder.

CORRESPONDENCE.

THE TREE-LINE IN THE AUSTRALIAN ALPS.

To the Editor of the Victorian Naturalist.

SIR,—Mr. G. Weindorfer's paper, "Some Comparison of the Alpine Flora of Australia and Europe," in the September *Naturalist*, is very interesting, and full of points for discussion. At page 65 he states that I do not explain the basis adopted by me for the statement that "the height of the tree-line is fairly constant (about 6,500 feet)" on Mount Kosciusko.

The trees forming the tree-line are *Eucalyptus coriacea (pauciflora)*. They are abundant on the Monaro plains, and can be traced all up Mt. Kosciusko, gradually diminishing in height until (at the height above sea-level stated) they abruptly cease, forming a narrow strip of mallee-like growth about twenty feet high. This growth fringes the edge of the escarpment, and extends for a considerable distance at the same level. There is no abrupt transition in the tree-growth, and it is proper, in my opinion, to use the term "tree-line" in the sense in which I have used it.

I agree with Mr. Weindorfer that the tree-line is much lower on the Victorian side—probably this is accounted for by the southern aspect.

With reference to the snow-fall, referred to at page 66, deep snow-drifts are eternal on the highest parts of Mt. Kosciusko. Snow may fall any day in the year. I have been snowed up for three days in January, and have seen the remains of some thousands of sheep that perished in a blizzard on 26th January, a few years ago.

I notice at page 64 that Mr. F. Reader, in exhibiting *Pherosphœra fitzgeraldi*, says that it has been found at the Katoomba and Leura Falls (quite close to each other) only. I beg to say that it is far from rare at the Wentworth Falls, Blue Mountains.—Yours truly,

J. H. MAIDEN,
Director Botanic Gardens, Sydney.

28th September, 1903.

"RED RAIN."—Those interested in the nature of "red-rain" sediments will find a valuable contribution to the subject by Prof. A. Liversidge, LL.D., F.R.S., in the Journ. and Proc. R. S. N.S.W., vol. xxxvi., 1902, pp. 241–285. We are indebted to Mr. G. S. Walpole for kindly calling our attention to the paper, which was unfortunately omitted from our article on the subject in the June number of this journal.—F. CHAPMAN and H. J. GRAYSON.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 12th October, 1903.

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

CORRESPONDENCE.

The hon. secretary read a letter from the Secretary of the Shire of Rutherglen, in reply to a communication from the Club drawing their attention to the destruction of game on Lake Moodemere. The Shire Secretary stated that his Council had done, and was continuing to do, everything in its power to prevent the destruction of game on the lake. In pointing out the difficulty the Council has had in carrying out its intentions with regard to the reserve, he explained that when the reserve was applied for some years ago the Government refused to adopt the suggestion of the Council that all shooting should be absolutely prohibited within the area in question, and stated that had this suggestion been acted upon convictions could easily have been secured, whereas, under existing conditions, they are all but an impossibility. He thought that, with the facts before it, the Club might be able to suggest some way out of the difficulty.

A letter was also read from the Secretary of Public Works regarding the same matter, which stated, in consequence of a communication received from the Club, that the inspector under the *Fisheries and Game Acts* had recently spent four days on and about the lake, and failed to find any justification for the reports mentioned. The inspector stated, in fact, that there is little or no game at the lake to destroy, as though on the lake before daylight and till after dark he never saw more than twenty ducks.

In the discussion which followed, the action of the Rutherglen Shire Council was favourably commented upon, and it was urged that the Club should support the Council in its endeavours to protect the game on the reserve.

Mr. F. Pitcher moved, and Mr. F. Baker seconded—"That the matter be left in the hands of the committee, to take such action as it thought necessary."

Messrs. G. Coghill, G. A. Keartland, and the secretary also took part in the discussion.

REPORTS.

Mr. F. G. A. Barnard reported a good attendance of members in response to Dr. G. Horne's invitation to visit his aviary of

Australian and other birds on Saturday, 19th September, when an interesting afternoon was spent.

Mr. G. Weindorfer read a lengthy report on the botanical portion of the Club's excursion to Sandringham on Saturday, 26th September.

Mr. W. Stickland, in reporting on the pond life portion of the same excursion, stated that only the usual forms common to the district were met with.

Messrs. G. Coghill and G. A. Keartland reported a good attendance on the excursion to Mitcham on Saturday, 10th October, and mentioned some of the more important species met with both in botany and ornithology.

The hon. librarian reported the receipt of the following donations to the library :—*Journal of Agriculture of Victoria*, vol. ii., No. 3, from Department of Agriculture, Melbourne ; " Memoirs of Geological Survey of Victoria, No. 2 : Castlemaine Goldfield," and " Annual Report for 1902," from Department of Mines, Melbourne ; *Agricultural Gazette of New South Wales*, vol. xiv., parts 8 and 9, August and September, 1903, from the Department of Agriculture, Sydney ; " Sydney Botanic Gardens : Biographical Notes of Officers," vi., vii., and viii., by J. H. Maiden, F.L.S., Director, from the author ; " Catalogue of Nests and Eggs of Australian Birds," part 3, and " Records of Australian Museum," vol. iv., No. 8, from the Trustees Australian Museum, Sydney ; " Proceedings Royal Society of Victoria," vol. xvi., part 1, 1903, from the society ; " Journal and Proceedings Royal Society of New South Wales," vol. xxxvi., 1902, from the society ; " Proceedings Linnean Society of New South Wales," vol. xxviii., part 2, from the society ; " Transactions of New Zealand Institute," vol. xxxv., 1902, from the institute ; *Nature Notes*, August and September, 1903, from Selborne Society, London ; *Knowledge*, August and September, 1903, from the proprietors ; " Proceedings Academy of Natural Sciences, Philadelphia," vol. liv., from the Academy ; " Transactions Nova Scotian Institute of Science," vol. x., from the institute ; and publications from Field Columbian Museum, Chicago.

ELECTIONS.

On a ballot being taken, Messrs. Wm. Somerville, 16 Bellevue-street, Richmond ; Ernest E. Barker, F.R.M.S., Wyuna, Park-street, South Yarra ; and Master Joseph Hilton Tuckett, Neerim-road, Murrumbeena, were duly elected members of the Club.

GENERAL BUSINESS.

The president announced that, in view of the many and valuable services rendered to the Club by Mr. J. Searle in placing his

lantern and services at the disposal of the Club free of cost, the committee had appointed him honorary lanternist.

PAPERS READ.

1. By Mr. A. E. Kitson, F.G.S., entitled "On the Occurrence of Older Cainozoic Marine Fossils near Hexham, Western Victoria."

The author recorded the occurrence of marine fossils near Hexham, and pointed out the geological features of the district. The fossils were discovered in a bed of clay, when boring for water, at a depth of 56 feet from the surface. Few entire shells were found, but from the fragments obtained upwards of twenty species were identified, and the deposit is closely related to the well-known beds at Mornington, Port Phillip, and Muddy Creek, Hamilton.

NATURAL HISTORY NOTES.

Mr. T. S. Hart, M.A., contributed a note on some specimens of a Pimelea collected at Canadian, 3 miles S.E. of Ballarat which he forwarded for exhibition.

Mr. G. Lyell, jun., forwarded a note on the time of appearance of the butterfly *Una agricola*, concerning which some discussion had taken place at the August meeting of the Club.

Mr. A. D. Hardy called attention to the fact that some of the leaves on an Oriental Plane tree in Collins-street, Melbourne, which were in close proximity to an electric light, had remained on the tree all the winter, and were still green.

Mr. F. G. A. Barnard read a letter from Mr. Robt. Hall, dated Mouth of the Lena River, Siberia, 15th July last, in which he mentioned some of the more interesting features which attract the attention of an Australian in those regions.

EXHIBITS.

The evening was specially set apart for exhibits of wild flowers, but owing to the great heat of the weather on the two previous days, the display suffered to some extent.

The principal exhibits were :—

By Miss S. W. L. Cochrane, about 35 species collected at Beaumaris and Gembrook, including *Bauera rubioides*, *Grevillea alpina*, *G. rosmarinifolia*, *Thelymitra epipactoides*, *T. ixioides*, *T. aristata*, and *Calycothrix tetragona* and *Swainsona procumbens* from Stawell.

By Mr. G. Coghill.—Over 100 species from Point Lonsdale, Tunstall, Emerald, &c., including *Tetratheca ciliata* (white), *Correa æmula*, *Sphærolobium vimineum*, *Swainsona lessertifolia*, *Calochilus robertsoni*, *Prasophyllum patens*, *Caladenia suaveolens*, *C. menziesii*, *Pterostylis barbata*, &c.

By Mrs. Gatsworthy.—About 20 species from Beaconsfield' including *Dillwynia floribunda*, *Diplarrhena morœa*, &c.

By Mr. T. S. Hart, M.A.—Specimens of a Pimelea from Canadian, near Ballarat.

By Mr. J. T. Paul.—About 50 species from Grantville, Western Port, including *Goodia lotifolia*, *Styphelia lanceolata*, *Epacris obtusifolia*, *Caladenia cairnsiana*, *C. menziesii*, &c.

By Mr. W. Scott.—*Boronia serrulata* and *B. pinnatifida*, from Sydney.

By Mr. A. O. Thiele.—About 20 species from Castlemaine, including *Grevillea alpina*, *G. rosmarinifolia*, *Eriostemon obovalis*, *Brachyloma daphnoides*, *Pterostylis nutans*, &c.

By Mr. J. West.—About 25 species from Phillip Island, including *Caladenia patersoni* (very fine), *Clematis aristata*, *Caladenia carnea*, var., &c.

By Mr. H. B. Williamson.—7 species grown in the Hawkesdale State school garden, viz. :—*Lhotzkya genetylloides*, *Thryptomene mitchelliana*, *Stypandra glauca*, *Grevillea aquifolium*, *G. oleoides*, and *Pimelea linifolia*, transplanted from the Grampians, and *Goodia lotifolia*, grown from seed.

By Mr. F. Reader.—Dried specimens of *Erodium cygnorum*, with pinkish-violet flowers, and *Tunica prolifera*, L., a naturalized plant new for Victoria.

After an extended inspection of the wild flowers, the meeting terminated.

VISIT TO DR. HORNE'S AVIARIES.

At the invitation of Dr. G. Horne, about twenty-five members of the Club met at his residence, Queen's-parade, Clifton Hill, on Saturday, 19th September, in order to inspect his collection of live birds, which in some respects is quite unique. The afternoon, unfortunately, was cold and windy, and the birds, being in aviaries out of doors, were consequently not seen at their best. Great delight was expressed at the tameness and sociability of such birds as the Spine-billed Honey-eater, *Acanthorhynchus tenuirostris*, and the White-eye, *Zosterops cœrulescens*.

Among the other honey-eaters flying about in perfect freedom, and apparently in the best of health, were the Sanguineous, *Myzomela sanguinolenta*; Yellow-faced, *Ptilotis chrysops*; Yellow-tufted, *P. auricomis*; White-plumed, *P. penicillata*; White-eared, *P. leucotis*; Fuscous, *P. fusca*; Yellow-plumed, *P. ornata*; Warty-faced, *Meliphaga phrygia*; and White-bearded, *Meliornis novæ-hollandiæ*; also the White-browed Scrub-Wren, *Sericornis frontalis*; Yellow-breasted Shrike-Robin, *Eopsaltria australis*; Blue Wren, *Malurus cyaneus*; and Ground-Lark, *Anthus australis*.

Many of these birds are usually regarded as very shy, and quite impossible to keep in captivity; but Dr. Horne and his niece, Miss Bowie, by studying their habits, &c., have managed to gain their confidence to such an extent that they will take from the hand the flies or other tit-bits provided. On entering the aviaries it was interesting to see how soon the birds recognized their mistress, and even answered to pet names. The collection of finches is very extensive, and includes specimens of the following Australian species: — The Fire-tailed, *Zonæginthus bellus*; Red-browed, *Ægintha temporalis*; Painted, *Emblema picta*; Gouldian, *Poephila gouldiæ*; Banded, *Stictoptera bichenovii*; Black-ringed, *S. annulosa*; Chestnut-breasted, *Munia castaneithorax*; Plum-headed, *Aidemosyne modesta*; Long-tailed, *Poephila acuticauda*; Black-throated, *P. cincta*; Masked, *P. personata*; Scarlet-headed, *P. mirabilis*; Crimson, *Neochmia phaeton*; and the Red-faced, *Bathilda ruficauda*, besides a number of handsome species from foreign countries. Besides the Chestnut-bellied (King) Quail, *Excalfactoria australis*, which does exceedingly well in the aviary, and a clutch of whose eggs was being reared in an incubator, there were specimens of the Brown Quail, *Synœcus australis*, and the Stubble Quail, *Coturnix pectoralis*. Pigeons were represented by the Partridge (Squatter) Pigeon, *Geophaps scripta*, and the Crested, *Ocyphaps lophotes*. A large number of small foreign birds were quite at home, such as the Weaver-birds of Africa and India, the Paradise Whydah, the Napoleon Whydah, &c. In one aviary the contrast between our familiar Blue Wren and the brilliant orange-red of the Orange Bishop-bird of South Africa was very striking.

Among the larger birds fine specimens of the Golden, Amherst, Reeves's, and Swinhoe's Pheasants were greatly admired. Two hours quickly passed, and after partaking of the hospitality of Dr. and Mrs. Horne, the party separated, well pleased with the interesting afternoon.—F. G. A. Barnard.

ADDITIONS TO THE LIST OF VICTORIAN MARINE MOLLUSCA.

By J. H. Gatliff.

(*Read before the Field Naturalists' Club of Victoria, 10th August*, 1903.

Some years ago I contributed to the *Naturalist* a list of the Victorian marine mollusca which included some 350 species. In this list, which will be found in vol. iv. (1887), p. 57, and vol. v. (1888), p. 111, an attempt was made to reduce the number of synonyms, which had always proved a great hindrance to the study of Australian mollusca. Since that time fresh observations have been made, and additional species recorded, so that the

list became almost obsolete, consequently in 1897 Mr. G. B. Pritchard and myself undertook the preparation of a complete catalogue of the Victorian marine mollusca, with full synonomy and notes. This has been published from time to time in the "Proceedings of the Royal Society of Victoria," the sixth part, completing it to the end of the Gastropods and enumerating 531 species, having been published in February last; but even during the publication of the new catalogue additional species have been found and described. These will be dealt with later on in a similar manner to those already catalogued, giving references, habitat, observations, &c., but in the meantime it has been thought desirable to publish the names of the additional species, amounting to 41 in all. These, which include several types, I am exhibiting to-night, but special attention might be called to the following as being particularly noteworthy :—

Truncaria australis, Angas.—Described in 1877, found in New South Wales. So far I have only obtained three specimens.

Mitra pellucida, Tate.—This is a very small white shell, from 4 to 8 millimetres in length, and is, as its name denotes, pellucid.

Columbella filosa, Angas.—This was described in 1867, having been dredged in Port Jackson; it is an interesting form, being spirally lirate. The specimens exhibited were dredged in Western Port. I had some others and placed them with larger shells on the roof of an outbuilding to become deodorised. I noticed that the sparrows often hopped about these shells, and when I brought them in found that the small ones had disappeared, and could only conclude that the birds had devoured them.

Donovania fenestrata, Tate and May.—This is the first record of the genus having been found here, and the species is one recently described. The type was obtained on the east coast of Tasmania.

Conus aplustre, Reeve.—This species makes the fourth in the genus that has been found on our shores; it was described in 1843, and is recorded as occurring in New South Wales, New Zealand, and Cape of Good Hope. The shell is somewhat solid, usually about 1 inch in length, and may be readily distinguished from our other species by its broader form and encircling dotted lines of colouration.

I have been enabled to add the four additional species of Triforis through the kindness of Mr. Chas. Hedley, Conchologist, Australian Museum, Sydney, who has been studying the New South Wales representatives of the genus. Having published his results in the "Proceedings Linnean Society N.S.W.," part iv., for 1902, he was good enough to send me examples of some of the species for comparison, and I was thus enabled to identify four more as species found in Victorian waters.

Truncaria australis, *Angas*
Mitra pellucida, *Tate*
Marginella strangei, *Angas*
Marginella whani, *Pritchard and Gatliff*
Marginella pisum, *Reeve*
Marginella tridentata, *Tate*
Marginella cymbalum, *Tate*
Columbella filosa, *Angas*
Terebra inconspicua, *Pritchard and Gatliff*
Terebra fictilis, *Hinds*
Conus aplustre, *Reeve*
Natica tenisoni, *Tate*
Donovania fenestrata, *Tate and May*
Daphnella crebriplicata, *Reeve*
Daphnella mimica, *Sowerby*
Daphnella mimica, *Sowerby*, var. fusca
Mangilia incerta, *Pritchard and Gatliff*
Mangilia st. gallæ, *T. Woods*
Crepidula aculeata, *Gmelin*
Vermetus caperatus, *Tate and May*
Scala (Acrilla) minutula, *Tate and May*
Crossea cancellata, *T. Woods*
Fulima inflata, *Tate and May*
Turbonilla (Ondina) harrisoni, *Tate and May*
Odostomia deplexa, *Tate and May*
Odostomia suprasculpta, *T. Woods*
Oscilla ligata, *Angas*
Pseudorissoina tasmanica, *T. Woods*
Triforis graniferus, *Brazier*
Triforis labiatus, *A. Adams*
Triforis cinereus, *Hedley*
Triforis maculosus, *Hedley*
Teinostoma cala, *Pilsbry*
Cyclostrema inscriptum, *Tate*
Cyclostrema johnstoni, *Beddome*
Rissoa agnewi, *T. Woods*
Rissoa dubitabilis, *Tate*
Rissoa tumida, *T. Woods*
Rissoa flammea, *Dunker*
Rissoa pellucida, *Tate and May*
Rissoa maccoyi, *T. Woods*.

ON THE OCCURRENCE OF OLDER CAINOZOIC MARINE FOSSILS NEAR HEXHAM, WESTERN VICTORIA.

By A. E. Kitson, F.G.S.

(*Read before the Field Naturalists' Club of Victoria, 12th October*, 1903.)

The Older Cainozoic marine fossiliferous deposits of Victoria are of wide distribution in the southern portion of the State. They occur in various places, from the Snowy River on the east, to the South Australian border on the west, so that it may appear unnecessary to mention the occurrence of a few shells from bores sunk on the Western plains. Still, as every fresh discovery helps to link together more or less widely separated occurrences, it is of value, and should be recorded. Noticing, therefore, in the public press during February last that Mr. R. Hood, of Merrang, near Hexham, had obtained some fossil shells from material taken out of bores for water sunk on his estate, I asked him for some of the fossils, and for particulars regarding the bores. He very

kindly furnished these, together with a plan of his estate, and the information thus obtained is embodied in this paper.

Before, however, describing the occurrence, it may not be out of place to give a brief general outline of the geology of the surrounding districts.

As early as 1865, the late Mr. C. S. Wilkinson, in a report* dated 13th March, 1865, referred to the Cape Otway area as one which "seems to have been, if not an island, an elevated portion of the sea bottom during the deposition of the Miocene strata." (These strata have more lately been regarded as Oligocene and Eocene.)

He was thus of the opinion that between the Otway Jurassic area and the central watershed of Victoria fossiliferous beds of this system were hidden from view.

Later on Mr. R. A. F. Murray, F.G.S., speaks† of the Otway area on the west, and the South Gippsland area on the east, as having been separated from the mainland by two straits during Lower Cainozoic times.

This wide belt of country forms the plains of the Western district of Victoria—that great volcanic stretch, consisting of numbers of flows of basalt and beds of volcanic ash, among which numerous old craters, such as Mounts Porndon, Leura, Elephant, Noorat, Shadwell, Rouse, Napier, Eccles, and Tower Hill, rear themselves, and form such prominent features in the landscape. This country has been appropriately referred to by Mr. T. S. Hall, M.A.,‡ as the Victorian Puys, from its resemblance to the well-known Puys of Auvergne, France.

Taking a line running roughly north from the eastern edge of the Otway Jurassic region at Point Castries, we find it following approximately the Barwon River, along the middle part of its course; thence along the Yarrowee or Leigh River towards Ballarat to Elaine.

From this line westward to a line running approximately north from Portland to near Digby this wide expanse of volcanic rock occurs, with a length of about 140 miles, and a mean width of about 40 miles.

The area is bounded on the west by the post-Cainozoic deposits of Normanby, overlying the marine Cainozoics of the Glenelg valley; on the north by the Jurassic area of the Wannon, the Upper Palæozoic and Older Cainozoic to Recent deposits of Dundas, the pre-Ordovician and Ordovician rocks of Villiers, and by the granite, and Ordovician and Recent sediments of

* Report of the Director of the Geol. Sur., Vict., for period from June, 1863, to Sept., 1864, with Appendices, Vict. Parl. Papers, 1864–5.

† "Geology and Physical Geography of Victoria," Melbourne, 1895, p. 102.

‡ Handbook of the Aust. Assoc. for Advancement of Science, Melbourne meeting, 1900, p. 29.

Ripon and Grenville; on the east it is flanked or underlain by the amphibolites, diabases, epidiorite, and granodiorite * of Batesford and Geelong, Ordovician sediments of the Steiglitz district, Jurassic sediments of the Barrabool Hills, basalt, of probably early Eocene age, and Cainozoic sediments of the Dean's Marsh district, and the Moorabool and Leigh valleys.

This Upper Volcanic area, of probably late Pliocene age, or perhaps even younger, is not limited on the east by the rock masses specified, for it extends to the Melbourne district; and in the intervening area the Older Cainozoic sediments underlie, as has been proved by bores and shafts sunk at Newport and Altona, near Williamstown, and near Laverton and Werribee.

On the south the Otway Jurassic wedge extends to the coast, forming high, bold cliffs. It is flanked on all sides, though not continuously, with Cainozoic sediments, probably of the older series, while a great mass of Older Cainozoic sediments extends along the coast to Warrnambool, narrowing rapidly at the surface from east to west.

These Cainozoics consist in the main of rather incoherent quartz sands, under which, in the western portion, lie white and yellow limestones of friable and fairly compact texture, together with calcareous clays. These are seen to great advantage in the coastal cliffs from near the mouth of the Gellibrand River to near Warrnambool, and again in the basin of Curdie's River. The clays contain a rich fauna, chiefly Mollusca, while the limestones, though also originally rich, have now only the remains of the organisms whose shells consist of calcite, those of aragonite having been dissolved, and casts only left.

Within this volcanic area of the Western district only a few outcrops of rock other than volcanic occur. The most important of these is between Lakes Bullenmerri and Gnotuk, near Camperdown. This is a deposit of limestone and calcareous clay of Older Cainozoic age, described† by the late Professor Tate, F.G.S., and Mr. J. Dennant, F.G S., F.C.S., and contains a fauna represented by upwards of 100 species.

The locality from which the fossils recorded herein were obtained is near Hexham, on the Hopkins River, near Muston's Creek junction. It lies near the N.E. corner of the parish of Yeth Youang, and the S.E. portion of Hexham West. A small, narrow strip of Older Cainozoic deposits is marked on the new geological map of Victoria as extending for about 3 miles along the Hopkins River, but I am unable to say of what it consists.

* These rocks have been determined by Professor Gregory, D.Sc., F.R.S., see "The Heathcotian—a Pre-Ordovician Series, and its Distribution in Victoria." (Proc. Roy. Soc. Vic., vol. xv. (N.S.), part ii., 1903, pp. 165, 166.)

† "Correlation of the Marine Tertiaries of Australia," part i. (Trans. Roy. Soc. S. Aus., 1893.

Bore No. 1 is in Yeth Youang, about ½ mile S. of Muston's Creek, and between it and the Hopkins River, distant from the latter about 1 mile. Bores 2 and 3 are in Hexham West, the former about 3 miles N.N.E. from bore 1, and the latter a little over 1 mile N. from bore 2.

Bore No. 1 was sunk in a depression close to a basalt ridge. To the west and south of it basalt is distant about ¾ mile. This bore reached a total depth of 68 feet, through clay and stone, probably limestone. Good water was struck, but no shells were observed.

Bore No. 2 is on the south-eastern side of a ridge of basalt. It passed through, in descending order, 6 feet clay, 23 feet basalt, 12½ feet clay, 33½ feet drift sand, to a total depth of 75 feet, when it had to be abandoned, as sand prevented the casing from being forced down. No Mollusca were found in this bore, but Foraminifera and Bryozoa occur in the fine argillaceous and slightly calcareous sand from the lower portion. Possibly fossiliferous clays are present beneath the sand. Brackish water was met with in this bore.

Bore No. 3, the most northerly one, was sunk on the opposite side of this ridge of basalt, and in an area not covered with basalt. This area extends westwards for some 3 miles, where in a creek a good deal of limestone may be seen. Similar limestone was also found in some drains near the bore, but whether or not it is fossiliferous is not stated by Mr. Hood. Good water was struck in this bore, which passed through a succession of clay and stone to a depth of 63½ feet. This stone is probably limestone, since pieces of such rock show as nodules among the material.

The fossils now recorded were found in a bed of clay, 4¼ feet thick, at a depth of 56 feet. As might be expected from a water bore, much of the shell material occurs as fragments, but a few small shells occur entire. They include upwards of 20 species, which have the same facies as those of Mornington and Altona on the east, and the lower beds at Muddy Creek, near Hamilton, on the west. The general appearance of the material also greatly resembles that of the localities quoted, and the new beds probably belong to the same horizon as they do.

This occurrence of Older Cainozoic fossils near Hexham, and already known marine fossiliferous beds, especially those at Dean's Marsh, Birregurra, Camperdown, and Pitfield, leave little reason for doubting a former continuous connection between the Older Cainozoic deposits of the Geelong and Mornington districts and the Moorabool and Leigh valleys on the east, and those of Muddy Creek on the west.

Moreover, since the fossils found indicate clearly an Oligocene or Eocene period for the containing deposits, it seems probable

that deposits of the Miocene period, if they occur there at all, do so as isolated patches, as at Shelford in the Leigh Valley (upper beds), and at Muddy Creek (upper beds), and not as a wide-spread sheet, as is the case with the Older Cainozoics.

The appended list shows the fossils obtained from these Hexham bores :—

GASTEROPODA.

Bullinella phanerospira, Cossmann
Pleurotoma murndaliana, T. Woods
P. trilirata, Harris
Surcula claræ, T. Woods
Buchozia hemiothone, T. Woods
Mitromorpha daphnelloides, T. Woods
Ancilla pseudaustralis, Tate
Marginella cassidiformis, Tate
M. (n. sp.)
Nassa tatei, T. Woods
Columbella gracilirata, T. Woods
Cerithium apheles, T. Woods
Turritella tristira, Tate (prob.)
Mathilda transenna, T. Woods
Solarium acutum, T. Woods
Natica hamiltonensis, Tate
Niso psila, T. Woods.

SCAPHOPODA.

Dentalium mantelli, Zittel
D. subfissura, Tate
D. aratum, Tate.

LAMELLIBRANCHIATA.

Amussium zitteli, Hutton
Barbatia crustata, Tate
Limopsis forskali, Adams.

ACTINOZOA.

Flabellum gambierense, Duncan
Trematotrochus declivis, Dennant, prob. (juv.)

Otolith
Echinoid spine
Foraminifera spp.
Bryozoa spp.

In addition to the foregoing, there are fragments of several other genera.

The lists of fossils, and descriptions of the containing deposits, of the Cainozoic period in the districts herein referred to can be obtained from the papers by the late Professors M'Coy and Tate, and Messrs. Dennant, Hall, Pritchard, Grant, Thiele, and myself, in the "Proceedings" and "Transactions" of the Royal Societies of Victoria and South Australia, and the publications of the Geological Survey of Victoria.

I am greatly indebted to Mr. Hood, of Merrang, for his kindness in sending me information about and material from these bores; also to Mr. J. Dennant, F.G.S., F.C.S., for the identification of the unfamiliar fossils in the list.

AUSTRALIAN RHOPALOCERA.—Mr. John W. Moore, "Calbourne," Vicarage-road, King's Heath, Birmingham, England, wishes to obtain specimens of Australian Rhopalocera (in papers) for purposes of study, and is anxious to correspond with collectors willing to sell or exchange.

PIMELEA SPATHULATA, Lab.—Some specimens of a Pimelea, collected recently at Canadian, near Ballarat, seem to differ from the normal form of *P. spathulata*, and particulars may be of interest. The white specimens differ in robustness of growth, and though the relative hairiness of the calyx is used in the "Key" to separate *P. spathulata* from *P. collina* and *P. linifolia*, their characters as a whole seem to refer them all to *P. spathulata*. In the slenderer form there is a tendency to an increased number of bracts, or a transition from the ordinary form of leaves to that of the involucral bracts with the highest leaves closely appressed to the bracts. This is also seen in the pink specimen. The pink-flowered specimens seem almost without stamens, but traces of imperfectly developed stamens can be found.—THOMAS S. HART, School of Mines, Ballarat. 10th October, 1903.

THE BUTTERFLY UNA AGRICOLA.—I notice that at the August meeting of the Club there was some little discussion as to the dates of appearance of the small blue butterfly, *Una agricola*. As Mr. Waterhouse consulted me on this point before the publication of his "Revision," it is but right I should have something to say on the subject. In Sydney I have found this species occur very abundantly in October and November, but although I have collected there for several years in March and April, I have never come across it at that time of the year. This experience agrees with that of Mr. Waterhouse—who has searched carefully for it in the autumn in the same localities where he has captured hundreds of specimens in the spring—and leads us to conclude that, so far as Sydney is concerned, there is certainly no autumn brood. I have taken *U. agricola* at Gisborne in November and December, and at Oakleigh in November. It has been sent me from Wandin (Nov.), Longford (30th Dec.) and Hobart, Tasmania (Dec.) I have eighteen Victorian specimens in my collection, each with its date label attached, and the latest is 30th December. I regard Mr. Kershaw's record of 30th January as a late specimen of an especially late season, and until specimens with autumn date labels attached are forthcoming I think we may safely conclude that *U. agricola* is single-brooded in Victoria as well as in New South Wales. The opportunity should not be lost of impressing upon young collectors the immense importance of attaching locality and date labels to each insect at time of capture. Only so can one be certain of his facts—if he trusts to memory he is sure to be sometimes misled; and moreover the value of a properly labelled collection is increased fourfold. This discussion will, I hope, lead to careful watch being kept in the field this season for the first and last appearance of the butterfly in question.—GEO. LYELL. Gisborne, 29th September, 1903.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 16th November, 1903.

The president, Mr. O. A. Sayce, occupied the chair, and over 100 members and visitors were present.

REPORTS.

Mr. H. T. Tisdall reported that, owing to the very wet weather, only three members attended the Club excursion to Emerald on Saturday, 24th October, and little collecting could be done. Fifty-two species of plants were, however, noted.

Mr. D. Best read a report on the excursion to Wandong on Cup Day, Tuesday, 3rd November, when six members attended. The excursionists were favoured with exceptionally fine weather, and, considering the district is not a good one for general collecting, a fair number of specimens were noted, particularly in Coleoptera. Some good micro-fungi were collected, which, on being handed over to Mr. M'Alpine for examination, were found to include several new species. A number of specimens of Silurian fossils were also collected during the day.

A lengthy report on the excursion to Launching Place, which extended from the 7th to 9th November, was read by Mr. A. D. Hardy, who, with Mr. J. A. Kershaw, acted as leader. The party numbered 14 altogether, including two lady members. Saturday afternoon was spent working the flat country along the course of the river Yarra, and in the vicinity of Launching Place. On the following day a trip was taken to Malleson's Glen, on the Don River, while Monday was devoted to a visit to Britannia Creek. The general results of this excursion were regarded as very satisfactory, particularly as regards botany. Mr. Kershaw gave a report on the zoological results of the trip, while Mr. F. Chapman furnished a note on the geology. The members of the party were all delighted with the district for general field work, and returned to town well satisfied with the results accomplished.

The hon. librarian reported the receipt of the following donations to the library :—"Bulletin Geological Society of Victoria," Nos. 2 and 8, from the Society ; *The Emu*, vol. iii., part 2, October, 1903, from the Australasian Ornithologists' Union ; "Memoirs of the New South Wales Naturalists' Club, No. 1 : a Catalogue of the Rhopalocera of Australia," by G. A. Waterhouse, F.E.S., from the Club ; *Agricultural Gazette of*

New South Wales, vol. xiv., part 10, October, 1903, from the Department of Agriculture, Sydney; "Proceedings Academy of Sciences, Philadelphia," vol. lv., part 1, from the Academy; "Proceedings Boston Society of Natural History," vol. xxx., parts 3 and 7, vol. xxxi., part 1, from the Society; *Knowledge*, October, 1903, from the proprietors.

ELECTION OF MEMBERS.

On a ballot being taken, Messrs. Donald Macdonald, Melbourne, and J. Newell, jun., Fitzroy-street, Fitzroy, were duly elected members of the Club.

GENERAL BUSINESS.

Mr. G. A. Keartland mentioned that a meeting was to be held on Wednesday, 18th November, in Melbourne to form a society to be called the Field Trial Game Protection Society, to which persons interested were invited. He suggested that a representative from this Club be appointed to attend to ascertain whether the Club might co-operate with the new society, or whether it might be necessary to take steps to uphold the action of the Club in connection with the *Game Act*.

On the motion of Messrs. J. A. Kershaw and F. G. A. Barnard, Messrs. G. A. Keartland and D. Le Souëf were appointed to attend the meeting as representatives of the Club.

PAPERS READ.

1. By Mr. E. E. Barker, F.R.M.S., entitled "The Bull-ants of Victoria."

The author, by way of an introduction to his paper, gave an outline of his work in establishing an insect-house in connection with the Aquarium at the Exhibition Building, Melbourne, and briefly explained the construction of several ants' nests planned in such a manner that the insects could be seen at work and their habits studied. It is also the intention of the Exhibition Trustees to exhibit various other living insects, as well as the larvæ of such of our local Lepidoptera, &c., as can be obtained. It was explained, however, that it is the intention of the Trustees to confine themselves to the exhibition of only living specimens of insects. The author then gave some interesting details concerning the habits of two of the common species of ants found near Melbourne.

Messrs. F. G. A. Barnard, J. A. Kershaw, and the President spoke to the paper, and congratulated the author on his work.

2. By Mr. A. J. Campbell, entitled "Trips to Phillip Island."

Mr. Campbell gave a very interesting account of some trips to this locality, dealing particularly with visits to the Mutton-bird rookeries. A particularly fine series of lantern views, showing

various parts of the island and the rookeries, added considerably to the interest of the paper.

The President congratulated Mr. Campbell on his highly interesting paper, and regretted that owing to the lateness of the hour it would be necessary to withhold any discussion, and said for the same reason Mr. G. A. Keartland's paper would have to be postponed.

EXHIBITS.

By Mr. F. G. A. Barnard.—Abnormal flower of Foxglove—photograph, drawing, and preserved flower.

By Mr. C. L. Barrett.—Nest and eggs of Coachwhip-bird, *Psophodes crepitans.*

By Mr. R. A. Bastow.—Specimens of *Daldinia concentrica*, Boll., and *Stereum versicolor*, Fr.

By Mr. A. G. Campbell.—Specimen of Tree Orchid, *Sarcochilus parviflorus*, from Dandenong Ranges.

By Mr. F. Chapman, A.L.S.—Photographs taken in the ranges near Launching Place. Rock specimens: From Don River—Granulitic Diorite, Mica Diorite, and Dacite; also Titaniferous Iron-sand. From near Britannia Creek—Granodiorite. Also rock sections in illustration of the above.

By Mr. P. C. Cole.—Large stone wedge used by the aborigines for splitting logs, &c., from Willandra, N.S.W.

By Mr. D. M'Alpine.—*Polyporus mylittæ*, C. and M., fructification of Native Bread, collected by Miss K. Cowle.

By Mr. E. B. Nicholls.—Nest and egg of Rufous-breasted Thickhead.

By Mr. F. M. Reader.—Dried specimens of plants collected in the Wimmera—*Chara australis*, Brown, var. *crassifolia*, Al. Braun; *C. fragilis*, Desv.; *C. muelleri*, Al. Br.; *C. preissii*, Al. Br.; *C. scoparia*, Bauer, var. *muelleri*, Al. Br.; *Nitella diffusa*, Al. Br.; *N. gelatinosa*, Al. Br.; *N. glochostachys*, Al. Br.; *N. lhotzkyi*, Al. Br.; *N. myriotricha*, Kuetz; and the alga, *Lychnothamnus macropogon*, Al. Br.

By Mr. C. Walter.—Record of a new locality for *Oxylobium alpestre*, Upper Yarra, Vic., south, recorded previously from the north-east of Victoria only. Collected by Messrs. D. Best and C. Walter, October, 1903.

After the usual conversazione the meeting terminated.

Change of Name for New Genus of Polyzoa.—The name, Solenopora, that I gave to a new genus of fossil Polyzoa, described by me in the "Proceedings of the Royal Society of Victoria," vol. xvi., part 1, page 143, is, I find, pre-occupied; I therefore substitute for it the name Aulopocella. There is only one species, *Aulopocella tubulifera.*—C. M. Maplestone.

EXCURSION TO SANDRINGHAM.

I AM pleased to say that our excursion to Sandringham, on Saturday, 26th September, proved a very successful one. Owing to the heavy rainfall in the middle of September, and the following warm days, plant life was in a well-advanced state. About eighty species of the plants found on this part of the Victorian coast were seen in flower, thus giving those who are beginners in the study of plant life a splendid opportunity of securing a great number of species, as an encouraging start for a collection. Indeed, it was a great pleasure to see what keen interest the fifteen members of the excursion took in examining and collecting specimens of the flora surrounding them.

Leaving the station at Sandringham, we followed the road to Beaumaris for a few hundred yards, and then, turning to the left into the open country, entered the Tea-tree scrub near the Red Bluff, through which we proceeded as far as Black Rock. Then, as time did not permit us to go further, we decided to return to Sandringham, collecting partly on the sea coast and partly on the slope rising from the shore.

Before proceeding further, I would like to offer some explanation of the reasons for the conditions peculiar to this coastal flora. It is at once observable that the Sandringham flora presents quite a different appearance from that of more inland parts, and that the prevailing species are either of a succulent nature, occurring principally near the coast, or they are of a spinescent nature, small and narrow leaved.

Soil and climate play an important part in determining the character of a flora in general, and especially of a small local flora. They are the causes by which some species are distributed chiefly in certain regions, whilst in others with different soil and climatic conditions they are either missing or occur in a modified form. It seems as if plants which have the same claims on climate and soil form a "fellowship," taking up, with united strength, the struggle against the unfavourable conditions to which they are exposed, or enjoying together such advantages as Nature has provided. In the flora of Sandringham we observed three of these fellowships.

As the sea forms a natural barrier to phanerogamous plant life, I will speak first of all about those plants which brave the inclemency of wind and wave, and, so to speak, form the outposts of the flora further inland. In the poor, sandy soil which stretches only a few yards in width along the sea we noticed *Atriplex cinereum*, a species belonging to the Salsolaceæ, in solitary patches, while *Mesembrianthemum australe*, *M. æquilaterale*, *Tetragonia implexicoma*, and *Rhagodia billardieri* dare not go too near the sea, but are chiefly found on the partly rocky, partly sandy slope,

intermingled with small bushes of *Myoporum insulare*, *M. viscosum*, *Styphelia richei*, and *Alyxia buxifolia*. Nature wisely provided all these species with a great succulence or leathery consistency in their foliage, in order to resist effectively the great dryness of the soil and the hot temperature which frequently occurs during the time of flowering in this coastal district. Numerous small bushes of *Leptospermum lævigatum*, with its dainty white flowers, cover the slope, whilst here and there, in small clusters, we found *Lasiopetalum baueri*, the whole overshaded at intervals by specimens of *Casuarina quadrivalvis*. All these plants, growing on the slope and forming there the prevailing vegetation, are living in a community that differs in appearance from the next group, in which the Coast Tea-tree, *Leptospermum lævigatum*, is the prominent feature.

Immediately on the edge of the slope, the Tea-tree, being arborescent, forms a belt of dense scrub of varying width, having for companions *Acacia longifolia*, *Casuarina quadrivalvis*, and *Banksia integrifolia*, on which we often noticed the climbers *Clematis microphylla* and *Cassytha pubescens*, both at this time in fruit, with *Muehlenbeckia adpressa* in flower. On the edge of the slope, where the Tea-tree does not form a compact mass, we found Mesembryanthemum, Myoporum, Styphelia, Rhagodia, and Tetragonia—a repetition of the first fellowship—while in the shade of the Tea-trees, where the sandy soil has been improved through the old leaves falling from the trees year after year, the orchids *Caladenia carnea*, *Pterostylis curta*, *P. concinna*, *Diuris longifolia*, *Acianthus exsertus*, and *Corysanthes pruinosa* find the necessary conditions for their life.

The vegetation growing on the slope and this of the second fellowship show a considerable overlapping of the associated species, but this condition does not occur further inland, where the transition to the open ground is more or less fairly well marked.

The third fellowship is composed of entirely different species, which, on principle, will not accept the shelter which the Tea-tree offers them close by. In fact, if we strike in this part a separated group of Tea-trees, we notice that the flora under them does not consist of the same species as those growing around them. The prevailing species do not like the shade at all. Most of them are well marked by their spinescent leaves, thus having the surface area greatly reduced. This we observed in *Hakea nodosa*, *H. ulicina*, *Acacia oxycedrus*, *A. juniperina*, *Isopogon ceratophyllus*, *Davesia ulicina*, *Epacris impressa*, and *E. obtusifolia*. As the sandy soil here is very dry, and the transpiration, owing to the dry air, is so great, the transpiring foliage must be reduced to a minimum in order to maintain the balance and allow the plant to utilize the scanty supply of water to the

greatest advantage. We also observed the reduction in the size of foliage in forms such as *Ricinocarpus pinifolius*, *Leptospermum scoparium*, *L. myrsinoides*, *Casuarina distyla*, the yellow-flowering *Aotus villosus*, *Dillwynia cinerescens*, *D. ericifolia*, *Acacia suaveolens*, and others. Wherever we set our foot we met with the bright yellow-flowered Hibbertias—*fasciculata*, *stricta*, and *diffusa*—with *Goodenia pinnatifida*, and the white-flowered Pimeleas—*humilis*, *phylicoides*, and *octophylla*—the last-named species well provided with a dense coat of hairlets, in order to successfully regulate the transpiration.

Where the soil is free of bushes or shrubs, herbaceous plants, well-known friends of the inland parts, such as *Hypoxis glabella*, *Brachycome graminea*, *Microceris forsteri*, *Craspedia richea*, *Hydrocotyle laxiflora*, and *Ranunculus lappaceus* seem to enjoy one another's company. Under the shelter of dwarf bushes of *Casuarina distyla*, *Banksia marginata*, and others, *Drosera menziesii*, *Platylobium obtusangulum*, and *Calostrophus fastigiatus* appear, whilst the climber *Cassytha glabella* grows exuberantly among the bushes.

Most of the species mentioned bear white or yellow flowers, which colours predominate in the flowers of the Sandringham flora at this time of the season. But this want of variety of colour is sometimes interrupted by the occurrence of more highly coloured species, such as *Glossodia major*, *Caladenia patersoni*, *Thelymitra antennifera*, *Prasophyllum elatum*, *Candollea serrulata*, *Arthropodium strictum*, *Patersonia glauca*, *Dianella revoluta*, *Wahlenbergia gracilis*, *Chamæscilla corymbosa*, and the scarlet creeper, *Kennedya prostrata*. In places where the soil retains the moisture for a considerable time during the year we collected *Utricularia dichotoma*, *Polypompholyx tenella*, *Ranunculus aquatilis*, *Lymnanthemum exaltatum*, and *Drosera spathulata*. Fine specimens of the grass *Stipa semibarbata* frequently rise above the low shrub vegetation. Of representatives of cryptogamic plant life we found the ferns *Lindsaya linearis* and the cosmopolitan *Pteris aquilina*.

My report is rather a lengthy one, as, in writing it, I have not confined myself to merely mentioning the different species we found in bloom, and which pleased us by their beautiful forms or other peculiarities, but have taken the opportunity to try and point out that even a superficial observation of a flora should create such an interest in the observer as to cause him to study the plants, not only as individuals, but also in the relationship which the different species have one to another.—G. Weindorfer.

EXCURSION TO WANDONG.

For this excursion on Cup Day, Tuesday, 3rd November, six members put in an appearance. Probably it was the very early hour at which one had to arise to catch the 6.15 a.m. train at Spencer-street that accounted for so limited an attendance. Arriving at Wandong, on the northern slopes of the Dividing Range, about 34 miles from town, we at once started eastward along the old timber tram track, and at first little collecting was to be done, there being no plants or shrubs in flower, scarcely any Lepidoptera to be seen, and under logs, stones, &c., no beetles whatever were found. About a mile from the station the Coleopterists were fortunate in securing a good variety of specimens from under the bark of the eucalypts, the best capture being three fine Longicorns, *Phlyctœnodes pustulosus*. The most numerous beetle, however, was an Elater, *Hapatesus hirtus*, very plentiful almost anywhere within 40 or 50 miles of Melbourne. Other Elaters, of the genera Crepedomenus and Lacon, were also plentiful, as were also small Carabs, mostly of the genera Sarathrocrepis and Xanthophœa. A Longicorn which was fairly numerous, but mostly dead, was *Coptocercus aberrans*, their death appearing to be probably due to a fungus—at all events they had a very fungoid look about them. *Coptocercus rubripes* was also taken, but was not nearly so plentiful as *C. aberrans*. As we ascended the ranges appearances improved considerably, but still very few flowers of any description were to be seen, hence the scarcity of butterflies. Of these the only ones we noticed, and none of them numerous, were *Pyrameis kershawi*, *P. itea*, *Junonia vellida*, and *Pieris teutonia*. Near to and on the summit were plenty of *Acacia stricta* (none in flower), and from these we secured a few beetles, among them being one rather rare Longicorn, *Aphneope sericata*, and an equally rare Elater, *Chrosis trisulcata*. We also took from these acacias, feeding in the wood, a few larvæ, which we think will prove to be *Peisarthreus marginella*, so common in the *Acacia longifolia* about Cheltenham and Mordialloc. Here on the summit we also saw one solitary specimen of the yellow butterfly, *Terias smilax*, but, our Lepidopterists not being present with their nets, it was not captured. We extended our walk about two miles beyond the summit, descending on the eastern slopes, but from a collecting point of view they were more barren of results than the western, as the only specimens we secured were two orchids, *Calochilus robertsoni* and *Chiloglottis gunnii*. These were the only two orchids seen on the ranges, and only two or three of each species. A good many micro-fungi were taken, principally on the leaves of Veronica, Viola, Hypericum, &c. These fungi have been handed to Mr. D. M'Alpine, who reports several of

them as being new to science, and who, if present to-night, may probably have something to say respecting them.

One of our members, Mr. Spry, was fortunate in securing some Silurian fossils, but in the absence of a list from him I am unable to say whether of any special interest. On our return to Wandong, rather than wait there for three or four hours for our train, we decided to walk to Wallan, distant about five miles on the Melbourne side, and it was whilst walking inside the railway enclosure that we came across a fine patch of the orchid *Diuris sulphurea*; other plants were noted, nothing, however, worthy of special mention, and no other orchids were seen.

Taken altogether, these ranges do not offer a good field to the collector, but for Lepidoptera it will no doubt be much better in a few weeks hence. For beetles there seem to be very few flowering shrubs for them to feed upon, Leptospermum, upon which so great a variety are generally found, being almost entirely absent, and certainly none was seen in flower. Although our excursion was not a great success, we were fully compensated by having an exceptionally fine day, and the only drawback to a very pleasant outing was our having had to wait for close on three hours at a most uninteresting station for the train to bring us home, which we reached about 12 p.m.—D. Best.

THE BULL-ANTS OF VICTORIA.

By E. E. Barker, F.R.M.S.

(*Read before the Field Naturalists' Club of Victoria, 16th Nov.*, 1903.)

At the September meeting of the Club I had the honour, on behalf of the Exhibition Trustees, to exhibit two section cases containing live ants; and I now have pleasure in informing you that the trustees are shortly about to open an Insectarium in connection with the Aquarium. I am sure you will be glad that a means will be thereby provided of observing the habits and changes of many of those insects in which you are interested, and which are known to the public by the excellent collections in our National Museum and the Government Entomologist's Department.

To show various phases of insect life under, as nearly as possible, natural conditions, the Exhibition Trustees have set aside a building which is specially fitted up as an Insectarium. Prominence is given to bees and ants at work, which are shown in specially designed glass cases. You are no doubt aware that at the Zoological Gardens in London the insect-house is a very interesting feature, but it does not include sociable insects. At the Crystal Palace there is an exhibit of British ants, but cases adapted for small insects of from under $\frac{1}{16}$ inch to $\frac{3}{8}$ inch are unsuitable for the larger insects of Victoria. The Exhibition Trustees have therefore had to devise cases to meet the requirements of local

specimens, and in doing this they have gone very far in advance of anything hitherto existing.

The largest case (which is occupied by a colony of Red Bull-ants) measures 6 feet x 4 feet x 1 foot 6 inches deep, while others measure 3 feet 6 inches square, and are capable of containing an entire nest. Some of the sectional cases measure 4 feet x 3 feet. For the bees observatory hives of an advanced pattern have been made. The area of comb under observation in each case is about 12 square feet. The Trustees hope that this section will be helpful to those practically interested in the production of honey from a commercial point of view. Then there are cases for the larvæ of Lepidoptera, for scorpions, tree-spiders, stick and leaf insects, beetles, and for the rearing of various kinds of silk-caterpillars.

The Trustees may, I am sure, rely upon the co-operation of members of the Field Naturalists' Club to contribute live specimens as the season advances. It may frequently happen that during your excursions you may come across specimens which, although perhaps not of the kind towards which you have a special leaning, still would be very interesting to the general public. May I ask you to assist the efforts of the Exhibition Trustees by forwarding such unconsidered trifles to their secretary, Mr. Thomas Short, who will gladly acknowledge your contributions.

THE BULL-ANTS OF VICTORIA.

In speaking of the Bull-ants I am particularly referring to the Black, *Myrmecia forficata*, Fabr., and the Red, *M. sanguinea*, Smith, both of which I have had under observation in the insect-house during the winter. I do not know whether they most deserve the name of "Bull-dogs" from the square shape of the head, their pugilistic disposition, or from their tenacity in retaining a hold. They certainly deserve the title by reason of their courage. To me the "Bulls" are but new friends, for I only made their acquaintance in the early part of this year, but since then it has been close, continuous, and occasionally lively. They are very similar in structure; the colour is their greatest difference, and next to that the size, for the Blacks are a little larger than the Reds. They are decidedly dissimilar, however, in habits and temperament. The Blacks are more nocturnal in their habits; comparatively few of them show themselves under ordinary circumstances during the day. A much greater activity is visible with the Reds. But when once the Blacks are aroused they are active enough. If you probe the nest they come teeming out with mandibles extended in a very "let-me-get-at-him" attitude, so that in digging out a nest and boxing between 600 and 700 you have to look particularly lively or they will soon dance all round you, showing a special preference for the part above the boots. I

have seen them follow an intruder for quite 30 feet from the nest in the hope of getting a parting bite. With the Reds it is different; should one of them come to the entrance of the nest and see you there he usually withdraws again and backs out of sight. But in such a case a Black would come straight for you; he knows no discretion. Even in opening a nest of Reds, they will withdraw to the lower chambers, so that when you come to the end of a channel (which usually ends in a pocket) you may be sure of getting a spade-full "all alive." During the winter the Blacks keep very much under ground, scarcely showing themselves, and even at this date (November), and with the present warm weather, the Blacks give very little sign of activity outside the nest during the day, while the Reds have been out in considerable force during the winter, busily working, with the thermometer at 50 degrees. The Reds are much more gentle than the Blacks; they will approach you with an inquisitive but inoffensive air, and I have had them frequently walk over my hands without any attempt to bite or sting. The Blacks, however, with threatening aspect, open wide their mandibles before reaching you, and should they touch your hand they at once dig into it without any ceremony. The Bulls remind me very forcibly of the bees, the Reds representing the more gentle disposition and more industrious habits of the "banded Italians," and the Blacks the irritability and less activity of the Black Bees. Another feature of resemblance is in the bands of colour on the abdominal plates of the Red, and also their lighter colour generally. I don't say that lightness of colour and abdominal bands, in ants, is to be considered indicative of the same traits as they mark with the bees; but in working with them both one is being constantly reminded of the similarity. The Bulls are most remarkable for their size; I believe the Black Bull-ant of Australia enjoys the unique distinction of being the largest ant known. Hundreds of the large workers in the colony will measure from an inch to $1\frac{1}{16}$ inches, and the females will measure $1\frac{1}{8}$ inches and over.

Both the Red and the Black Bulls consist of minor workers, major workers, males, and females. The minors (which are the least numerous) commence at about $\frac{9}{16}$ inch. The majors (which outnumber the minors by 5 to 1) run from a little below to a little above an inch, and the females $1\frac{1}{8}$ inches. The males and females may be distinguished from the workers by their wings and their greater development of the thorax, and, if apterous, the nodes showing where the wings were attached.

There are three processes by which the wings of the females may be removed :—1st. By the drastic use of violence. When a colony is queenless, and they capture one from a neighbouring nest, they tear off its wings to secure it at home. The same

strong measures are taken to denude some of the young queens at the swarming period. 2nd. By voluntary action of the queen itself. For this purpose the two posterior legs are used. The legs are hitched over the wings, which are bent back and broken off. Their attitude during this operation forcibly reminds you of a gentleman carrying his walking-stick across his back, with his elbows hitched over it. 3rd. By the natural process of exfoliation—or, to use a legal term, the wings become "null and void by the effluxion of time." All Bull-ants sting.

As regards the nests, they are very similar in outward appearance and internal construction. Externally, a little loose earth and a few holes are the only indications. I have opened many of them during the past winter, and while there is a very strong resemblance in the construction of the nests, I have been struck with the fact that in all the Black nests I have found larvæ. This is not a case of the last brood hibernating, as is the case with some ants, for the larvæ are in various stages, and increase in size during the winter months. In the Red nests I have not found any larvæ, and infer that breeding with the Blacks goes on all the year round, while with the Reds it may not proceed during the winter. The impression is strengthened by the fact that the Blacks are far more numerous around Melbourne. I know one paddock at Hampton in which I could discover only one nest of Reds, while there are over 50 nests of Blacks. It had first occurred to me that this discrepancy might have been owing to the Blacks having almost exterminated the Reds there, but I find the same occurs at the scrub between Sandringham and Beaumaris, where the question of warfare would not come in, for the district there is comparatively wide, and the Blacks are not in such numbers as to have the nests so close together; yet it would be safe to say that even there 30 nests would be found of the Blacks for one of the Reds. At Heidelberg also I have found the Blacks more numerous. Probably some of my fellow-naturalists may be able to confirm this in localities further afield.

[Since writing this paper I have had the queen Black Bull laying its eggs, and am therefore able to confirm the impression that breeding proceeds all the year round with the Black Bulls.]

The strength of the colonies is also different. I have found the Blacks number from five hundred to a thousand, while the Reds I have opened numbered from two hundred to five hundred. Both the nests go down 2 to 4 feet through the surface soil into the yellow clay, and I have found them where the clay was particularly hard, so that considerable labour with pick and shovel is required in taking them out. There are exceptional cases where the form of the nest is modified, which it may be from the strength of the colony, the time it has been established,

the nature of the soil, or the advantage taken of its local surroundings. I have found the Blacks show a greater preference for old tree roots, and in one case where they had made a nest near a fallen tree, one of the limbs of which had dipped into the ground, where it had rotted away, the ants had returned up the limb, so that that nest was not only below but also 2 feet above ground, and larvæ were found in the portion above the ground level.

The sectional case exhibited at the September meeting measures 4 feet x 3 feet, and is a type of the nests of both the Reds and the Blacks. The channels are wider towards the bottom, narrower and more numerous at the surface, and they diverge from the entrances. The inception of this design of case is due to the secretary of the Trustees, Mr. Thomas Short, who, as a practical constructional engineer, is *au fait* with sections. It has been made under his direction, and possesses the great advantage of showing both the ants and the construction of the nest. I propose that this vertical section should be called "Short's section," to distinguish it from the flat table, which is Sir John Lubbock's section.

It has been inferred by Sir John Lubbock that ants do not like the light, while the Rev. W. Farren White states that they have a preference for it. The Bulls certainly show a preference for the light. Not only are their nests generally placed where the sun may shine on them, but in the insect-house they desert the side of the case farthest from the light and frequent the portion nearest the windows. Where they have themselves made additional entrances to the nest, both the Blacks and the Reds have made them as near to the windows as they could, while the Reds have even closed up those entrances I had at first made for them at the side of the case farthest from the windows.

In the proceedings of the Linnæan Society (of London) for 1861 is a communication from a Mrs. Hatton, of Sydney, in which are details of what is called the "funeral rites" of the "Soldier" Ant—presumably the Red Bull. She states that, a number of these ants having stung one of her children, she killed about 30 of them, and on returning to the spot half an hour afterwards she found a large number surrounding the dead ones. She adds :—"I determined to watch their proceedings closely, and followed four or five that started off from the rest towards a hillock a short distance off in which was an ants' nest; this they entered, and in about five minutes they reappeared, followed by others; all fell into rank, walking regularly and slowly two by two until they arrived at the spot where lay the dead bodies of the Soldier Ants. In a few minutes two of the ants advanced and took up the dead body of one of their comrades, then two others, and so on until all were ready to march. First walked two ants

bearing a body, then two without a burden, then two others with another dead ant, and so on until the line was extended to about 40 pairs, and the procession moved slowly onwards, followed by a regular body of about 200 ants. Occasionally the two laden ants stopped, and, laying down the dead ant, it was taken up by the two walking unburdened behind them, and thus by occasionally relieving each other they arrived at a sandy spot near the sea. The body of ants now commenced digging with their jaws a number of holes in the ground, into each of which a dead ant was laid, where they now laboured on until they had filled up the ants' graves. This did not quite finish the remarkable circumstances attending this funeral of the ants. Some six or seven of the ants had attempted to run off without performing their share of the task of digging; these were caught and brought back, when they were at once attacked by the body of ants and killed upon the spot; a single grave was quickly dug, and they were all dropped into it." This account was incorporated by the late Mr. F. Smith in his paper before the society in 1861, and is referred to by Rev. W. F. White in his interesting and instructive volume of 1895 on "Ants and Their Ways." It is to be regretted that in the interval between these dates no corroboration of so extraordinary a story should have been obtained.

I will merely state that if that story refers to the Red Bull it finds no corroboration in my observations. I have kept a daily record of the deaths of this ant extending over four months, and while I have frequently watched them carrying their dead I have never seen any attempt at burying them; they usually bring them to the corner of the case nearest to the light, and that portion may be called the cemetery; here they leave them, without any attempt to cover them. It occasionally happens that the dead bodies get covered unintentionally—as for instance, when they are dropped on what may be called the general dumping ground for the refuse building material. So far as the Bulls are concerned, I have seen nothing to lead me to suppose that they deliberately bury their dead, while I have seen a great deal which contradicts the "De Rougemontesque" funeral procession which I have quoted. When ants from opposing nests meet a fight ensues, and it often happens that an ant from one nest will be laid hold of by two from another nest, while a third will look on and occasionally encourage its friends with its antennæ. The two attacking ants do not act in concord, but often pull in different directions. When the strongest gets an advantage they run for a time in the same direction, and this might have given the idea of a procession.

The antenna, as with all ants, is a very important portion of their anatomy. The flagellum is composed of eleven joints,

furnished with very sensitive hairs, and serves the purpose of speech as well as touch and taste. It has been thought that they may also possess the sense of smell. I have tried some experiments with *M. sanguinea*, which do not seem to confirm their appreciation of scent as we understand it. If a very pungent and noxious matter is placed near the antennæ they do not hesitate to touch it, although they suffer thereby. They will touch their antennæ on wet paint or varnish, so that the sense of smell that would be a warning to us does not seem to be appreciated by them. If a drop of their own formic acid is placed near them they will touch it with the antennæ, and immediately show signs of distress. If the larva of the cockchafer, which has been impregnated with formic acid by the stings of the ants, is torn open and held towards them, and they touch it with the antennæ, they show signs of distress; the antenna that has touched the affected part will be violently rubbed either on the side of the case or on the ground, the ant walking quickly backwards. Only the antenna which has touched the objectionable matter will be rubbed, and after a very brief space the ant walks away as if the pain had subsided. When they come into contact with any slimy matter, as, for instance, in grappling with a worm or attacking a slug, both the mandibles and antennæ will become coated. They will then seek a soft part of the ground, and rub them in the sand preparatory to cleaning them. This seems to be a very artful operation, for the grains of sand by attraction will, to a certain extent, absorb the matter which they wish to remove, and make it easier for them in the process of cleaning.

While the foregoing experiments would argue against the sense of smell in the antennæ, there are some points in favour of such a faculty. For instance, the power of recognition by touch of the antennæ. If two ants from the same nest are separated for a time (I have tested it after a period of months), they recognize each other as friends by a touch of the antennæ, but if two ants meet from different nests (even if only a few yards apart) they at once recognize each other as enemies, and a fight ensues. It is not necessary that the antenna of one ant should touch that of the other, for recognition at once takes place if the antenna of one touches any portion of the body of the other. It is difficult to disassociate this process of recognition from the sense of smell, and equally as difficult to see why adjoining nests should differ in that respect.

In performing their toilet their attitudes are both grotesque and interesting. A favourite position is to turn the abdomen under (like a crayfish), and extend the two hind legs backwards as props, and then sit straight upright. This relieves the two fore legs, which may be used simultaneously to clean the antennæ and mandibles. On the anterior tibia there is an elaborate apparatus, consisting of a brush to clean the antennæ

and a scraper to polish the mandibles (this apparatus is easily seen in the microscope). In brushing one of the antennæ both legs are often used in quick succession. The tibia of the intermediate and posterior legs are each provided with two spurs with brushes, but they are not so elaborate as those provided for the antennæ. A very frequent attitude is for the ant to careen over on the three legs of one side and then lift up all the legs of the other side clear of the ground, and clean the centre one with the two others. I have seen them balance on two legs and abdomen, and use four legs at once in the cleaning process. All the Bull-ants possess both simple and compound eyes. The simple eyes (of which there are three, situated on the top of the head) are used to see objects at a distance, and the large compound eyes for objects at very short focus. It does not require a great stretch of imagination to suppose the compound eyes of ants possess a magnifying power. They see objects of microscopic minuteness, and at very close focus. You are aware that all ants are most sanitary in all that pertains to the formic castle. They not only remove the dead, but also the dying. I have often seen a struggling ant brought out of the nest and conveyed to the cemetery. Thinking it was only an ordinary fight, I have put it back again, only to find it again ejected. On putting one of these under the microscope I discovered its feet and other parts of the body were very dirty. I conclude, therefore, that neglect to clean themselves is one of the first signs of sickness with the ants.

The Bull-ants (like other ants) are very fond of water ; they not only drink it, but bathe in it and swim in it. I have frequently seen them voluntarily leave one side of a 6-inch dish and swim across to the other. You have no doubt often wondered at the comparatively heavy weights lifted and carried by ants. A Bull-ant will carry a large cockroach, which is several times its own size and weight. Some of the stones they bring up from their nests are like nuts or marbles. I have here a pair of gloves made of doe-skin and lined with chamois leather ; they weigh nearly 3 ounces. Any of the Red Bulls will hold one of them in its mandibles, and the large workers of the Black variety will sustain the united weight of both gloves. The ant weighs 1¼ grains. The gloves are therefore eleven hundred times as heavy as the ant. Applying these figures to genus *homo*, it would be equal to a man of 12 stone being suspended head downwards and sustaining a weight of 82 tons in his teeth.

Personal.—Our fellow-member, Mr. Robert Hall, F.L.S., C.M.Z.S., returned to Melbourne during the month, looking well after his long journey. We understand the collections made in Siberia are in the hands of the Hon. Walter Rothschild, of Tring, England, for working out, but we hope to hear some of Mr. Hall's experiences within the Arctic circle ere long.

BOOK NOTICE.

AUSTRALIAN NATURE STORIES FOR CHILDREN. By Constance Tisdall, B.A. Melbourne: Ingram and Son. Price, 6d.

Under the above title has been published a little volume of nearly 100 pages, designed as an elementary reading book for schools. In the dozen chapters of which it is composed as many of our characteristic birds, animals, and trees are dealt with in an interesting style, generally conversational, in which each object tells its own story, and in so doing emphasizes many of the more prominent facts connected with its life-history. Each chapter is illustrated, and is thus made more interesting for young readers. It is to be hoped that its usefulness will be recognized by teachers throughout Australia.

TIMBER-GROWING IN SOUTH AUSTRALIA.—The recently issued report of the Conservator of Forests for South Australia, Mr. Walter Gill, shows what may be done in the way of tree-planting in Australia. His State can fairly claim to be the first of the Australian States to put timber on the market, suitable for commercial purposes, from trees planted and grown under Government supervision. Mr. Gill reports that an Aleppo Pine, *Pinus halepensis*, grown in the Wimbarra Forest in twenty years, was felled and cut into timber for fruit cases, yielding enough boards for sixteen cases. The result was so satisfactory that a small saw-milling plant has been erected, and enough trees felled to yield 6,000 export apple cases. The report is illustrated with several views of portions of the plantations, as well as of the Date Palms at Hergott, where 330 lbs. of very fine fruit was produced last season. In another pamphlet on "The Growing Scarcity of Coniferous Timber," Mr. Gill points out that the growing of pine timber could be largely entered upon in Australia, and that the Ninety-Mile Desert, between the Murray and the Victorian border, could be made a vast pine forest, to the manifest advantage of fruit-growers and others, besides affording an outlet for labour.

DESTRUCTION OF MARSUPIALS.—The Annual Report (for 1902) of the Queensland Inspector of Stock contains some large figures with reference to the destruction of marsupials in that State. Since the inception of the Act of 1877 a bonus has been paid on the scalps presented, which have numbered 17,378,392 in all, comprising 7,407,863 kangaroos and wallaroos; 9,290,039 wallabies; 460,838 paddymelons, bandicoots, and kangaroo rats; and 219,652 dingoes. The report states that, owing to the drought there is a decrease of 4,250,000 in number of sheep cattle, and horses in the State, in comparison with the previous year. Competent authorities have stated the loss to Australia by drought, during the last seven or eight years, has amounted to at least 60,000,000 head of sheep, cattle, and horses.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 14th December, 1903.

Mr. D. Le Souëf, C.M.Z.S., one of the vice-presidents, occupied the chair, and about 55 members and visitors were present.

REPORT.

The hon. librarian reported the receipt of the following donations to the library :—"Forest Flora of New South Wales," part 5, by J. H. Maiden, F.L.S., Government Botanist, from the author; *Agricultural Gazette of New South Wales*, vol. xix., part 11, November, 1903, from the Department of Agriculture, Sydney; *Nature Notes*, October and November, 1903, from the Selborne Society, London; *Knowledge*, November, 1903, from the proprietors.

ELECTIONS.

On a ballot being taken, Miss Carrie Cowle, East Melbourne, and Messrs. H. G. Haig, 32 Princes-street, Fitzroy; Hugh A. Browne, Croydon Road, Surrey Hills; and Arthur C. Parkyn, Campbell-road, Balwyn, were duly elected members of the Club.

GENERAL BUSINESS.

The chairman took the opportunity of welcoming back to the Club Mr. R. Hall, F.L.S., who recently returned from a collecting trip through Siberia and Russia, and afterwards visited England. Mr. Hall, in acknowledging the cordial welcome extended to him, expressed his pleasure at being back again in Australia.

Mr. G. A. Keartland reported on the meeting of the newly-formed Field Trial and Game Protection Society, at which he was appointed to attend, together with Mr. D. Le Souëf, C.M.Z.S., as representatives of the Club. Mr. Keartland stated that he was cordially received by the Society, which gave him an opportunity of explaining the Club's views regarding the close season for game. He availed himself of this opportunity to protest against the tendency of many sportsmen to endeavour to secure "big bags" at the expense of the birds. The chairman, Mr. Le Souëf, also spoke, and mentioned that a deputation of sportsmen had recently waited on the Commissioner of Public Works to advocate the opening of the shooting season for ducks and quail at an earlier date. The hon. secretary reported that in consequence of the action of the sportsmen the committee had appointed Messrs.

T. S. Hall, M.A., G. A. Keartland, and the secretary, Mr. J. A. Kershaw, F.E.S., to act as a deputation to wait upon the Commissioner to protest against any alteration in the present *Game Act*. He had communicated with the Minister, who had fixed the 16th inst. as the day on which he would receive the deputation. He further explained that the Club's delegates would be supported by the representatives of the Australasian Ornithologists' Union and the Zoological and Acclimatization Society, while representatives of the sportsmen would be present to oppose the action of the Club.

Mr. A. Mattingley drew attention to the proposal of the Government to lease the creek and river frontages throughout the State, and to give the right to the lessees to cultivate these areas. He thought some action should be taken by the Club to prevent the destruction of the timber on these water frontages, as, in addition to the loss of the timber, the native mammals and birds, through being deprived of their cover, were driven from the district. He also stated that there was a proposal to throw open for selection portions of Wilson's Promontory.

Mr. G. Coghill thought the Minister was only endeavouring to obtain revenue from those areas which are already used by farmers and others.

Mr. F. Wisewould thought that the adoption of such a proposal would mean the total destruction of all the timber on the river frontages, as the land would be cultivated, and it would therefore affect not only the fauna and flora but even the fish.

Mr. F. Pitcher said that the Minister found that squatters and others had been using these water frontages for years without payment, and his object was to obtain some revenue in return for the concession. All river frontages, with very few exceptions, are permanently reserved for a chain or so. Regarding Wilson's Promontory, he thought that if it were definitely known that the Government proposed to throw any of it open for selection, some action should certainly be taken by the Club to prevent it.

Mr. A. Coles spoke in support of Mr. Mattingley's remarks.

It was decided that the Committee should consider the matter, with a view to taking some definite action.

PAPERS.

1. By Mr. G. A. Keartland, entitled "Ornithological Notes—The Grass-Wrens."

The author stated that the genus Amytis, Grass-Wrens, was a difficult one to investigate owing to the inaccessibility of their habitats, and their peculiar methods of rendering themselves invisible to the observer. He related his experiences with *Amytis textilis*, *A. striatus*, and *A. modesta*, and ventured the opinion

that *A. macrourus*, of Gould, will prove synonymous with *A. textilis*, Quoy and Gaimard.

Mr. R. Hall and the Chairman made some observations on the paper, and congratulated Mr. Keartland on the value and usefulness of his work. The former stated that the genus was, however, preoccupied, and would not therefore stand.

REMARKS ON EXHIBITS.

Mr. J. A. Kershaw, F.E.S., drew attention to and made some remarks on a rare colour-variety of the common eel, which he exhibited on behalf of the National Museum. The specimen was recently presented to the Museum by Mr. H. Quiney, of Mortlake.

Mr. C. French, jun., drew attention to the specimen of the orchid *Pterostylis mackibboni*, exhibited on the table.

Mr. J. Gabriel called attention to a small collection of Polyzoa and shells, recently dredged at Western Port Bay, exhibited on the table.

NATURAL HISTORY NOTES.

Mr. F. Wisewould remarked, regarding the recent wreck of the tank vessel *Petriana*, off Point Nepean, from which large quantities of oil escaped, that mussels collected near Williamstown, nearly 50 miles from the scene of the wreck, were found to be strongly impregnated with kerosene.

Mr. G. A. Keartland drew attention to the reports in the newspapers of the enormous quantities of caterpillars which were doing great damage to the grass and crops in various parts of the State.

Mr. C. French, jun., stated that they were the larvæ of the well-known moth *Heliothis armigera*.

Mr. J. Gabriel stated that the European Starlings were eating large quantities of the caterpillars, and that the farmers recommended their protection on that account.

Mr. A. Coles endorsed what Mr. Gabriel said regarding the value of the Starling. He also furnished a newspaper cutting regarding the destructiveness of sparrows to grain.

Mr. D. Best remarked on the enormous quantities of the common white butterfly, *Belenois java*, Spar., usually known as *Pieris teutonia*, Fab, on the Buffalo Mountains, where they appeared in thousands.

Mr. J. A. Kershaw, F.E.S., stated that these butterflies were unusually numerous this season almost all over the State. They were to be seen almost every day flying along some of the principal streets in the city and suburbs. Sydney entomologists had also remarked on the large numbers in that State. In answer to a question, Mr. Kershaw stated that the larvæ of this species feed on the leaves of *Capparis mitchelli*.

EXHIBITS.

By Miss L. Bainbridge.—The rare orchid *Pterostylis mackibboni*, from South Australia; also, a Lemon showing germinating seed, with well-developed chlorophyll.

By Mr. P. C. Cole.—A sacred ceremonial stick, from N.W. Australia.

By Mr. C. French, jun.—Buprestis Beetle, *Stigmodera bremei*, Hope, found breeding in wood of *Acacia stricta*, collected at Wandong Ranges; also, fine specimen of aboriginal stone knife, from Murray River, near Swan Hill.

By Mr. C. J. Gabriel.—Specimens of shells of *Cypraea augustata* and varieties dredged alive at Western Port; also old teapot lid encrusted with Polyzoa, Lithothamnia, and Gorgonia; and some fine specimens of Polyzoa, all dredged by him at Western Port.

By Mr. G. A. Keartland.—Eggs of Grass-Wrens (Amytis), in illustration of paper; also, skins and eggs of *Platycercus adelaidensis*.

By Mr. J. A. Kershaw, F.E.S., for National Museum.—A colour variety of the common eel, *Anguilla australis*, Rich., collected by Mr. H. Quiney, Mortlake; also a collection of Coleoptera, collected by Mr. G. Coghill and himself at Launching Place and Emerald during November.

By Mr. D. Le Souëf, C.M.Z.S.—An aboriginal wedge, axe, tomahawk, and chisel from Western District, Victoria.

By Mr. A. Mattingley.—Echinoderm, *Asterias sinusoida*, from Sandy Bay, Tasmania; also Pecten shells from Storm Bay, Tasmania, and fossils from Mt. Wellington, Tasmania.

By Mr. C. Walter.—Dried specimen of *Hakea vittata*, R. Brown, Victorian Alps and Buffalo Mountains, new localities for this species; previously recorded only from S.W. and N.W. of Victoria. Collected by C. French, jun., and C. Walter. Specimens of remarkable Alpine varieties of the following well-known Victorian plants, together with ordinary types:—*Caladenia carnea*, *Euphrasia brownii*, *Hovea heterophylla*, *Pimelea axiflora*.

After the usual conversazione the meeting terminated.

EXCURSION TO LAUNCHING PLACE.

This excursion, extending from Saturday, 7th November, to Monday, the 9th, was well attended and proved very enjoyable. Launching Place, situated on the south bank of the Upper Yarra, distant 41 miles from Melbourne by railway, and 14 miles by road from Healesville across the Watts and Yarra divide, was visited by some members of the Club in January last, and a brief report of that visit will be found in the last volume of the Club's journal (xix., page 147).

Launching Place! What a misleading name! On hearing it for the first time, one, not initiated into the mysteries and incongruities of our local geographical nomenclature, might conjure up a scene on the Gippsland Lakes or the sea coast, where some stately ship might take its initial plunge into the broad waters. The shallow, crooked stream, hurrying and gurgling 'mid scented shrubberies, its surface broken by boulder and snag, could hardly accommodate a canoe for more than a few hundred yards at a stretch. Yet here, in days that passed with the opening up of country by road and rail, miners and others did their carrying trade by means of flat-bottomed boats—themselves often wading whilst towing—to parts remote from the highway. And, at this spot, the boats, kept high and dry when not in use, were launched for the water carriage of merchandise. Hence the name.

Launching Place is well situated as a base whence excursions may be made up several tributaries of the Yarra. In the upper parts of these small streams there exists, in natural state, a wealth of that native vegetation which is, in many other parts of the State, fast disappearing before the axe of the selector.

Two important tributaries, from the naturalist's point of view, debouch into the Yarra a short distance from the hotel, which, as in January, we made our head-quarters. These two are the Don, dignified with the title of river, and the Yarra Rivulet. The former has its source in the range which forms the divide between this and other streams flowing southerly to the Yarra and the tributaries of the Watts River.

The source of the Don, as ascertained by our aneroid observations, is something over 1,500 feet above sea-level, and during a run of about six miles the water falls about 1,100 feet to the Yarra. This gives, roughly, a drop of 183 feet to the mile, or a grade of 1 in 30.

The Britannia Creek emerges from among spurs of the range which separates the Gippsland and Evelyn waters, and, flowing westerly some six miles to its confluence with the Yarra Rivulet, continues as part of that stream another mile and half to the Yarra, the main drainage channel of Evelyn county. The nursery of Britannia Creek is granitic country, while the Don rises among dacite rocks. Both streams flow over an intermediate stretch of undulating silurian country before reaching the main river flats.

Launching Place was reached about 10.45 a.m., and Saturday's rambling was near home, the available time before lunch being spent on the flat between the railway and the Yarra Rivulet. There we found a luxuriant growth of rushes and sedges, and, sheltered by them, such small plants as *Viola hederacea*, the buttercups, *Ranunculus rivularis* and *R. lappaceus*, while bolder shrub plants fringing the rivulet where chiefly *Cassinia aculeata*, *Aster stellulatus*, a few wattles, and occasional young

eucalypts, and, prettiest of all, *Kunzea pedunculatis*. Here, too, the Prickly Box, *Bursaria spinosa*, grows plentifully, but at this time lacking the glory of bloom and the myriads of insects—bee, bug, beetle, and the like—which made it so conspicuous in January. The entomologists of the party had, therefore, to turn their attention to the less showy plants, and to decayed logs and semi-detached bark for their captures.

In the afternoon we struck easterly, along the railway line, towards Yarra Junction, and found within the railway enclosure, and thus protected against browsing animals, well-developed specimens of plants which, owing to their scarcity in or absence from roadway and adjacent paddocks, seemed the more conspicuous. Here *Goodenia ovata* was plentiful but much disfigured by insects; the Native Primrose, *G. geniculata*, *Billardiera scandens*, the Trigger Plant, *Candollea serrulata* (perhaps better known as Stylidium, and of deeper shade of pink than is commonly seen), *Arthropodium strictum*, *Burchardia umbellata*, and *Wahlenbergia gracilis* were those mostly in evidence.

At about two-thirds of the distance to Yarra Junction we left the railway, and, turning northerly, crossed the tongue of flat land between the Yarra Rivulet and the Yarra to a point where a private bridge over the main stream gave us access to the undulating scrub country north of the Yarra, the immediate locality being private property on which stands a house well known locally and to visitors as "Yarra Doon." The afternoon's ramble was rather disappointing, as there were few plants, and none not already enumerated, found beyond the river. The scrub consists of *Cassinia aculeata*, *Aster stellulatus*, *Acacia stricta*, young eucalypts, and bracken fern, a few fruitless dwarf ferns sheltering under logs, &c. Indeed, had it not been for the pretty scene at the bridge, which delighted us with its loops of rushing water and banks shaded by lichen-covered trees and shrubs, of which some, such as the willow, have been introduced, this outing, as regards all but the railway enclosure, may be recorded as unprofitable.

Our geologists, who had meanwhile gone westerly to Woori Yallock, returned in the evening, and the night train brought two members from the city, increasing our number to ten, including two ladies.

On Sunday morning we made an early start up the Don River valley by the bridge which crosses the Yarra, a stone's throw from our hotel. Beyond the river the country may be divided into three classes, viz., flat, undulating land, and hilly country. The flat proved barren of pleasing or interesting vegetation. It is divided into paddocks for grazing cattle, and only such dwarf plants as are invariably neglected by browsing animals, *e.g.*, *Mazus pumilio*, *Isotoma fluviatilis*, *Viola hederacea*, and *Aster glandulosus* were found between the clumps of grass and sedge

which partly sheltered them. On reaching the undulating country there was a striking change in the vegetation—*Dianella longifolia* growing luxuriantly, as also *Goodenia ovata*, marking the beginning of dryer soil. *Leptospermum scoparium* and *Melaleuca squarrosa* were plentiful and in full bloom, and occasionally *Pimelea ligustrina*, six or eight feet high, with terminal inflorescence, was met with. *Pultenæa muelleri* occurred in places. The eucalyptus trees are of inferior quality in this locality, but, though poor as timber, they afford shelter to numerous plants whose absence from the cleared land we had already remarked—viz., *Drosera menziesii*, *Chiloglottis gunnii*, *Tetratheca ciliata*, &c., the Dianella and Goodenia beforementioned keeping with us as we march.

Still climbing gradually, with the stream near at hand but below us on the left, where the fern *Lomaria discolor* is sending up its fruiting fronds, we reach country which, on account of timber denudation, is barren looking and uninteresting when examined. The slope is almost monopolized by *Cassinia aculeata* and *Pteris aquilina*, which have replaced the lost eucalyptus. The large paniculated headlets of the Cassinia have pink and white buds, on separate bushes, and promise a fine show of white to relieve the extensive but varied green which is predominant now.

The first eastern tributary marks a change, though the Cassinia and Goodenia are still with us. Here we make our first acquaintance with the "Glen" flora, and the Native Mulberry, *Hedycarya cunninghami*, bearing both fruit and flowers, is admired; the Native Pepper, *Drimys aromatica*, too, reminds us that we have reached a higher and more shaded locality, while other shrubs and small trees, characteristic of the typical Gippsland and Upper Goulburn tributary valleys, appear in plenty. Side by side with Hedycarya and Drimys stands our old friend the Musk Tree, *Aster argophyllus*, its flowers early developing.

We come to a conspicuous artificial landmark. It is the skeleton of a demon that slaughtered the tall eucalypts, and thus deprived the lowly plants of their natural protection. The steam heart of this dead monster is gone, the body has been dismembered, and the cruel steel teeth have been drawn, but for many a long day the refuse from this dead gourmand's meal, in the shape of a huge sawdust heap, will mark what was once forest land.

Still ascending we reached a point where the road turns abruptly to the left, crosses the stream, and goes north-westerly. Here on the hillside on the right is another prominent landmark, known as "Malleson's." The introduced trees and shrubs about it and the cleared garden space are in striking contrast to the native vegetation. Here we have the entrance to what is popularly known as "Malleson's Glen," which is really the upper

part of the Don River. The rival attractions of the glen and of "Malleson's Look-out"—some three miles further along the road, a little over the saddle, and looking towards Healesville—causes us a little hesitation, but during our halt for lunch the discovery of some fine moss, *Dawsonia superba*, near the road, and some orchids, *Chiloglottis gunnii*, on the trunks of the Valley Tree Fern, *Dicksonia billardieri*, settles the matter, and we keep to the glen. There is a broad track cut for a considerable distance by timber-getters, who found in the stately forest trees, *Eucalyptus amygdalina*, &c., excellent material for city sewerage slabs and palings.

"Malleson's Glen" is a luxuriant tangle of beautiful trees, associated with an undergrowth of shrubs and tree-ferns, with dwarf ferns, mosses, and lichens scattered between or growing in epiphytal beauty. Overhead the Beech, *Fagus cunninghami*, its green foliage turning from brown and gold at the branch tips, mingles with the modest but graceful and aromatic Sassafras, *Atherosperma moschatum*, the Native Pepper Tree, *Drimys aromatica*, the "Blanketwood," *Senecio bedfordii*. These, with *Hedycarya cunninghami*, and the handsome but nasty-smelling *Zieria smithii*, form the main shade of this splendid fernery, wherein may be found a large variety of smaller ferns, such as *Pteris incisa*, *Aspidium aculeatum*, *A. capense*, *A. decompositum*, *Lomaria discolor*, *L. fluviatilis*, *L. lanceolata*, *L. capensis*, *Asplenium bulbiferum*, *A. umbrosum*, &c., were found. The orchids grew only on the upper parts of upright tree-fern trunks, seeking the shade of the crown of fronds, and the softer woolly matter of the upper stem, and on the erect and recumbent fern trees the Victorian Staghorn Fern, *Polypodium pustulatum*, and *P. australe*, cling affectionately, while some of the trunks are almost hidden by the dense lace-like mat of *Hymenophyllum tunbridgense* and *Trichomanes venosum*.

We creep up from the cool, damp fernery to the sunlit slope, and find our ubiquitous friend, *Goodenia ovata*, the Native Nettle, *Urtica incisa*, and the Native Elderberry, *Sambucus gaudichaudiana*, commencing to fruit. Here and there on the shade margin sprays and festoons of *Clematis aristata* show conspicuously, and by the side of the track at least one fine specimen of the Square Tree Fern, *Osmunda barbara*, with short, thick trunk and magnificent dark green fronds, many bearing ripe brick-red spores in great quantity.

The beginning of November is too early for the fruiting of the ferns in general. Except on *Osmunda barbara*, *Dicksonia billardieri*, *Polypodium pustulatum*, and *P. australe*, fruit specimens were not obtained, though the fronds of *Asplenium bulbiferum* showed indications of spores, besides having young plants developing at the tips. "Malleson's Glen" is

a place where tired brains and aching hearts should find relief, where fairies might hold their revels, and the tired Titan find some brief repose. Yet presently we might lose this beauty spot. It is not reserved, and is only protected by a gazetted proclamation, which merely withholds the area from cutting of timber. Something should be done at once to effect the permanent reservation of this area, and we suggest that the Field Naturalists' Club should initiate such action.

Monday, 9th November, was devoted to the Britannia Creek, but we did not on this occasion go far enough along the tramway to reach the saw mill which is cutting on the margin of the State Forest. Previous experience taught us that a whole day should be devoted to the trip. The ferns and glen shrubs, we know, are of less luxuriant growth and less numerous in the Britannia Creek valley than in correspondingly accessible parts of the Don valley. Starting at an early hour we walked easterly along the railway, encountering many plants which had been noted on Saturday, and saw at the roadside near by *Leptospermum scoparium* and *Melaleuca squarrosa* in bloom. Further away, on the low hillside, the Native Cherry Tree, *Exocarpos cupressiformis*, bore young fruit. Passing on to where the timber tramway connects the Britannia Creek saw-mills with the railway, we use the tram track for the rest of our route, soon across marshy land where grows a dwarf forest of sedges, &c., comprised chiefly of *Xerotes longifolia*, *X. thunbergii*, *Gahnia trifida*, and *Cyperus lucidus*, and sheltered by these plants a few smaller ones. A bottle of water and weed taken here showed, on later examination under the microscope, some filamentous algæ, such as Spirogyra and Zygnema, some Desmids and countless myriads of Protozoa feeding on the decaying weed. Here and there we saw the Blue Lily, *Patersonia glauca*, the orchid *Microtis porrifolia*, and occasionally the Bladderwort, *Utricularia dichotoma*. Then, after crossing the Yarra Rivulet and some more flat land, the tramway begins to climb through lightly timbered undulating country. Here we meet with the "Sandringham flora" mixed with other plants. We note *Stackhousia linarifolia*, *Gompholobium huegelii*, *Sphærolobium vimineum*, and the Trigger Plant, *Candollea serrulata*; also *Brunonia australis*, *Tetratheca ciliata*, *Burchardia umbellata*, *Comesperma volubile*, *C. ericinum*, *Drosera menziesii*, *Pultenæa gunnii*, *Indigofera australis* (in seed), *Brachycome*, sp., *Helichrysum apiculatum*, *Wahlenbergia gracilis*, &c. All these are fairly plentiful. Of orchids a few finely developed *Thelymitra aristata*, *Pterostylis cucullata*, and *Prasophyllum patens* were seen, and a small isolated patch of *Calochilus robertsoni*. Where the tram track winds about the south side contour of the valley, and the slope is steeper, the Tetratheca continues and grows more robust, the "Sandringham

flora " is gradually left behind, and flowering plants in general are few and far between. *Amperea spartioides* occurs occasionally, and here and there a *Hakea nodosa* in fruit. *Cryptandra hookeri* and *Grevillea alpina* almost complete the list, the last-named being very plentiful.

At about four miles from Launching Place the tramway encounters a small creek flowing down a gully so steep and narrow that it cannot be negotiated by a curve. Here we lunched, and are rendered immortal by our amateur photographer. And after collecting a few plants, of which, as a specimen for the herbarium, *Platylobium formosum* is the most important, in fine development, we return to our starting point.

For some account of the zoological results of the excursion I am indebted to my co-leader, Mr. J. A. Kershaw, F.E.S. Messrs. G. Weindorfer and R. A. Bastow have assisted in the compilation of the botanical results, while Mr. F. Chapman, F.L.S., has contributed some notes on the petrology of the district.—A. D. Hardy.

Zoology.— As a whole, the zoological results of this excursion were not so good as anticipated, though this was to a great extent due to the limited number of workers, and to a lesser extent to the want of time to more thoroughly work the district. For instance only some twenty-six species of birds were noted, but had one been able to devote more attention to this branch the number could easily have been greatly increased. Numbers of small birds were seen among the thick undergrowth of the gullies and along the bush tracks which could not be identified with any degree of certainty without closer examination, while, no doubt, many notes regarding the nesting might have been obtained.

Among the insects, Lepidoptera were unusually scarce, only a very limited number of species being seen, and most of these were well-known kinds. Two small micros., however, proved new to me.

Several specimens of *Papilio macleayanus* were seen at Malleson's Glen, on the Don River; while quite a number of fresh specimens of *Tisiphone* (*Epinephile*) *abeona* were flitting about on the track, in company with *Pyrameis kershawi* and *P. itea*. The larvæ of *Heteronympha merope* and *Pyrameis itea* were taken, the former under a log and the latter curled up in a folded leaf of the native nettle. Numbers of the wood-boring larvæ of *Hepialus lignivora* and a few of *H. eximea* were seen at Malleson's Glen.

Portion of the country on the track to Britannia Creek reminded one strongly of Sandringham, and here were noticed a number of well-known geometers common to that class of country. In the low-lying ground freshly-emerged specimens of

Agarista lewini were flying about, while higher up on the hills some good specimens of the skipper, *Hesperilla doubledayi*, were taken.

Coleoptera were more plentiful, the flowering Leptospermum growing thickly along the Yarra about Launching Place and Yarra Doon yielding numbers of some of the commoner species of Chrysomelids, Clerids, &c. Searching under the bark of the larger eucalypts in this locality proved profitable, though less so on the hills. On stripping our first tree near the station no less than nineteen species of Coleoptera were noticed, including Carabs, Clerids, Longicorns, Elaters, &c., not to mention the numbers of spiders, earwigs, centipedes, &c. The common Elater, *Hapatesus hirtus*, was particularly numerous, and where exposed a dozen or so were seen closely clustered together, with a few specimens of the Clerid, *Pylus fatuus*, in their midst.

Log-rolling, which was freely indulged in, revealed several species of Carabs, some of which were numerous, while a male and female each of *Lissapterus howittanus* (now becoming rare) and *Ceratognathus niger* were also taken. Upon a closer examination at home, about seven species of Coleoptera proved new to me.

The large green Cicada, *Cyclochila australasiæ*, numbers of which were just emerging from their ungainly-looking pupa cases, made their presence keenly felt by their continuous ear-splitting stridulation.

Several species of Hemiptera were found on the Leptospermum, gum saplings, under bark, &c., some of which were very common. Spiders were, as usual, plentiful, but only a few were bottled. A special search was made under logs, &c., for living specimens of the large Black Snail, *Paryphanta atramentaria*, at one time very plentiful near Fernshaw, but now scarce, but only one was found, though two perfect and several broken shells were found. The smaller species, *Rhytida capillacea*, and the small white *Eudodonta depressa* were, however, common. Several specimens of a very small brownish species were found under bark in the gullies. The common Freshwater Mussel, *Unio australis*, occurs in the Yarra at Launching Place, and a small species of Bulinus was found on some sticks taken from a pool near the township, together with a fine Freshwater Leech.

Land Planarians were few in number, though five different species were taken.—J. A. Kershaw.

List of birds identified :—

Birds (26 species).

Graucalus mentalis
Grallina picata
Collyriocincla harmonica, nest and eggs
Gymnorhina leuconota
Petrœca rhodinogaster
Eopsaltria australis
Acanthiza chrysorrhoa
Malurus cyaneus

Rhipidura tricolor
,, albiscapa
Psophodes crepitans
Acanthorhynchus tenuirostris
Ptilotis leucotis
Myzantha garrula
Acanthochæra carunculata
Podargus strigoides
Menura victoriæ
Petrochelidon nigricans
Dacelo gigas
Halcyon sanctus
Cacatua galerita
Platycercus eximius
Cuculus pallidus
Notophoyx novæ-hollandiæ
Sturnus vulgaris.

List of insects identified:—

COLEOPTERA (78 species).
Scaraphites rotundipennis
Stenelophus dingo
Sarothrocrepis civica
S. calida
S. duponti
Scopodes varipes
Antiporus gilberti
Xantholinus chloropterus
Dasygnathus dejeani
Semanopterus distributus
Ceratognathus niger
Lissapterus howittanus
Liparetrus sylvicola
,, macleayi
Mæchidius mellyanus
Stigmodera varia
,, bicincta
,, victoriensis
Monocrepidius punctato-striatus
,, cordieri
,, pictus
Hapatesus hirtus
,, jugularis
Eleale pulcher
,, unicolor
Natalis porcata
Xylotretus canaliculatus
Aulicus plutus
Trogodendron ephippium
Scrobiger splendidus
Pylus fatuus
Eros scutellaris
Metriorrhynchus erythropterus
Atractus ruficollis
Chromomæa rufipennis
Mordella communis
,, dumbrelli
Lagria basalis
Apsis howitti
Lepispilus sulticollis
Pseudhelops ocellata
Belus sparsus
,, bidentatus
Prypnus canaliculatus
Pelororrhinus argentosus
Asplocnemis suturalis
Rhinota hæmoptera
Ecrizothis inæqualis
Euops falcata
Euchoptera apicalis
Stenoderus bicolor
Epithora dorsalis
Callidiopsis scutellaris
Pempsamacra pygmæa
,, dispersa
Paropsis lachesis
,, nigerrima, var. alternata
,, trimaculata
,, liturata
,, bicolor
,, ulcerosa
Coccinella conformis
Cheiloxena insignis
Drypta australis
Haltica pagana
Alesia frenata
Cryptocephalus flavocinctus
Leperina adusta
Lemodes coccinea

Ulodes verrucosa
Scitala rugosula (?)
Seirotrana crenicollis
Cordus hospes
Platisus australis
Brontes militaris
Prostomus intermedius
Euryspa vittata
Hapatesus hirtus.

Lepidoptera (25 species).

Papilio macleayanus
Pyrameis kershawi, and larva
„ itea, and larva
Tisiphone (Epinephile) abeona
Belenois java, Sparr. = teutonia, Fabr.
Una agricola
Hesperilla doubledayi
Agarista lewini
Nyctemera amica
Asura lydia
Porthesia hololeuca
Comarchis aspectatella
Lichenaula arisema
Hypertropha tortriciformis, Gn.

Scirpophaga patulella, Walk.
Mecyna polygonalis
Dichromodes stilbiata
Hydriomena subochraria, Dbld.
Scoparia meyrickii, Butl.
Talis pedionoma, Meyr.
Philobota chrysopotama, Meyr.
„ pretiosella, Walk.
„ arabella, Newm.
Coesyra annularis, Rosens.
Thudaca obliquella, Walk.

Hemiptera (6 species).

Amorbus robusta
Oxycarenus luctuosus
Dindymus versicolor
Pisates opacus
Harpacter australis
Ptelocnemus plumifer.

Homoptera (6 species).

Cyclochila australasiæ
Eurymela speculum
Stenocotis varia
Bythoscopus latifrons
Pœciloptera acuta
Centrotus australis.

Freshwater and Land Shells.

Paryphanta atramentaria
Rhytida capillacea
Chloritis brevipila
Endodonta depressa
Unio australis
Bulimna, sp. (?)

Land Planarians (5 species).

Geoplana munda
„ spenceri
„ hoggii
„ adæ
„ mediolineata.

Fresh-water Leech (1 species)

Limnobdella quinquestriata, Schm. (?)

List of plants identified :—

Phanerogams.

Clematis aristata
Ranunculus aquatilis
R. lappaceus
R. rivularis
Hibbertia stricta
Drimys aromatica
Atherosperma moschatum
Hedycarya cunninghami

Cassytha glabella
Cardamine stylosa
Viola betonicifolia
V. hederacea
Billardiera scandens
Drosera menziesii
Comesperma volubile
C. ericinum
Tetratheca ciliata

Zieria smithii
Correa lawrenciana
Erodium cygnorum
Pelargonium australe
Amperea spartioides
Australina pusilla
Urtica incisa
Fagus cunninghami
Stackhousia linarifolia
Stellaria pungens
Gompholobium huegelii
Sphærolobium vimineum
Pultenæa gunnii
P. muelleri
Dillwynia ericifolia
Platylobium formosum
Goodia lotifolia
Indigofera australis
Glycine clandestina
Acacia verticillata
A. leprosa
A. dealbata
Rubus parvifolius
Acæna ovina
A. sanguisorbæ
Leptospermum scoparium
L. lanigerum
Kunzea peduncularis
Melaleuca squarrosa
M. ericifolia
Eucalyptus amygdalina
Pomaderris apetala
Cryptandra hookeri
Panax sambucifolius
Exocarpos cupressiformis
Loranthus pendulus
Grevillea alpina
Hakea nodosa
Lomatia longifolia
L. ilicifolia
Banksia marginata
Pimelea linifolia
P. ligustrina
P. humilis
P. axiflora
P. flava
Galium australe
Brachycome graminea
Aster argophyllus
A. stellulatus
A. ramulosus
A. glandulosus
Helichrysum leucopsidium
Cassinia aculeata
Siegesbeckia orientalis
Cotula coronopifolia
Senecio bedfordii
Lobelia purpurascens
Isotoma fluviatilis
Wahlenbergia gracilis
Candollea serrulata
Brunonia australis
Goodenia ovata
G. geniculata
Erythræa australis
Solanum vescum
Mazus pumilio
Utricularia dichotoma
Prostanthera lasiantha
Epacris impressa
Thelymitra aristata
Calochilus robertsoni
Prasophyllum patens
Microtis porrifolia
Pterostylis cucullata
Caladenia carnea
Chiloglottis gunnii
Diplarrhena moræa
Patersonia glauca
Hypoxis glabella
Dianella longifolia
Burchardia umbellata
Thysanotus patersoni
Arthropodium strictum
Xerotes brownii
Xanthorrhœa minor
Triglochin procera
Cyperus lucidus
Anthistiria ciliata.

CRYPTOGAMS.

FERNS.

Trichomanes venosum
Hymenophyllum tunbridgense

Gleichenia circinata
Osmunda barbara
Alsophila australis
Dicksonia billardieri
Davallia dubia
Pteris aquilina
P. incisa
Lomaria discolor
L. lanceolata
L. fluviatilis
L. capensis
Blechnum cartilagineum
Asplenium bulbiferum
A. umbrosum
Aspidium aculeatum
A. capense
A. decompositum
Polypodium australe
P. grammitidis
P. pustulatum
P. punctatum.

Collected by Miss K. Cowle, and identified by Mr. R. A. Bastow :—

HEPATICS.

Trichocolea tomentella
Lepidozia ulothrix
Symphyogyna flabellata
Marchantia polymorpha.

MOSSES.

Leucobryum candidum
Funaria hygrometrica
Orthotrichum crispum
Hypnum crinitum
Hypnodendron spininervium
Dawsonia superba
D. appressa
Sphagnum cymbifolium
Cyathophorum pennatum
Bryum bimum
Ceratodon purpureus
Polytrichum angustatum
P. juniperum
Atrichum ligulatum
Dicranum setosum
Hookeria nigella
Blindia acuta.

LICHENS.

Parmelia conspersa
P. perforata
P. tenuirima
Usnea barbata
Cladonia aggregata.

GEOLOGY.—The petrology of the districts visited on this excursion is of much interest, and the rocks would repay the work of a detailed study. Although some of the types of rocks met with are similar to the Macedon rocks described by Professor Gregory, there are others which seem to be peculiar to this locality, or, at any rate, different from the Macedon type. The geologists of the party collected specimens of Dacite from the Don River valley, near the junction of the intrusive rocks with the Silurian. Some of these exhibited weathering in a striking manner, large boulder-like masses peeling at their angles, reminding one of the spheroidal weathering of some finer-grained granites; this resulted in the formation of large residual spheroids of the rock, often 3 or 4 feet in diameter. The occasional fracture of these boulders revealed a rudely radial structure in the interior of the mass. The granulitic diorites were occasionally found weathered in concentric coats seen on striking off the corners of the exposed rocks. This was especially the case with a mica diorite found here. Some of the rocks higher up the mountain are presumably rich in titaniferous iron, for the runnels at the sides of the track were filled with the black glittering material, an almost pure menac-

canite sand. Following a tributary of the Britannia Creek the principal rock met with, at a height of about 900 feet above sea level, was a huge mass of Granodiorite or Granitite, the typical granite of the older surveyors of the colony.

Notes on the Rock Specimens :—

Granodiorite.—In a tributary of Britannia Creek.

This rock is characterized by the felspars being almost essentially of the plagioclase types. Quartz fairly common, allotriomorphic, rarely idiomorphic. Plagioclase felspars, frequently zoned. Much biotite. Apatite occurs sparingly. Tourmaline as inclusions in quartz. The felspars are in many cases undergoing metasomatic or internal chemical changes.

Granulitic Diorite.—Don River Valley.

An augite diorite, having a granulitic base or ground mass of small rounded plagioclases. Porphyritic crystals of plagioclase occur scattered throughout, sometimes determinable as oligoclase. Also much green augite, nearly always enwrapped by a coat of small platy brown hornblendes derived by dynamical metamorphism from the augites which still form a nucleus. A fine rhombic pyroxene, presumably hypersthene, occurred in one example. The rock has evidently suffered much deformation, and is quite gneissose in hand specimens.

Dacite.—Don River, near junction with Silurian.

This rock somewhat resembles the Willimigongong type described by Professor Gregory from Mt. Macedon, but the groundmass is micro-crystalline, with evidence of fluxion structure. It is crowded with phenocrysts of quartz, felspar, and mica. The felspars are plagioclastic and idiomorphic (with crystalline boundaries); they are frequently corroded, and many contain inclusions. The quartz, although in idiomorphic crystals, is as a rule rounded and corroded by the magma, and the crystals are often fractured. Biotite common. Apatite rare.

Although there are several quarries and cuttings in the district, the locality is unfavourable for fossils, the only specimen seen being the markings of a fucoid in some grey argillaceous Silurian rock.—F. CHAPMAN.

AT the Summer School for Teachers, at present being conducted by the Education Department, nature study is taking a prominent position. Messrs. J. A. Leach and H. T. Tisdall, members of the Field Naturalists' Club, are lecturing on zoological and botanical subjects.

THE first award of the Baron von Mueller medal for original researches in Natural Science, referring especially to Australasia, has been made by the Australasian Association for the Advancement of Science, now sitting at Dunedin, to Mr. A. W. Howitt, F.G.S., of this State, for distinguished work in ethnology, geology, and botany, extending over forty years.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 18th January, 1904.

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

REPORTS.

The hon. librarian reported the receipt of the following donations to the library: — "Geological Survey of Victoria, Bulletins 9, 10, and 11," from Department of Mines, Victoria; *Journal of Agriculture*, Victoria, vol. ii., part 3 (January, 1904), from Department of Agriculture, Victoria; *Emu*, vol. iii., part 3, (January, 1904), from the Australasian Ornithologists' Union; *Agricultural Gazette of New South Wales*, vol. xiv., part 12, from the Department of Mines and Agriculture, Sydney; "Report of Australian Museum for 1903," from the Trustees Australian Museum, Sydney; "Proceedings Linnean Society of New South Wales," vol. xxviii., part 3, from the society; "Transactions Royal Society of South Australia," vol. xxix., part 2, from the society; *Nature Notes*, December, 1903, from the Selborne Society, London; *Knowledge*, December, 1903, from the proprietors; "New or Little-Known Victorian Fossils," parts 1 and 2, by F. Chapman, A.L.S., from the author.

Mr. G. A. Keartland gave a report on the results of the deputation from the Club which recently waited on the Minister of Public Works to protest against the suggested alterations to the *Game Act*. The Club was represented by the hon. secretary, Mr. J. A. Kershaw, F.E.S., and himself, Mr. T. S. Hall, M.A., being unavoidably absent. They were supported by representatives of the Victorian Zoological and Acclimatization Society and the Australasian Ornithologists' Union. The sportsmen, who were present to oppose the Club's action, were strongly represented, and were supported by several members of Parliament and delegates from several shire councils from the northern districts. He, Mr. Keartland, explained the action taken by the Club in July, 1901, when a sub-committee was appointed to draw up a list of suggestions for the guidance of the minister administering the *Game Act*, and reviewed in detail the method adopted to obtain the views of representative sportsmen, agriculturists, bird-dealers, and others throughout the State on the subject. The list which was drawn up, submitted to, and finally adopted

by the minister was based on the evidence thus obtained. He brought forward strong evidence to prove that by opening the shooting season for quail on 1st March, and for ducks on 20th December, as suggested by the sportsmen, great destruction of both young birds and eggs would follow, and that the sportsmen were only acting against their own interests in advocating the earlier dates. He further explained that the Club was quite aware of the fact that the birds in the northern districts bred earlier than those in the southern, but he contended that it was almost impossible to divide the State into districts, with a different date for the shooting season in each, and that, if there were any doubt in the matter, the birds should be allowed the benefit. Mr. Godfrey, for the Zoological and Acclimatisation Society, Mr. D. Le Souëf, C.M.Z.S., for the Australasian Ornithologists' Union, and others, strongly supported his remarks. The sportsmen, together with the several delegates from the shire councils, strongly resented the action of the Club, which, it was asserted, wished to prevent any birds being shot. They contended that the quail had practically done breeding by the 1st March, and several of the speakers stated, as a reason for opening the season earlier, that, as the birds frequented the stubble paddocks, large numbers were destroyed during the burning of the stubble, which was done in March, before the shooting season, as now arranged, opened, after which there were no birds left to shoot. The Minister, in giving his decision, stated that if he had his own way he would prevent all shooting for at least two years, so as to give the birds an opportunity to increase. He decided that, as the birds in the northern areas bred earlier than those in the southern, he would divide the State into two divisions, and that the shooting season for Quail would commence on 1st February north of the Dividing Range and on 7th March on the south. For ducks he fixed the opening season for the 27th December. He stated, however, that this alteration would only apply for twelve months, and he hoped by that time to be able to go into the matter again with a view to establish some uniformity regarding the *Game Acts* throughout the several States.

Mr. D. Le Souëf, C.M.Z.S., and the hon. secretary, Mr. J. A. Kershaw, F.E.S., also made some remarks on the subject.

The President commended the valuable efforts of those who had acted in the interests of the Club on the deputation.

ELECTIONS.

On a ballot being taken, the following were duly elected members of the Club : — Ordinary members—Miss A. F. W. M'Haffie, "Chadderton," Park-road, St. Kilda West; Miss M'Innes, "St. Duthers," Kintore-street, Camberwell; Miss M.

Shaw, Merton-crescent, Albert Park; Dr. Gertrude Halley, M.B., 22 Collins-street, Melbourne; Master Percy Taverner, Derby-street, Camberwell. As country member—Mr. William Hugh M'Mahon, Warrnambool.

GENERAL BUSINESS.

The President announced that a new Leitz microscope stand, together with a No. 3 and No. 6 Leitz lens, an Abbe condenser, and two eye-pieces had been purchased for the use of members at the Club meetings. Mr. J. Shepherd had also very kindly presented the Club with a No. 1 Leitz lens, and he had much pleasure in extending to Mr. Shephard the thanks of the Club for the gift, which would be greatly appreciated by the members.

PAPERS.

By Mr. R. Hall, F.L.S., entitled "A Summer Journey through Corea and Siberia."

With the assistance of a very fine series of lantern views, the author described his journey through Japan, Corea, and Siberia, in company with Mr. Trebilcock, of Geelong, the chief object being the study of the birds of the country passed through, together with those which visit Australia but nest in Siberia. By the aid of a map he pointed out the route followed, and then proceeded to describe the many items of interest which came under their notice. In Japan, where they stayed about 10 days, he saw the Spine-tailed Swift, which migrates to Australia, returning to Japan to breed. They next proceeded to Corea, several scenes of which were shown; thence, *viâ* Vladivostock, they travelled through Manchuria and visited Irkutsk and Yakutsk, making a short stay at each place, and collecting and noting the various birds met with. The long journey down the River Lena was full of interest to the naturalist. Here he found the Australian Swift, *Micropus pacificus*, among other Australian birds, nesting, and frequently saw it perching on the rocks. Here also they were fortunate in witnessing the migration of one of the European finches, which passed over in thousands. Photographs of Reindeer Moss growing among the rocks and a variety of plants in flower were shown, also of piles of the great tusks of the extinct mammoth awaiting shipment, many of which weighed between one and two hundredweight. In conclusion a series of maps were shown to illustrate the probable route followed by the birds migrating to Australia. Altogether some 400 birds were collected on the journey, mostly from country never before worked by the ornithologist.

The president, Mr. O. A. Sayce, congratulated Mr. Hall on the work he had accomplished, and the value of his observations in the field, particularly regarding the migrations and breeding places of the birds which visit our shores.

Messrs. D. Le Souëf, G. Coghill, F. G. A. Barnard, and C. Coles also spoke to the paper.

NATURAL HISTORY NOTES.

Mr. F. G. A. Barnard drew attention to the numerous letters appearing in the daily press regarding the question, "Do snakes swallow their young?" and asked the opinion of Mr. Le Souëf on the matter. Mr. Le Souëf stated that this was no doubt one of many popular errors. He did not think for a moment that the young take refuge inside the mother. He stated that a Tiger Snake has up to fifty-two young at a time, and ridiculed the idea of such a number finding room inside the mother. The young of Australian venomous snakes, he stated, are born alive, and are quite active and ready to bite, though from his personal experience the effects of their bite are not serious. In fact, he said, it was not possible for a snake to poison a person if bitten through the trousers or stocking, as owing to the canal which conveys the poison through the fangs opening some little distance from the point of the tooth, the poison is lodged in the clothing and not in the punctures. He thought that many of the cases reported of recovery from snake-bite might be accounted for in this way.

Mr. G. A. Keartland mentioned a case, which came under his own observation, of a snake confined in the Sydney Zoological Gardens, which had forty-two young ones, and which swallowed several of them, but none of them appeared again.

Mr. A. J. Campbell drew attention to a beautiful nest of the Scrub-Tit, *Acanthornis magna*, from Tasmania, which was collected and exhibited, together with the mounted bird, by his son, Mr. A. G. Campbell; also to *A. ewingi*, a species which had been reinstated in the Tasmanian fauna after being lost sight of for some 40 years.

EXHIBITS.

By Mr. A. G. Campbell.—The following four species of Tasmanian Tits:—*Acanthiza chrysorrhoa*, *A. diemenensis*, *A. ewingi* (reinstated after being lost sight of for 40 years), and *A. magnirostris*, from King Island; also nest and mounted bird of the Scrub-Tit, *Acanthornis magna*, from Mt. Wellington, Tasmania.

By Mr. P. C. Cole.—Aboriginal reed necklace, worn when in mourning, from North Queensland.

By Mr. A. Coles.—Mounted specimen of the Northern Diver, *Colymbus glacialis*, from Russia.

By Mr. C. French, jun.—Three Victorian scale insects, new to science, and collected by Mr. C. French, jun., viz.:—*Pulvinaria salicorniæ*, Green, on salicornia, from Little River; *Sphærococcus*

floccosus, Green, on roots of *Correa alba*, from Cape Schanck; *Aspidiotus alatus*, Green, on eucalyptus stems, from Kerang. This latter coccid has also been recently collected in New South Wales, by Mr. W. W. Froggatt, F.L.S. Also eggs of *Acanthiza ewingi* (rare), collected in 1892 by Mr. E. D. Atkinson, in Tasmania.

By Miss M'Haffie.—Nest of *Melithreptus lunulatus*, collected on Buffalo Ranges excursion.

By Mr. A. Mattingley.—Echinoderm, *Pentagonaster astrologorum*, from Western Port.

By Mr. F. Pitcher, for Director Botanic Gardens, Melbourne: —Flowers of several varieties of *Eucalyptus ficifolia*, Scarlet-flowering Gum, from Western Australia, including what may possibly be a white-flowering variety. Also flowers of rose-coloured variety of *Eucalyptus calophylla*.

By Mr. C. Walter.—Plants not previously recorded from N.E. of Victoria:—*Pultenæa mollis*; *Stypandra cæspitosa*, var. *alba*; and *Tetratheca ciliata*, collected by C. French, jun., and C. Walter.

By Mr. F. M. Reader.—Dried specimens of *Camelina dentata*, Pers., naturalized, and new for Victoria; *Calotis anthemoides*, F. v. M., new for N.W. of Victoria; also of *Poa bulbosa*, L., *Alopecurus geniculatus*, L., sub.-sp. *fulvus*, Sm., naturalized grasses, new for Victoria.

After the usual conversazione the meeting terminated.

ORNITHOLOGICAL NOTES.—THE GRASS-WRENS.

By G. A. Keartland.

(*Read before the Field Naturalists' Club of Victoria*, 14*th Dec.*, 1903.)

Writing of the genus Amytis, Gould, in his "Handbook," p. 335, says "it is strictly Australian, and of which three species are known, inhabiting the southern half of the country." How far this is now correct may be gathered from the following notes:—

The genus comprises about half a dozen species, all with modestly coloured plumage. Owing to the nature of the country in which they are found and its distance from civilisation but little is known concerning their habits. The species recorded are:—*Amytis textilis*, Quoy and Gaimard; *A. striatus*, *A. macrourus*, and *A. goyderi*, Gould; *A. modesta*, North; and *A. housei*, Milligan.

Gould appears to have based his remarks on *A. textilis* on a single specimen, which he describes as a male, but made no

allusion to the appearance of the female. Still his few remarks on its habits and mode of life are interesting. Of *A. striatus* he obtained only one male specimen himself. Although he saw others secured in New South Wales he again omits any mention of the female. This is unfortunate, as will be seen later on. Of *A. macrourus* he says :—"This is the only species of the genus found in Western Australia, and it is evidently the western representative of *A. textilis* of the eastern coast, to which it is nearly allied, but it is easily distinguished by its more robust form and greater length of tail." This last remark is somewhat peculiar, as he gives the measurements in inches, as follows :—*A. striatus*, total length, 6½ ; bill, ⅝ ; wing, 2⅜ ; tail, 3½ ; tarsi, 1. *A. macrourus*, total length, 5½ ; bill, ½ ; wing, 2⅞ ; tail, 2⅛ ; tarsi, ⅞. Of *A. textilis* he gives no measurements.

During the four months of 1894 spent in Central Australia with the Horn Scientific Exploring Expedition I had the good fortune to shoot specimens of three species—*A. striatus*, *A. textilis*, and what Mr. North has since described as *A. modesta*—which at the time were considered as only two. The male birds were easily identified as *A. textilis*, but the females were lighter in colour, and less striated on the breast and throat, besides having a marked difference in the shape of the bill. Mr. C. E. Cowle has since then kindly sent me other skins, which I have forwarded on to Mr. North, and after careful examination he has described this bird as a new species, under the name of *A. modesta*. The mistake arose from the fact that the different sexes were obtained in different localities. But when I crossed the Great Desert of North-Western Australia with the Calvert Exploring Expedition, in 1896, I saw many birds in all stages of plumage of both *A. striatus* and *A. textilis*. Nothing appears to be known of *Amytis goyderi* beyond the fact that a bird was obtained by the Lake Eyre Expedition, and on its being forwarded to England was thus named by Gould. It is said to be a near ally of *A. striatus*. For information *re Amytis housei* and *A. gigantura*, I am indebted to an old member of this Club, Mr. A. W. Milligan, of Perth, Western Australia, who kindly furnished me with the notes given under their headings.

All the species I have met with were in sandy or rocky country, in which their plumage harmonized with the ground or rocks of ferruginous sandstone. The proximity of water seems to be a matter of indifference. Where *A. striatus* was found breeding in the Great Desert in numbers in September and October, 1896, we travelled 230 miles from Brookman's Creek to the nearest well in which we obtained water by sinking, and throughout the trip noted an entire absence of water-loving birds. The Grass-Wrens were seldom known to fly 20 yards at a time, and on alighting at once secreted themselves under the nearest cover.

Taking the species in their order, I will now give a few notes that may prove of interest to ornithologists who cannot study from nature for reasons already stated.

Amytis textilis, Quoy and Gaimard, Grass-Wren.

Stunted ti-tree scrub, cane grass, samphire and spinifex flats are the favourite haunts of this species. I first saw it at Idracowra, one of the flats on the Finke River, about 100 miles north-west of the Charlotte Waters, Northern Territory. Most of the level ground near the river was covered with tussocks of coarse cane grass, among which the low note of the Grass-Wren was frequently heard. After searching for some time for the author of the strange sound, I saw what at first appeared to be a species of Calamanthus run from tussock to tussock, with head low and tail erect. I made several attempts to shoot, and at last killed one at a distance of about six yards. Although the cartridge was a light one the bird was destroyed, which was annoying, as it proved to be a bird I had never seen before. I then decided to stand still until one appeared on the open ground within range. For half an hour I watched these birds hopping over the ground, one at a time, with tail erect like the Maluri, picking up insects and seeds. Occasionally one found an insect, and, whilst holding it in its bill, uttered a twittering note, probably intended as a challenge to an unseen comrade. In response to the call another emerged from the cane grass, and a fight or chase for the morsel took place. During one of these episodes, I took a quick shot at a pair of birds about forty yards off and both fell. One fluttered into a tussock, winged, but the other lay until I got near, when it too struggled to a tussock. Although the bird had both a wing and a leg broken it took about twenty minutes to capture, and would probably have escaped had I not been assisted by a native. The other bird could not be found. The specimen secured was afterwards identified as the *Amytis textilis* of Gould. Its general colour was dark brown above, with a dirty white stripe down the centre of each feather. The breast was a little lighter in colour, but similarly striped; on the side and flank was a patch of chestnut-brown. The thighs were exceedingly massive for so small a bird, and were almost denuded of feathers, which appeared to have been worn off by running through the coarse grass. Other specimens subsequently shot were also males.

In 1896, whilst travelling from Cue to Lake Way in Western Australia, many of these birds were disturbed by our camels as we passed through some stunted heath resembling boronia, but, owing to their refusal to fly, I had difficulty in obtaining specimens until Lake Way was reached, when several were secured in the following manner. As soon as we located the little clump from which the peculiar note of the Amytis came, Mr. G. L.

Jones walked up to and kicked the bush, and as the bird ran out he threw a stick at it, causing it to fly a short distance, thus enabling me to get a shot at about 12 or 15 yards' range. But in a samphire flat near our camel depôt on Brookman Creek, I had the pleasure of observing these birds daily for five weeks (August–September), which proved to be breeding time in that neighbourhood. The male birds showed themselves with great freedom, hopping about the open grounds amongst the samphire, which extended for about a mile on the west side of the creek, or displaying their agility in the low bushes close to our camp. Females would soon appear in answer to the call of the male, and then all the antics of the Maluri were gone through. Each pair of birds kept to themselves, and should a third one appear it was at once chased away. Specimens of each sex were shot, all of which corresponded exactly with the male birds obtained in Central Australia. We also found several of their nests, containing either eggs or young ones. The nests were either on or close to the ground, in dense undergrowth, dome-shaped, with a large side opening. The eggs were as uniform in colour as the birds themselves, the rich red markings almost obscuring the white ground. The young, as soon as feathered, are exactly like the parents, except that the tail is a trifle shorter.

Amytis striatus, Gould, Striated Grass-Wren.

This bird is a much brighter rust colour on the upper parts than *A. textilis*, and the white stripe along the shaft of each feather on crown, neck, and back is rendered more conspicuous by a black line separating it from the outer webs, which are rust-coloured. A black line runs from near the base of the bill beneath the eye to the ear coverts. The throat is white, shading off to dirty-white or pale buff on the breast. The wings are short and rounded, and the tail long, generally carried erect. Many of their movements coincide with those of the Maluri. *A. striatus* is truly a grass bird, *i.e.*, it is invariably found in spinifex or porcupine-grass flats, where it runs rapidly from tussock to tussock when disturbed. It is very wary, and although hundreds of them were observed by members of the Horn Scientific Expedition, on the table-lands of Central Australia, very few were shot, owing to their habit of disappearing into the prickly Triodia. How they avoided impaling themselves on the pointed blades was a mystery. Occasionally one might be seen, towards evening, perched on a low bush, giving utterance to a feeble but plaintive song. At the least sign of danger it would hop to the ground and run to cover. The sexes are alike in plumage, and can only be distinguished by dissection.

A. striatus is a solitary bird, and seldom more than a pair are seen together. They live in country destitute of water, and their

food consists principally of ants and spiders, of which a plentiful supply is always available. Crossing the Great Desert of North-West Australia they were frequently the only birds visible. As we travelled through the spinifex, in September and October, we often saw these birds suddenly hop off the side of a tussock, and, on visiting the spot, found the nest placed on top of the tussock. It was dome-shaped, with a large side-opening, invariably facing east, and constructed of the dead strippings of the spinifex. The two eggs which constituted the clutch were white, with a few light brown spots, as though sprinkled with bran. Others were freckled with finer spots, in some cases forming a zone.

AMYTIS MODESTA, North.

Whilst with the Horn Expedition, at Stokes's Pass, in the Macdonnell Ranges, I shot several birds which at that time I thought were *A. textilis*, and labelled them as such, but on a subsequent examination I noticed a marked difference in the shape of the bill and the colour of the under parts. They happened to be all females. Apart from the difference already pointed out between this bird and *A. textilis* is the fact that they are almost exclusively confined to the rocky sides of the gorges in the Macdonnell Ranges, where they are found in flocks of from six to ten birds, apparently living in the most perfect harmony. I saw several flocks of these birds hopping amongst the rocks or on the ground, others on the stones. Sometimes as many as four or five on one stone at a time, but at the least alarm they all vanished behind stones or into crevices in the rocks, but apparently avoiding the shelter of the grass. Whether this species is polygamous is doubtful. My opinion is that they are simply gregarious when not breeding. Through the kindness of Mr. C. E. Cowle I received several clutches of eggs of this species, which were taken from nests in cane grass tussocks. Fortunately Mr. Cowle shot the bird at the nest, and so established its identity. As Mr. North has already pointed out in the *Victorian Naturalist*, vol. xix., p. 103, these birds are paler and less striated than *A. textilis*, though resembling that species in some respects. Their eggs have also a different appearance, as will be seen from the specimens on the table.

AMYTIS GOYDERI, Gould, Goyder's Wren.

The bird to which this name was given by Gould was secured by a member of the Lake Eyre Exploring Expedition in the interior of South Australia. Its nearest ally is said to be *A. striatus*. Until further particulars are to hand I shall retain the opinion that it is a doubtful species, as the white throat and chest appear to indicate too close a connection with *striatus*. It is also found in the same country.

Amytis housei, Milligan, Black Grass-Wren.

This bird was one of the trophies secured by my friend, Dr. F. M. House, whilst with the Kimberley Exploring Expedition, in 1901. Mr. Milligan writes :—"As regards *Amytis housei* I consider it the most handsome and distinctive member of the genus." Black is the prevailing colour, but the head, neck, and breast are striated with silky white, abdomen black, whole of back and upper tail coverts very dull chestnut. The following is Dr. House's field note :—"This bird was first found near Camp F. B. 25, where the surrounding country was very rough, and strewn with piled-up masses of sandstone, in colour chiefly shading from red to black. It was observed passing over the boulders, with which its colouring harmonized so perfectly that it might easily pass unnoticed. In running it lowers the head and tail, giving it a peculiar appearance, not unlike that which the Pheasant Coucal presents when running on the ground. Its distribution seemed to be entirely determined by the colour of the rocks. It was only observed running over the sandstone, and only in places where the colouring of the rocks harmonized with its own. Its measurements are as follows :—Total length, 8 inches ; tail, 3½ inches ; tarsus, 1 inch ; mandibles, from gape to point, ¾ inch ; from forehead to point, ⅝ inch ; wings, 3 inches."

Amytis gigantura, Milligan, Western Grass-Wren.

Recently it was announced that Mr. Tunny, one of the collectors for the Perth Museum, had obtained a new species of Amytis, which Mr. Milligan described as *A. gigantura*. I therefore wrote to that gentleman for any information he could supply concerning it, and he very kindly replied by return of post as follows :—"As regards *A. gigantura*, Dr. Sharpe appears to have forestalled me in the Zoological Records, 1901. I described it in the *Victorian Naturalist* (xix., p. 28) of the same year. He calls it *Amytornis megalurus*." Mr. Milligan further states—"There is not any doubt in my mind that Gould confounded the two species (*A. textilis* and *A. macrourus*). The bird he subsequently described in the Proceedings of the Zoological Society as *A. textilis* many years after he first described that species was undoubtedly Dr. Sharpe's *A. megalurus* and my *A. gigantura*. Just look at the measurements given by Gould on each occasion, as also the description generally, and then say if it be possible to reconcile the two. I have had the pleasure and opportunity of handling a number of *A. gigantura* lately, and the tail measurements invariably equal 4 inches."

Amytis macrourus, Gould, Large-tailed Grass-Wren.

I am strongly of opinion that when further investigation has been made this name will disappear from the list of Australian

birds. All information concerning it points to the conclusion that *macrourus* and *textilis* are one and the same bird. It is, to say the least, remarkable that Gould should give such a name to a bird, and then show by his measurements that it is the smallest species of the genus.

How Mushrooms Grow.—Writing on fungi in the January issue of *Knowledge*, Mr. George Massee states that "in all fungi the portion visible to the naked eye, however varied its form or colour, represents only the reproductive portion; whereas the vegetative part is buried in the substance from which the fungus obtains its food. The popular belief that the mushroom and other fungi grow in a single night is not correct; it is quite true that when the mushroom has reached a certain stage of development one or two days suffices for it to attain its full size after it appears above ground. Before this final spurt is reached, however, the baby mushroom has been growing for some weeks, and undergone various changes of structure and development before it emerges above ground. A little thought will recall to mind the fact that mushrooms do not spring up within two or three days after the formation of a mushroom bed, but several weeks elapse before the mushrooms are ready for the table. . . . The various methods of spore dispersion as occurring in the fungi are interesting; only a few of the most pronounced can be noticed here. By far the most universal agent in effecting the distribution of spores is wind, as may be observed when a ripe puffball is crushed under foot. Insects are also answerable for the extension of many fungus epidemics, by alternately feeding on or visiting diseased and healthy plants, and in so doing unconsciously conveying spores from one plant to another. Perhaps the most interesting instance occurs in a group of fungi to which our 'stinkhorn' belongs. Most of the species are tropical; in this country (England) we have only three representatives. In this group the reproductive portion of the fungus often assumes most fantastic forms, and is generally brilliantly coloured. Over this framework is spread at maturity a dingy green, semi-fluid mass, intensely sweet to the taste, and, from the ordinary human standpoint, intensely fœtid; the exceedingly minute spores are embedded in this substance, which is greedily devoured by various kinds of insects, mostly flies, who thus unconsciously diffuse the spores, as it has been shown that these are not injured by passing through the alimentary tract of an insect. It is interesting to note that in certain of the fungi the same advertisements in the guise of colour, sweet taste, and smell are used for the purpose of unconscious dispersion of the spores by insects as are used by many flowering plants for the purpose of securing cross-fertilization, also through the agency of insects."

A Colour Variety of the Common Eel, *Anguilla australis*, Rich.—A rather unusual colour variety of the common eel was recently presented to the National Museum by Mr. H. Quiney, of Mortlake. The specimen, which measures 22 inches in length, was captured at Mortlake, and resembles the ordinary typical form in every respect except in colour, which is of a deep orange, the head, pectoral fins, and under side being somewhat paler. Though this variety is rare, it is not unique. Count de Castelnau, in his notes on this eel (Proc. Zool. and Accl. Soc. Vic., vol. i., p. 192), says "its colours are very changeable," and that "the dorsal and anal are often in a great part yellow." There is a specimen in the National Museum which was obtained so far back as December, 1872, of which a coloured sketch was made, which is very similar to the present specimen, though not quite so uniformly yellow.—Jas. A. Kershaw, F.E.S., Curator Zool. Dept. Nat. Mus.

Australian Spiders.—At a recent meeting of the Zoological Society of London, Mr. R. I. Pocock, the new superintendent of the society's gardens, called attention to a remarkable habit of some Australian spiders belonging to the genus Desis. These spiders, he stated, live in the crevices of rocks between tide-marks on the shore, and by spinning a closely woven sheet of silk over the entrance, imprison a mass of air, in which they are able to live during high tide.

A.A.A.S.—The tenth congress of the Australasian Association for the Advancement of Science was held at Dunedin, N.Z., in January last, and was well attended both by scientists and interested visitors. Unfortunately the gathering was somewhat marred by wet weather. The president, Professor David, of Sydney, delivered the inaugural address, in which he traced the aims and ideas of the association, and spoke of the necessity for more endowments for research fellowships in Australia. He hoped that men who had obtained their wealth through the application of science to nature would devote some of their wealth to such endowments. It was decided to hold the next meeting in Adelaide in September, 1906, and Professor Baldwin Spencer, F.R.S., was elected president for that meeting.

Mr. C. French, F.L.S., Government Entomologist, has recently been elected a Fellow of the Entomological Society of London, and also a member of the Society of Economic Entomology of America.

Commencing with the January number, increased space in *Knowledge* will be devoted to microscopy, which will be under the editorship of Mr. F. Shillington Scales, F.R.M.S., a well-known writer on this subject.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

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

Mr. D. Le Souëf, C.M.Z.S., one of the vice-presidents, occupied the chair, and about 100 members and visitors were present.

REPORTS.

An interesting report of the Club's excursion to Yan Yean Reservoir on Foundation Day, Monday, 1st February, was read by the leader, Mr. J. Shephard. He stated that about twelve members took part in the outing, and were accompanied by Mr. Ritchie, assistant engineer of water supply, who greatly facilitated the operations of the members. The party divided into sections, some to work along the banks for plants, others took the boat in order to use the tow net for surface specimens and the drag-hook for submerged plants, while another section gave their attention to the search for fossils. The results of the day's work were embodied in a series of reports dealing with the material obtained, which showed that a very profitable as well as enjoyable day had been spent.

The hon. librarian reported the receipt of the following donations to the library:—"Annual Report of Botanical Gardens, Sydney, for 1902," by J. H. Maiden, F.L.S., Director, from the Department of Lands and Agriculture, New South Wales; *Agricultural Gazette of New South Wales*, January, 1904, from the Secretary for Agriculture, Sydney; "Contributions to the Queensland Flora," by J. F. Bailey, F.L.S., Government Botanist, Brisbane, from the author; pamphlets from the Government Entomologist, Sydney; and *Knowledge*, January, 1904, from the proprietors.

ELECTIONS.

On a ballot being taken, Dr. J. R. M. Thomson, Mt. Alexander-road, Essendon; Dr. Wilfred Kent-Hughes, 22 Collins-street, Melbourne; Rev. James Rickard, Congregational Church, Brighton; and Miss Alice Armstrong, Balwyn-road, Canterbury, were duly elected members of the Club.

PAPERS.

1. By Mr. Jas. A. Kershaw, F.E.S., entitled "Notes on Colour-Variations of two Species of Victorian Butterflies."

The author described four dark varieties of the male of *Heteronympha merope*, Fabr., which he collected in Gippsland, and alluded to a very dark form of the female of the same species which he saw at the same time. This, he considered, agreed with the female described by the late F. A. Skuse as var. *suffusa*. He also described a very dark variety of the male of *H. philerope*, Boisd., and added some notes on the variation of this species, questioning, at the same time, the advisability of giving varietal names to such varieties.

The chairman, in speaking to the paper, alluded to the difficulty of determining when a variety is sufficiently distinct to be entitled to a varietal name.

2. Reports on the Buffalo Mountains Camp-out.

Mr. G. Coghill read a detailed report dealing generally with the Club's camp-out on the Buffalo Mountains, which extended from 24th December, 1903, to 4th January, 1904. The party numbered altogether twenty-six, including eleven ladies, and notwithstanding the discomforts occasioned by the wet weather, a thoroughly enjoyable outing was spent. The ten days were fully occupied in exploring the surrounding country, where the collectors in the party found plenty to interest them, and especially those who visited the district for the first time. The opportunity was taken by two members of the party to extend their explorations to Mount Bogong, the highest point in Victoria.

Reports were given on the following subjects :—Ornithology, by Miss McHaffie ; entomology, by Mr. J. A. Kershaw, F.E.S.; pond life, by Mr. J. Shephard ; crustacea, by Mr. O. A. Sayce ; and botany, by Mr. G. Weindorfer.

A number of lantern views illustrating various localities and incidents of the trip were exhibited.

The chairman congratulated the members of the excursion on the good results of their outing. Messrs. F. G. A. Barnard and C. Coles also spoke.

3. By Mr. G. Weindorfer, entitled "Notes on the Origin of the Alpine Flora."

The author took advantage of the observations made during his visit to the Buffalo Mountains and Mount Bogong to summarize the theories of different authors on the origin of our alpine flora, and whether it had been affected by a glacial period, and showed how the latter would account for certain resemblances in the floras of Australia and Tasmania with those of the Chatham Islands and southern South America.

NATURAL HISTORY NOTES.

Mr. G. A. Keartland mentioned that on the 30th January last he visited the Melton district with some friends, taking with

them a pointer dog, their object being to ascertain how far quail-breeding had advanced. He found great numbers of young birds and eggs. Out of about ten brace of adult birds flushed, all but three or four were disturbed from either eggs or chickens. Many coveys of young quail just able to fly were seen, whilst in other cases, when the old bird rose, there was a scatter of little ones like balls of down, not more than two or three days old. Fully ten young ones were seen for every old bird flushed.

Mr. J. Shephard drew attention to a report in the daily press, detailing very large numbers of native birds which had been collected from various parts of Australia for export to Europe.

EXHIBITS.

By Mr. F. G. A. Barnard.—Specimen of shrub, *Cassinia theodori*, from Yan Yean.

By Mr. A. Coles.—Mounted specimen of a sport of the Warbling Grass-Parrakeet, *Melopsittacus undulatus*.

By Mr. C. Coles.—Skin of Blue Wren, *Malurus cyaneus*, exhibiting the change of plumage.

By Miss S. W. L. Cochrane.—Painting of flowers of the Scarlet-flowering Gum, *Eucalyptus ficifolia*, of Western Australia.

By Miss K. Cowle.—Dried specimen of *Pultenæa villosa*, from Launching Place, S. division of Victoria; hitherto recorded only from S.W.

By Mr. G. Coghill.—Collection of insects, chiefly Coleoptera, collected during the Buffalo Mountains camp-out.

By Mr. C. French, jun.—Beetles collected by Messrs. D. Best and C. French, jun., on the Victorian Alps, viz.:—*Diphucephala elegans*, Blkb.; *D. pulchella*, Westw.; and *D. frenchii*, Blkb., (n. sp.)

By Miss M'Haffie.—Nest of Scarlet-breasted Robin, *Petrœca leggii*, Sharpe, collected during Buffalo Mountains camp-out.

By Mr. A. D. Hardy.—Drawings of several Desmids and other Algæ, together with microscopical slides of same; also *Potomageton obtusum*, *Nitella*, sp., and a Water Spider, from Yan Yean excursion.

By Mr. T. S. Hart, M.A.—Specimen of beetle, *Rhipidocera mystacinalis*, from Mt. Buninyong, Victoria.

By Mr. Jas. A. Kershaw, F.E.S.—Specimens of dark varieties of *Heteronympha merope*, Fabr., and *H. philerope*, Boisd., from Gippsland, in illustration of his paper.

By Mr. J. Shephard.—Photos. of views taken during the Buffalo Mountains camp-out.

By Mr. G. Weindorfer.—Dried specimens of plants collected during the Buffalo Mountains camp-out.

After the usual conversazione the meeting terminated.

THE BUFFALO MOUNTAINS CAMP-OUT.

THURSDAY, 24th DECEMBER, 1903, to MONDAY, 4th JANUARY, 1904.

ALTHOUGH my name does not appear on the excursion list as one of the leaders of the Buffalo camp-out, yet through force of circumstances I came to occupy that position, and therefore have to give some short account of the outing. When the idea of a "camp-out" at the Buffalo Mountains was suggested some months ago by Dr. Sutton and Mr. Barnard in a paper descriptive of a Christmas collecting trip which included a visit to the Buffalo Gorge, it was thought that the distance from Melbourne (nearly 200 miles) and the time required for such an excursion would prove difficulties in the way of getting a representative party from the Club, besides which the character of the country to be visited added further difficulties. However, inquiries were made of a local guide as to the probable cost, &c., and on this being announced several names were handed in as probable starters; the list grew, and finally a party of twenty-two, including eleven ladies, left Melbourne by the early morning train on Thursday, 24th December last, for Porepunkah, the nearest station to our destination. Some of the ladies on arrival at Spencer-street Station, and claiming seats in the compartments reserved for the Field Naturalists' Club were scarcely believed by the porters, who had evidently formed quite a different idea as to the appearance of a field naturalist. We travelled very comfortably as far as Wangaratta; here we had to change trains, and, to be all together, chose a covered truck, which proved rather dirty and decidedly rough. On our way we were interested in seeing the large fields of golden grain, ripe and ready for the harvest. Many of these same fields on our return journey had been badly discoloured by the heavy rains in the interval.

On arrival at Porepunkah we were met by our guide, Mr. Jas. Manfield, jun., and greeted by a telegram from the president of the Club wishing us a pleasant trip and the compliments of the season. Quite an imposing array of traps, evidently collected from all the district round, was waiting to convey us and our belongings to "Ernani," Mr. Manfield's home at the foot of the mountain—a 4-roomed house, where twenty of us were accommodated that night. The gentlemen occupied the barn, sleeping on improvised beds of wire-netting stretched over logs. Mr. Weindorfer, eager to be early at work, accompanied by Mr. Roy Felstead, pushed on for the summit of the mountain that evening. Three members set out for the Eurobin Falls, some two miles up the stream, missed their way, did not see the Falls, and were too late for the good dinner the rest of the party enjoyed. Others were content to explore the creek, bathe, and generally amuse themselves as they were severally inclined.

One member having a sprained ankle, and wishing to ride, reduced our pack-horses by one-third, consequently our persona baggage had to be kept down to very small limits, which caused some of the party much labour in deciding what to take and what to leave behind. Unfortunately, through carelessness of the pack-boys, much of this luggage was a long time reaching its owners on the mountain.

Friday (Christmas) morning, 25th December, we had breakfast before 6 o'clock, and the walkers (15 in number) started off in good spirits for their climb of over 3,000 feet, the riding party coming on later. We crossed the Eurobin on stepping-stones, and got over the steepest though not the most difficult part of the climb before we realized it as such. Mr. Kernot encouraged us every little while by telling us how high we had ascended according to his barometer.

At length we reached the granite country and were actually on the Buffalo. Then what a change in the flora! I could not resist the temptation to leave the track and search amongst the flower-covered rocks, noting many plants new to me, and various old friends in unusually rich garb. Here I collected several beetles, noting especially a Curculio which was found only on the white flowers of *Grevillea parviflora*. Most of the party met at the mountain stream close to the first rocks, and here the horses, with an extra member, Mr. Gerrand, caught up to us. All enjoyed a rest and the delightfully cool water, and started off refreshed, but we should have had a substantial meal and a longer rest. Future parties should bear this in mind. The track now followed round the northern end of the mountain, and presently the climbing is somewhat stiff, as the path with some steep pinches winds between the huge rocks—an uncomfortable country for nervous riders. Beautiful little mountain streams crossed the track every here and there; near one of these I collected several rather good Longicorn beetles from the flowers of an Aster.

The top of the mountain was reached, in my case at least, without my knowledge, and it will be many a day before I forget my first glimpse of the "tundra" country in front of Carlile's Hospice. Here were flowers of all colours and kinds. Though the last of the party, I could not hurry through such a rich collecting field. A walk of about a mile brought us to our camp, just before reaching which we got the first glimpse of the glorious view from the Buffalo Gorge into the valley below, and across to Bogong, with Kosciusko in the distance. The camp was within fifty feet of the edge of the Gorge, and consisted of a slab hut, in which seven ladies slept, a canvas tent-house for eight men, a dining tent, two of Mr. Mattingley's bell tents, and two small tents—a really imposing settlement, excellent in fine weather, but somewhat leaky, excepting the bell tents, in wet

weather. The beds were of wire netting and logs. We were here about 4,500 feet above sea level.

On Saturday (26th) the botanists and three others went to the Hump, nearly four miles from the camp, some even as far as the Horn, about another mile and a half. The day's collecting was good, and especially so to those who were visiting the district for the first time. I added several beetles to my collection, including a beautiful green Scarabid, *Diphucephala elegans*, which appears to be rather local. Other members, under the leadership of Mr. Manfield, took a stroll to the "Haunted Gorge."

On Sunday morning (27th) three more gentlemen arrived, very wet, bringing our total up to its highest number, twenty-six, reduced, however, to twenty-five before nightfall by Mr. Gerrand's departure. The rain that seemed so unfortunate really added very much to our enjoyment, as in consequence the waterfall was much increased in size and beauty, and the mist effects in the Gorge, varying every moment, were something never to be forgotten. The rolling billows of mist in the near and distant valleys sometimes reminding us of snow and often of the sea, more than compensated for any discomforts we experienced earlier in the day. The three who came up in the rain were specially enthusiastic when the lovely panorama was unfolded to their eyes.

Monday (28th) was still showery. Some went to the "Horn," others were content with shorter rambles, such as to the "Haunted" and Buffalo Gorges, the views and mist effects being quite different, and just as glorious, the moisture in the air giving a softening effect to everything. In the afternoon Mr. G. Weindorfer and Dr. Sutton started off for their trip to Bogong.

Tuesday (29th) was fine, and a good thing too! Wet weather is well enough with such views, but all were glad to see the sun again. On this day we visited the "Look-out" Rock, near Carlile's, climbed the swinging ladder to the top, and admired the comparatively circumscribed view.

Wednesday (30th) we all, under the leadership of our guide, went to the Horn, 5,645 feet, the highest peak of the Buffalo, and enjoyed a long day's collecting and rambling. The view from the Horn is far-reaching and superb, the grandest many of us had ever seen. On our return some of the party went over the "Hump," and had a look at the "Leviathan" Rock, which is said to be the largest detached rock in Australia. It is tilted well off the ground in front, and under it the cattle camp. It is said to measure 150 feet long, 75 feet high, and 60 feet broad. This portion of the party went back by a different track, and were at the camp some time before the main body. Unfortunately the day did not pass without accident, as Miss Cowle fell and sprained her ankle.

Thursday (31st) was spent in short walks round about the camp, and during the day we said good-bye to Mr. Gossler. Then we had to prepare for the evening's bonfire, under the direction of the Messrs. Summers. Long will we all remember that New Year's Eve, with its impromptu programme of songs and recitations, a charade, the re-incarnation of the Buffalo and the Haunted Gorge ghost, speeches, singing of "Auld Lang Syne," and supper. The glorious night, the eerie position, with its weird outlook, and the jolly company combined in making an effect never to be forgotten.

Friday (1st January, 1904) was mostly spent in resting after the exertions of the previous evening. We said good-bye to Mr., Mrs., and Miss Shephard, Miss Shaw, and Mr. Mathieson. An attempt was made to go to the "Leviathan" Rock, but we only got a little beyond Carlile's when, as rain threatened, we had to return. Having collected a pair of Buprestid beetles on *Richea gunnii*, and being anxious to secure more, I stayed behind, and succeeded in getting several, but also got a drenching. This beetle proves to be a rarity.

During our absence Mr. Weindorfer paid a flying visit to the camp to show that he had returned from Bogong, and to say good-bye.

It rained all Friday night, and Saturday was almost equally wet, still two or three enthusiasts went out collecting.

On Sunday morning rain was still falling. However, about 10 o'clock the weather cleared, and we started for lower levels, with many a regret for having to leave the Buffalo, ten days there seeming far too short.

On reaching the creek that tumbles down the Gorge we turned aside to have a last look at the waterfall, and the sight well repaid us. Here the rain began again, and continued for the rest of the day. The "tundra" in front of Carlile's was practically under water, so that dry feet, not to mention legs, were out of the question. Slippety-slop down that mountain we went, occasionally measuring our length, but merry withal. The Eurobin Creek, we crossed so easily on our journey up, was now a swollen torrent, and we had to make a detour to find a log high enough to form a bridge.

At "Ernani" we met some of the others who had come down before, all nice and dry, and ready to practically welcome us with spare clothes. Then ensued such a drying of garments.

On Monday morning, 4th January, eighteen of us left Porepunkah by the early train (5 a.m.), and mid-day saw most of us in the city again, where we were met by Messrs. Weindorfer, Shephard, and Mathieson, whose kindly welcome we much appreciated.

Everybody enjoyed themselves, judging by the regrets expressed

at leaving and wishes for a longer stay. Our vice-president, Mr. F. G. A. Barnard, is to be congratulated on the result of his suggestion that Mr. J. Manfield, jun., be asked to undertake the management of the camp, and our thanks are due to the latter for his untiring efforts to provide for our wants; also to Mr. A. Mattingley for the loan of two of his tents, and we sincerely regretted that business prevented him from being with us.

The following are the names of the members and friends comprising the first camping-out party from the Field Naturalists' Club of Victoria to visit the Buffalo Mountains :—Mesdames Coghill and Shephard, Dr. Gert. Halley, Misses K. Cowle, Felstead (2), McHaffie, McInnes, Shaw, Shephard, and Wingrove, Dr. Sutton, Messrs. Blackett, Felstead (2), Gerrard, Gossler, Kernot, Mathieson, J. Shephard, Summers (2), and Tilly, Master J. Tuckett, with Messrs. Coghill and Weindorfer as leaders.

I am indebted to my co-leader, Mr. G. Weindorfer, for the botanical report of the trip; to Mr. J. A. Kershaw, F.E.S., for a list of the beetles collected; to Mr. R. A. Bastow for the names of the mosses, &c., collected by Miss K. Cowle; to Miss McHaffie for notes on the birds observed; and to Mr. J. Shephard and Mr. O. A. Sayce for some notes on the pond-life.

Ornithology.—In the following notes I have included the principal birds observed during the "camp-out" at Mt. Buffalo :—

Uroaëtus audax, Wedge-tailed Eagle.—Occasionally seen on the ranges, but not numerous anywhere.

Corone australis, Raven.—Observed a flock of about eight or ten flying backwards and forwards amongst the high rocky peaks.

Strepera cuneicaudata, Grey Crow-Shrike.—Saw a few, and frequently heard their familiar harsh double note.

Collyriocincla harmonica, Grey Shrike-Thrush.—Fairly plentiful wherever the timber was thickest, and its melodious voice was one of the first to be heard before sunrise.

Petrœca leggii, Scarlet-breasted Robin.—Very numerous everywhere, but particularly in rocky localities. Found a nest in the crevice of a huge granite boulder, containing three eggs; but for the most part the birds had not finished building, a good many nests we found being still unlined.

Malurus cyaneus, Blue Wren.—Numerous among the low scrub, and appeared to be building.

Rhipidura albiscapa, White-shafted Fantail. — Not very common. Did not find a single nest, old or new.

Geocichla lunulata, Mountain-Thrush. — Observed several hopping about on the ground, in their search for insects through the tangled undergrowth.

Acanthiza chrysorrhoa, Yellow-rumped Tit.—A great many

were seen hopping about the branches of the gum-trees, but no nests found.

Sericornis osculans, Allied Scrub-Wren.—Only to be seen on penetrating the thickest scrub, when the bird, thus disturbed, would fly out. Probably too late for nests.

Gymnorhina leuconota, White-backed Magpie.—Not particularly abundant, and did not observe any of the Black-backed variety.

Eopsaltria australis, Yellow-breasted Shrike-Robin.—The soft, melodious note of this bird could be heard frequently in the wooded gullies and along the creeks. They were building, and were shy of approach.

Acanthorhynchus tenuirostris, Spine-billed Honey-eater.—These honey-eaters were only just building, and we watched one carrying pieces of bark to form its nest in a broad-leaved acacia, and uttering a loud cry at intervals.

Ptilotis lewini, Yellow-eared Honey-eater.—Only saw one or two of these lovely birds, and they were extremely shy.

Ptilotis leucotis, White-eared Honey-eater.—Very plentiful wherever the timber or scrub was thick, and not at all shy. Whilst sitting on a log they hopped quite close to us in their search for insects, regardless of our presence.

Manorhina garrula, Noisy Minah.—Fairly common wherever the scrub was dense, and their noisy voices were constantly heard.

Acanthochæra carunculata, Red-Wattle Bird.—These were numerous, and mostly to be heard and seen amongst the stunted gums which grow in these alpine regions.

Zonæginthus bellus, Fire-tailed Finch.—This pretty finch was seen in flocks of ten or twelve, mostly near watercourses and marshy land.

Menura victoriæ, Lyre-bird.—Wherever it was boggy, wet, and the vegetation much tangled, there these beautiful birds roamed at will, nor did they seem alarmed at our intrusion into their haunts, continuing their gambols as long as we remained still.

Dacelo gigas, Kookaburra, Brown Kingfisher.—This quaint-looking bird was to be heard both in the early morning and at sunset, but it seemed to pass the greatest heat of the day amongst the leafy foliage of the gums. Saw one in the act of swallowing a fair-sized lizard.

Halcyon sanctus, Sacred Kingfisher.—Saw two or three, and from their loud, shrill cries they probably had nests close at hand.

Callocephalon galeatum, Gang-Gang Cockatoo.—Very plentiful in the thickly timbered country, where their harsh, discordant notes could always be heard at any time of the day.

Cacatua galerita, White Cockatoo.—This bird was only noted once or twice on the high table-lands.

Polytelis barrabandi, Green-Leek Parrakeet.—Seen occasionally amongst the stunted eucalyptus or near the creeks.

Platycercus elegans, Pennant Parrakeet.—Abundant all through the timber. Found nest containing two fledglings in a hole of a dead eucalypt about 15 feet from the ground.

Platycercus eximius, Rosella.—Fairly common on the high lands and in the gorges of the ranges. Did not find any nests, but saw some young birds just able to fly.

No doubt, had we been favoured with finer weather a greater variety of birds would have been seen.—A. F. W. McHaffie.

Entomology.—The entomological results of the Buffalo Mountains excursion, collected by Mr. G. Coghill and handed to me for identification, consist almost exclusively of Coleoptera. These were to a large extent well-known species, but among them over twenty species were new to the National Museum collection. The majority of these latter have not yet been determined, and they include several very desirable additions. Among the Longicorns I might specially mention a nice pair of *Macrones*, sp. (?), a single specimen of *Ceresium simplex*, and four specimens of the small ant-like *Ochyra coarctica*, all of which are rare species. A very fine series of the brilliant *Diphucephala elegans* were secured, a species which is probably confined to this class of country. Several species of Carabidæ, and a pretty little Buprestid have, among others, proved strangers to me.

Coleoptera.

Sarothrocrepis luctuosa
,, durvillii
,, calida
Philophlœus rotundipennis
Silphomorpha suturalis
Xanthophæa grandis
Ptomaphila lachrymosa
Lemodes coccinea
Macrogyrus rivularis
Cheiroplatus mælius
Isodon australasiæ
Scitala rugosula
Diphucephala elegans
Mæchidius mellyanus
Telura vitticollis
Stigmodera cruentata
,, varia
,, stephensi
,, australasiæ
Stigmodera burchelli
Monocrepidius punctatostriatus
Natalis howitti
Thanasimus tricolor
Xylotretus canaliculatus
,, obscurus
Elsale unicolor
Rhizopertha elongatula
Metriorrhynchus erythropterus
Telephorus pulchellus
Œdemera dorsalis
Allesula fuscipennis
Apasis howitti
Lepispilus sulcicollis
Titæna columbina
Pterohelæus kollari
Belus suturalis
Chrysolophus spectabilis
Pachyura australis

Cherrus infaustus	Hebecerus crocogaster
Orthorrhinus cylindrirostris	Omotes erosicollis
Aterpus cultratus	Trichomesia newmani
Aopolocnemis rufipes	Macrones (sp.)
Phoracantha quinaria (?)	Enchoptera apicalis
Ceresium simplex	Rhagiomorpha concolor
Callirhoe allapsa	Pempsamacra dispersa
Epithora dorsalis	,, pygmæa
Callidiopsis scutellaris	Adrium artifex
Ochyra coarctata	Coccinella racemosa

Taken altogether, the collection, which numbers about 91 species, speaks well for the zeal and interest of Mr. Coghill.

Jas. A. Kershaw.

Pond-Life.—In the immediate vicinity of the camp was a creek, running down a rugged gully, which on the first days of our visit was a chain of small waterholes, and an investigation resulted in the capture of some crustacean forms, regarding which Mr. O. A. Sayce reports as follows :—

"The bottle of specimens collected by you from a creek at 'Haunted Gorge,' on the summit of Mount Buffalo, contained two species of sessile-eyed crustaceans. One is an Isopod, *Phreatoicus australis*, Chilton, and belongs to a family of considerable morphological and physiological interest, so far known only in Australasia. Until now it has been recorded only from the top of Mount Kosciusko, N.S.W., and Mount Wellington and Lake Petrach, Tasmania. In the bottle were two females, each with developing young in the marsupium, and also a number of free very young forms. The other is an Amphipod, closely related to the genus Niphargus of the old world, where the various species are blind inhabitants of subterranean waters. On close inspection I failed to find any important differences from *Neoniphargus fultoni*, Sayce, collected from an altitude of 3,000 feet near Wood's Point, except that all of the present specimens are devoid of eyes. A more detailed examination of this species, together with some other material in hand, will be made when I have more time at my disposal, and communicated in a separate paper.—O. A. Sayce."

The stream running down the Buffalo Gorge was exceedingly clear, and only added one or two specimens, which are included in the animals dealt with by Mr. Sayce. The flats promised better, but owing to weather conditions yielded little. The stream which precipitates itself over the Gorge arrives there after meandering through a series of boggy valleys. On reaching the upper land after the long ascent from Porepunkah the appearance of flat valley bottoms with sinuous streams traversing them is very interesting. Instead of being on a peak, as might be

expected from an inspection of the Buffalo Mountain from below, one is on a grassy plain surrounded by small hills of granite, in places bare of all vegetation, and studded with huge boulders. As the journey to the Horn showed, there is a considerable stretch of country, composed of a series of valleys, divided from each other by small but precipitous hills, of which the Hump and the Horn are the most striking examples. Peaty morasses are present in all the valleys, the peat being apparently of considerable thickness. This peat was very suggestive of the former existence of a series of mountain lakes. The nearer valley to the camp was where the "Hospice" is situated, and on the arrival of the party presented a promising appearance to the pond-life gatherer. A visit was, however, not made to this spot before the heavy rains came, which filled the old pools to the brim and created a great many more. Under these circumstances the yield was not great. Of the Entomostraca gathered here, the common Cylops was the most numerous, and of a number of the Daphnia family submitted to Mr. J. F. Haase he recognized *Chydorus leonardi* and two species of Alona. Desmids were fairly plentiful, and under normal conditions of rainfall this would no doubt prove a prolific collecting ground. It was curious that not a single Rotifer was seen, this also being due to the flooding of the pools with rain water.—J. SHEPHARD.

BOTANY.—The wonderful poesy which the world of the Alps presents in its springtime is strange to the inhabitants of the lowlands. One who visits the Australian Alps at Christmas will find, in comparison with the vegetation of lower altitudes, that the plant-life has not as far advanced, nature there presenting us with an awakening spring, which has again and again filled the hearts of men with greatest delight. But spring in the Alps must be seen not only from the depths of the valleys—it must be viewed from the heights of the mountains, for there is the kingdom of the Alpine flowers, where beauty of form is competing with splendour of colour or perfume.

As our arrival at Porepunkah, the nearest railway station to our destination, took place late in the afternoon of the 24th December, not much could be done that day in the way of collecting. The road, which crosses the valleys of the Ovens and the Buckland Rivers, leads for three miles through more or less uninteresting country. Bushes of *Hymenanthera banksii*, in company with some of *Acacia pravissima*, *Bursaria spinosa*, and *Prostanthera lasiantha*, lining the cultivated paddocks, give an impression which does not seem to promise much for the botanist. Half-way to the Eurobin we enter the forest, here consisting chiefly of *Eucalyptus amygdalina*, *E. melliodora*, and *E. gunni*, while the under-shrub was represented by *Exocarpus stricta*, *E. cupressiformis*, *Aster asterotrichus*, and *Leptospermum lanigerum*,

under the branches of which here and there appeared *Lomatia ilicifolia* and the orchid *Dipodium punctatum*, both of which continue all the way up as far as the Gorge.

Our first halt was at our guide's homestead, "Ernani," situated at the foot of a spur from the mountain, and up which the bridle track leads to the Buffalo table-land. Two miles from this charmingly situated spot, on the banks of the Eurobin, a change from the silurian to the granitic formation takes place, and we find, with the appearance of *Grevillea parviflora*, *Hibbertia serpillifolia*, *Astrotricha ledifolia*, *Veronica derwentia*, *Pultenæa mollis*, *Calycothrix tetragona*, and *Trachymene billardieri*, a striking change in the vegetation, which here, in the black soil saturated with water, shows a luxuriant growth. The higher we ascend the more the plants of the lowlands disappear, being gradually replaced by alpine forms. *Goodenia hederacea*, almost clinging to the rocks, is one of the first of the alpine plants to greet us. The declivities burst forth in splendour under the bright yellow-flowering *Oxylobium alpestre*, accompanied by *Daviesia ulicina* and *D. latifolia*, while the white-flowering *Pimelea linifolia*, the pink-petalled *Tetratheca ciliata*, *T. ericifolia*, *Candollea serrulata*, and *Erythræa australis*, the azure blue bell of *Wahlenbergia gracilis*, with *Stackhousia viminalis* and other lowland forms, which, in spite of the great climatic differences, succeed in ascending to these higher altitudes, each contributes its share to the harmony in the gradation of colour.

But all this splendour and magnificence is only an introduction to the kingdom of the apine flowers which nature presents to us at a height of 4,500 feet above sea-level, and involuntarily we put the question, "What is it which induces all these plants to enjoy their life in these lofty altitudes?" It looks as if a number of selected species had combined in order to enjoy their existence far from the destructive hand of man; or as if their proud relatives in the valleys had banished their dwarfed sisters to the barren heights of alpine regions.

With the first view of the Buffalo Hospice we set our feet on a green carpet, interwoven with the greatest variety of colours in flowering plants. The blooms of *Ranunculus muelleri*, *Huanaca hydrocotylea*, and the pale straw-coloured flowers of *Caltha intraloba*—the first messengers of the alpine spring—have disappeared, and made room for others; *Herpolirion novæ-zealandiæ* scatters its star-like flowers over the sunny meadow land; at the edges of the rocks *Kunzea muelleri* exposes its light yellow, and *Kunzea parvifolia* its purple flowers to the sunbeams; on the banks of the creek we met with the orchids *Prasophyllum fuscum* and *Thelymitra ixioides*, the sky-blue flowering *Veronica nivæa*, *Comesperma retusum*, *Cardamine dyctiosperma*, and *Drosera peltata*. In marshy ground appear *Goodenia gracilis*,

Aciphylla simplicicaulis, and *Gentiana saxosa*, its single white flowers pencilled with lines of a tender blue, while *Azorella cuneifolia*, *Pultenæa fasciculata*, *Goodenia humilis*, *Scleranthus bifloris*, *Hydrocotyle hirsuta*, *Coprosma nertera*, *Oreomyrrhis andicola*, and *Scævola hookeri* may be found almost hidden under the grasses, of which we enumerate *Echinopogon ovatus*, *Agrostis montana*, *Festuca hookeri*, and *Trisetum subspicatum*, with *Luzula campestris* (Juncaceæ) and *Carex paniculata* (Cyperaceæ) in bloom. Large white patches are formed by the almost stalkless flowers of *Claytonia australasica*. In large clusters occurred the singular epacrid *Richea gunnii*, with its pale yellow flowers, often accompanied by *Helichrysum baccharoides*. Where the embankments of the creek are narrowed by gigantic rocks—the first precursors of the far-famed Gorge—the meadow-like character loses itself among numerous bushes which form the transition to a forest, chiefly consisting of *Eucalyptus gunnii*, *E. sieberiana*, and *E. melliodora*.

Eriostemon alpinus stands with its yellow flowers in harmonious contrast to the pink-flowering *Boronia algida* and *Bæckea gunniana*, or to the white-flowering *Prostanthera cuneata* and *Westringia senifolia*, among which we often notice the star-like yellow flowers of *Stypandra cæspitosa*, and *Podolepis longipedata*, also *Bæckea diffusa*, *Micrantheum hexandrum* (seed), and *Bossiæa foliosa* (seed). We experienced great satisfaction in noticing *Prostanthera walteri* growing in great profusion near the Gorge, in the locality where a single bush was found in bloom the year before (*Victorian Naturalist*, vol. xix., p. 156), but so far as we could ascertain it is confined to this particular locality.

From there our way led through the forest to the camp, situated on the edge of the Gorge. The afternoon was mostly spent in preparing the camp and preserving the specimens collected. The following day was reserved for a visit to the "Haunted Valley" and the "Hump," which actually turned out for three members of the party to be a visit to the Buffalo Peak, or the "Horn," about two miles beyond the Hump.

In the numerous swamps which we met with on our way we found more or less a repetition of the flora surrounding the Buffalo Hospice. A surprise was prepared for us in the Haunted Valley, where we met with one of our few Victorian conifers, *Nageia alpina*, growing luxuriantly along the creek, in company of splendidly developed bushes of *Drimys aromatica*, *Orites lancifolia*, the purple-flowering *Prostanthera rotundifolia*, and the pompous *Pimelea ligustrina*, in the shade of which *Epacris mucronulata*, *E. heteronema*, and *Comesperma retusum*, with the ferns *Lomaria alpina* and *Asplenium flabellifolium*, made themselves conspicuous. As we ascended to higher altitudes, the

vegetation became more and more gorgeous, and we noticed plants in bud or in full bloom which lower down showed signs of further advancement. *Dianella tasmanica*, with its dark blue coloured flowers, *Gaultiera hispida*, *Styphelia montana*, and *Grevillea parviflora*, which we found in fruit near the camp, had there just expanded their flowers.

On ascending the waterless slope which leads to the table-land from which the Hump rises, we leave behind many of the bushes which require a considerable amount of moisture in the soil. Their place is worthily taken by bushes of one of our most beautiful proteads, *Grevillea victoriæ*. The number of species in these high altitudes (about 5,500 feet) becomes more and more restricted; but, on the other hand, development in the splendour of flowers is gained. In the swamp which extends on the southern side of the Hump we added to our collection *Astelia alpina* and the dull purplish variety of the orchid *Chiloglottis gunnii*, blooming there in great masses, in dry soil; *Gnaphalium alpigineum*, *Micrantheum hexandrum*, and *Hovea heterophylla*. The nearer we approached the Horn we met with *Bossiæa foliosa* richer in flower, lining our way on both sides with its beautiful masses of yellow flowers, on which thousands of insects found the table laid for their meal.

Near the top of the mount on the warmer northern slope we collected *Hovea heterophylla*, *Gaultiera hispida*, *Drimys aromatica*, *Trachymene billardieri*, *Brachycome scapiformis*, *B. nivalis*, and *Aster stellulatus*, ; while on the cooler southern side, exposed to wind and weather, grew *Aciphylla glacialis*, a true child of our alpine flora, enjoying there the eternal peace which imparts that majestic character to the lofty altitudes of alpine regions, where we can see expanding at our feet the proofs of the creative power of nature during uncountable ages.

The proposed trip along the Buffalo River over Mount Howitt and Mount Buller to Mansfield by Dr. Sutton, Mr. Gossler, and myself was made impossible owing to the heavy rainfall during Sunday and Monday. Being obliged to stay in camp for these two days, we had ample time to busy ourselves with the collected specimens and to take short rambles around the camp. During these opportunities we observed *Helichrysum stirlingii*, which has been known as a rare north-eastern plant, growing on the road from Harrietville to Mount St. Bernard. In the Buffalo Mountains it is far from rare, forming, in company with *Gaultiera hispida*, *Daviesia latifolia*, *Callistemon salignus*, *Leptospermum scoparium*, and *Helichrysum rosmarinifolium*, the undergrowth of a fine forest, in the shade of which grew *Helichrysum lucidum*, *Hibbertia serpillifolia*, *H. diffusa*, *Comesperma ericinum*, *Eriostemon phylicifolius*, *E. trymalioides*, *Pultenæa gunnii*, and the orchids *Gastrodia sesamoides* and *Caladenia carnea*.

On the perpendicular sides of the Gorge, in any cleft where a little soil has lodged, the hardy *Aster celmisia* has found a home, forming there, with its large white flowers, a striking contrast to the dark walls of the Gorge.

VISIT TO MOUNT BOGONG.

Having secured a great number of specimens during the four days of our stay in the Buffalos, I welcomed a proposal from Dr. Sutton to pay a visit to Mount Bogong, some thirty miles away, which in the distance appeared both majestic and imposing, and seemed to challenge us to explore and carry off its botanic treasures. For that reason we both left for "Ernani," on the Eurobin, on Monday evening, the 28th. Tuesday, the 29th, saw us early in the morning making our way on horseback, *vid* Porepunkah, to Bright, where we made the acquaintance of a gentleman from the Kiewa Valley, in whose company we rode to Tawonga. The road leads from Bright about three miles along the Ovens River, through partly cultivated land, and is lined on both sides with bushes of *Acacia pravissima*, among which an occasional flowering *Bursaria spinosa* may be seen. The road crosses the Ovens, and we then ascend the range which separates the Ovens from the Kiewa Valley. On this road, which leads for about three miles along the German Creek, we met with a great variety of plant life. The creek vegetation consisted mostly of familiar bushes, such as *Zieria smithii*, *Atherosperma moschatum*, *Aster argophyllus*, *Prostanthera lasiantha*, *Cryptandra hookeri*, &c., here and there overlooked by the light green fronds of the Valley Tree-Fern, *Dicksonia billardieri*. From where we leave the creek, both sides of this beautifully constructed road were covered with a mass of *Persoonia chamaepeuce*, *Veronica derwentia*, *Lomatia ilicifolia*, different species of Senecio, *Cassinia longifolio*, *C. aculeata*, *Gompholobium huegelii*, *Grevillea alpina*, *Coprosma billardieri*, and *Daviesia ulicina*.

After a ride of twenty-five miles we arrived at a cattle station in the Kiewa Valley, the nearest house to Bogong, whose hospitable owner, a Mr. Duane, was kind enough to invite us to a "shake-down" for the night.

As it was a distance of fourteen miles from here to the top of Mount Bogong, we had to make an early start the next morning, and were guided by our host, who kindly undertook to put us on to the only possible ascent of Bogong from this side. Our way went along numerous paddocks, in which stood here and there groups of trees of *Eucalyptus amygdalina*, the remnants of the original forests left by the bush-clearing settler. After a two miles ride the outrunners or spurs of Mount Bogong became narrower, and we entered a rich under-shrub, chiefly consisting of *Leptospermum lanigerum*, *Hymenanthera banksii*, *Acacia pravis-*

sima, *Kunzea pedunculariis*, *Pimelea axiflora*, *Exocarpus cupressiformis*, *Omphacomeria acerba*, *Banksia collina*, and *Hakea microcarpa*. We observed a few trees of *Banksia integrifolia* (which is not recorded for the north-east in the "Key"), also *Acacia melanoxylon*, *A. prominens*, and *A. dealbata*. At a distance of six miles from our starting point we left the undershrub, which occasionally was interrupted by creeks, with a splendid development of fern life, and began our climb along a spur rising at about 30 to 45°, which was covered with a forest of *Eucalyptus sieberiana*. This route is occasionally used by travelling stock, and shows here and there traces of a track. However, fallen trees across the back of the small spur and boulders of rocks made riding impossible.

At the foot of the spur and on the waterless declivity of the sub-alpine region the vegetation was not very promising. We met there with *Acacia penninervis*, *Persoonia confertiflora*, *Lomatia ilicfolia*, *Daviesia latifolia*, *D. ulicina*, *Veronica derwentia*, and *Haloragis tetragona*, to which we added in higher elevations *Goodenia hederacea*, *Dianella tasmanica*, and *Candollea serrulata*. At an elevation of about 5,000 ft. we entered the snow-gum scrub, *Eucalyptus coriacea*, which was there interspersed with *Grevillea victoriæ* (better developed in its flowers than on the Buffalos), *Acacia alpina*, *A. penninervis*, *Bossiæa foliosa*, and *Pimelea ligustrina*. About 1 o'clock we arrived at the cairn, 6,508 ft. above sea-level. Here we were surrounded by a dense fog, only occasionally allowing a view of other mountains or down into the valley.

The proper alpine region of Mt. Bogong is, at its west side, not very rich in the variety of plant-growth. The plateau around the cairn shows no compact mass of vegetation. Bunches of grasses alternate with large spots of barren ground, sometimes interrupted by a white cluster formed by so many flowers of *Claytonia australasica* or the Victorian Eidelweiss, *Leontopodium catipes*, both of which species were there well developed. On the slope between the tree-line and the table-land, where water occasionally percolates through the rocks, we met with *Pimelea alpina* and *P. axiflora* var. *alpina*, *Grevillea australis*, *Helichrysum leucopsidium*, *Brachycome scapiformis*, *B. nivalis*, *Aster myrsinoides*, *A. celmisia*, *Oxylobium procumbens*, *Styphelia montana*, and *Euphrasia brownii*, the last-named species very rich in its flowers.

Neither the anticipated botanical result nor the view which we expected to have got from Mt. Bogong could induce us to a longer stay, and so we started on our return journey shortly after 2 p.m., and arrived at the cattle station in the Kiewa Valley at 7.30, where we again took shelter for the night.

On Thursday morning, 31st December, we made our way

back to the Eurobin, and while crossing the paddocks in the Kiewa Valley were not a little astonished to find growing there, in uncountable masses, and in perfect development, the somewhat rare orchid *Spiranthes australis*. Returning the same way to Bright, we collected on the road *Senecio bedfordii*, *Arthropodium paniculatum*, which grew there in great quantities, *Hibbertia diffusa*, *Platylobium formosum*, *Thysanotus tuberosus*, *Lomatia ilicifolia*, *L. longifolia*, *Lobelia simplicicaulis*, *Cynoglossum suaveolens*, *Caladenia patersonii*, and *Pimelea curviflora*.

We arrived at "Ernani" about 7 p.m., and spent the greater part of the evening in arranging our specimens. Friday, the 1st January, was devoted to an examination of the Eurobin Creek, which we followed as far as the Ladies' Bath and the Eurobin Falls close by. The banks of the creek bear there a luxuriant vegetation, mostly consisting of underwood such as the white-flowering *Bœckea crenatifolia*, *Dodonæa viscosa*, *Lomatia longifolia*, *Aster argophyllus*, *Cryptandra hookeri*, the blue-flowering *Indigofera australis*, and *Pimelea axiflora*, over which frequently rise some trees of *Acacia implexa*. Under their shelter grew *Isotoma axillaris*, *Viola hederacea*, and *V. betonicifolia* (which occur almost anywhere in the Buffalos), *Lotus corniculatus*, *Lyousia straminea*, *Pimelea humilis*, in moist places *Drosera binata*, *Utricularia dichotoma*, besides many species common to other parts of the State. We noticed, with great admiration, the fern *Osmunda barbara* growing, splendidly developed, along the creek.

In the afternoon I decided to pay a short visit to the camp on top of the Gorge, in order to bid good-bye to my fellow-excursionists. I chose for this stroll the shorter way, *viâ* the Ladies' Bath and up the south wall of the Gorge, which is in its lower part densely covered with shrubs, such as *Trachymene billardieri*, *Dodonæa viscosa*, *Pultenæa mollis*, *Acacia penninervis*, and *Correa lawrenciana*, which are higher up mostly replaced by *Helichrysum stirlingii*, *Gaultiera hispida*, *Oxylobium alpestre*, and *Acacia alpina*. With regard to all the Acacias observed, I may mention that their principal glory had departed, as we found no specimens in bloom; their flowering season for this locality was over, and all specimens were in fruit. Several species of Mosses and Lichens were found specially well developed in the alpine regions, specimens of which have been submitted to Mr. Bastow by Miss Cowle for identification.

Our excursion to the Buffalos turned out very successful from a botanical point of view. Nearly 300 species were observed in bloom, but I have mentioned only the more interesting ones, plebeians such as *Gallium australe* or *Ranunculus lappaceus* being, on principle, omitted. May this excursion serve as an

inducement for other of our members to collect and study our highly interesting alpine flora, of which each visitor to the Alps cannot fail to say that here richness of colour and beauty of form exist such as only Nature herself has the power to think out and create.—G. WEINDORFER.

CRYPTOGAMIC BOTANY.—Among the mosses, hepatics, and lichens collected by Miss Kate Cowle, I have been able to identify the following species :—

Mosses.—Hypnum cerviculatum, Hook. and Wils.; Bartramia affinis, Hook.; Leptotheca gaudichaudii, Schwr. ; Bartramia comosa, Mitt.; Bryum brachyurus, Hmpe.; Sphagnum cristatum, Hmpe.; Thuidium furfurosum, Hook. and Wils.; Hypnum rutabulum, Lin.; Bryum ; Polytrichum commune, Lin., also a long-growing variety of P. commune amongst Sphagnum.

Hepatics.—Chiloseyphus sinuosus, Nees, with Lepidozia patentissima, Hook., the latter very minute ; Lepidozia cupressina, Lindberg ; Jungermannia colorata, Lehman.

Lichens.—Parmelia perforata, Wulf. ; Cladonia pyxidata, Cladonia aggregata, Ach.; Parmelia (conspersa?), Usnea barbata, L., var. dasypoga.—R. A. BASTOW.

The excursion having been such a success should warrant a similar camp being formed another Christmas in the real Alps, at the higher altitude of Mount St. Bernard or Mount Hotham, where no doubt an equally profitable and enjoyable time could be spent.—GEO. COGHILL.

EXCURSION TO YAN YEAN RESERVOIR.

ABOUT twelve members met at Spencer-street Station on Foundation Day, Monday, 1st February, for a visit to the Yan Yean Reservoir, the main storage basin of the water supply for the metropolis. The party was accompanied by Mr. E. G. Ritchie, Assistant Engineer of Water Supply, and the Club is indebted to him for his assistance in facilitating the operations of its members on this occasion. On arrival at the reservoir, lunch was disposed of, and a section of the party commenced a search for flowering plants along the bank, while another section made use of the boat in order to apply a tow net to secure the "plankton" and a drag hook for submerged plants. The strong wind interfered considerably with the success of the boating party, as it created quite respectable waves, and no doubt very much reduced the number of free-swimming animals near the surface. After an hour or two of persevering application, the boating party joined the shore section, and further search was made along the margin in the sheltered parts. Several members made an examination of the locality in search of fossils, meeting with fair success.

Of the zoological captures it may be said that, either owing to

the roughness of the surface or to general sterility, they were not large in quantity. The crustacean most plentiful was a common copepod of the genus Boekella. A fair number of Daphnia, of a common small species, were found in the marginal gatherings. In both open water and shore gatherings there occurred large numbers of a protozoan of the class Infusoria and family Heterotricha, which is most probably identifiable with *Stentor igneus* in the motile stage, but it was not observed in its sedentary form. The occurrence of a single form such as this in great numbers is common in pools, and is due to the development of conditions favourable to it in regard chiefly to food supply. In this case there is little doubt that the unicellular plant *Pleurococcus mucosus* was the pabulum. Another infusorian, of the genus Amphileptus, was noticed, but was scarce. It was interesting to find a single specimen of the rotifer *Pedalion*, sp. A small form of the family Ploima was also in numbers, but is probably an unnamed species.

A representative of the group Arachnida was present in large numbers as a small water mite. This is a form very commonly found, but owing to no worker having attempted this branch of the spider family, its name cannot be given.

Of the botanical material obtained from the reservoir itself Mr. A. D. Hardy has handed in the following particulars :—

Owing probably to the exposed nature of the shore, such plants as *Potomageton natans*, *Ottelia ovalifolia*, Azolla, Lemna, &c., usually found on fresh-water surfaces, were absent. Among the partly submerged plants were the reed *Arundo phragmites*, the rush *Juncus communis*, and *Triglochin procera* with fruiting spikes. Of wholly submerged plants we obtained *Potomageton obtusum* and *Nitella*, sp., which was several feet in length, but not in fruit. Such filamentous Algæ as Spirogyra and Zygnema grew along the margin, but could not be determined, owing to the absence of any sign of conjugation. Of the unicellular Algæ, *Pleurococcus mucosus* were visible with the aid of a pocket lens, and appeared to form the chief food of a protozoan which was present in large numbers. The genera of Desmidiaceæ present were, in order of frequency, Pediastrum, Micrasterias, Closterium, Docidium, Staurastrum, and Kirshneriella, the most beautiful species being *Pediastrum tricyclium*, with individual cells grouped in three concentric circles, all touching at the extremities of the fronds. Among the Diatomaceæ the most conspicuous was *Tabellaria flocculosa* (?), a zig-zag chain of rectangular frustules, but the most numerous species was a Navicula, not yet determined.

I am indebted to Miss K. Cowle and Mr. F. Chapman, A.L.S., for short reports on the botany and geology respectively.*—J. Shephard.

* [These reports will appear in the next *Naturalist*.—Ed.]

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 14th March, 1904.

Mr. D. Le Souëf, C.M.Z.S., vice-president, occupied the chair, and about 55 members and visitors were present.

REPORTS.

A report of the Club excursion to Beaumaris on Saturday, 20th February, was read by the leader, Mr. F. Chapman, A.L.S., who stated that about twelve members were present. The condition of the tide was unfortunately unfavourable, but by devoting their search to the small rock-pools the party were able to secure many interesting marine forms. Examples of the Copepoda and Ostracoda were taken, one of the latter proving new to Victorian waters. Samples of a frothy material washed up by the tide, collected for microscopical examination at home, were found to be rich in living Diatomaceæ, several species being recorded.

A report of the geological excursion to Keilor on Saturday, 12th March, was given by the leader, Mr. T. S. Hall, M.A., who, by means of a geological map of the district and a coloured plan, traversed in detail the spots visited, explaining at length the different formations met with. Descriptions of the locality have already appeared in the *Naturalist*, vol. x., p. 21, and vol. xiv., p. 52.

The hon. librarian reported the receipt of the following donations to the library:—"Proceedings Royal Society of Victoria," vol. xvi. (N.S.), part 2, from the Society; *Agricultural Gazette of New South Wales*, February and March, 1904, from the Secretary for Agriculture, Sydney; "Forest Flora of New South Wales," by J. H. Maiden, F.L.S., from Department of Lands, Sydney; "Memoirs of the Geological Survey of New South Wales: Monograph of the Cretaceous Invertebrate Fauna," by R. Etheridge, jun., from the Department of Mines and Agriculture, Sydney; "Annual Report Smithsonian Institute," 1901, from the Institute; *Nature Notes*, January and February, 1904, from the Selborne Society, London.

GENERAL BUSINESS.

The hon. secretary announced that the Royal Society of Victoria had decided at their meeting in April next to present to

Mr. A. W. Howitt, F.G.S., the Mueller medal, which was awarded him for distinguished work in natural science, by the Australasian Association for the Advancement of Science, at the Dunedin session in January last. He had been asked by the Royal Society to bring the matter before that meeting of the Club, with a view to holding a joint meeting with the Royal Society for that purpose. He mentioned that Mr. Howitt was one of the honorary members of the Club, and is the first recipient of the Mueller medal, and moved—"That, in conjunction with the Royal Society of Victoria, a special meeting of the Club be called on the occasion of the presentation of the Mueller medal to Mr. Howitt." Mr. T. S. Hall, M.A., seconded the motion, which was carried unanimously.

Mr. G. A. Keartland drew attention to an announcement in the daily press that the Government had decided to revert to the old dates for the close season for quail and ducks. In December last, owing to the representations made by sportsmen and others, and against the strong protestations made by representatives of the Club, the Minister of Public Works altered the dates for the opening of the shooting season from 1st February to 27th December for ducks and for quail divided the State into two divisions, and altered the date from 1st April to 1st February north of the Dividing Range, and 7th March on the south. The numerous protests from all parts of the State against this alteration have compelled the Government to revert to the former dates, which were adopted by a former Minister from a list submitted by this Club.

The chairman remarked that in view of the active interest taken in this matter by the members, it was gratifying to learn that the Government, acting on the advice tendered by this Club, had decided to revert to the former dates.

Mr. G. Coghill stated that the reference to *Prostanthera walteri* in the botany of the Buffalo Camp-out (*Vict. Nat.*, vol. xx., p. 154) was incorrect, as he had noticed the shrub in several localities on the mountain.

PAPERS.

By Mr. J. A. Leach, entitled "On the Occurrence of the Mosquito, 'Anopheles,' in Victoria."

The author in a very interesting paper, illustrated by several diagrams, detailed the life-history of a species of "Anopheles," probably *A. annulipes*, Walk., which he had found to occur commonly in various parts of the State, and especially in the vicinity of Melbourne. After describing the habits as observed by himself, he drew attention to the statement in Theobald's monograph that Victoria is the only district where malaria occurs from whence collections have been received which contained no "Anopheles." He was able to furnish evidence to prove that

while Victoria is free from malaria, "Anopheles" occurs commonly. He expressed the opinion that it would not be a difficult matter to eradicate the mosquito by draining or treating with kerosene all standing water, and introducing into permanent water-pools, dams, &c., small fish, water insects, frogs, &c.

Mr. F. G. A. Barnard congratulated the author on the importance of his discovery, and also Miss F. Bage on the able manner in which she had executed the drawings to illustrate the paper.

Mr. J. Shephard spoke of the value of Mr. Leach's observations, but thought that the extermination of the mosquito would be a very difficult matter to carry out successfully.

Mr. J. A. Kershaw, F.E.S., stated that the National Museum collection contained specimens of "Anopheles" collected near Melbourne fully thirty years ago; others were obtained from Dandenong, Victoria, over twenty years ago.

Mr. T. S. Hall, M.A., mentioned that Khartoum, once stricken with malaria, has become free through the mosquitoes being killed off with kerosene.

Mr. G. A. Keartland and the chairman also spoke to the paper.

Mr. Barnard apologized for not being prepared to read his paper, which he stated would be ready for the next ordinary meeting.

NATURAL HISTORY NOTES.

The chairman, Mr. D. Le Souëf, mentioned the breeding of the Partridge Bronzewing Pigeons in the Zoological Gardens. He also mentioned that specimens of the immature males of the Satin Bower-bird in the Gardens were showing the change of plumage from the young to the adult.

Mr. G. A. Keartland stated that a Minorca fowl, which some time ago commenced to gradually develop white feathers, is now almost white.

EXHIBITS.

By Mr. F. Chapman, A.L.S.—Graptolites (Monograptus), from the Silurian, bank of Saltwater River, near Keilor, collected on Club excursion, March, 1904; also *Cytherella punctata*, G. S. Brady, a bivalved Ostracoda, obtained on recent Club excursion to Beaumaris. First occurrence for Victoria.

By Miss S. W. L. Cochrane.—Orchid, *Pterostylis grandiflora*, from Kilmore.

By Mr. Geo. Coghill.—Longicorn beetle, *Tryphocaria mastersi*, from Canterbury.

By Mr. P. C. Cole.—Fine specimen of Stone Tomahawk, from Willandra, N.S.W.

By Mr. C. French, jun.—Remarkable cocoon formed inside an

ordinary tumbler by caterpillar of Wattle Goat-moth, *Zeuzera eucalypti*.

By Mr. G. A. Keartland.—Eggs of White-breasted Shrike-Tit and Frontal Shrike-Tit.

By Mr. J. A. Leach.—Life-history of mosquitoes, Culex (pupæ and adult) and Anopheles (larvæ).

By Mr. A. Mattingley.—Echinoderm, *Asterina exigua*, from Western Port, Vic.

By Mr. G. B. Nicholls.—Satin Bower-birds, *Ptilonorhynchus violaceus*, male and female, mounted, showing change of plumage in male, from Rubicon River, Thornton ; Night-Heron, *Nycticorax caledonicus*, mounted, from Goulburn Valley, Thornton ; skin of Lewin's Rail, *Hypotœnidia brachipus*, Goulburn Valley, Thornton.

By Mr. F. Pitcher, for Director Botanic Gardens.—Flowers and foliage of *Acacia discolor*, Willdenow, the Sunshine Acacia, E. Victoria, New South Wales, and Queensland ; *Clianthus dampieri*, A. Cunn., Sturt's Desert Pea, Western Australia, grown at the Melbourne Botanic Gardens.

By Mr. J. Shephard.—Photographs of geological sections at Keilor, taken on Club excursion, March, 1904.

By Master J. Tuckett.—Specimen of Trilobite, new species, from Yan Yean.

By Mr. H. B. Williamson.—Dried specimens of *Brachycome calocarpa*, F. v. M., Wickliffe, 11/03. New for S.W. Victoria. *Hypericum androsæmum*, L., Mirboo, Gippsland, and Apollo Bay district, well established at both places. New for Victoria. *Plagianthus microphyllus*, F. v. M., Lake Bolac, December, 1903. New for S.W. Victoria. *Schœnus sculptus*, Bœckler, Hawkesdale, December, 1903. New for S.W. Victoria. *Ptilotus spathulatus*, Poiret, Goulburn Valley, September, 1903. New for N.E. Victoria. *Helipterum pygmæum*, Benth., Goulburn Valley, September, 1903. New for N.E. Victoria. *Helipterum corymbiflorum*, Schlect., Goulburn Valley, September, 1903. New for N.E. Victoria. *Bartsia viscosa*, L. (yellow flower), Apollo Bay district, January, 1904. Naturalized and new for Victoria. *Mimulus gracilis*, R. Br., Goulburn Valley, October, 1903. New for N.E. Victoria. *Lomatia longifolia*, R. Br., Mitta Mitta River, December, 1903. A variety with broad and entire leaves, probably rare. Forms of this plant have been met with in the Kosciusko district, with narrow and entire leaves, but none with such broad leaves without denticles. *Ajuga australis*, R. Br., Bright, October, 1902. New for N.E. Victoria.

After the usual conversazione the meeting terminated.

EXCURSION TO YAN YEAN.

THE following reports were unavoidably omitted from the report in the last *Naturalist*, page 160.

On the same page the word *Potomageton* should read *Potamogeton.*

BOTANY.—Altogether some thirty-three plants were found in bloom. In a swampy branch of the Plenty fine specimens of the Loose-strife, *Lythrum salicaria*, were growing, and some within reach collected; also *L. hyssopifolium* and *Veronica gracilis.* Under the pines along the western side of the reservoir, *Glycine clandestina* was plentiful. Nearer the water grew the umbellifer *Eryngium vesiculosum*, having a thistle-like appearance. At the southern end of the lake, on some stony ground, grew *Cassinia theodori*, *Helichrysum obcordatum*, and other shrubs in a part which in the springtime would be worth visiting, and would probably yield many specimens.—K. COWLE.

GEOLOGY.—The Silurian rocks in the neighbourhood of Yan Yean consist of brown sandstones, mudstones, and olive and blue shales. These are in places highly fossiliferous. Some members of the party visited the heaps of material which, nearly fifty years ago, were thrown out of the shafts when excavating the tunnel which conveys the water of the Plenty River into the reservoir. After some hammering and sorting the following specimens were secured, the most noteworthy being a fine Trilobite, found by Master J. Tuckett, and a specimen of Hyolithes, of a species until lately found only in Bohemia, found by Master W. D. Chapman:—*Phacops*, sp.; *Encrinurus*, sp. (fragments of pygidia common); *Chonetes*, near *melbournensis*, Chap.; *Bellerophon*, sp.; and *Hyolithes novellus*, Barrande. At the southern end of the reservoir, in a cutting on the Arthur's Creek road, other fragmentary fossils were found, including a cast of a Murchisonia and a small specimen of *Retzia liopleura*, M'Coy, sp., but time did not allow of an extended search.—F. CHAPMAN.

EXCURSION TO BEAUMARIS.

A PARTY of twelve members of the Club visited Beaumaris on Saturday, the 20th February, our main object being the collection of various marine organisms such as might be carried home for further observation under the microscope. The weather was very pleasant, but the condition of the tide was particularly unfavourable, as there were only two hours before high water when we arrived at our destination. We decided to devote the time to the small inlets near at hand, rather than to the bay towards Mentone, as we had at first intended if the tide had been favourable, since the tide-streaks which can be gathered at the latter locality, con-

taining small shells and Foraminifera, would probably have been dried and blown off before this. The rock-pools here still uncovered contained several of the usual seaweeds and corallines. These on closer examination yielded a perfect harvest of Copepoda, not yet determined, as well as the Sea Centipede, Nereis. Samples of the water from the pools contained numerous ciliated infusorians and several kinds of diatoms. Some dredging in the pools resulted in the capture of several living Ostracoda of the genus Xestoleberis, and a single valve of a very interesting ostracod, *Cytherella punctata*, G. S. Brady, was found in the sediment of a tubeful of water. This latter form, although widely distributed in Europe and the Pacific, is new to Victorian shores, it having been found previously in Australian waters in Port Jackson by the *Challenger*, and off the Great Barrier Reef by the *Gazelle*. Only a single specimen of a foraminifer fell to our net, namely, *Polystomella crispa*, and this was dead and rather the worse for wear. The shell beach towards Ricketts Point was next searched for shells, but as the tide was nearly full the only perfect shells obtained were *Venus* (*Chione*) *strigosa* and *Tellina decussata*. The incoming tide had washed up, in one place, a quantity of brown, frothy material. Of this we took samples for home examination under the microscope. We found it to be very rich in living Diatomaceæ, including the following forms:—*Bacillaria*, sp., *Grammatophora marina*, *Gyrosigma*, sp., *Licmophora*, sp., *Nitzschia longissima* and another species, *Podosphenia*, sp., *Rhabdonema*, sp., *Synedra*, sp., and *Stauroneis*, sp. Reassembling for the return to town, we met the youthful members of the party, who had organized a little trip of their own to the cliffs to study fossilized marine zoology, and this had resulted in their securing cetacean bones, fish teeth, and a fair collection of tertiary shells.—F. CHAPMAN.

AT PHILLIP ISLAND, WESTERN PORT.

(WITH LANTERN ILLUSTRATIONS.)

By A. J. CAMPBELL.

(*Read before the Field Naturalists' Club of Victoria, 16th Nov.*, 1903.)

PHILLIP Island and Mutton-birds are almost synonymous terms, hence my remarks will deal almost entirely with that section of the bird-life of the Island.

The pictures I shall have pleasure in showing you this evening are the results of three trips—two in the spring and one in the autumn—to Phillip Island. For the sake of convenience they may be divided geographically into three groups or sets—(1) The neighbourhood of Cape Wollomai, at the eastern end; (2) the site of the 1902 Ornithologists' Camp on the Back Beach

at the Narrows ; and (3) the neighbourhood of the Nobbies, at the western extremity of the island.

You may reach Wollomai by taking a sailing boat from either Hastings or Stony Point, and, running out at the narrow eastern entrance of Western Port at San Remo, land in a snug sandy bight under Red Point, about 2½ miles from the latter place, the most convenient place to camp ; or you may take the regular steamer which meets the train at Stony Point, land at San Remo, or rather Newhaven, opposite, and make overland for the Cape.

I shall never forget the last time I passed out of this eastern entrance. It was very early (about 2 o'clock) one bright moonlight morning. We were comfortably camped on the deck of a cutter, and had just left behind (coming from the mouth of the Bass River) a mud bank, where the night voices of various birds —Sea Curlews, Greenshanks, Plovers, Cormorants, Swans, Ducks, &c.—sounded strangely in our ears. As we passed by San Remo, a favourite resort, borne on a swiftly-ebbing tide, all was silent and asleep. What a picturesque weirdness there seemed about the scene. The buildings sheltered by the dark and dense foliage of banksia trees, here some in shadow, there the roofs, dew-laden, shining like sheets of silver in the moonlight!

On the same trip we had tents pitched and all luggage ashore near Cape Wollomai by sunrise. Our quarters were exceedingly comfortable, being sheltered by two stunted tea-trees with tops like umbrellas, which threw a grateful shade. Here, shielded from the meridian sun, we used to recline, clothed only in our pyjamas (a heat wave was on at this particular time), drinking delicious billy tea, or an occasional lemon squash. At the rear we were protected by a sand dune covered with scrub, tussock-grass, bracken, &c., while our front was towards the beach, and at night it was delightful to be lulled to sleep by the sound of the sea so near. Fresh water in sufficient quantity was handy. At intervals along the steep shore, water as clear as crystal issues from tiny springs.

Other camps were near. During our stay about twelve or thirteen boats arrived with egging parties from different parts of Western Port. The largest of these parties numbered eleven. Four-horse conveyances came by way of Newhaven, thence along the strand when the tide was out. There were also several visitors, including ladies, on horseback.

After an early breakfast (6 o'clock) we started to explore the Mutton-bird rookeries, and found a few birds were in their burrows and had laid. The burrows, like rabbit warrens, extend over many acres of the Cape plateau, under a covering of horehound (an introduced plant), pig-face weed (Mesembryanthemum), adorned with small pink flowers, sword and tussock grass, &c., the chief rookeries being nearest the sea. You can

always tell when you are on a good rookery. The stronger the odour of the live guano, and the more pungent the musty smell of the sea-birds themselves, the better the rookery, because the more plentiful the eggs.

Cape Wollomai, seen from a distance, seems naked and bald. The summit is reached from the inland side by a series of undulations, which once climbed you stand 332 feet above sea-level, peering over a rugged and frowning bluff. The Cape in its broadest part is about 1⅛ miles across. As may be expected, from this coign of vantage a most magnificent panorama of land and water can be obtained.

We found it convenient to work the rookeries morning and evening, resting in camp when the day was warmest. There are two advantages in turning out of camp soon after daylight. It is the most pleasant time for egg-gathering, and you get the choice of rookeries when "foreigners" are about. You arm yourself with a crook—*i.e.*, a staff of thin swamp tea-tree, about 5 feet long, with a crook made of fencing wire at the end. This instrument you introduce into a burrow, which extends from 2 feet to 6 feet, usually in a diagonal direction, in the sandy soil. If the bird is at home it will rap sharply the end of the crook with its bill. Then you commence to fence with the hidden bird and to feel for its egg (only one being laid) till by practice you soon learn, by a turn of the wrist, to hook the egg and gently draw it to the surface. So on from hole to hole. Of course, many holes are vacant. Others contain birds that have not laid, and these are sometimes hooked instead of an egg. When a bird is so hooked it is needless to state it is just as well to keep your hands out of the way of its beak and claws, or there may be torn flesh, and most probably language both "frequent and free." The eggs are gathered into baskets, buckets, billies, &c. It is interesting watching eggers at work. The most comfortable position is bending on one knee when plying your crook in the burrows. Others prefer laboriously bending their backs instead of their knees when raking a burrow, while some sit down in a buiness (or, rather, unbusiness) way at work. Occasionally you come accross a small party of ladies, gloved and veiled, deftly using their egg-crooks.

Our party killed three snakes, and saw as many more which made their escape. One is somewhat startled when withdrawing an egging stick to see a Copper-head dart past one's hand. Almost every egging party reported adventures with snakes. Large Blue-tongued Lizards were plentiful. Several eggs left in camp were cleanly sucked by these gaunt saurians whilst we were away. We caught one in the very act, and wishing to take his photograph we wiped some narcotic juice from a dirty pipe across his mouth, and he posed quite gently—stupefied.

The Mutton-bird has characteristics which render it a remarkable creature. It is properly known as the Short-tailed or Sooty Petrel, *Puffinus tenuirostris*, Temminck. It is of a uniform dusky colour, web-footed, and about the size of a small duck. Its food is chiefly molluscs, crustaceans, &c. Thousands upon thousands annually visit Phillip Island, as well as other places in Bass Strait, to breed. Miles upon miles the flocks extend. The punctuality with which the birds arrive is truly wonderful. From about 13th to 16th September they first appear, to clean out their burrows, and presumably to mate. About the first week in November all go forth to sea again. The return of the birds, both male and female, the latter to lay, commences about the 18th November, and continues each evening for about ten days, the great mass of arrivals being possibly the 25th or 26th. The incoming of the birds at dusk is a marvellous sight.

Let me endeavour, feebly perhaps, to describe just one spot in the general scene. I have been Mutton-birding in three States, and after several species, but gained my first experiences on old Wollomai long ago. First impressions, like "first love," are best remembered. We are on the crown of the Cape, with the surf coiling in gently below. The sun has set. We sit in anxious expectation to be introduced to our feathered friends. Precisely at 35 minutes after sundown one bird darts in from seaward like an arrow; but "one swallow does not make a summer." Presently a few more fly around, then dozens come, then hundreds, and, however incredible it may seem, then thousands. Such a scene is difficult to describe, more difficult to explain. In the dim gloaming, lit up by a new-horned moon, myriads of dusky feathered forms are cutting the air and circling in all directions with lightning-like rapidity, their flight resembling that of Wild Ducks, very swift. We stand behind some bushes as the birds whizz past. Two or more may be coming in the direction of any of us, who launches out with his egging crook at the first form; it is by like a Swift. He strikes a yard or two behind it, while the next bird nearly lifts his hat. However, at times the air is so thick that it would be well nigh impossible to miss a bird were you to strike. By dark the majority of birds have landed, and the whole place seems literally alive with feathers, and such a noise—flapping of wings along the ground, pattering of webbed feet, rustlings through grass and bushes; while hundreds of birds are underground, croaking, squeaking, wrangling. So on the livelong night. The place is never still. Many birds appear to keep upon the ground; others are on the wing the whole night long, judging by their squealing cries o'erhead.

On a subsequent occasion, and after waking suddenly from a nap enjoyed on the lee side of an outcrop of rock, our surround-

ings seem utterly strange and weird. The subterranean squealing and croaking of birds are unabated. We walk abroad in the crisp clear air preceding the dawn. Birds scuttle to right and to left from underneath the tussocks as we pass. One or two eggs are picked up on the surface, evidently deposited in a hurry. The outgoing of the birds at dawn is as wonderful as their incoming in the dusk. At about half-past 3 o'clock, or just as day is breaking, birds begin to depart seawards. We take up positions on the edge of the cliff to witness this interesting leave-taking. Birds in ones or twos waddle up, or sneak silently through the grass like rats, then spreading their wings to catch the breeze, take a short run, launch over the cliff, and disappear into the gloom to seaward. Sometimes on reaching the edge of the cliff they congregate awhile, and then gradually, one by one, making a neat spring off tip-toe, sail away. This performance finishes about 4 o'clock.

Now for the Narrows, and incidentally the scene of the recent (1902) headquarters camp of the Australasian Ornithologists' Union. This outing extended over a week, and about 30 persons, including a number of ladies, took part in it.

As the Association (Union) is a national one for the study and protection of native birds, it has already received Government recognition. The Hon. the Minister of Public Works, on the recommendation of Mr. C. W. Maclean, kindly granted such members as cared to travel by the Government steamer *Albert* (which was on a buoying cruise to Western Port) passages gratis, with the heavier baggage of the camp. The rest of the party proceeded overland by train, steamer, and conveyance to the site of the camp.

The camp (8 tents) was splendidly situated, part sheltered 'neath a banksian grove and part in a tea-tree brake, with a well of sweet water in the midst, and a Mutton-bird rookery in the sand dunes at the rear, between the camp and the Back Beach. The sandy rises, riddled with rabbit-like burrows, mostly containing birds, were of course the chief centre of attraction. At dusk every evening a move was generally made for points of vantage to watch the home-coming of the interesting wandering birds. The usual bird pandemonium continued all night. Indeed, so great were the nocturnal noises near one of the tents (occupied by ladies) that at one time it was deemed necessary to remove the tent to a quieter quarter. But it is wonderful what one can really get used to.

The amusement of egging was carried on during the day, chiefly to supply the larder. Mutton-bird eggs fried are a great delicacy, and were enjoyed by all in camp. The weight of an egg varies from 3 ozs. to 3½ ozs., or four about equal the weight of six domestic fowls' eggs.

You will remember in our trip to Wollomai I gave you the date of arrivals of the birds in spring. Now we may come to the history of the egg and the final departure of the birds, both young and old, in autumn. After the pure white egg is deposited by the female, she goes to sea for a week to recruit and grow fat and saucy, while her lord takes his domestic turn and sits steadfastly on the egg. He goes out the following week, and they proceed, turn and turn about, for eight weeks, till the precious chick is hatched. The young are fed in the burrows for about three months, till about the middle of April. Just fancy what a strange existence for the happy, or unhappy, chick, to be reared in a sandy burrow for three long months, and to be alone every day from dawn till dark! The young are curious-looking objects, clothed in long, dark down, with black bill and eyes, and feet to match. At a certain stage a young bird will weigh about 3¼ lbs., and be heavier than either of its parents, who at this stage desert it and proceed to sea for good. The youngsters will then thrive on their own fatty nature for a week or so; quills and feathers sprout, and the birds becoming hungry, and having learnt to stretch their own new wings, proceed to follow their parents. Quitting Bass Strait, all will disperse for the winter over the milder waters of the Pacific, some of the birds wandering even up to Japanese waters before returning in crowds to Phillip Island again the following nesting season. How marvellous, without chart or compass to roam the western Pacific from north to south, and without calendar to return to land again almost to a day to lay!

From the rises near our camp you may see in the distance, looking westward, what is locally known as the Pyramid—a pinnacle of rock rising from an outlying reef. To reach the spot you have to take the road, which runs out from the back of Cowes, for about six miles. Close by, on Red Cliff, about 150 ft. above the sea, is a rookery, formerly about two acres in extent, but which has somewhat sunk in size by over-raiding by egging parties. The authorities have wisely prohibited egging here for the next few years.

I will now conclude with the third and last group of pictures. Up betimes in the morning, we head away westerly towards the Nobbies, which are 12 miles distant from Cowes. The shire council is to be commended for the good roads it has constructed to all the more interesting parts of the island. On the way we pass a native garden of grass-trees; the flowers, nectar laden, were attracting numbers of insects—a paradise for the entomologist. Bowling merrily along, we perceive the native timber —nowhere tall—thins out, giving place to open, undulatory rises of coarsely grassed land, while the hollows hold tea-tree tracts, and an occasional swamp or lagoon. The only cultivations

noticed are chicory plantations, for which the island has a reputation of its own. After the opening and shutting of many gates the track now lies between Swan Lake and the sandhills of Cat Bay. The lake, true to name, has a pretty family of Black Swans upon it. At one point the sand dunes are encroaching upon its shore. The planting of marram grass, as has been done successfully in other places on the island, would stay the shifting sand from spoiling an ornamental sheet of water and a sure retreat for wild fowl. At length arriving on the extreme western headland, Point Grant, we find the tide favourable—going out—and are able to scramble dry-shod over the reef, and scale the side of the Nobby, a rotund islet about 100 ft. high. Its summit and southern slope are closely clothed with green, succulent ice-plant and pig-face weed. The latter, trailed in tresses over the cliff, is beautiful, both flowers and foliage being ablush with pinkish tint. Probing with our sticks the holes under the herbage discovers brooding Mutton-birds and Penguins. The Little Nobby, immediately between the Big Nobby and the mainland, is, however, the most convenient place to see the Penguins at home, sitting in shallow hollows upon a pair of eggs or dusky-coloured chicks. Like the Mutton-birds, the young of the Penguins are full grown at autumn, when they don a beautiful blue coat, enhanced with silvery-white underparts.

Returning to our vehicles on the hill, we find it time to boil the billy for mid-day meal. There is no fresh water hereabouts, but we had provided for that contingency. Retracing our steps homeward, some of our party strolled round Cat Bay—so named, it is said from the fact that Bass, the explorer and discoverer of Western Port, lost a cat there. You will doubtless remember (it is only 105 years ago) that he and his party coasted round from Sydney in an open whaleboat in 1798. They were putting ashore in search of fresh water, when pussie sprang first into the scrub, and was never seen again.

Some of us proceed to Flynn's rookery, which is on the sand dunes between a small picturesque lagoon and the inner beach of Western Port. Judging by the presence of a pungent odour of guano, the place is fairly frequented by Mutton-birds. A few eggers are at work, but as the burrows are deep, some quite 6 feet in length, and well protected by a natural covert of rushes, tussock-grass, bracken, and other coarse vegetation, the birds probably have the best of it. About half a mile further on (eastward) is M'Haffie's rookery, which is similar in size and extent to Flynn's, and even more protected with scrub, as well as grass. This rookery derives its name from the original lessee of the island, Mr. J. D. M'Haffie, who settled here about 1845. Evidences of the old homestead are still standing, while

the imported pines look strange towering above the native trees.

All things have an end, or, rather, I should say there is no end to the delights of Phillip Island if you go round and round it. But we must, for the present at least, say to its many pleasant places—Farewell.

NOTES ON COLOUR-VARIATIONS OF TWO SPECIES OF VICTORIAN BUTTERFLIES.

By. Jas. A. Kershaw, F.E.S.

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

While collecting on the hills in Gippsland, between Trafalgar and Thorpdale, in December, 1901, I was very fortunate in taking several well-marked dark varieties of our Common Brown Butterfly, *Heteronympha merope*, Fabr. This species was particularly numerous at the time, and as usual the males greatly predominated. My attention was first attracted to a particularly dark variety of a female, which settled on the ground within two or three yards from me, but, greatly to my regret, it took to the wing before I was able to approach near enough to use my net, and rising up among the tree-tops was soon lost to sight.

I was close enough, however, to see that it was an unusually dark specimen, with quite the outer two-thirds of both the fore and hind wings suffused with blackish-brown, and showing no trace of usual light markings in the black of the fore-wings. The under side of the wings was also strongly suffused with blackish-brown.

This, as far as I could judge from the glimpse I had, seems to agree with the female taken by Mr. G. A. Waterhouse at Bowral, N.S.W., and described by the late Mr. F. A. A. Skuse as *Heteronympha merope*, Fabr., var. *suffusa*, on p. 13 of the "Proceedings of the Entomological Society of London" for 1895.

I spent some hours in searching the locality, in the hope of seeing it again, but, though I examined scores of females, I did not find one showing any perceptible variation.

For my long search, however, I was rewarded by the capture of the dark varieties of the males described below, and curiously enough, these were all taken within a short distance of the spot where I saw the dark female.

Although I devoted the remainder of the day searching for further specimens, and during the two days following travelled over some miles of similar country, examining hundreds of these butterflies, I did not meet with any more examples of this interesting variety.

It is well known that the "Browns" have a tendency to vary in the manner described, and I have no doubt that if closer

examination were made by collectors, especially in the mountain districts, these dark forms would be more frequently met with.

As I am not aware, however, of this variety of the male of *H. merope* having been described before, I have thought it of sufficient interest to place it on record.

I have also taken this opportunity to add the description of a similarly dark form of a male of *H. philerope*, Boisd., which has been in the collection of the National Museum for many years, together with a few notes on the variation of this species.

HETERONYMPHA MEROPE, Fabr.

Var. A.—Fore-wings.—Upper side.—The basal half as in typical form, the markings, however, being rather suffused. Remainder of wings strongly suffused with blackish-brown, which extends along the costa and dorsum almost to base. The usual orange-brown markings are very slightly indicated by very small suffused patches on veins 2 and 3, a rather more distinct spot below ocelli, and a faint patch below costa at two-thirds. Ocelli very indistinct, with a very small bluish-white central dot. *Under side.*—Almost as equally suffused as upper side, but with apex paler. Ocelli suffused, and without the surrounding black ring. Thorax and abdomen darker than in typical form.

Hind-wings.—Upper side.—The basal half to just beyond cell and along the dorsum as in typical form, except that the cell is almost completely occupied with a suffused dark patch. Remainder of wings blackish-brown, the ocelli being fairly distinct, but with the marginal ring present only on the inner edge. *Under side.*—The dark suffusion as on upper side, though not so intense nor extending quite to the margin. The usual wavy line running through cell is only indicated by three suffused broad patches. Ocelli without the marginal ring.

Var. B.—Similar to A, though more generally suffused. The dark suffusion extends further in cell of fore-wings, while it is almost absent in that of hind-wings. The ocelli of hind-wings is completely encircled with the orange-brown ring.

Var. C.—Approaching the typical form, but with the markings suffused, especially on hind-wings. *Fore-wings.*—All the dark markings beyond the cell extend to the dark marginal band, which is much broader than in typical form. The ocelli are represented by small black spots without the usual bluish-white iris. *Under side.*—As in typical form, but the dark markings rather broader and somewhat suffused.

Hind-wings.—The dark markings on outer half of wings coalesce and form a broad marginal band extending from costa to dorsum, and running inwards in centre to end of cell, but not enclosing ocelli, which are as in typical form. *Under side.*—Markings as on upper side, but very pale and indistinct.

Var. D.—Though showing the typical markings, this specimen has a peculiar dull, suffused appearance, as though rubbed, and possesses an additional half-developed ocellus in each hind-wing.

Another male specimen, which was taken on French Island, Western Port, and is in the collection of Mr. G. Lyell, jun., has the upper wings very dark; the brown patches surrounding the ocelli at apex are absent, and the other brown markings reduced to mere lines. Hind-wings all black except the disc and inner margin.

HETERONYMPHA PHILEROPE, Boisd.

Male.—Fore-wings.—Upper side.—The markings on basal half as in typical form; the usual broad median fascia dark orange-brown; the remainder suffused with blackish-brown, with a row of three small patches of dark orange-brown running parallel to termen below the ocelli. Ocelli indistinct, with bluish-white iris. *Under side.*—With basal half and apex as in typical form, the remainder with markings suffused as on upper side, but paler.

Hind-wings.—Upper side.—The base and terminal half suffused with blackish-brown; a broad rather suffused dark orange-brown fascia extending from costa and occupying outer half of cell, thence narrowly extending towards, but not connecting with, dorsum, which is also orange-brown. The ocellus near tornus fairly distinct, slightly edged on inner side with orange-brown; a similar one near apical angle represented by little more than a minute whitish dot. *Under side.*—As in typical form, but rather suffused.

A very variable character in this species is the black transverse band which runs from the costa to the tornus. In some specimens it connects at its centre with the black spot in cell, and also with the short transverse bar below centre of cell, while in others it is not connected. Of six females examined, all are thus connected; while of thirteen males only six are connected, though the remainder show intermediate stages.

Another variable character is the size of the sub-apical ocelli of hind-wings. These can be found varying from a minute black dot in some specimens to a white-centred ocellus as large as that near tornus in others. There is also a tendency, in some specimens, towards the development of a second smaller sub-apical spot.

PERSONAL.—We learn with pleasure that Mr. F. Spry, F.N.C., has been appointed to a vacancy on the staff of the National Museum. Mr. Spry's accurate powers of observation, both in entomology and geology, should stand him in good stead in his new position.

CORRESPONDENCE.

THE GENUS DROMICIA ON THE AUSTRALIAN MAINLAND.

To the Editor of the Victorian Naturalist.

Sir,—In the "Records of the Australian Museum," vol. v., No. 2, p. 134, published in January last, Mr. E. R. Waite records the capture of *Dromicia nana* from the Snowy River country in New South Wales. From his remarks it would seem that he is under the impression that this is the first authentic record of this Tasmanian species on the mainland, Krefft's *D. unicolor* (= *D. nana*) having been regarded by Thomas (Brit. Mus. Cat., Marsup. and Monot.) as introduced. As a matter of fact its occurrence has been previously noted, and it is evidently still widely spread in the south-east of the continent.

In his presidential address to Section D, at the Hobart meeting of the Australasian Association in 1892, Professor Baldwin Spencer noted *D. nana* as occuring in southern Victoria. In the "Report of the Horn Expedition (1896)," p. 184, the same author, in a footnote, records its capture at Gembrook by Mr. Dudley Le Souëf, on the Blacks Spur by himself, and at Sale by Mr. A. Purdie. The Blacks Spur specimen is now in the Biological Department's Museum, and Mr. Purdie's example was examined by Professor Spencer and myself.

Dr. R. Broom, in the "Proceedings of the Linnean Society of New South Wales," in 1896, places it on record that he "found a large number of both lower and upper jaws" of *D. nana* in a bone breccia deposit near the Wombeyan Caves.

In 1897, Mr. A. H. S. Lucas, in his paper on "The Geographical Distribution of the Land and Freshwater Vertebrates in Victoria" (Proc. Roy. Soc. Vic., vol. ix., p. 40) repeats the record for this State.—I have, &c.,

T. S. HALL.

University, 21st March, 1904.

Mosquitoes.—The *School Papers*, published monthly by the Victorian Education Department for the use of the scholars in the State schools, often contain articles of interest to children of a larger growth. Thus the February and March issues of the paper for Classes V. and VI. contain articles descriptive of the life-history of the mosquito from the pen of Mr. J. A. Leach, F.N.C., which are well illustrated and worthy of perusal.

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