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THE VICTORIAN NATURALIST.

VOL. XXII., 1905-6.

THE

VICTORIAN NATURALIST:

THE JOURNAL & MAGAZINE

OF THE

Field Naturalists' Club of Victoria.

VOL. XXII.

MAY, 1905, TO APRIL, 1906.

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

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

Melbourne:

WALKER, MAY & CO., PRINTERS, MACKILLOP STREET
(OFF 390 LITTLE COLLINS STREET).

1906.

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ERRATA.

- Page 55, line 5—For “*Aprasia pulchella*” read “*Delma fraseri*.”
- Page 56, line 17—For “*Aprasia pulchella*” read “*Delma fraseri*.”
- Page 64, par. 4—Strike out the words “compiled from the sources mentioned,” and after “classification” add “The species in brackets, recorded by Watts, I have not seen.”
- Page 74, line 8—For “*Aprasia pulchella*” read “*Delma fraseri*.”
- Page 159, line 6 from bottom (in some copies)—For “*Hypericum perfoliatum*” read “*Hypericum perforatum*.”

The Victorian Naturalist.

VOL. XXII.—No. 1.

MAY 4, 1905.

No. 257.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 10th April, 1905.

The president, Mr. O. A. Sayce, occupied the chair, and about 65 members and visitors were present.

REPORTS.

[Owing to pressure on space, several reports are held over.—*Ed. Vict. Nat.*]

ELECTION OF MEMBERS.

On a ballot being taken, Mr. J. T. Jutson, Smith-street, Northcote, was elected as an ordinary member, and Master F. Hill as a junior member of the Club.

PAPERS READ.

1. By Mr. J. H. Gatliff, entitled "Descriptions of two New Shells of the Genus *Leuconopsis*," with two figures.

The author gave a description of two very small shells, one of which was obtained by him at Portsea, Port Phillip Bay, the other from South Australia, kindly supplied by Dr. J. C. Verco, being the first record of the genus having been found in these two States.

2. By Mr. J. H. Gatliff, entitled "Catalogue of Victorian Estuarine Univalve Mollusca."

The author gave a list of mollusca which, although found on the sea-shore, are not actually inhabitants of the sea, their habitats being among mangroves, muddy flats, or under stones which are within reach of the spray.

Mr. T. S. Hall, M.A., congratulated the author on clearing up this small group of shells. The papers would prove useful, as they included a group that there was some difficulty in placing accurately as to their classification, as being marine or otherwise.

3. By Mr. A. D. Hardy, entitled "Notes on Freshwater Algæ (continued)—Family Desmidiaceæ."

The author gave a description of these unicellular plants, describing, with the assistance of many excellent coloured drawings and blackboard sketches, their great variety and exceeding beauty. Among the exhibits a very fine series of microscopical mounts were shown, and included some forms which have led to the conclusion by European specialists that Desmids are degenerate plants that have descended from more highly developed filamentous algæ.

The Chairman congratulated the author on the paper, and was pleased that Mr. Hardy was working the group systematically. More knowledge of these plants was badly wanted, many of which were of great economic importance.

4. By Mr. E. O. Thiele, entitled "A Trip to Lake Karng and Mt. Wellington, North Gippsland."

The author gave an account of a recent trip, in company with three others, to a small mountain lake in North Gippsland. The lake possesses certain features which place it in a position apart from other Victorian lakes. Its cause is a huge barrier of tumbled rocks in a very deep, narrow, and precipitous mountain valley, which effectually dams back the stream flowing down the valley, and thus forms the lake. Landslip and glacial agencies have been respectively suggested to account for the origin of this remarkable dam. The merits of these explanations were discussed, and the observations made by the author caused him to favour the landslip origin. Soundings of the lake gave a depth of 150 feet near the centre. The paper was illustrated by about 30 lantern slides, and a number of botanical specimens from the top of the mountain were exhibited.

Mr. T. S. Hall, M.A., said that Mr. Thiele had apparently settled the question of the origin of Lake Karng. It was not a glacial tarn, but a landslip-dammed valley. He had also made an important addition to our knowledge by extending the area over which we knew Upper Ordovician rocks occurred. During the past two or three years our knowledge of the rocks in the district just west of Mount Wellington had been greatly modified, and the comparatively recent geological map was quite unreliable.

Mr. A. E. Kitson, F.G.S., complimented Mr. Thiele on the importance of the observations made by him, and said that on the evidence brought forward he was satisfied of the landslip origin of the dam at Lake Karng. From the description given of the porphyries forming the main mass of Mt. Wellington, and their associated sediments, he was inclined to think that the former belong to the Snowy River series (Lower Devonian), and, if so, would be unconformable to the Upper Devonian or Carboniferous sediments, instead of being intrusive into them, as was suggested by Mr. Thiele. He said that to the north-west of Mt. Wellington, in the basin of the Upper King River, he had recorded a series of similar sediments, over 2,000 feet thick, which undoubtedly rest unconformably on porphyries similar to those referred to, and quite different from those interstratified with the sediments.

EXHIBITS.

By Miss K. Cowle.—Plant, *Encryphia billardieri*, and shells, from Stanley, Tasmania.

By Mr. F. P. Godfrey.—White-browed Babbler, *Pomatorhinus superciliosus*; black crystal chipped off granite rock on Nangunia Station, N.S.W., 25 miles north of the Murray River, corresponding with the small black crystals embedded in partially decomposed granite rock.

By Mr. J. H. Gatliff.—Two new species of shells described by him, *Leuconopsis victorie* and *L. tatei*; also, shells included in his "Catalogue of Victorian Estuarine Univalve Mollusca."

By Mr. C. J. Gabriel.—Shell, *Cardium costatum*, Linn., from China.

By Mr. A. D. Hardy.—Various microscopic mounts and coloured drawings in illustration of paper.

By Mr. H. Jeffery.—Shell, *Cypræa umbilicata*, from Tasmania.

By Mr. A. O. Thiele.—Botanical specimens from top of Mt. Wellington, North Gippsland.

By Mr. W. H. A. Roger.—Three specimens of butterfly, *Ialmenus evagoras*, bred from larvæ received on 6th February last from Pantom Hill. The larvæ pupated during the next few days, the butterflies appearing on the 23rd, 24th, and 27th February respectively; *Ogyris abrota*, female, taken near Sandringham on 2nd April.

By Mr. F. M. Reader.—Dried plants—*Medicago arbiontaris*, All., naturalized and new for Victoria, collected at Murchison East on 26/10/04 by Mrs. W. Mather; *Blumea integrifolia*, D. C.; *Verticordia cunninghamii*, Sohan; *Panicum trichoides*, Sw., from Northern Territory, South Australia, collected by Mr. J. H. Niemann in 1904.

After the usual conversazione the meeting terminated.

SOME NEW VICTORIAN COCCIDÆ.

By E. ERNEST GREEN, Government Entomologist, Ceylon.

(Communicated by F. G. A. Barnard.)

(Read before the Field Naturalists' Club of Victoria, 13th Feb., 1905.)

THE species described below have been forwarded to me by Mr. James Lidgett, of Myrning, Victoria, who collected them in his district, about 40 miles north-west of Melbourne.

ASPIDIOTUS (EVASPIDIOTUS) SUBRUBESCENS, Mask., var. CORTICOIDES, n. var. (fig. 1).

Puparium larger, darker, and more opaque than in type. Colour chocolate-brown, opaque. Pellicles concealed. Diameter, 2.50 mm.

Adult female larger and more circular. Pygidium proportionately broader. (Typical *A. subrubescens* appears to have a rather narrow, pointed pygidium.) Pygidium with eight lobes, the outer one sharply denticulate (as in type). Circumgenital glands in 4

groups—upper laterals 17 to 27, lower laterals 6 to 10. Length, 1.25 to 1.50 mm.

Habitat.—On *Eucalyptus globulus*, Labill. Myrning, Victoria. (No. 55A.) Very inconspicuous, the scales being exactly of the tint of the bark upon which they rest.

AONIDIA (GREENIELLA) PULCHRA, sp. nov. (figs. 2, 3).

Female puparium circular or broadly oval; strongly convex. Normally with a whitish secretory covering, which becomes ruptured during growth and frequently falls off, together with the larval pellicle, leaving the reddish-brown nymphal pellicle exposed. The first pellicle, when present, may carry the glassy processes found on the larval and male scales, but they are usually lost before the puparium has reached its maximum development. Diameter, 0.75 mm.

Male puparium (fig. 2) larger, flatter, and more oval, consisting of a brownish-grey secretory area (whitish towards margin), with a central fulvous pellicle bearing a number of long curling glassy brittle processes. There are usually 4 of these processes on the median line—2 on each side, above the thorax; and 22 forming a marginal fringe. In exposed situations the processes are often lost by abrasion. Length, 1 mm. Breadth, 0.80 mm.

Adult female enclosed within the second pellicle. Subcircular, the posterior extremity only slightly prominent. Pygidium without lobes, spines, or squames. Margin (fig. 3) irregularly crenulate. A few small circular pores irregularly distributed over both surfaces. Anal orifice central, large, circular. Diameter, 0.50 to 0.60 mm.

Female of second stage with pygidial margin resembling that of *Parlatoria*.

Larva with glassy processes, as on male puparium.

Habitat.—Insects of both sexes crowded on under surface of leaves of *Callistemon salignus*, Candol. Myrning, Victoria. (Coll. J. Lidgett, No. 54.) Received also, on same plant, from Mr. C. French (Nos. 23 and 64).

The character of the larval pellicle clearly suggests relationship with *Aonidia* (*Greeniella*) *cornigera*, from Ceylon. But the second pellicle presents characters found in species of *Gymnaspis*.

MYTILASPIS CASSINIÆ, sp. nov. (figs. 4, 5).

Female puparium long and narrow; sides subparallel; often curved. Colour dull reddish-brown; pellicles reddish, almost concealed. Length of well-developed examples, 2.75 to 3.50 mm. Greatest breadth, about 0.50 mm.

Male puparium of similar colour, but shorter and straighter. Length, about 1 mm.

Adult female deep red-brown (dried examples). Anterior extremity abruptly truncate (before compression). Form other-

wise normal. Rudimentary antenna with 4 stout bristles, 2 of them considerably larger than the others. Anterior spiracles each with a large group of parastigmatic glands. A dorso-lateral series of 4 or 5 stout chitinous spines on each side, situated at the junction of the meso- and metathorax, and following three or four intersegmental divisions (see fig. 5). Occasionally one or more of the spines are duplicated, and those nearer the pygidium tend to become smaller and marginal. Median lobes of pygidium large and prominent; free edge minutely denticulate, and sloping from each side to a blunt point; base constricted. First lateral lobes duplex, prominent inner lobule largest and bluntly pointed, outer lobule somewhat sharply pointed. Second lateral lobe broad, inconspicuous, scarcely projecting beyond margin, its free edge minutely serrate. Circumgenital glands in five groups—median group 4 to 7, upper laterals 11 to 14, lower laterals 12 to 15. Anal orifice at base of pygidium, anterior to circumgenital glands. Length, 1.25 to 1.75 mm.

Habitat.—On *Cassinia aculeata*, R. Brown. Myrning, Victoria. (No. 62.)

MYTILASPIS (COCCOMYTILUS) HYMENANTHERÆ, sp. nov. (fig. 6).

Female puparium reddish-brown, more or less covered by fibres of the bark upon which it rests. Pellicles reddish, the second completely concealed. Moderately convex; rather broadly dilated, expanding abruptly behind the first pellicle. Length, 2.50 to 3 mm.

Male puparium not observed.

Adult female oblong oval, narrowed in front, broadest across median abdominal region. Lateral margins of abdominal segments produced into rounded lobes. Pygidium broad; median lobes very large and prominent (fig. 6), the sides sloping steeply from a median point; first and second lateral lobes small, simple, pointed. Spiniform squames (*fusi piliformes* of Leonardi) strongly developed, decreasing in size as they approach the extremity of pygidium. No circumgenital glands. Some conspicuous oval pores on dorsal area of pygidium and margins of abdominal segments. Length, 1.25 to 1.75 mm. Greatest breadth, 1 mm.

Habitat.—On stems and twigs of *Hymenanchera banksii*, F. v. M. Myrning, Victoria. (No. 63.)

Very close to *M. leptospermi*, Mask.; but easily separable by the absence of circumgenital glands, and the proportionately larger median lobes.

MYTILASPIS INTERMEDIA, var. VICTORIÆ, n. var.

Mytilaspis intermedia, Mask., "Trans. N.Z. Inst." 1890, page 7; Leonardi, "Gen. e. Spec. d. Mytilaspides," page 79.

Differs from type in the following particulars:—Lateral margins

of abdominal segments not markedly produced. Median lobes proportionately narrower. Other lobes obsolescent. Circumgenital glands few—median group 1 to 3, upper laterals 6 to 9, lower laterals 4 to 7. The spiniform squames are very small and inconspicuous. Length of puparium, 1.50 to 1.75 mm. Length of adult female, 1.25 to 1.50 mm.

Habitat.—On bark of *Acacia montana*. Myrning, Victoria. (No. 67.)

MYTILASPIS MULTIPORA. (?) Green.

This species has been described and figured by Dr. Leonardi, in his recently published "Genera and Species of the Mytilaspides," 1903.*

The following is Dr. Leonardi's description:—

"Fœmina fusco-aurantiaca, lagenæformis, segmentis abdominalibus in lobulis productis, ex quibus segmenta tria, pygidium præcedentia, processu conico brevi sub apicem truncato aucta, cuius ad basim glandula major sericipara aperitur. Pygidium trullarum paribus quatuor; mediis bene evolutis; secundi et tertii paris multo minoribus; quarti paris obsoletis. Fusi pili-formes inter trullas et ultra variæ magnitudinis. Disculi ciripari, $\frac{10}{14-14}$. Long., 1,000 μ .
23-21

"Folliculus fœmineus albicans, vix convexiusculus, exuvia nymphali majore auctus. Exuviæ autem fusco-aurantiacæ. Velum ventrale parum extensum. Long., 1,400 μ .

"*Habitat.*—Super *Pittosporum undulatum*, Auckland (Nuova Zelanda)."

I would add that the outer lateral lobe is not always obsolescent. In many examples it is as prominent and fully as large as the second lobe. My examples average in length 0.75 mm. (= 750 μ .) The second pellicle is proportionately large, having a length of 1 mm.

(It should be noted that the *second* and *third* lobes of Dr. Leonardi are usually treated by other authors as separate lobules of a duplex second lobe.)

Dr. Leonardi calls the species *M. multipora*, Green. But as the description is entirely his own, no previous description having been published by me, his name ought rightly to figure as the author.

CHIONASPIS CANDIDA, sp. nov. (fig. 7).

Female puparium snowy-white, smooth and sericeous; pellicles pale yellow. Flattish, moderately dilated behind. Length, 2 to 2.50 mm.

Male puparium white; very feebly keeled. Length, 1.50 mm.

Adult female of normal form; broadest across median abdominal

* "Generi e Specie di Diaspiti saggio di Systematica delle Mytilaspides," Gustavo Leonardi (p. 87).

region. Lateral margins of abdominal segments produced into rounded lobes. Pygidium broadly rounded. Median lobes conspicuous, prominent, divergent, the extremity expanded and somewhat malleiform. First lateral lobes simple, prominent, narrow, pointed. Other lobes obsolete. Spiniform squames well developed; but other spines obsolescent. Anus anterior to genital orifice. Circumgenital glands in five groups—median 6 to 8, upper laterals 11 to 17, lower laterals 17 to 20. Conspicuous series of oval pores on sides of pygidium, and numerous smaller pores on sides of abdominal segments and metathorax. Length, 1 to 1.50 mm.

Adult male not observed.

Habitat.—On leaves of *Callistemon salignus*, Candolle. Myrning, Victoria. (No. 61.)

Ch. candida is readily separable from all its allies by the form of the pygidial lobes. Without a knowledge of the male puparium this species might have been assigned to the genus *Mytilaspis*; but the keeled scale definitely indicates its present position.

SPHÆROCOCCUS PUSTULANS, sp. nov. (fig. 8).

Female insects living beneath flattish blister-like swellings on surface of bark. An isolated pustule measures 4 to 5 mm. in diameter, is roughly circular, with a small median pore. The walls of the cell are stout, and of a corky nature. The cavity is comparatively small, and lined with a whitish film. When crowded the pustules becomes confluent, and lose their circular form.

Adult female circular or broadly oval. Segments ill defined. Antennæ small and atrophied; conical; with 2 (sometimes 3) broad basal segments, and a much wrinkled terminal joint bearing several stout hairs. Legs small; the joints much swollen and wrinkled; tibio-tarsal articulation obscure, indicated by a median constriction; claw proportionately large, stout, curved, with a denticle near the tip on inner edge. Rostrum moderately large. Macerated examples show an ill-defined median darker area on the dorsum. No glandular pores or spinnerets. Some inconspicuous scattered hairs on the derm, slightly larger on the hind margin. Anal and genital orifices obscure, close to posterior extremity, the former with a slightly thickened chitinous dorsal lip. Diameter averaging 2 mm.

Male not observed in any stage.

Habitat.—On bark of *Eucalyptus goniocalyx*, F. v. M. Myrning, Victoria. (No. 52.)

The habitat and habits of this species resemble those of *Sph. elevans*, Mask., which also inhabits blister-like cells in the bark of *Eucalyptus*. But *elevans* is distinguished by the absence of limbs, and by the presence of a complicate rosette pattern on the dorsum. The presence of legs is exceptional in the genus

Sphaerococcus. The only other species in which they occur are *inflatus*, Mask., *populi*, Mask., *leaii*, Full., and *tepperi*, Full., all of which are easily separable by the character of their coverings, the two first secreting waxy tests, while the other two inhabit galls.

EXPLANATION OF FIGURES.

- 1.—*Aspidiotus subrubescens*, var. *corticoides*, extremity of pygidium of female.
- 2.—*Aonidia pulchra*, male puparium.
- 3.—Do. pygidium of female.
- 4.—*Mytilaspis cassiniæ*, adult female.
- 5.—Do. pygidium of female.
- 6.—*Mytilaspis hymenanthera*, extremity of pygidium of female.
- 7.—*Chionaspis candida*, extremity of pygidium of female.
- 8.—*Sphaerococcus pustulans*, adult female, ventral view.

NOTES ON THE VOLCANIC HISTORY OF MOUNT SHADWELL, VICTORIA.

BY J. T. JUTSON.

With an Appendix by F. Chapman, A.L.S., on Some Rocks and Minerals from the Locality.

(Communicated by F. M. Chapman.)

(Read before the Field Naturalists' Club of Victoria, 13th March, 1905.)

THE observations which I desire to submit for your consideration appear to me to throw some light on the volcanic history of Mount Shadwell, a point of volcanic eruption of the Newer Basalt period, near Mortlake, in the Western District of Victoria. The sections to be described are splendid examples of their kind, and it is hoped that this paper may direct some attention to them.

Literature.—This consists practically of bare records. The following are the only references I have been able to find:—

Selwyn, 1866.* Mount Shadwell is included in his list of craters and points of eruption; but it is a record only.

Catalogue of the Rocks of Victoria in the Technological Museum, 1894,† which mentions the Mount as a locality for the occurrence of tuffs, scorix, lapilli, a bomb, and Oligoclase.

Prof. Gregory, 1903.‡ A reference to the quarries at the Mount as showing good sections of volcanic scoria.

Prof. Gregory, 1904.§ The aboriginal tradition of the eruption of Mount Shadwell is referred to; and a statement made that the Mount looks much older than the craters of Mount Noorat, respecting which there are no traditions.

* Exhibition Essays.

† This is based on the Catalogue issued by Ulrich in 1875, in which, however, no references to Mount Shadwell are made.

‡ "Geography of Victoria," p. 192.

§ "The Antiquity of Man in Victoria," Proc. Roy. Soc. Vic., vol. xvii. (N.S.), part 1, pp. 134 and 136.



fig. 8.

Sphaerococcus pustularis
Green.



fig. 1.

Aspidiotus subrusescens
var. *corticoides*



fig. 5.

Mytilaspis cassiniæ. Green.

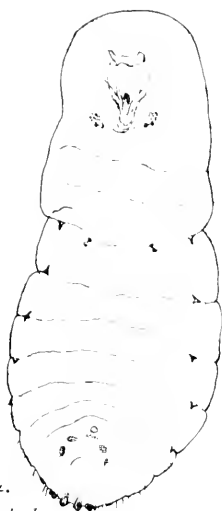


Fig. 4.
Mytilaspis cassinæ, Green.



Fig. 3
Aonidia pulchra Green
pygidium of female $\times 600$

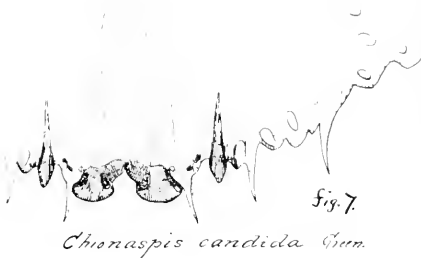


Fig. 7.
Chionaspis candida Green.

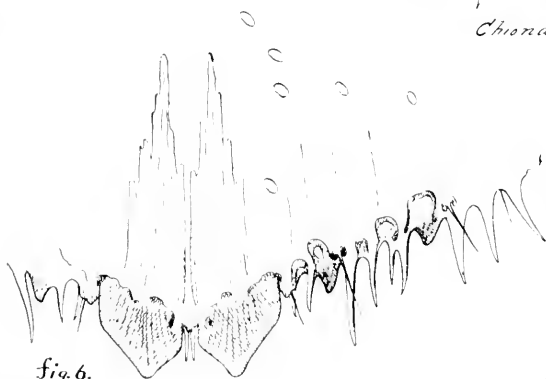


Fig. 6.
Mytilaspis hymenanthæ Green

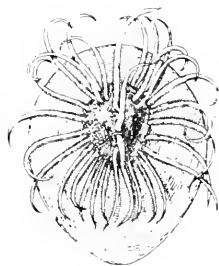
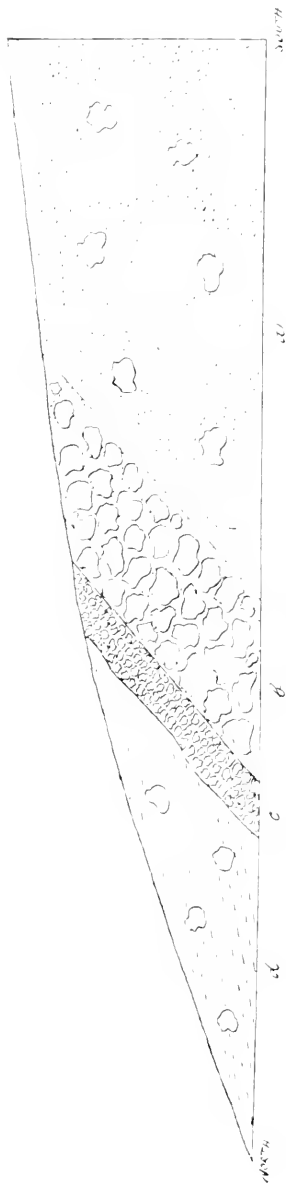


Fig. 2.
Aonidia pulchra Green
male puparium $\times 45$

Diagrammatic Section along the eastern face of the quarry
on the north eastern side of Mount Franklin.



a Lignite and some with occasional pieces of fossil.

b Quartz boulders with unsorted matter - representing the red line
an conglomerate

c Conglomerate of smaller pieces of fossil.

d Lignite and some with small pieces of fossil
- conglomerate to c. the black line

Description.—Mount Shadwell is a crater of uneven height, broken down on the north-west and west sides. Its form suggests a breached crater, considerably modified by denudation. Its height is recorded as 962 feet above sea-level, and it rises about 500 feet above the surrounding plains.

The sections to which the observations in this paper refer occur in two quarries on the flanks of the Mount. One is of greater size than the other, so for convenience I shall refer to them as the larger and smaller quarries respectively.

Taking the larger quarry first, it is situated on the north-east flank of the Mount, and abuts the western side of the road running north from Mortlake to Lake Bolac. The quarry opens from the north, and deepens as it extends to the south, until a depth of 30 feet or 40 feet is reached. The interesting sections are on its east and west faces.

The *eastern section* displays a series of rocks of different thicknesses. Beginning at the southern end (where the rocks are the oldest) there is the following succession (see diagrammatic section attached):—

- (a.) * A considerable thickness of incoherent basaltic scoria † and lapilli, mixed with blocks of basalt up to about 2 feet in diameter. The scoria and lapilli are of a dull reddish colour, fairly vesicular, and much decomposed. The included blocks are also vesicular, and vary in colour from a light dull red to an ashy white. This deposit possesses no distinctly observable lines of inclination.
- (b.) A fairly thick bed, consisting almost entirely of blocks of basalt similar to those in (a), with the interspaces filled with decomposing volcanic material. The dip is in a northerly direction, at an angle of about 40°. This bed is apparently an agglomerate.
- (c.) An agglomerate of basalt of similar character to that in (a) and (b), made up wholly of pieces of uniform size (about 4 inches in diameter), with no interstitial matter. It rests on and possesses the same angle of inclination as (b).

These three sets of beds belong apparently to one period of time. For convenience they are hereafter collectively referred to as the "red beds." In these beds Olivine, associated with its ferri-ferous variety, Fayalite, occurs, the latter predominating. (See Appendix, specimen 2.) The Fayalite has become considerably decomposed. Pieces of Oliagoclase Andesine (specimen 4), often an inch in length, are also found.

* The letters refer to the beds marked by the same letters on the diagrammatic section.

† The terms used in this paper for the fragmentary volcanic material are those adopted by Prof. Gregory in his "Geography of Victoria"), pp. 183 *et seq.*

(*d.*) Basaltic scoria and lapilli lying unconformably on (*c.*)
 These rocks are of the same character as those exposed in the western face of the quarry, and will consequently be embraced in their description.

The *western section* along its whole length and height presents but one series of rocks, which, as mentioned above, are of a similar character to (*d.*) They consist of black basaltic scoria and lapilli, with scattered blocks of vesicular and solid basalt. The scoria and lapilli are less vesicular than in the red beds, are angular in shape, and vary in size from a pea to 3 or 4 inches, the majority being about a $\frac{1}{2}$ -inch. The included basalt boulders are often 2 feet or more in diameter. These materials are quite unconsolidated and undecomposed, and they appear to have a slight dip in the same direction as those of the red beds, whose dip is defined, but at a lower angle. In both the scoria and basalt boulders are found somewhat globular or polygonal pieces (running to 2 or 3 inches in length) of granular and practically unaltered Olivine, which sometimes contain blebs of Diopside in varying quantity. (See specimen 1, Appendix.) Neither Fayalite * nor prominent pieces of Oligoclase Andesine were observed. The beds just described, together with (*d.*), may conveniently be called the "black beds." The red and the black beds abut against one another at the north end of the quarry.

The smaller quarry is on the east side of Lake Bolac road, and a little south of east of the Mount. Except for the occurrence of a grey, fine-grained, homogeneous tuff, and the smaller size of the ejected material, the rocks exposed are similar to the black beds. No red beds are observable. A specimen collected here is interesting on account of the mixture of black and undecomposed, with red and decomposed fragments, thus supporting the conclusion stated in this paper.

Conclusion.—The red beds are highly decomposed, while the black beds are practically unaltered; the included minerals are either different or occur in different ways; and the black beds rest unconformably upon the red. Decomposition must have taken place in the latter prior to the ejection of the former. There is also evidence of this in the specimen above referred to from the smaller quarry. There have therefore been at least two distinct volcanic disturbances at approximately the same point, separated by a considerable interval of time. The red beds were first ejected, and then denuded and decomposed for some depth. Such decomposition must have occupied much time. Then a second eruption took place, and the fragmentary material of that eruption has been in part removed, so as to expose the red beds at the surface of the ground. Possibly some

* Specimen 3 in Appendix consists largely of Fayalite, less decomposed than the typical more ferriferous Fayalite from the red beds. As this was not obtained *in situ*, it is possible, from its fresh appearance, that it came from the black beds.

movement of the latter took place at the second disturbance, which might explain the rather high angle of inclination of some of these beds.

The Geological Survey of Victoria, in its recently published Quarter Sheet * (the country surveyed in which approaches closely to but does not include Mount Shadwell), divides the volcanic rocks of the district into an older and a newer series. Whether they coincide with the two sets of beds described above can only be ascertained by further examination; but the independent determination by the Survey of two distinct periods of volcanic activity in other parts of the same area is interesting, and somewhat confirmatory of the views expressed herein.

In conclusion, I desire to offer my warm thanks to Mr. F. Chapman, A.L.S., for his determination of and notes on the specimens referred to in the Appendix, and also for his interest and advice in connection with this paper. Mr. T. S. Hall, M.A., has also been good enough to direct me to some of the scanty references to Mount Shadwell.

APPENDIX.

NOTES ON SOME ROCKS AND MINERALS FROM MOUNT SHADWELL.

BY FREDERICK CHAPMAN, A.L.S.

Specimen 1 (from the "black beds").—This is a portion of an Olivine bomb. It has the usual granular character and apple-green colour of fresh specimens. Here and there amongst the granules are blebs of a darker mineral, which is proved by microscopical examination to be Diopside. The cleavage is very distinct. Its extinction angle with the crystallographic axis c is rather less than that of typical Diopside. The pleochroism is generally feeble, but sometimes shows a range from pale yellow through yellow-brown to pale green. The optical sign is positive. One of these crystals of Diopside includes numerous parallel plates of a serpentinous mineral, which is a secondary metasomatic change referable to Schiller structure. In the same slide there occurs a granule of Bronzite showing strong cleavage and marked refraction. The Olivine forming the mass of this rock shows an incipient change by the separation of some of the iron in the form of magnetite. The striking purity of these Olivine nodules resembles that of the nodules found in the Tertiary basalts of the Eifel, Germany. The conditions pertaining to the occurrence of these nodules in Victoria would seem to point to a segregation origin for these agglomerated minerals.

Specimen 2 (from the "red beds").—A massive Olivine rock, having a specific gravity of 3.54. The specimen is mainly composed of the ferriferous variety Fayalite, and it shows the characteristic strong brachydiagonal cleavage of that mineral. There has been a considerable amount of iron separated, in the

* S N.E. (New Series).

form of Hematite, which under the microscope is seen to occupy all the coarse cleavage cracks, as well as to fill up the numerous thin, incipient cracks in the crystals. Although the pleochroism of Fayalite, like that of Olivine, is feeble, one crystal in the present slide is distinctly pleochroic, and most of the granules show this phenomenon to some extent.

Specimen 3.—This sample has a specific gravity of 3.26, and is largely composed of Olivine of the variety Fayalite, although it is not so ferriferous as the preceding specimen. The rock has a dark appearance and a rough fracture, whilst the granules of which it is composed have an iridescent and metallic lustre. Under the microscope the rock is seen to consist of Olivine, with rather definite cleavages and a conspicuous development of Schiller structure, normal or obliquely to the cracks, and almost diallagic in character, but in somewhat irregular patches. Other constituents of this rock are some crystals (often well developed) of Omphacite, and a reddish or orange-coloured mica, sometimes enveloping the former.

Specimen 4 (from the "red beds").—A fragment of a finely scoriaceous rock of a red-brown colour, containing a portion of a large porphyritic crystal of Felspar. The Felspar is white, with a vitreous or almost pearly lustre. By its low extinction angle of 7° , measured from a cleavage surface parallel with the brachypinakoid, it is seen to be Oligoclase Andesine. The crystal, although otherwise clear, contains a few included crystals of other minerals, one of which appears to be Hypersthene.

DESCRIPTION OF TWO NEW SPECIES OF SHELLS OF THE GENUS LEUCONOPSIS.

By J. H. GATLIFF.

(Read before the Field Naturalists' Club of Victoria, 10th April, 1905.)

THE genus was founded by Capt. Hutton for the reception of a small mollusc from Auckland, New Zealand—*L. obsoleta*, Hutton. Since then Mr. Charles Hedley has described a species from New South Wales. The present paper describes a species from our coast, and a fourth species, from South Australia.

LEUCONOPSIS VICTORIÆ, n. sp. (fig. 1).

Shell ovate, imperforate, opaque white. Whorls four, very faintly spirally grooved. When viewed from the front the apical whorl is not situated in the centre, but is placed to the left. Inner lip with a well-developed central tooth, and another much smaller anterior one, only visible when the mouth is looked into sideways. Aperture about half the length of the shell.

Dimensions.—Length, 1.65 mm. ; breadth, 1 mm.

Locality of Type.—Portsea, Port Phillip.

Observations.—Other specimens obtained by Mr. F. E. Grant under stones at Stony Point, Western Port, which have a thin grey epidermis, and are rather smaller than the type.



Fig. 1.

Fig. 2.

LEUCONOPSIS TATEI, n. sp. (fig. 2).

Shell ovate, imperforate, opaque white. Whorls four, faintly spirally grooved. The apex, viewed from the front, is on the right of the centre. There is a central well-developed tooth on the inner lip, followed anteriorly by another, much smaller, only visible sideways. Aperture about half the length of the shell.

Dimensions.—Length, 1.84 mm.; breadth, 1.05 mm.

Locality.—Fowler's Bay, South Australia. (Prof. Tate.)

Observations.—The two foregoing species are very similar, but the South Australian shell is more inflated in the whorls, and the position of the peculiar apex is on the right, and in the Victorian species it is on the left. The New South Wales species, *Leuconopsis mermis*, Hedley, is a larger shell, and the central tooth is situated further back. I have to thank Mr. C. Hedley for kindly informing me that the name *Leuconia minima*, Tate, No. 451 in Adcock's "Hand-List of Aquatic Mollusca of South Australia," appertained to an undescribed form, which might be the Victorian species. Dr. J. C. Verco kindly sent me four specimens of it, and from a microscopic examination of them I am led to conclude that they are distinct, and have named it as above. The drawings are by Mr. R. A. Bastow, to whom I am much obliged for his skill in delineation and the use of his microscope.

CATALOGUE OF VICTORIAN ESTUARINE UNIVALVE MOLLUSCA.

BY J. H. GATLIFF.

(Read before the Field Naturalists' Club of Victoria, 10th April, 1905.)

IN the "Catalogue of Marine Shells of Victoria," by Messrs. Pritchard and Gatliff, in recent volumes of the "Proceedings of the Royal Society of Victoria," species of mollusca that are not

actually inhabitants of the sea, although found on the sea coast, were purposely omitted.

Those contained in the following list are usually found among mangroves, on muddy flats, or under stones at the sea-side which are sprayed by the action of wind and wave.

Compared with tropical areas our fauna of this class is not numerous.

The references given are confined to the original description, and one where the species is figured is given. Synonyms that are generally known are also referred to.

The list includes nine genera, comprising twelve species.

Class GASTROPODA.

Order PECTINIBRANCHIATA.

Family TRUNCATELLIDÆ.

Genus *Truncatella*, Risso, 1826.

TRUNCATELLA SCALARINA, Cox.

1867. *Truncatella scalarina*, Cox. Australian Land Shells, p. 93, pl. 15, f. 10.

1876. *Truncatella tasmanica*, Ten.-Woods. Proc. Royal Soc. Tasmania, p. 143.

1876. *Turbonilla tasmanica*, Ten.-Woods. Id., p. 145.

Hab.—Hobson's Bay, Port Phillip; Western Port.

Obs.—May be distinguished from the other species by its more solid test and stronger sculpture.

TRUNCATELLA MARGINATA, Kuster.

Truncatella marginata, Kuster. Conch. Cab., p. 12, f. 24, 25.

1867. *Truncatella marginata* (Kuster). Cox, Australian Land Shells, p. 92, pl. 15, f. 8a, b.

Hab.—Hobson's Bay, Port Phillip.

Obs.—Very similar to the foregoing species, but almost smooth and semi-translucent.

Genus *Coxiella*, E. A. Smith, 1898.

COXIELLA CONFUSA, E. A. Smith.

1867. *Blanfordia striatula*, Cox (non Menke). Aust. Land Shells, p. 95, pl. 15, f. 13, 13b.

1893. *Pomatiopsis striatula*, Adcock (non Menke). Hand-List Aquatic Mollusca S. Australia, p. 7.

1898. *Coxiella confusa*, E. A. Smith. Proc. Malacological Soc. Lond., vol. iii., p. 76.

Hab.—Hobson's Bay; Lake Corangamite (Coll. Sykes).

Obs.—Mr. Smith in the paper above referred to states that Menke's species, *C. striatula*, is a Western Australian shell distinct from the above species, with which it has been wrongly identified.

Family RISSOELLIDÆ.

Genus **Tatea**, Tenison-Woods, 1879.**TATEA RUFILABRIS**, A. Adams.1862. *Diala rufilabris*, A. Adams. *Annals and Magazine Nat. Hist.*, p. 298.1876. *Bythinia huonensis*, T.-Woods. *P.R.S. Tasmania*, p. 77.1879. *Tatea huonensis* (T.-Woods). *Id.*, p. 72.1883. *Tatea huonensis* (T.-Woods). *Tyron, Structural and Systematic Conch.*, vol. ii., p. 259, pl. 72, f. 30.

Hab.—Port Phillip; Western Port.

Obs.—In the generic description the operculum is stated to be calcareous. This is not correct; it is horny. I extracted the operculum, and Mr. Bastow and I tested it with a solution of muriatic acid, observing it under the microscope. There was no reaction. A fragment of calcareous shell was then put in the same solution, and strong reaction took place immediately.

Family ASSIMINIDÆ.

Genus **Assiminea**, Fleming, 1828.**ASSIMINEA BRAZIERI**, Ten.-Woods.1876. *Rissoina* (*Setia*) *brazieri*, Ten.-Woods. *P.R.S. Tasmania*, p. 146.*Rissoa brazieri*, Ten.-Woods. *Tyron, Man. Conch.*, vol. ix., p. 335, pl. 71, f. 97.

Hab.—Port Phillip; Western Port.

Obs.—Usually has one broad brown encircling band.

ASSIMINEA TASMANICA, Ten.-Woods.1876. *Assiminea tasmanica*, Ten.-Woods. *P.R.S. Tasmania*, p. 79.1877. *Rissoa* (*Setia*) *siennae*, Ten.-Woods. *Id.*, p. 153.

Hab.—On mangroves at Hastings. Western Port.

Obs.—Has no colour band, and is flatter in the whorls than *A. brazieri*.

Order PULMONIFERA.

Family AMPHIBOLIDÆ.

Genus **Salinator**, Hedley, 1900.**SALINATOR FRAGILIS**, Lamarck.1822. *Ampullaria fragilis*, Lamarck. *An. S. Vert.*, vol. vi., pt. ii., p. 179.1832. *Ampullacera fragilis*, Quoy and Gaimard. *Voy. Astrolabe*, vol. ii., p. 201, pl. 15, f. 13, 14.1900. *Salinator fragilis*, Hedley. *Proc. Lin. Soc. N.S.W.*, p. 511.

Hab.—Port Phillip; Western Port.

Obs.—As its name denotes, this is a fragile shell, with generally a broad dark brown band encircling the upper portion of the whorl.

SALINATOR QUOYANA, Potiez and Michaud.

1838. *Amphibola quoyana*, Potiez and Michaud. *Galerie des Mollusques*, p. 288, pl. 1, 28, f. 17, 18.

Hab.—On mangroves at Hastings, Western Port.

Obs.—This is a smoother and stronger shell than *S. fragilis*, and, in addition to the encircling band on that species, has numerous waved, irregular, transverse lines. One specimen obtained measuring—height 25 mm., breadth 19 mm.

Sub-order GEYHYDROPHILA.

Family AURICULIDÆ.

Genus *Alexia*, Leach, 1847.

ALEXIA MERIDIONALIS, Brazier.

1877. *Alexia meridionalis*, Brazier. *Proc. Lin. Soc. N.S.W.*, p. 26.

1883. *Alexia harrissoni*, Beddome. *Proc. Royal Soc. Tasmania*, p. 169, No. 15.

1901. *Alexia meridionalis*, Brazier. *Tate and May, Proc. Lin. Soc. N.S.W.*, p. 419, pl. 23, f. 7.

Hab.—Port Phillip.

Genus *Marinula*, King, 1832.

MARINULA PATULA, Lowe.

1835. *Marinula patula*, Lowe. *Zool. Journal*, vol. v., p. 289.

1841. *Auricula pellucida*, Cooper. *Microscopic Journal*, p. 16.

1854. *Marinula xanthostoma*, H. and A. Adams. *P. Zool. Soc. Lond.*, p. 35.

1856. *Cremnobates solida*, Swainson. *P. Roy. Soc. Tas.*, p. 44, pl. 7, f. 2.

1901. *Marinula patula*, Lowe. *Hedley, P.L.S. N.S.W.*, p. 704, pl. 34, f. 18.

Hab.—Port Phillip; Western Port.

Genus *Leuconopsis*, Hutton, 1884.

LEUCONOPSIS VICTORIAE, Gatliff.

1905. *Leuconopsis victoriae*, Gatliff. *Ante*, p. 12.

Hab.—Portsea, Port Phillip; Stony Point, Western Port (F. E. Grant).

Genus *Ophicardelus*, Beck, 1837.

OPHICARDELUS AUSTRALIS, Quoy and Gaimard.

1832. *Auricula australis*, Quoy and Gaimard. *Voy. Astrolabe*, vol. ii., p. 169, pl. 13, f. 34, 38.

1856. *Cremnobates cornea*, Swainson. *Proc. Royal Soc. Van Diemen's Land*, vol. iii., p. 43, pl. 7, f. 1.

Hab.—Back Beach, Williamstown, Port Phillip; Hastings, Western Port.

The Victorian Naturalist.

VOL. XXII.—No. 2. JUNE 8, 1905.

No. 258.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 8th May, 1905.

The president, Mr. O. A. Sayce, occupied the chair, and about 50 members and visitors were present.

REPORTS.

A report of the excursion to the Zoological Gardens on Saturday, 22nd April, was given by Mr. F. Wisewould, in the unavoidable absence of the leader, Mr. D. Le Souëf, C.M.Z.S. The afternoon was spent in the inspection of the many animals and birds, whilst the points of interest of several recent additions were explained by the leader. Altogether a very pleasant two hours were spent in the Gardens, and the party left well pleased with the outing.

A report of the junior excursion to the Botanical Gardens on Saturday, 6th May, was given by the leader, Mr. F. Pitcher, who reported that about 70 members, including a few seniors, were present. Commencing with the Economic Museum, the juniors were shown over the principal and more interesting parts of the Gardens. The excursion, which was of a very pleasant character, was interesting from the many questions put to the leader, who mentioned that perfect order was maintained throughout, and he anticipated that the outing would lead to good results.

The following reports were held over from last issue:—

A report of the excursion to Heidelberg on Saturday, 25th March, was given by the leader, Mr. A. D. Hardy, who stated that nothing of special interest was met with during the afternoon, other than some fine rotifers and green hydras.

A report of the excursion to Royal Park on Saturday, 8th April, was given by the leader, Mr. T. S. Hall, M.A., who said there was a fair attendance of members. Attention was first directed to the railway cutting near Flemington Bridge, and its geological features explained. A visit was then paid to the valley of the adjacent Moonee Ponds Creek, and evidence that the one-time valley floor had been elevated some twenty feet pointed out. Other minor points which arose were also discussed.

A report of the excursion for juniors to Clifton Hill Quarry on Saturday, 1st April, was given by the leader, Mr. F. Chapman, A.L.S., who said that there had been a good attendance of juniors and others. They showed a decided interest in the different features of the quarry and its contents, and were successful in securing a number of mineral specimens, such as radial bunches of Aragonite, or the rounded pilule-like groups of Ferrocaltite. Mesolite, Vivianite, and Magnesite were also

found, and the current-bedded sand of the old river bed, on which the basalt, over one hundred feet in thickness, rests, was seen exposed in one portion of the quarry floor.

The hon. librarian reported the receipt of the following donations to the library:—*Journal of Agriculture of Victoria*, vol. iii., part 2, March, 1905, from the Secretary for Agriculture; *Geelong Naturalist*, new series, vol. i., part 4, December, 1904, from the Geelong Field Naturalists' Club; "Monograph of the Silurian and Devonian Fossils of New South Wales," from the Department of Mines, Sydney; "Report of Fisheries Department, New South Wales," 1903, from the Department; *Agricultural Gazette of New South Wales*, vol. xvi., part 2, February, 1905, from the Department of Agriculture, Sydney; "Forest Flora of New South Wales," vol. ii., part 5, by J. H. Maiden, F.L.S., Government Botanist, from the author.

ELECTION OF MEMBERS.

On a ballot being taken, Prof. E. W. Skeats, D.Sc., Melbourne University; Miss E. S. Booth, Oakover, Coburg; Miss D. E. H. Booth, 25 Rathdown-street, Carlton; Mr. H. T. Coles, 337-339 Elizabeth-street, Melbourne; Mr. F. P. Godfrey, 70 Avoca-street, South Yarra; Mr. C. P. Kinane, 37 Hope-street, South Yarra; Mr. J. M. Stephens, Croyden, Heidelberg-road, Fairfield; Miss Randell, Primrose-street, Essendon; Miss J. White, B.Sc., Observatory Quarters, South Yarra, were elected as ordinary members; Messrs. Edgar J. Christian, Alma-road, Caulfield; James M. Thomson, Hawthorn-grove, Hawthorn; M. Batelier, 44 Howard-street, North Melbourne, as associates; and Masters Norman Barnard, A. W. Le Souëf, and James Schreuder as junior members of the Club.

GENERAL BUSINESS.

After the nominations of office-bearers for 1905-6 had been made, Messrs. D. Best and G. Weindorfer were appointed to audit the accounts for the past year.

PAPERS READ.

1. By Mr. J. A. Hill, entitled "Fights between two Species of Ants."

The author gave a description of the severe encounters which he had observed as occurring at Kewell (Wimmera District) between a large and a very small species of ant, the latter by weight of numbers always being victorious. Whether the raids, and subsequent conflicts, are made for the possession of the nest, or for the object of securing the feeding-ground, could not be determined.

In the discussion that followed the reading of the paper Mr. J. A. Kershaw, F.E.S., remarked that it was probable that the raids are undertaken, not only for the possession of the nests, but for the purpose of securing the pupæ, with the object of rearing them for slaves. Slave-making ants were common to

many countries, and it was quite possible that they will be found in Victoria. He also mentioned that the subject afforded a good field for observation, particularly to the country members.

2. By Mr. G. Weindorfer, entitled "A Botanical Trip to the Grampians."

The author gave an account of a botanical trip which he with two others had made to the Goat Rock and Mt. Cassell, in the Grampians, during the Christmas holidays. Though too late for many of the flowers, fine specimens of *Conospermum mitchellii*, *Boronia pilosa*, *B. polygalifolia*, and *Candollea sobolifera* were obtained, as well as a very fine series of seed specimens.

In the discussion that followed the reading of the paper, the author remarked that he was disappointed in the size of the trees to be found on the Grampians. The eucalypts, when compared with those of the forests of south-eastern Victoria, are very small; in most cases the height would not exceed sixty feet, with a stem diameter of about three feet.

In answer to Mr. G. A. Kearnland as to whether birds were plentiful, the author stated that only a few were noticed on the lower slopes of the Grampians, but, as far as he could remember, not a single bird was seen on the higher parts of the ranges.

3. By Dr. C. S. Sutton, entitled "A Botanical Trip to Mount Erica, Baw Baw."

The author gave an interesting account of a short trip, which, with a couple of companions, he had made to Mount Erica, one of the peaks of the Baw Baw Range, during the New Year holidays. The train was taken to Moe, from whence the party was driven along the Walhalla road as far as Upper Moondara, the rest of the journey being accomplished on foot. A number of the flowers were past their best, but on the summit fine specimens of *Helichrysum rosmarinifolium*, *Oxylobium alpestre*, *Sisyrinchium pulchellum*, *Wittsteinia vacciniacea*, *Richea gunnii*, *Gentiana saxosa*, and a few other plants, reminders of visits to the Buffalo Ranges and the Alps, were obtained.

Mr. F. Pitcher remarked that some years ago he visited the district, passing through Marysville and Wood's Point to Walhalla, and found the country, from a botanist's point of view, generally very poor, and thought that September or October would yield the best results to the collector.

Mr. A. D. Hardy inquired whether the author had made a collection of grasses during the trip, and at what elevation was the Kangaroo Grass, *Anthistiria ciliata*, found. He questioned whether the party had really been on the Mount Erica of the maps, and mentioned that the late Baron von Mueller had stated that the mount was incorrectly named, as no true Erica had been found in Victoria; however, one of the plants recorded, *Wittsteinia vacciniacea*, F. v. M., belongs to the Ericaceæ, our other representative of that order being *Gaultiera hispida*.

Mr. G. Weindorfer, in reply for Dr. Sutton, who was unavoidably absent, remarked that grasses as well as flowers were collected during both trips, and the list would be published with the paper. With regard to the Kangaroo Grass, he had found it generally at low elevations, both on the Grampians and Mount Erica. He also suggested that the locality would prove a suitable one for a "camp-out" by the Club at a future date, especially as the completion of the Walhalla railway would enable the mount to be visited with much less trouble.

In this he was supported by Mr. J. A. Kershaw, F.E.S., who mentioned that the district should be a good one from a zoological point of view, as he had obtained some insects from the locality which until then had been found only in New South Wales.

NATURAL HISTORY NOTES.

ABNORMAL PARROT.—Mr. A. Coles drew attention to his exhibit of a Rosehill Parrakeet, *Platycercus eximius*, with abnormal colouring, shot near Sale, the head, neck, chest, and under tail coverts being of the ordinary Rosella red; breast, belly, and thighs canary-yellow; nape, back, and rump canary-yellow; tail yellow, shading off to a bluish-white. Wings.—Primaries bluish-white, secondaries and shoulders yellow.

Alluding to the exhibit, Mr. G. A. Keartland remarked that it was singular that whilst green feathers changed to yellow, the red ones retained their colour. He stated that he had seen the entire plumage of Warbling Grass-Parrakeets yellow. In the case of birds whose natural colours are brown or black the change was to white. He gave an instance of a Pectoral Quail, which, after ten years' captivity, changed to pure white, and the plumage on black fowls will undergo the same change. In these cases the eyes retained their original colour, but in the case of the true albino they are always red.

Mr. F. Pitcher remarked that for some time past a male Wren, *Malurus superba*, with a white head, and a white Blackbird have been constant visitors on the lawns of the Botanical Gardens.

EXHIBITS.

By Mr. A. Coles.—Rosehill Parrakeet in yellow plumage.

By Mr. A. G. Campbell.—Four charts of typical Victorian soils, designed for use in schools; one large chart to illustrate main principles of weathering of rock and disposition, with upheaval of sediment above sea-level.

By Mr. C. French, jun.—Scale-insects, *Mytilaspis frenchii*, Green, new to science, collected at Sorrento by Mr. C. French, jun.; Saltmarsh Mosquitoes, *Culex labeculosus*, Coquillet, new to science, collected at Coode Island by Mr. J. A. Leach, B.Sc., and Mr. C. French, jun.

By Mr. J. A. Hill.—Pied Mouse, *Mus musculus*, from Kewell, Victoria; specimens of ants in illustration of paper.

By Mr. G. A. Keartland.—White-fronted Storm-Petrel, caught alive in a store at West Melbourne.

By Mr. A. Mattingley.—Aboriginal sharpening-stone from Bunyip, Gippsland.

By Mr. F. P. Spry.—Life-history of moth, *Pinara fervens*, Walk., collected near Melbourne.

After the usual conversazione the meeting terminated.

EXCURSION TO ROYAL PARK.

ABOUT a dozen members attended the excursion to Royal Park on Saturday, 8th April, for the purpose of examining the railway cutting near Flemington Bridge. The upper series of beds, consisting of red clays, sands, and gravels, was seen to have been laid down by water action, and to represent merely the harder residues or "concentrates" of a large mass of original rock. The finer material had been removed by the agitated water, and could only have been deposited in some other locality where there was comparative calm. A few fossils picked out of these red-beds were evidently cones and cowries, and showed that the beds were of marine origin. Under the red-beds is a thick mass of clay, with a very uneven surface, and of variable colour and structure. This clay was carefully examined, beginning at the north end of the cutting. As we went south rust-coloured rings, at times in concentric groups, and ranging from feet to inches in diameter, were met with. Many of these were barely distinguishable from the grey and white finely-mottled clay; others were very plain. Then examples were seen in which the rings were seen to be the cut edges of a series of concentric shells. Then, by further successive steps, there was found a mass of hard bluestone or basalt in the middle of one lump, while the boundaries of the lump gradually faded off into the clay. Thus it was seen that bluestone, under the influence of weather, changes into a soft clay with a greasy feel like fuller's-earth.

After a glance at the small outcrop of Silurian bed-rock visible in the cutting, the valley of the Moonee Ponds Creek was briefly examined. The valley floor is flat, being filled in with river-silt, or rather there are two flats at different levels. The lower one is about the present level of the creek, the higher being about twenty feet above it. The lower is so near sea-level that water cannot run off it very fast, and, consequently, it is scarcely being cut away by the stream, while the upper one is being attacked. Both levels or terraces are the product of river action, and even the upper one was laid down by the stream when moving more slowly than at present. In this locality this can only mean that at that time the top of the terrace was more nearly at sea-level than it is now, or, to put it in popular language, the land has since risen. The amount of the rise is shown by the difference of level of the two river-flats—namely, about twenty feet. About Laverton

and Altona the country for several square miles is covered by recent sea-shells. It was many years ago pointed out that this indicated a recent elevation of about twenty feet, and it is interesting to notice that the two estimates, arrived at on different grounds, so closely agree.

Besides these points, which were discussed on the ground, other minor points were dealt with as they arose.—T. S. HALL.

A TRIP TO LAKE KARNG AND MT. WELLINGTON, NORTH GIPPSLAND.

BY E. O. THIELE.

(*Read before the Field Naturalists' Club of Victoria, 10th April, 1905.*)

THE Mt. Wellington district is one of the least known and settled parts of North Gippsland. Neither the miner's pick nor the settler's axe has yet made much impression in this rugged and mountainous district. Broadly, the area under consideration consists of an elevated plateau rising steeply on the north side of the great plains of the Gippsland valley, to a height of from 4,000 to over 5,000 feet. The table-land stretches north to the Dividing Range, where in Mt. Howitt it rises to 5,715 feet. River action has so deeply dissected this highland that deep gorges are overlooked by frowning precipices and bluffs rising from 2,000 to 3,000 feet above the shadowy depths of the valleys.

Geologically the area forms a belt of reddish to purplish sandstones, shales, and conglomerates, with associated igneous rocks, the latter mostly of a porphyritic nature. This formation stretches in a north-westerly direction across the main divide to Mansfield, where it is now generally regarded as Carboniferous, though it was originally described as Devonian. As, however, the relation of the southern portion to the Mansfield area has not been fully worked out, it is preferable at present to simply refer to the Gippsland portion as Upper Palæozoic.

Owing to the difference in rock structure from the better known alpine parts of Victoria, its scenery is quite distinct. Abrupt scarps and precipitous cliffs terraced with rocky ledges form characteristic features, which lend a rugged grandeur to the mountains, and contrast them strongly with the more gently flowing outlines of the Silurian ranges.

On the map much of the area is still marked by a blank; only several of the more important peaks are shown. No roads exist, and only a few tracks have been blazed. Two well-known Victorian geologists, Mr. R. A. F. Murray and Dr. A. W. Howitt, have contributed practically all that is at present known of the geology of this most interesting series of rocks. On visiting this region one is struck by the exceptional difficulties and arduous work these two pioneer geologists had to face in obtaining the information embodied in their respective reports.

The Progress Report of the Geological Survey of Victoria, No.

V. (1878), pp. 44 to 70, contains the report of Mr. R. A. F. Murray on part of the Mt. Wellington district. His observations extended from Maffra in the south-east, north along the Avon River to the east of Mt. Wellington to Mt. Kent, and from the south-west at Moondara, northwards to the west of Walhalla, as far north as Mt. Skene. The following mountain peaks are included in the region examined:—Ben Cruachan, 2,765 feet; Mt. Useful, 4,750 feet; Connor's Plain, 5,500 feet; Mt. Skene, The Crinoline, 4,500 feet; Mt. Tamboritha, 5,381 feet; Mt. Wellington, 5,363 feet; Mt. Kent, 5,128 feet. A sketch geological map to accompany the report was issued in 1884, and is a good guide to any traveller in these parts.

Later investigation of some of the more inaccessible parts will render some slight alterations in the geological features necessary; but, considering that it is probably more than thirty years since Mr. Murray traversed the area, it is marvellous how carefully he has delineated the topographical and geographical features of such a rough country.

Dr. A. W. Howitt made numerous visits to parts of this area, and in company with Mr. Murray examined Snowy Bluff, overlooking the Wonnangatta River, where a fine series of sedimentary and associated igneous rocks is shown.

It was through Dr. Howitt that the existence of a small, interesting mountain lake, lying in a deep valley on the north-western slope of Mt. Wellington, was made known to the general public. The lake was discovered by a stockman named Snowden in 1886, and was afterwards visited several times by Howitt. In December, 1890, Messrs. Lucas, Dendy, and Howitt visited the lake, and gave an interesting account of their trip before this Club in February, 1891 (*Vict. Nat.*, viii., p. 17). Numerous incidents recorded in their account give some idea of the nature of travelling in that rocky and mountainous district.

The desire to further investigate the lake and the surrounding country was the main object of the present trip. The party consisted of Mr. A. O. Thiele, of Williamstown, Mr. A. E. Thiele, of Doncaster, and myself. Mr. W. Reid, of Glenmaggie, was engaged to supply both riding and pack horses, and to go himself to act as guide and look after the horses. Train was taken to Heyfield, and after driving seven miles to Glenmaggie the horses were obtained, and a start was made on Wednesday, 4th January, 1905. The route has been well described by Howitt's party, so that the experiences and observations of the first part of the journey, though interesting, must be passed over here. After two days' travelling, first along the Macallister, and next along the Wellington River, the junction of the main stream with a branch coming in on the left bank was reached. This tributary stream is unfortunately locally known as the right branch, but is in reality a left branch, as Mr. T. S. Hall, M.A., kindly pointed out to one of the

party afterwards. It is therefore proposed to call this tributary Dolodrook River, as it flows through the parish of that name. Along the Wellington River, below the Dolodrook junction, for a distance of about two miles, it was noticed that the reddish and purplish strata gave place to highly inclined crumpled and faulted slates and sandstones, suggesting at once an older formation.

Soon after camping Graptolite impressions were found in some black slate fragments in the bed of the river. These interesting fossils were soon traced to their position *in situ* in the highly inclined black slates along the right bank of the river close to the camp.

Specimens were very abundant and in good state of preservation. This interesting occurrence at once fixed the age of the strata, and subsequent observations in the neighbourhood showed that a great inlier of Upper Ordovician rocks of many square miles in extent occurred along the valley of the Wellington River, right in the heart of a large Upper Palæozoic area.

It is intended at a later date to give further particulars regarding this occurrence. In the meantime the specimens have been handed over to Mr. T. S. Hall, M.A., for working out.

A survey party was camped at the junction of Dolodrook River with the Wellington; they were engaged in surveying the land along the river, and at an early date 1,280-acre blocks will be available for grazing. We profited by the bush hospitality of the surveyors, for they offered us the use of many camp conveniences which did not enter into our list. The camp oven, extra billies, and bark table were specially acceptable. The evening's fishing did not provide very exciting sport, but several of the men at the camp were more successful, and generously handed over their haul to us.

Friday, 6th January.—This day was spent making a trip on foot across the ranges to the south-east to an exceptionally interesting belt of serpentine rocks which crosses a part of Dolodrook River in a south-easterly direction. The area on the left bank of the river at this position is locally known as "Little Plain," and is at present being prospected by Mr. J. Macfarlane for a Chromite deposit. Several shallow holes have been opened up and irregular blocks of Chromite up to several hundredweight in size have been obtained in the decomposed Serpentine matrix. A sample of Chromite from Mount Wellington district which was analyzed by the late Mr. J. Cosmo Newbery many years ago probably came from this spot. Mr. R. A. F. Murray, in his reports, stated that Serpentine was said to exist in the neighbourhood of Mount Wellington, but he had not seen any occurrence *in situ*.

This formation is one of great geological interest, and is of Palæozoic age—perhaps Ordovician, or older. The rocks are highly foliated in places, and show signs of great pressure,

movement, and torsion. The prevailing strike of the plane of foliation is from north-west to south-east, and is with that of the Ordovician rocks. Close to the north-west end of the Serpentine belt, at the head of Black Soil Gully, were found obscure Graptolites, associated with small Brachiopods; the latter were kindly identified by Mr. F. Chapman, A.L.S., National Museum, as *Siphonotreta* cf. *discoidalis*, Chap. A particularly interesting conglomerate occurs in the Serpentine, but the discussion of its peculiarities must be postponed for the present.

At Monument Gap, at the head of Black Soil Gully, a magnificent view was obtained. To the east lay Wellington, with its precipitous sides of porphyry; to the north Tamboritha, even higher, but less rugged. The long, deep valley of the main Wellington River wound down among the shadowy depths from the north-east. Between this valley and Mount Wellington the horizon was bounded by the edge of a great plateau over 5,000 feet in height. Long, steep parallel spurs, with dark valleys intervening, led up to the top of the table-land. Reid pointed out the spur by which Riggall's track climbs, from the junction of Barrier Creek with the Wellington River to the top of the mountain. In a distance of about eight miles an ascent of over 3,000 feet is made. Such a scene would rejoice the eye of an artist as well as that of a student of physical geography. On the Monument Gap several aboriginal tomahawks were found. These had been made from waterworn stones, and were flaked only on one side.

Saturday, 7th January.—On Saturday morning a start was made for the top of the mountain. After a short ride up the valley of the Wellington, where some good sections of anticlinal folds in the Ordovician rocks were observed, the junction of Barrier Creek with the Wellington was reached. The main stream, which turns to the north-east, was left, and a long, steep spur was ascended to the east, with Barrier Creek on the right. The climb was very arduous for the horses, and in places so steep that it was often advisable to hang on to the horse's neck or mane to avoid slipping off behind. About half-way up the spur the first view of the lake was obtained by turning off from the ridge of the spur thirty or forty yards to the right.

The view was a charming one. Standing on the edge of a precipitous face of the spur the little lake was seen in a deep depression fully a thousand feet below. A lower transverse wooded spur of loose rocks lay between us and the lake, and hid from view the western and widest end of the lake. Part of this spur forms the barrier which has formed the lake. On both sides the mountain slopes rose steeply from the water's edge. On the right, the north-western part of Wellington, 2,000 feet above the lake, towered to the sky, with two imposing bluffs of jointed porphyry. The timbered slope below showed long scars where

huge blocks of rock had cleared a path in the headlong descent from the cliffs above. A lower but precipitous face of rocks overlooked the east end of the lake, where the deep wooded gully of Nigothoruk Creek entered from behind a steep spur on the left. A bouldery delta marked the entrance of the creek, and showed that the filling up of the lake has already advanced to a considerable extent at the top end. At the north-west end of the lake another tributary creek enters, and it is proposed to call this Snowden's Creek, in honour of the discoverer of the lake.

Unfortunately, the extreme difficulty of taking horses down to the lake, and the fact that there was no feed for the horses there, prevented a camp being chosen on the lake. It was therefore necessary to climb another 1,000 feet to the top of the mountain, where good feed was expected. This part of the journey was particularly steep and rocky, first over angular blocks of apparently altered sedimentary rocks, and finally over loose rocks of many varieties of porphyry. The upper part of Snowden's Creek was crossed twice, and at the last crossing a snake, locally known as the Snow Snake, was killed. It was about 3 feet long, bluish-black on the back, light underneath, and with a well-defined ring round the neck. Close to the top of the mountain a damp peaty and mossy slope, with springs, was crossed. This was gay with numerous sub-alpine flowers, and was a refreshing sight compared with the bare rocky places passed over lower down. At the top of the mountain a comfortable camping spot was chosen, close to a log hut erected by Mr. Riggall, and used when mustering cattle on the mountain. It was soon found that we were not the only inhabitants on this extensive table-land. Two cattle drovers from the plains were camped here, having come up the Avon Valley with cattle to graze them on the snow plains. Usually there is good summer feed on these elevated tracts, but this season is the driest remembered in the district. With the additional cattle to be brought up a few days after we left, it was estimated that there would be over a thousand head of cattle depasturing there. This will perhaps give some idea of the extent of country on the top of the mountain.

Mt. Wellington forms the southern bluff of a range which extends as a somewhat broken plateau for 7 miles to the north-east, where it culminates in the Trig. Station. From here a lower saddle turns easterly to Castle Hill. Mt. Wellington itself forms a flat-topped mass of quartz porphyry of considerable extent, with shallow, gently sloping valleys radiating to the edge of the plateau. A deep gap formed by the approaching head waters of Nigothoruk Creek on the west, and a tributary of the Avon on the east, divides the main mountain mass on the south from the northerly extension of the range. This latter portion consists of two parallel ridges running in a north-easterly direction: the westerly one consists of porphyry; and the easterly, of indurated

Diagrammatic section across Mt Wellington Range from Upper Macallister River to Aron Valley to show apparent relation of Sea mounts and igneous rocks



SKETCH MAP SHOWING LAKE KARORO AND BARRIER
Scale 1 mile to 1 inch

red shales and sandstones of the Avon series, dipping south-easterly at 40° to 30° . A lower transverse ridge joins the two parallel ridges at the north-east end, and forms a divide between the Moroka and the waters flowing into the Wellington.

Great quantities of snow during the winter drift into the great depression lying between the Trigonometrical Station and Mt. Wellington, and from the Sale plains it can be seen to lie on the outer slopes for nearly six months, only disappearing late in spring.

Further evidence of the weight of snow is shown in parts of the sheltered valley, where the Snow Gums have been so bent down and broken that it was found very difficult to get through the tangle of fallen and broken scrub. Numerous springs of beautiful water soak out in mossy slopes on the mountain top, and here a great variety of flowers were blooming. Some of the more important species are given in an appendix, being kindly identified by Mr. Weindorfer.

Sunday, 8th January.—Early on Sunday morning, accompanied by the two stockmen, Grogan and Horstman, we made a start on foot for the lake. Riggall's track down the spur was retraced, and after crossing the upper part of Snowden's Creek, the side of the spur on the lower side of that valley was followed. Though the travelling here was much hindered by fallen trees and scrub, a very fair track could be made with not much difficulty. At present, to take horses down to the lake would be an undertaking that anyone valuing his horses would absolutely refuse to try.

The burrows of the Wombat and the dancing-heaps of Lyre-birds were noted in this unfrequented valley. After some considerable amount of scrambling over logs and through scrub, glimpses of the clear waters of the lake were obtained through occasional breaks in the forest foliage, and at last from a more open part of the descending rocky spur the waters of Lake Tali-Karng were seen lying peacefully between the steep mountain slopes. Just before descending to the shingly beach at the west end, Reid pointed out a dead Stringybark tree, which many years ago had been barked by the aborigines, probably for a canoe. The tree had a well defined curve, and showed clearly the marks of a blunt tool used for detaching the bark. The stripping extended to a height of about 15 feet, and the tree had the appearance of having been dead for many years.

The barrier end of the lake was reached, where Howitt and party camped 14 years before. Rough measurements of the lake were made, and the area calculated at approximately $23\frac{1}{2}$ acres, which closely corresponds with Howitt's estimation. The shores of the lake on either side are marked by steep slopes of loose rock, bare of vegetation to a height of about 20 feet above the water, but strewn with fallen trees, long dead, having their heads deeply submerged in the water. The trees of the mountain

slopes descend on either side to this high-water mark, except in places where they have been swept away by the fall of rocks from above. Shoals of little trout, *Galaxias nigrothoruk*, Lucas, sported along the edge of the lake, and with an extremely small hook one of the party amused himself by pulling out numbers of these unwary customers. Larger fish, over six inches in length, were seen in the deeper waters, but none were secured. Five ducks were swimming on the lake, but the absence of a reedy margin probably accounts for the rarity of water birds. A swim in the lake was much enjoyed, and the bathers were agreeably surprised by the mild temperature of the water. The lower side of the barrier was closely examined, and was aptly described by Howitt's party, "The Valley of Destruction." The tumultuous tumble of huge angular rocks which descends at a steep angle for about a mile down the valley makes the task of exploration in this direction particularly difficult. Its characteristics have already been well described in a previous paper. The noteworthy features are that there is no evidence of the waters of the lake ever having flowed over the top, and further, the barrier extends as a ridge down the valley, and is lowest along the margins of the mountain slopes on either side. This structure is not due to the carving or transporting action of running water, but is an original feature in the rocky spur. Streams of water issue from the bottom of the barrier, over 500 feet below the level of the lake.

While two of the party were investigating the mysteries of this remarkable accumulation of rock *débris*, the others had constructed a raft with dry wattle trunks, firmly laced together with rope. On to this novel craft two of the party embarked, after first disrobing most of their garments. They were towed by their companions round the shore of the lake towards the east end and then by means of a rough paddle, the raft was laboriously headed for the centre of the lake, and soundings were proceeded with. Advantage was taken of the easterly breeze blowing down the lake to aid the somewhat tedious journey to the barrier. The greatest depth found was along the middle of the lake, amounting to 150 feet. Several strong white fishing lines were used for sounding, with specially heavy lead sinkers on the end. About 30 yards from the barrier end the depth was only 17 feet, indicating a shelving bottom at that end. The entrance of Snowden's Creek at the north-west end of the lake probably partly accounts for the shallower depth of the lake at that end. The general features of the lake, and the soundings taken, point to the lake occupying a deep V-shaped mountain valley, which has been dammed by a huge barrier of rocks. The origin of the barrier, and consequently that of the lake itself, formed the subject of an interesting discussion by Messrs. Dendy, Lucas, and Howitt. The respective opinions held are given in the paper by those gentlemen in the *Victorian Naturalist*, vol. viii., p. 34, 1891, and

also in a paper by Dr. A. W. Howitt in the Mining Department Report, Victoria, September, 1891, p. 28. Dr. Dendy favoured the landslip theory. Dr. Howitt regarded the origin as due either to landslip or ice action. The latter cause was favoured by him. Mr. Lucas could not accept either the landslip or the moraine theory, but is not clear in his description as to how he explains the formation of the lake. The main objections to the landslip theory appear to have been the following:—The source of the slip; the higher central portion of the barrier; and the unfavourable geological structure of the surrounding rocks.

Dr. Dendy's explanation that a high cliff, similar to that of Wellington, once existed on the opposite side of the valley, and to the north-west of Wellington, appears to fit the case. On ascending from the lake the party climbed the rocky spur leading up from the barrier to the north. It lies in the direction of the rocky ridge of the barrier below, and its surface is strewn with huge rocks of similar nature to the prevailing ones of the barrier. In places, particularly at the top, the characteristic hummocky form of a land-slipped surface is well shown. The ridge-like form of the barrier rocks appears to be readily accounted for by the fact that the old valley at the lower end of the lake takes a sharp bend almost at right angles to the east and west direction at the lake, and thus turns to the south, which is in the direction of the rocky spur. It appears evident that a gigantic run of rocks from a falling cliff has shot down the centre of this southerly trend of the valley, forming a steep ridge longitudinally along this part. A portion of the easterly fringe of the rock *débris* has barred the old valley at the bend, where it was originally very narrow. Though very rocky, both the barrier and the mountain spur from whence the rock-fall appears to come are now overgrown with vegetation of considerable size, so that any scar which may have existed is now completely masked. A slide such as this appears to have been would materially differ from the ordinary type, such as the one of the Dandenong Ranges, 1891, where a large mass of the surface soil and loose rocks, thoroughly saturated with water, slipped off a steep face of solid igneous rock. The Lake Karng slide appears to have been more of the nature of a rocky cliff fall, of the type well known in the Rocky Mountains of Colorado. These slides have been explained as being probably due to earthquakes.

The mountains of Victoria are at present particularly free from such disturbances, but the large dimensions of this tumultuous accumulation of rocks suggests some sudden and gigantic shock to dislodge such a mass of material. The igneous rocks of the Wellington mass are particularly well jointed, the vertical set being especially well developed, hence precipitous bluffs of tottering rock form a feature of the mountain face.

After a particularly hard day's exertion, examining the lake

and its surroundings, the prospect of a 2,000-foot climb back to camp over rough rocks and fallen trees, laden with photographic and geological impedimenta, was not encouraging, but nevertheless it had to be faced, and two hours' resolute climbing brought us back to the camp.

The next few days were spent examining and collecting on the top of the mountain, where many interesting features for the botanist, geologist, geographer, and lover of scenery are to be found in abundance. The exhilarating mountain air gives a stimulus to general activity, and what would be a labour on the plains is thoroughly enjoyed on the mountain top. We were quite surprised when we descended to the low country to hear of the intense heat wave that had passed over the State. On Monday the sun temperature did not reach higher than 82° F., and on looking up the shade readings for Melbourne on that day the highest temperature recorded was 104½° F.

On Wednesday, 11th January, we returned to the old camp alongside of the survey party on the Wellington River. Some exceptionally good fishing was obtained, and some surprisingly large blackfish were landed. Along the river the Gippsland Water Lizard, *Physignathus howitii*, is particularly common, and is seen basking on the logs or splashing into the water and shooting to the opposite bank when disturbed. It is locally reported to be a great eater of blackfish.

After another day in this vicinity, a start was again made for the return to civilization, and two days' travelling over our old route brought us back to Glenmaggie on Saturday evening, but too late to catch the Melbourne train at Heyfield. It was therefore necessary to spend the Sunday at Glenmaggie, where an easy ramble along the Macallister River was indulged in.

By 1.30 p.m., Monday, 16th January, we were back in Melbourne.

LIST OF BOTANICAL SPECIMENS FROM THE TOP OF MOUNT WELLINGTON, kindly identified by Mr. G. Weindorfer.

Craspedia richea (?), Cassini	Candollea serrulata, Labill.
Helichrysum bacchaoides, F. v. M.	Stackhousia linarifolia, Cunn.
Epacris mucronulata, R. Br.	Gentiana saxosa, Forster
Epacris heteronema, Labill.	Goodenia hederacea, Smith
Aster celmisia, F. v. M.	Euphrasia brownii, F. v. M.
A. myrsinoides, Labill.	Oxylobium alpestre, F. v. M.
Veronica derwentia, Littlejohn	Westringia senifolia, F. v. M.
V. perfoliata, R. Br.	Arthropodium paniculatum, R. Br.
Pimelia ligustrina, Labill.	Styphelia montana, F. v. M.
P. alpina, F. v. M.	Prostanthera cuneata, Benth.
Comesperma retusum, Labill.	Kunzea muelleri, Benth.
Bæckeia gunniana, Schauer	Grevillea miqueliana, F. v. M.

THE FRESH-WATER ALGÆ OF VICTORIA.

PART II.

BY A. D. HARDY.

(Read before the Field Naturalists' Club of Victoria, 10th April, 1905.)

Family—DESMIDIACEÆ.

SINCE reading the introductory paper on the fresh-water Algæ of Victoria before this Club in August last (*Vict. Nat.*, vol. xxi., p. 81), I have received two new works from abroad. These are "A Revision of the Classification of the Green Algæ," by Messrs. Blackman and Tansley, M.'sA., 1903, and "A Treatise on the British Fresh-water Algæ," by Professor G. S. West, M.A., A.R.C.S., F.L.S., &c. The former treats the Chlorophyceæ as a heterogeneous class which is now broken up, the term "Chlorophyceæ" being therefore abandoned. The scheme of classification embraces four divisions, viz. :—Class I.—Isokontæ; Class II.—Stephanokontæ; Class III.—Akontæ; and Class IV.—Heterokontæ. The Akontæ is synonymous with the Conjugatæ of other authors, and comprises two series — viz., Desmidiæles (or Desmidioidæ) and Zygnemales (or Zygnemoideæ). Further subdivision into families, sub-families, and 31 genera follows. In the second work mentioned, West divides his Algæ (marine and fresh-water) into six classes, retaining the term Chlorophyceæ for the third class, as comprising Algæ containing "only the green colouring-matter known as chlorophyll; very largely fresh-water plants. The stored product of assimilation is in almost all cases starch."

As Professor West has most kindly undertaken, at my request, to identify those Victorian forms which appear to me to vary so far from the type as to be doubtful, and also to name and describe new species, it is desirable that his nomenclature and classification be adhered to in this and subsequent papers bearing on the subject.

In addition to the foregoing, "A Monograph of the British Desmidiaceæ" is being issued by the Ray Society to its members. Of this the first volume has reached me, further parts being still in the press.

Hitherto Cooke's "British Desmids" has been the standard English authority, and many of the Desmids included in the short list which I submit this evening have been identified by means of that work, though reference has also been made to those records of Victorian Desmids mentioned in an historical sketch included herewith, also to the works of Maskell and Spencer in New Zealand, and to Bailey's "Contributions to the Queensland Flora," which includes in the several Botany Bulletins descriptions of Desmids prepared by Professors Moebius, Askenasy, Nordstedt, Schmidle, and Borge.

Before proceeding further, it may be advantageous to give

an up-to-date description of the plants of this family, which is as follows:—Desmids are unicellular fresh-water plants of microscopic size. They are, in most genera, constricted in the middle to form two more or less conspicuous and equal semi-cells, and multiply by simple vegetative division, and also by means of zygospores, the former asexual and the latter a sexual reproduction of rather low grade. They are, speaking generally, of a uniform grass-green colour, owing to the presence of chlorophyll, contained in bodies known as chloroplasts, which may be one or more in each semi-cell, clinging to the walls (parietal) or centrally situated (axillary). In the chloroplasts are imbedded small colourless organs called pyrenoids, which are similar in most respects to those seen in the common "Silk-weed," *Spirogyra*.

The great diversity of form, the symmetry, and the beautiful surface markings and other ornamentation of Desmids make them pleasing objects for even casual microscopists, while these characters, taken with others, such as the movement of the plant as a whole and the movement of the contained protoplasm, give to the Desmids an inestimable value in the mind of the botanical student.

The constriction referred to is distinct in most genera, but less prominent in some, and quite absent in a few. The genus *Micrasterias* shows it at its maximum, the isthmus joining the inflated portions of the semi-cells being only nominal. The least constriction is seen in the sub-cylindrical genera, such as *Penium*, *Docidium*, &c. It is absent from genera such as the crescent-shaped *Closterium*, the cylindrical *Gonatozygon*, and others, while in certain species of *Staurostrum* a peculiar terminal inflation of each semi-cell and abruptly reduced inner part give the appearance of a constriction like a circumcised trench of rectangular section, the whole plant thus resembling approximately a prickly bulbed dumb-bell, as may be seen in one of the microscopic exhibits. In the plants which have no constriction there is a colourless region in the centre of the cell which divides the colouring matter into two parts, and in this locality the nucleus is situated.

In tracing the descent of Desmids from ancestral filamentous algæ of the *Conjugatæ*, West and West draw attention to the genus *Penium* as showing the first sign of constriction. Some species of that genus have none at all. A further indication of the connection between the free unicellular Desmids and their filamentous ancestors may be seen this evening in a number of exhibits, which partly illustrate West and West's scheme of phylogeny. The genera of which specimens are shown are *Spondylosium*, showing at least four long cylindrical cells, which have the appearance, at first sight, of a portion of a multicellular

filamentous alga with axile chloroplasts, and *Hyalotheca* and *Desmidium* in long bands, containing scores of small compact cells something like species of *Cosmarium* when detached; and, again, see the normally independent *Cosmarium*, which has grown by vegetative cell division until one plant has given rise to four which remain attached by their apices to form a moniliform band. These bands are all more or less fragile, in *Spondylosium* particularly so, and break up into single cells, though, as a rule, the longer the cells the more readily is dissociation affected by mechanical and other means.

A series of microscopic exhibits show various stages in the asexual multiplication. For this purpose I have chosen a plant of the genus *Micrasterias*, and another of the genus *Cosmarium*. These show first the matured plant and various stages in the separation of the semi-cells, to allow of the interposition of new matter, which at first is almost colourless. Gradually this new matter is seen to pinch in the middle, and the halves between this pinched-in median line and the old semi-cells to assume a shape somewhat approaching the latter in appearance, and finally to acquire that shape exactly. The two new semi-cells thus formed between the old ones having, in growing, thrust the latter apart to the extent of a *Desmid*'s length, we have now two plants, the apices of their newly-formed semi-cells touching, and the older semi-cells outermost. Another exhibit shows two such newly-developed plants just after separation. The chief difference between the semi-cells of a new plant is that the ornamentation of the cell wall is not fully matured at time of separation, e.g., the exhibited *Closterium malinvernianum*, De Not, has one half of the cell wall distinctly striated, while the other is smooth. The striations on the old semi-cell wall distinguish this species from *Closterium ehrenbergii*, Menegh., also exhibited, and from the same lagoon at Heidelberg. It is an instance of the importance of the cell wall ornamentation, indispensable in many cases when diagnosing.

The multiplication of *Desmids* by means of zygospores has been known to science for many years, but the details of the process are still under discussion. I am exhibiting a plant, *Tetramorus brébissonii*, Menegh., in several conditions, viz. :—(a) the simple individual; (b) a newly formed smooth-walled spherical zygospore, together with the empty cell-cases, which have parted at the suture which marked the middle of the plant in the constricted area, and which, in their empty state, permit the cell wall ornamentation to be clearly seen; (c) a group of eight new plants, which have been freed from the product of a single zygospore. This *Desmid* is from a swamp near Brighton.

The movements of *Desmids* are of three kinds, though all three may not be seen in all genera. First there is the movement

or locomotion of the whole plant ; secondly we may see in large species of *Closterium*, *Pleurotænium*, &c., the circulation or rotation of the protoplasm ; this, however, is often obscured by the parietal chloroplasts. Thirdly there may be seen, in species of at least the two genera just mentioned, apical vacuoles, containing colourless cell fluid, and in the fluid exceedingly small particles of matter in violent agitation. These particles are known as "dancing granules," and are described by Professor West to be rhomboidal crystals of gypsum. They usually cluster near the centre of the spherical vacuole, but I have noted in experiments with *Closterium ehrenbergii* and *Pleurotænium ehrenbergii* that in whatever way the plant may be held there is a tendency on the part of the granules to sink earthwards, thus indicating geotropism, although this was less noticeable when stimuli were administered.

In a *Pleurotænium* of above-named species, which I am exhibiting, may be seen other than terminal vacuoles. These will be seen to contain dense masses of the granules, so like a compact swarm of bees in movement that the term "swarming granules" is often applied. I take this to be an unhealthy sign, having frequently noticed it as preceding decomposition of the cell contents. It is not uncommon, but in the present case has been produced under abnormal conditions—viz., change of environment. The Desmids were taken from a large lagoon, and have been kept some weeks in a small supply of water which daily lessened by evaporation.

The locomotion of Desmids has been much discussed lately. West and West describe the results of their own and Stahl's observations, which, in the case of a plant such as *Closterium*, were as follows :—The plant, from a prone position, slowly raised itself on one end, the free end passing through 180° of arc, until the plant again lay prone, but in a position its own length nearer the objective point of its journey, and with ends reversed. The process was repeated, and so the plant moved in steps equal to its own length. "This," the authors remark, "is an exhibition of periodical polarity, brought about by an alternation of positive and negative heliotropism or geotropism, or a combination of both." My own experiments showed this reversal of ends, in Desmid-length steps towards the light, to occupy about half an hour at least, and the time was much lengthened if any sort of obstruction interfered. In the case of many longer periods, several abortive attempts to turn over were made, the Desmid sinking back after each to the old position, but I have observed, on more than one occasion, that *Closterium malinvernianum* seemed to prefer progress by attachment of one and the other end alternately, but by keeping on its flat side, and moving by swinging round in horizontal plane, while an obstruction to this method caused it to

rise. Whether in horizontal swing or in rising and sinking to and from the vertical, the motion was always spasmodic and jerky, and is, I think, due to a tremendous tensile strain on temporary organs of attachment, which, probably because of a little flocculent matter, which more often than not adhered to the apices, I have not been able to make out.

This is explained if the most recent acceptable description of the character of the cell wall is correct. The wall consists of an inner coat of cellulose, in which innumerable pores give egress to protrusions of the cell protoplasm; these form a mucilaginous outer coat to the Desmid, and it is supposed that by means of the protruded protoplasmic threads the plant can attach itself to foreign objects. In a glass tube, which at the moment of writing I have under observation, there are scores of the crescent-shaped *Closterium* referred to above. These have within forty-eight hours travelled from one side of the one-inch tube to the other, and are now motionless near to the glass side, all attached by one apex, in an almost erect position, and with their edges turned to the light, which attracts them through a slit in a cylinder covering the tube. Several *Pleurotæniums* cling meanwhile to the side of the glass tube, as though for them the light was a more powerful attraction, most of the *Closteriums* having stopped a little short, attached to *débris* on the floor of the tube.

(To be continued.)

FIGHTS BETWEEN TWO SPECIES OF ANTS.

BY J. A. HILL.

(Read before Field Naturalists' Club of Victoria, 8th May, 1905.)

DURING my long residence at Kewell, in the Wimmera District, I have frequently had the opportunity of witnessing some of the fierce battles which take place between two species of ants, and it has been suggested to me that a few notes on the subject would be of interest, and probably induce some of our country members to supplement them.

One of the commonest species of ants in this district is that known locally as the Soldier Ant, *Formica purpurea*, a species about $\frac{3}{8}$ -inch long, which constructs large subterranean nests, often measuring on the surface from 12 to 15 feet in diameter. These nests contain thousands of inhabitants, and woe betide the animal that may unconsciously take its stand upon or near their abode. I have frequently seen small snakes, slow worms (*Typhlops*), and large insects fall a prey to their voracious habits. That these great colonies should be entirely annihilated by a small black species, only about one-third their size, seems almost incredible, but such is the case.

The fierce battles which frequently take place between these two species often last many months, but in the end the small species are always victorious. The fights generally start several yards from the nest, and it is very interesting to watch the larger ants marching out in the early morning to the battle-field. They go in bands of from 12 to 20, and their movements seem to indicate fear, as they very cautiously approach the enemy. The first little ant met with is immediately nipped in two by the strong mandibles of the larger species, but in a moment a second little one has fastened on to one of its legs. While he is vainly endeavouring to free himself of his little foe, others attack him on all sides, and seize hold of the nearest leg, until by force of numbers he is completely conquered. Others may approach to render assistance to their comrade, only to share his fate in the same manner. It is almost amusing to see the larger ants dodging from side to side, and lifting one leg and then another, trying to evade their energetic little tormentors. The fight continues in this way, hour after hour, until hundreds of dead and dying ants of both species are to be seen strewn over the battle-field. The smaller species are killed in hundreds, one bite from the powerful jaws of their opponents being generally sufficient to finish them off. They seem, however, to take it as a matter of course, and as reinforcements from the numerous nests close by are continually replacing those killed or disabled, they are probably not missed.

Early in the following morning the larger species gather in their dead, carrying them off to their nest. The smaller species does the same, though later on, as the day gets warmer. The cold and exposure at night seems to kill many of the ants which have been too disabled to reach their nests.

It is strange to see one section of the colony in deadly conflict with their foes, and the others working away as usual, as though nothing was the matter.

After completely annihilating their enemies, the smaller species take possession and make use of their nest.

I have not been able to find out what is really the cause of these battles, but I am of opinion that it is not only for the possession of the nest. I think it more probable that their chief object is to secure sole possession of their feeding-grounds. Perhaps some other observers may be able to throw some light on the subject.

ANOTHER GIANT TREE.—The *Leader* of 27th May last illustrates another of our giant eucalypts, said to be the largest in Victoria. This is situated at Mount Horsfall, on the southern boundary of the Yarra watershed. Its circumference is given as 78 feet at six feet from the ground; its height is not stated.

T H E

Field Naturalists' Club of Victoria.

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The Victorian Naturalist.

VOL. XXII.—No. 3. JULY 6, 1905.

No. 259.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE twenty-fifth annual meeting of the Club was held in the Royal Society's Hall on Monday evening, 12th June, 1905.

Mr. F. Wisewould, one of the vice-presidents, occupied the chair, in the unavoidable absence of the president, through ill-health, and about 65 members and visitors were present.

REPORTS.

A report of the junior excursion to the Entomological Branch, Department of Agriculture, held on Saturday, 3rd June, was furnished by the leader, Mr. C. French, jun., who reported that, doubtless owing to the inclement weather, only some 35 members attended. The afternoon was spent in viewing the collections of economic birds, insects, &c. Great interest was taken in the life-histories of many of the insects, which were explained by the leader. During the last few months, many life-histories of the commoner Victorian insects have been added to the collection, which is now considered by American and European entomologists who have viewed it to be the best of its kind in Australia.

A report of the visit to the National Museum on Saturday, 10th June, was given by the leader, Mr. J. A. Kershaw, F.E.S., Curator of the Museum, who reported a good attendance of members. Before examining the collections opportunity was taken to point out the progress of the new buildings and the proposed arrangement of portions of the collections in the new halls. The leader then gave a brief outline of the classification adopted in the Museum, and a detailed examination was made of the various cases of animals and birds in their natural sequence. However, the afternoon proved too short to allow of proper time being devoted to the reptiles and fishes, and the inspection of the invertebrate collections had to be abandoned altogether.

A report of the meeting for juniors held at the Biological School University on Saturday afternoon, 10th June, was given by Mr. F. G. A. Barnard, who stated that the lecture by Professor W. Baldwin Spencer, C.M.G., entitled "Arms and Legs," was attentively listened to by nearly 60 junior members. The lecturer, by means of diagrams and specimens, pointed out in a clear and simple manner the correspondence of structure in the limbs of different groups of animals and birds, and made his

remarks so interesting that general regret was expressed at the briefness of the lecture. Ample opportunity was given after the lecture to the juniors of examining the specimens and asking further questions about difficulties which appeared to present themselves.

The hon. librarian reported the receipt of the following donations to the library:—"Geological Survey of Victoria," bulletins 15 and 16, from the Department of Mines, Melbourne; *The Emu*, vol. iv., part 4, April, 1905, from the Australian Ornithologists Union; *Agricultural Gazette of New South Wales*, April, May, and June, 1905, from the Secretary for Mines and Agriculture, Sydney; "Forest Flora of New South Wales," vol. ii., part 6, by J. H. Maiden, F.L.S., Government Botanist, from the author; "Proceedings of Linnean Society of New South Wales, vol. xxix., part 4, from the Society; "Reprints of Articles in the *Agricultural Gazette of New South Wales* and Proceedings Linnean Society of New South Wales," by W. W. Froggatt, from the author; *Nature Notes*, April and May, 1905, from the Selborne Society, London; and *Nature Study*, March and April, 1905, from the publisher.

ELECTIONS.

On a ballot being taken, Master W. Reed was elected an associate; Misses B. Ruppell, D. Debney, V. Kerr, E. Fulton, and Masters W. Spencer, D. Seaton, F. Watson, W. Winn, W. Farr, W. Shewlow, L. Henderson, M. O'Dowd, and R. O'Dowd were elected as junior members of the Club.

ANNUAL REPORT.

The hon. secretary, Mr. J. F. Haase, then read the twenty-fifth annual report for 1904-5, 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-fifth annual report, detailing the work of the Club for the year ending 30th April, 1905.

"The membership of the Club continues to show a gratifying increase. During the year 135 members have been elected, of whom 36 were ordinary and country, 10 associates, and 89 junior members, now making a grand total of 325 members. During the same period we have lost two by death and five by resignations. The total membership of the Club now comprises 9 honorary, 2 life, 168 ordinary, 36 country, 16 associates, and 94 juniors.

"It is with great regret that we have to record the loss by death of Mr. J. G. Luehmann, F.L.S., late Government Botanist and Curator of the National Herbarium, to the relatives of whom

the sympathetic condolences of the Club have been sent. Mr. Luehmann was one of the original members of the Club, twice filling the position of vice-president, and also rendered service as a member of the committee. He was a contributor of many valuable papers at our meetings, while his extensive knowledge, and his willingness to assist others in the study he loved so well, endeared him to his fellow-members.

"Your committee also regret the death of Mr. H. W. Whitney, of Williamstown, who was an enthusiastic ornithologist and a frequent attendant at our meetings.

"Thirty-one papers were read at the monthly meetings, the list showing that 12 related to zoology, 7 to botany, 3 to geology, 3 to general subjects, and 6 to trips and excursions.

"The authors were Miss Freda Bage, B.Sc., Messrs. H. H. Baker, C. L. Barrett, F. Chapman, F.R.M.S., A.L.S., N. J. Caire, J. H. Gatliff, J. C. Goudie, E. E. Green, F.E.S., T. S. Hall, M.A.; A. D. Hardy, C. Hedley, F.L.S., J. T. Jutson, G. A. Keartland, A. E. Kitson, F.G.S., J. H. Maiden, F.L.S., A. H. Mattingley, E. B. Nicholls, F. M. Reader, D. Le Souëf, C.M.Z.S., O. A. Sayce, H. T. Tisdall, E. O. Thiele, R. E. Turner, Rev. W. W. Watts, and G. A. Waterhouse, B.Sc., F.E.S.

"The thanks of the Club are due to the several contributors who have thus placed the results of their observations and studies before their fellow-members.

"The attendance at the monthly meetings has been well sustained, and a lively interest has been shown in all the proceedings. The average attendance was 75, being about the same as the previous year.

"In addition to the ordinary meetings, three additional meetings were held for practical work, two of which, conducted by Mr. H. T. Tisdall, were devoted to botany, the flower and reproductive organs of the Broad Bean being the subject used for illustration. The other evening was presided over by Mr. J. Shephard, who took as his subject 'The Examination of Rotifers.'

"These practical evenings were held in order to encourage research, and give the members an opportunity of doing some practical work under the guidance of a more experienced worker, but it is to be regretted that the attendance was not so satisfactory as was anticipated, and did not warrant their continuance. Our thanks are due to the two members who, at considerable inconvenience, so generously placed their services at the disposal of the Club.

"An excellent programme of excursions was again provided, and, judging by the reports furnished to the monthly meetings, good and useful work has been accomplished. The attendance of members and friends has been good, and members are again

reminded of the many advantages to be derived by taking part in the excursions with their more experienced fellow-members.

"The list of extended trips included a three-days' outing at Warburton, a ten-days' trip to Beech Forest, Otway Ranges, during the Christmas and New Year holidays, and a three-days' excursion to Belgrave (Dandenong Ranges) in January last. These excursions were well attended, whilst the considerable amount of material collected testifies to the energy and enthusiasm displayed on the part of those who took part in them.

"The twenty-first volume of the Club's journal has been completed, and the thanks of the Club are again due to Mr. F. G. A. Barnard, who continues to so successfully fill the editorial chair.

"Owing to the continued increase of members, and that many back numbers of the *Victorian Naturalist* are almost out of print, your committee, in order to obviate any such contingency in the future, decided to publish a further 50 copies. This will allow ample for sale and exchange.

"During the current year the value of the journal has been further enhanced by the insertion of a number of valuable and interesting illustrations.

"In view of the fact that a growing interest in Natural History is now being manifested in the schools, and a desire on the part of both teachers and scholars to acquire further knowledge of our native fauna and flora, it was decided at a special meeting convened for the purpose to alter clause (a) of rule 4 of the Club's rules. This now provides for the admission of associates at an annual subscription of 5s., and junior members at the reduced rate of 1s. per annum.

"The movement has been a decided success, as will be seen by the large numbers enrolled since its inception. A special programme of monthly excursions to suitable spots within easy access of the city has been provided, and the reports furnished by the several leaders show that these outings should be productive of much good. The excursions have been largely attended, the average attendance being about 60, while in one case over 100 put in an appearance. Excellent discipline and good conduct has been maintained during all the rambles.

"The question of the permanent reservation of Wilson's Promontory as a National Park has engaged the earnest attention of your committee. In September last it was brought under their notice that the Minister of Lands had decided to subdivide a considerable portion of the Promontory into 1,000-acre blocks. The matter was discussed at the following ordinary monthly meeting, when three members were appointed to act as the Club's representatives in any action that was deemed necessary for its

prevention. During the next few days a deputation waited upon the Minister, at which representatives of the Club, the Royal Society of Victoria, Ornithologists' Union, the Zoological and Acclimatisation Society, the Royal Geographical Society, the Board of Directors of the Australian Natives' Association, and many influential gentlemen attended.

"The deputation was ably supported by Professor W. Baldwin Spencer, and we are pleased to be able to record that their efforts were entirely successful, and the proposed subdivision cancelled.

"In order to arouse further interest in the matter a public meeting was held in the Athenæum Hall. This meeting was a decided success. Resolutions affirming the desirability of retaining the Promontory as a permanent National Park, and having it vested in trustees, were unanimously carried.

"Some time after a large deputation, comprising, in addition to the various societies mentioned, the Victorian Anglers' Association, the Trustees of the Public Library and the Exhibition Building, again waited upon the Minister, but failed to obtain a definite promise to their request.

"Details of the action taken were given in the *Naturalist* for January last, and with this report will be issued a map of the Promontory, showing the portion since permanently reserved. This, though amounting to about 75,000 acres, we regret to say, does not embrace the whole area, as a strip half a mile in depth from the coast-line has been only temporarily reserved, which to a certain extent nullifies the advantages of the permanent reservation of the interior portion.

"With regard to the request to vest the park in trustees for its management, no action by the Government has yet been indicated. It is, however, gratifying to feel that the watchfulness of the Club has been of some benefit to the public at large.

"A report having been received regarding the wanton destruction of Lyre-birds at Bright and the surrounding districts, an effort was made through the daily press to arouse public feeling in the matter. Unfortunately little good appears to have been achieved, and it is feared that the slaughter continues.

"Further efforts were made during the year in several parts of the State to have the opening date for Quail-shooting altered to a month earlier, and the matter was brought forward at one of our monthly meetings, when, after considerable discussion, it was decided that the views of the Club, protesting against any alteration being made, be communicated to the Minister of Public Works and the daily press. Much public interest was aroused, and at the request of Mr. C. W. M'Lean, Engineer of Ports and Harbours, who has the administration of the *Game Act*, the Minister expressed his willingness to receive a deputation from

those opposed to any change. The deputation, which was a large one, comprised representatives from your Club, Ornithologists' Union, Zoological and Acclimatization Society, and sportsmen, with the valued support of Mr. G. A. Keartland, who acted as spokesman. The result of their exertions are already known to you, and while it is to be regretted that our representations were not entirely successful, we feel assured that but for the efforts then made the Minister's decision would have been in favour of making the requested alteration.

"The hon. librarian reports that additions to the library, by purchase and exchange, have been well maintained. During the year 60 volumes or parts have been purchased, 2 volumes have been donated, and 89 received by exchange, making an addition for the year of 151 volumes or parts.

"The thanks of the Club are again due to Messrs. T. R. B. Morton and Coghill, who have placed their offices at the disposal of the committee, free of cost, and to Mr. J. Searle the Club is indebted for the use and management of his lantern when required.

"We are pleased to report that financially the Club continues in a most flourishing state. The receipts from all sources are £165 4s. 11d., while the expenditure amounted to £128 16s. 3d. As will be seen the credit balance has further increased from £53 1s. 8d. to £89 10s. 4d., being a gain for the year of £36 8s. 8d., with all accounts paid. The principal factor in bringing about this highly satisfactory result has been the large increase received from subscriptions for the current year.

"In conclusion, your committee congratulate the members upon the sound and continuous prosperity of the Club, and would impress upon them that it is only by their individual help, whether by the contribution of papers or other appreciated work appertaining to such a Society as ours, that the Club can maintain the proud and useful position it now enjoys.

"O. A. SAYCE, *President.*

"J. F. HAASE, *Hon. Secretary.*

"5th June, 1905."

The report having been received, Mr. A. H. Mattingley, in moving its adoption, regretted that the Government had not gazetted the whole of Wilson's Promontory as a National Park. Mr. J. H. Gatliff seconded the resolution, which was carried unanimously.

FINANCIAL STATEMENT.

The hon. treasurer, Mr. G. Coghill, read the financial statement for 1904-5, which was as follows:—

RECEIPTS.

To Balance, 30th April, 1904	...	...	...	£53	1	8
„ Subscriptions	...	...	£139	3	6	
„ <i>Victorian Naturalist</i> —						
Subscriptions	...	£9	12	2		
Sales	...	3	18	9		
Reprints	...	3	9	0		
Advertisements	...	4	10	0		
				21	9	11
„ Sales of Books, account Library	...	...	2	10	0	
„ „ Club's Badges	...	...	1	4	0	
„ Interest	...	...	0	17	6	
				165	4	11
				£218	6	7

EXPENDITURE.

By <i>Victorian Naturalist</i> —						
Printing	...	£69	16	6		
Illustrating	...	6	16	0		
Reprints	...	5	0	6		
				£81	13	0
„ Rooms—Rent and Attendance	...	...	9	10	0	
„ Library—Books	...	1	4	6		
Periodicals	...	4	9	6		
Binding	...	4	8	0		
Insurance, &c.	...	0	14	9		
				10	16	9
„ Wild Flower Exhibition—Sundries	...	1	11	6		
„ Badges	...	2	2	0		
„ Wreath, late Mr. J. G. Luehmann	...	1	0	0		
„ Printing and Stationery	...	9	18	0		
„ Postages, &c.	...	12	5	0		
				£128	16	3
„ Balance London Bank	...	...	38	12	10	
„ „ Melbourne Savings Bank	...	...	50	17	6	
				89	10	4
				£218	6	7

G. COGHILL, *Hon. Treasurer.*
31st May, 1905.

Audited and found correct.

2nd June, 1905. D. BEST,
G. WEINDORFER, } *Auditors.*

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

ASSETS.

Balance in Banks	...	...	...	£89	10	4
Arrears of Subscriptions (£40 9s.), say	...	...	...	25	0	0
Library and Furniture (Insurance Value)	...	...	...	120	0	0
Arrears for Reprints	2	15	6
				£237	5	10

LIABILITIES.

Outstanding Account	£0	19	0
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The financial statement having been received, the chairman congratulated the members upon the splendid financial position of the Club. On the motion of Messrs. A. H. Mattingley and J. H. Gatliff the statement was adopted.

OFFICE-BEARERS FOR 1905-6.

The following office-bearers, being the only nominations received, were declared duly elected:—President, Mr. F. G. A. Barnard; vice-presidents, Messrs. G. A. Keartland and F. Wisewould; hon treasurer, Mr. G. Coghill; hon. librarian, Mr. S. W. Fulton; hon. editor, Mr. F. G. A. Barnard; hon. secretary, Mr. J. F. Haase; hon. assistant secretary and assistant librarian, Mr. C. L. Barrett.

Mr. F. Wisewould, in vacating the chair in favour of the newly-elected president, congratulated Mr. Barnard upon the high office in which the members had placed him, and referred to the many years of valuable and enthusiastic services he had rendered to the Club, and to the high esteem in which he was held by his fellow-members.

The president briefly responded, and thanked the members for the honour they had conferred upon him.

On a ballot being taken for five members of committee, Messrs. T. S. Hall, M.A., A. D. Hardy, J. A. Kershaw, F.E.S., D. Le Souëf, C.M.Z.S., and A. H. Mattingley were duly elected.

GENERAL BUSINESS.

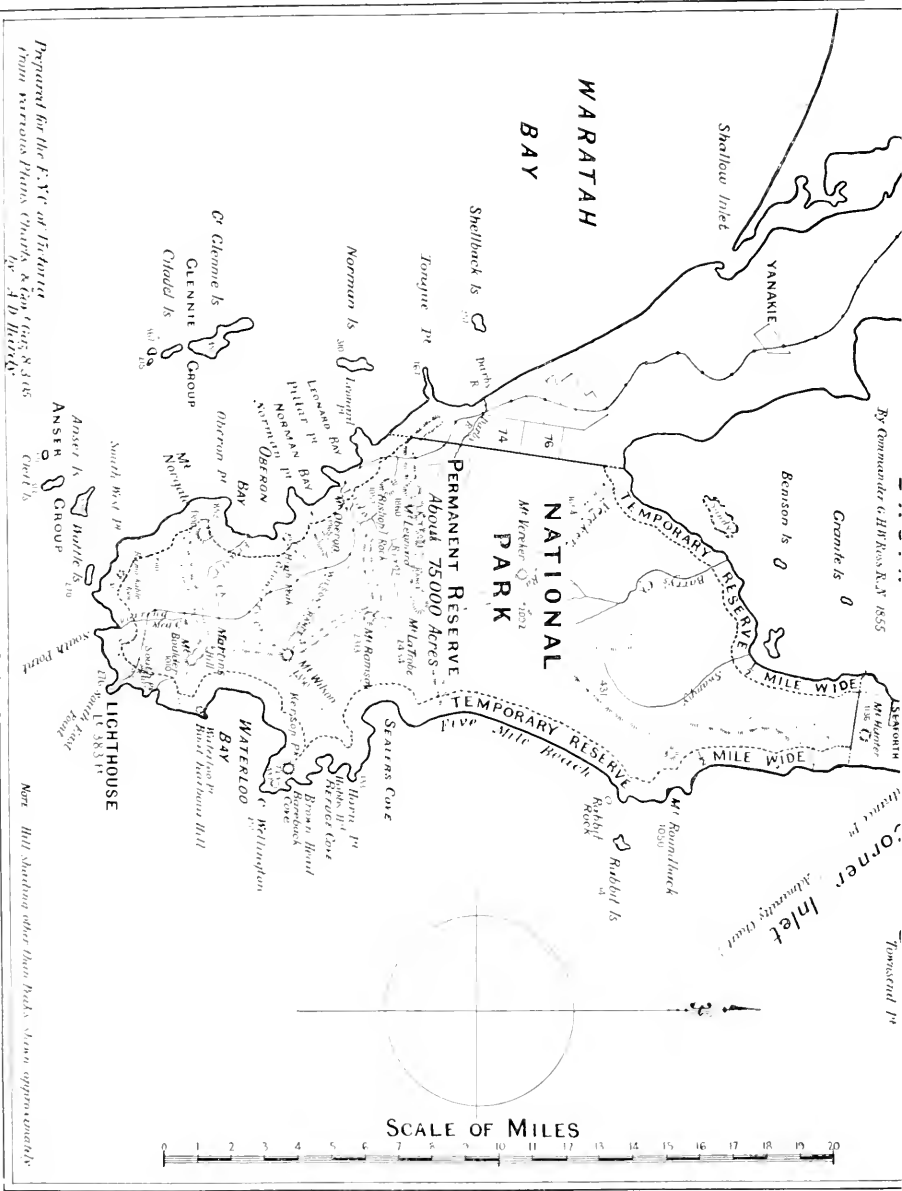
Mr. A. D. Hardy referred to the position of affairs with regard to the National Park at Wilson's Promontory, pointing out that its value as a sanctuary for members of our unique fauna and flora was discounted by the non-inclusion of the whole of the area in the permanent reservation, and moved—"That the inconsistencies of the present reservation destroy the usefulness of the Park, and the committee be empowered to take such action as may be necessary to urge the reservation of the whole area and its vestment in trustees."

The motion was seconded by Mr. A. H. Mattingley, and supported by Mr. F. Pitcher, who urged the importance of having the park vested in trustees, who could carefully guard public interests and at the same time conserve the scientific value of the area.

By way of showing the interest taken by the juniors in the meetings arranged for them, the President read an account of Professor Spencer's lecture on the previous Saturday, written without solicitation by one of the young girls present, and said that he proposed to mark his year as president by offering a prize, under conditions to be announced, for the best series of notes on the junior excursions held during the year.

Prepared for the F.S. of Victoria
 from various Plans, Charts & Co. Eng. S. 316
 by J. D. Hickey.

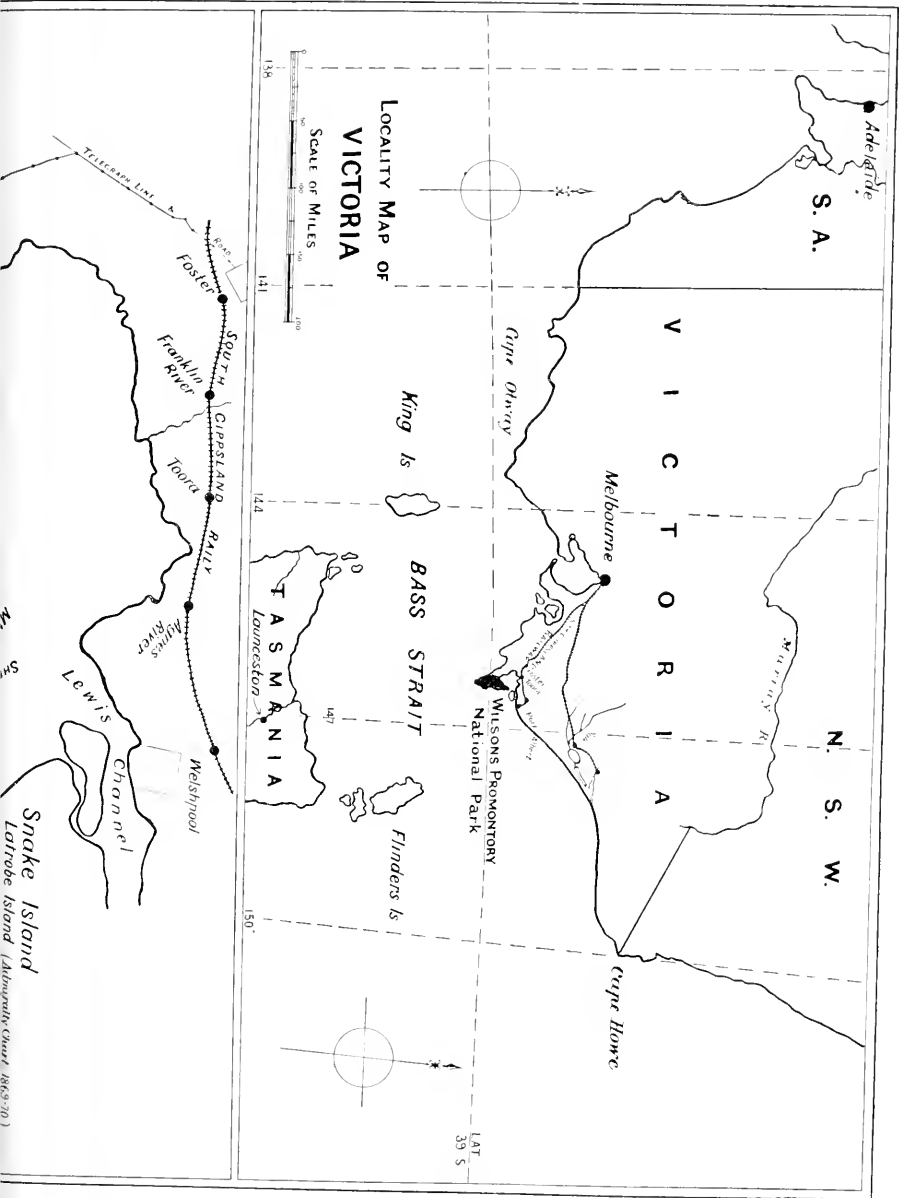
Note: All sounding other than Rocks, shown approximately.



By Commander G.H. Ross R.N. 1855

Surveyed by
 Mr. Hunter
 1857

MAP OF NATIONAL PARK



PAPERS READ.

1. By Mr. F. M. Reader, F.R.H.S., entitled "Contributions to the Flora of Victoria, xiv.—Description of *Pultenæa weindorferi*, sp. nov." Communicated by Mr. G. Weindorfer.

The author described a *Pultenæa* under the name of *P. weindorferi*, in honour of the finder, which had been found growing in swampy ground near Wandin, in the Lilydale district, and pointed out its affinities with and differences from other species of the genus.

NATURAL HISTORY NOTES.

Mr. G. A. Keartland said that he had recently received some interesting information with regard to the range of the Princess Alexandra Parrakeet, which he would bring before a future meeting of the Club.

EXHIBITS.

By Mr. A. Coles.—Albino Red-backed Parrakeet, *Psephotus hæmatonotus*, from Bendigo; Gouldian Grass-Finches, *Poephila mirabilis*, male normal plumage, and male abnormal plumage, kept in captivity for over seven years.

By Mr. G. Coghill.—Flowering branches of *Banksia collina*, from Launching Place.

By Mr. C. J. Gabriel.—Shells—*Lotarium spengleri*, Chem., *L. spengleri*, var. *waterhousei*, Adm. and Ang., and *Fusus undulatus*, Perry, from Western Port Bay; *Tellina radiata* and *T. strigosa*, from Florida.

By Mr. A. D. Hardy.—Desmid, *Staurastrum leptacanthum*, Nordstedt, from Whanregarwen.

By Mr. F. Pitcher.—Pot fern, *Asplenium flabellifolium*, grown from a small piece collected at Sassafra Gully, Easter, 1904.

By Mr. A. Mattingley.—Commercial Beche-de-mer, or Holothurian, from Great Barrier Reef, Queensland.

By Mr. F. Wisewould.—Ripe Cherry-plums picked in June at Elsternwick.

After the usual conversazione the meeting terminated.

A BOTANICAL TRIP TO THE GRAMPPIANS.

BY G. WEINDORFER.

(Read before the Field Naturalists' Club of Victoria, 8th May, 1905.)

IN order to satisfy a long-desired wish of mine, I was prompted to accept the suggestion of Dr. Sutton to accompany him on a short trip to the Grampians during the last Christmas holidays as the guest of his friend, Mr. Roland Wettenhall, of "Pomona," near Stawell.

We left town by the Adelaide express on Saturday afternoon, 24th December, reaching Stawell (150 miles) about eleven o'clock that night, where we were met by our host, Mr. Wettenhall, and

another Club member, Mr. H. B. Williamson, of Hawkesdale, and after a ride of two hours across the plains, through which the Little Wimmera flows, arrived at "Pomona," picturesquely situated at the foot of Mt. Cassell, an elevation of about 3,000 feet, one of the outliers of the Grampians towards the north.

We turned in soon after our arrival, as our programme for the first day of our stay in the district required an early start in the morning, and you may rest assured that with such prospects as we had in view we were up betimes. After breakfast we set out along the track for Mt. Cassell. Leaving the house, we had first to pass the orchard surrounding the residence of "Pomona." Here vigorous fruit trees, planted with elegant neatness—a delight to the artist's eye—showed unmistakable evidence of the careful management of the plantation, which is enclosed in a semicircle by the well-timbered slopes of the mountains, the effect produced at early morning being delightful to contemplate.

Passing the orchard, we immediately began our climb up the steep side of the mount, and in spite of the advanced period of the season were able to secure a number of species in flower, such as *Spharolobium darviesioides*, *Calycotrix sullivanii*, *Geranium rodneyanum*, *Hakea rostrata*, *Arthropodium fimbriatum*, and others. The top of the mount was reached about noon, when we were sorry to have to part for the rest of the day from our host, Mr. R. Wettenhall, who had to return to his home.

Acting on this gentleman's advice, we decided to descend the mount on the other side, in order to reach Barney's Creek, which leads on to the "pipe track" of the Stawell water supply. Nothing extraordinary in plant life was there observed, with the exception of specimens of the proteaceous shrub *Conospermum mitchellii*, and at Barney's Creek *Leptospermum flavescens*, festooned by the lovely *Marianthus bignoniaceus*, which we collected at the foot of a bold granite mass called Barney's Castle.

Having had to cut our way through the dense under-scrub of this well-timbered part of the Grampians, we were indeed highly pleased when, about four o'clock in the afternoon, we reached the open part of the country which was cleared for the construction of the waterworks. In walking along this picturesque part of the Grampians we collected, among others, some specimens of *Ixodia achilloides*, *Brachyloma depressum*, *B. ciliatum*, and *Halorrhagis teucrioides*. About seven in the evening we reached the tunnel of the waterworks. This is bored through the range separating Fyans Creek from the plains of the Little Wimmera, but in order to reach our point of departure we had to cross the range, and it was therefore fairly dark when we again reached "Pomona."

The following day we decided to follow the track back as far as the tunnel, and thence to cross Fyans Creek, and visit the Silverband Falls. However, unfavourable conditions of weather

prompted us during a short stay at Fyans Creek to give up this plan, and to follow the stream to "Glen Bower," the residence of the Misses Dalton.

We arrived there about three p.m., and tried to explore the neighbourhood of this charmingly situated place in Nature's solitude. Unfortunately heavy showers soon put an end to our work, and so we had to return to "Glen Bower," where we stayed for the night. By so doing we were saved the long journey back to our original starting-place, as on the following day, the third and last day of our stay in the "garden of Victoria," we proposed to visit the "Goat Rock." The evening was spent over the identification of the specimens (mostly seed) collected during the day, when Mr. Williamson's splendid knowledge of the Victorian flora was an invaluable help to the rest of the party.

We made an early start on Thursday, 27th December, as we had a long walk before us. Getting away at four a.m., we walked along a spur which leads to Sanderson's sawmill, now closed down. There the "billy" was boiled, and a hasty breakfast taken, all in the space of half an hour.

Continuing our walk along a jinker track, we collected splendid specimens of *Aster myrsinoides* and *Pimelea curviflora*, and on reaching the south end of the "Goat Rock" our attention was at once attracted by bushes of *Bossia cinerea*, var. *rosmarinifolia*.

At this point the vegetation alters its appearance almost abruptly, the Eucalyptus taking a stunted habit, just as it may be observed at the tree-line in our Alps. Careful searches were made for flowering specimens of *Pultenaea rosea*, but all our efforts were in vain. Springtime had passed in this locality, and we were only able to obtain seed specimens of this shrub. However, we were compensated for our trouble by obtaining most beautiful flowering specimens of *Conospermum mitchellii*, *Leptospermum lanigerum*, var. *grandiflorum*, which occurs all over the rock; *Boronia pilosa*, *B. polygalifolia*, *Correa lawrenciana*, *Candollea sobolifera*, and seed specimens of *Eucalyptus alpinus*.

The view from the top of the "Goat Rock," which we reached about eleven o'clock, was indeed sublime. Beneath us, towards the east and north, lay the fertile valley of the Little Wimmera, showing afar off the basin of Lake Lonsdale, situated in the transition of the mountains to the wide plains of the Mallee. To the right lay Mt. William, 3,827 feet, the highest point in this part of Victoria, in clear and bold outline, his light green forests making a magnificent contrast to the deep azure of the distant horizon. Turning back, the pleased eye ranged for miles over a varied scene of beauty through the Victoria valley, the elevations forming the same ending many miles off in a chain of distant mountains.

After a few hours' stay in this charming locality, it can be imagined with what regret we returned homewards. In order to pass the Silverband Falls we took a short cut from the south end of the "Goat Rock" through the so-called Dairy Creek, which proved rather an unpleasant walk, owing to the steepness of the descent. The Silverband Falls were reached about five o'clock in the afternoon, but the advanced time did not allow a long stay there. Crossing the Fyans Creek at the same spot where the day before we turned towards "Glen Bower," we reached "Pomona," *viâ* the tunnel, about eight p.m., and were there entertained by the ladies of the house, the whole party enjoying a most delightful evening.

As it was necessary to start for Stawell at two o'clock in the morning, we did not turn in for the few hours left for rest, but busied ourselves with the collected specimens. Stawell was reached at four a.m., and our trip to the Grampians terminated with the journey to Melbourne in the Adelaide express.

In conclusion, I would like to point out that Christmas time was rather too far advanced in the season for collecting flowering specimens. The greater part of our collection consisted of seed specimens, which, however, bear for the botanical student as much importance as flowers. From the geographical point of view, I am under the impression that the flora of the Grampians forms the westerly out-runner of our south-eastern Australian forest flora, constituting there the transition area from the latter to the so-called Mallee flora in the north-west of our State and the Euronotian region of South Australia. My investigations on this subject, however, will appear in a later paper.

I must here take the opportunity of expressing the sincerest gratitude of our party to Mr. Roland Wettenhall for the great kindness we experienced at his hands, first for inviting us to stay at his charming residence, "Pomona," and secondly for the courtesy he extended towards us during our stay, which will long be remembered in connection with our trip to the Grampians.

The following is a list of the plants collected. Those without any indication being found in bloom; those marked * were found in both bloom and fruit, while those marked † were found in fruit only:—

* <i>Clematis aristata</i>	† <i>Billardiera cymosa</i>
<i>Ranunculus lappaceus</i>	<i>Comesperma ericinum</i>
<i>Hibbertia densiflora</i>	<i>calymega</i>
<i>stricta</i>	* <i>Correa cernua</i>
<i>fasciculata</i>	* <i>speciosa</i>
<i>Cassylia glabella</i>	* <i>lawrenciana</i>
* <i>pubescens</i>	<i>Boronia pilosa</i>
* <i>melantha</i>	<i>polygalifolia</i>
<i>Viola hederacea</i>	† <i>Linum marginale</i>
<i>Marianthus bignoniaceus</i>	* <i>Geranium pilosum</i>
* <i>Billardiera scandens</i>	<i>Pelargonium australe</i>

- Pelargonium rodneyanum
 Oxalis corniculata
 *Lasiopetalum dasyphyllum
 Poranthera microphylla
 Ampera spartioides
 Phyllanthus thymoides
 †Casuarina distyla
 † quadrivalvis
 *Dodonaea viscosa
 Stackhousia linearifolia
 † viminalis
 Sagina procumbens
 Rumex brownii
 *Gompholobium huegelii
 Sphaerolobium daviesioides
 †Daviesia corymbosa (var. mimoso-
 ides)
 † brevifolia
 †Pultenaea scabra
 † dentata
 † mollis
 † juniperina
 humilis
 † rosea
 † benthami
 Dillwynia floribunda
 ericifolia
 *Platylobium obtusangulum
 †Bossiaea postrata
 † cinerea
 †Hovea heterophylla
 †Goodia lotifolia
 †Indigofera australis
 Glycine glandestina
 †Acacia mollissima
 † retinoides
 † myrtifolia
 † oxycedrus
 † verticillata
 † mitchelli
 Rubus parvifolius
 †Acæna sanguisorbæ
 †Bauera sessiliflora
 Tillea verticillata
 Epilobium glabellum
 Lythrum salicaria
 Halorrhagis tetragyna
 teucrioides
 Myriophyllum varifolium
 *Calycotrix tetragona
 * sullivanii
 Lhotzkya genetilloides
 *Leptospermum flavescens
 * scoparium
 * myrsinoides
 leavigatum (var. grandiflorum)
 *Thryptomene mitchelliana
 * ciliata
- Callistemon coccineus
 †Melaleuca squarrosa
 * decussata
 * squamea
 †Eucalyptus alpina
 * capitellata
 * melliodora
 Pomaderris apetala
 *Cryptandra tomentosa
 daltoni
 Astrotricha ledifolia
 Hydrocotyle laxiflora
 hirta
 Trachymene heterophylla
 billardieri
 *Loranthus pendulus
 Conospermum mitchelli
 Persoonia juniperina
 rigida
 †Grevillea alpina
 * aquifolium
 † oleoides
 Hakea rostrata
 † pugioniformis
 † sericea
 † ulicina
 †Banksia integrifolia
 †Pimelea axiflora
 linifolia
 humilis
 † flava
 octophylla
 curviflora
 *Coprosma billardieri
 hirtella
 Opercularia varia
 Asperula oligantha
 Galium umbrosum
 Sambucus gaudichaudiana
 Lagenophora billardieri
 Brachycome diversifolia
 scapiformis
 pinnatifida
 *Minuria leptophylla
 Aster ramulosus
 myrsinoides
 asterotrichus
 Gnaphalium japonicum
 Podolepis acuminata
 *Leptorrhynchus tenuifolius
 * squamatus
 *Helichrysum baxteri
 scorpioides
 lucidum
 apiculatum
 * semipapposum
 obcordatum
 ferrugineum

- Helichrysum leucopsidium*
Ixodia achilloides
 **Craspedia richea*
Siegesbeckia orientalis
Centipeda cunninghami
 **Senecio dryadeus*
 * *velleioides*
Microceris forsteri
 **Erechtites arguta*
 * *prenanthoides*
Lobelia gibbosa
 pedunculata
Isotoma fluviatilis
Wahlenbergia gracilis
 **Candollea serrulata*
 * *sobolifera*
 **Brunonia australis*
Goodenia geniculata
 ovata
Limnanthemum exaltatum
 **Erythraea spicata*
 **Plantago varia*
Convolvulus erubescens
 **Solanum nigrum*
Gratiola peruviana
 **Veronica derwentia*
 gracilis
 calycina
Euphrasia brownii
Utricularia dichotoma
 †*Cynoglossum latifolium*
Mentha australis
 † *Prostanthera lasiantha*
 † *rotundifolia*
 † *denticulata*
 †*Styphelia ascendens*
 † *sonderi*
 † *humifusa*
 glacilis
 virgata
 ericoides
 † *pinifolia*
 thymifolia
Brachyloma daphnoides
 ciliatum
 depressum
Sprengelia incarnata
Epacris impressa
 †*Callitris verrucosa*
 Dipodium punctatum
 **Thelymitra longifolia*
 †*Patersonia longiscapa*
 Dianella revoluta
 ' *longifolia*
Thysonotus tuberosus
 †*Burchardia umbellata*
Tricoryne elatior
- Styandra glauca*
 cæspitosa
Arthropodium paniculatum
 fimbriatum
 minus
Xerothes thunbergi
 longifolia
 †*Xantorrhoea australis*
Tryglochin procera
Potamogeton obtusifolium
Nyris operculata
Luzula campestris
Juncus pallidus
 planifolius
 prismatocarpus
 pauciflorus
Centrolepis fascicularis
Lepyrodia tasmanica
Restio complanatus
Calostrophus lateriflorus
 fastigiatus
Leptocarpus tenax
Cyperus lucidus
Scirpus inundatus
 nodosus
 fluitans
Schenus apogon
 axillaris
Lepidosperma elatius
 carphoides
Gahnia tetraquetrum
Caustis restiacea
Carex pseudocyperus
Stipa muelleri
 semibarbata
 micrantha
Anthistiria ciliata
Ehrharta stipoides
Echinopogon ovatus
Agrostis solandri
 quadriseta
Dantonia penicilata
Poa cæspitosa
Agropyron scabrum
Selaginella uliginosa
Gleichenia circinata
 flabellata
Osmunda barbara
Dicksonia billardieri
Davallia dubia
Adiantum æthiopicum
Cheilanthes tenuifolia
Pteris aquilina
Lomaria discolor
 capensis
Asplenium flabellifolium
Aspidium aculeatum

CONTRIBUTIONS TO THE FLORA OF VICTORIA.

No. XIV.

BY F. M. READER, F.R.H.S.

(Communicated by G. Weindorfer.)

(Read before the Field Naturalists' Club of Victoria, 12th June, 1905.)

PULTENÆA WEINDORFERI, sp. nov.

A slender, erect shrub, attaining the height of 5 feet; glabrous, with the exception of a few hairs on the inner side of the calyx lobes, ciliæ on the margin, and a ring of minute hairs at the base of the pedicels; with terete branches, which, when young, are generally covered with crowded leaves and appressed stipules.

Leaves short-stalked, more or less tapering towards the base, linear or broad-linear, erect or somewhat spreading and recurved at the end; blunt or with a small callous termination, upwards to $\frac{1}{2}$ -inch long; concave, with the margin more or less incurved, forming a channel or a groove; or they are almost flat, with the margin slightly incurved; underneath with the midrib more or less prominent. Stipules of the young shoots and at first those of the floral leaves partly united; upwards to 2 lines long or more; the lobes narrow, subulate, acuminate; those of the floral leaves broader. Flowers in leafy heads or short umbel-like leafy racemes, growing out into very short leafy shoots; the floral leaves, with their large, brown bract-like stipules, concealing the rachis and pedicels; the latter about $1\frac{1}{2}$ lines long. Bracteoles inserted on the calyx tube near the base, linear or broader at the base, somewhat subulate and keeled, shorter than the calyx, about 2 lines long. Occasionally, when the flower is in bud, tipped with one or two ciliæ or long hairs, and with one or two along the back. Calyx about 3 lines long, without the pedicel; the lobes sub-equal, narrow-lanceolate, somewhat falcate, longer than the tube, the two upper united at the base, slightly broader; the middle of the lower lobes longer than the others. Petals entirely yellow, sub-equal. Standard about half as long again as the calyx, slightly emarginate; keel emarginate. Ovary glabrous, tapering into the flat style. Pod (unripe) obliquely-ovate.

Collected at Wandin, in a swamp, near the road from Lilydale to Warburton, 25 miles from Melbourne, in September, 1903, by Mr. G. Weindorfer.

This species belongs to the section *Coelophyllum*, and in the shape of the stipules on the branches, approaches *P. stipularis* and *glabra*, but the arrangement of the flowers is different. It should be placed in the neighbourhood of *P. laxiflora*, *largiflorens*, and *villosa*, from all of which, and of other species of the same sub-section, it may easily be discerned by the large stipules, and especially those of the floral leaves. In *P. densifolia*, *elliptica*,

subspicata, and *villifera* the stipules of the floral leaves are also large, but the bracteoles are inserted close under the calyx, &c.

In the specimens examined minute abortive flowers have occasionally been observed among the fertile ones.

Named in honour of the finder, Mr. G. Weindorfer, who, during the last few years, has done much to extend our knowledge of the habitats of Victorian plants.

SOME LONG-COLLECTED PLANTS.—In the *Victorian Naturalist*, for December, 1900 (vol. xvii., p. 148), will be found an article by the late Prof. Morris, Litt. D., giving the history of a work on Australian plants, the first part of which had just been issued by the Trustees of the British Museum. The object of the work was to describe the plants collected by Mr. Banks, better known in later years as Sir Joseph Banks, president of the Royal Society, during his visit to New Holland in 1770. Now it is interesting to learn that Mr. J. H. Maiden, F.L.S., Government Botanist of New South Wales, has recently received a valuable addition to the National Herbarian of that State from the Trustees of the British Museum, in the shape of a large series of the actual specimens collected by Banks and his assistant, Dr. Solander, at Botany Bay, more than one hundred and thirty-five years ago. The collection was made during the stay there of Captain Cook's exploring ship, the *Endeavour*. They appear to have been well preserved, and Mr. Maiden is able to recognize all the unlabelled species. The botanizing was done between 28th April and 6th May, 1770. Banks, as the notes in his journal indicate, took the greatest pains to dry the specimens before packing them up, but on 26th June, when the *Endeavour* was beached at what is now Cooktown, after striking the Barrier reef, he discovered that many of his treasures had got a soaking in the salt water which entered the ship. Examination of the relics shows, says Mr. Maiden, that most of them were broken off, not cut. Some of the grasses bear marks of fire, showing that the blacks used to burn blady grass, or at all events that they used to have bush fires. Some show insect ravages, and on one is a cocoon. A flannel flower has acquired a deep brown colour through the effects of time. Mr. Maiden rejoices in the fact that Banks's name will for all time be associated with the native honeysuckle, named *Banksia*, after him. An attempt which has been made to substitute "*Isostylis*" for *Banksia*, Mr. Maiden scouts as doomed to total failure. Of the 600 specimens which have come to hand, a few represent the extensive collection made by Banks at Endeavour River, Queensland, while Cook's ship was undergoing repair.

EARLY FLOWERS.—The first blossoms of the Silver Wattle, *Acacia dealbata*, were picked at Kew on 1st July. Notes of other early flowerings are desired.

Parkin, A. C., Campbell-rd., Balwyn.
 Parson, H., Kintore-st., Camberwell.
 Parson, Miss A. C., Kintore-street,
 Camberwell.
 Paul, J. T., Grantville. Bot.
 Pescott, E. E., Edward-street, Shep-
 parton.
 o* Pitcher, F., Botanical Gardens, M.
 Bot.
 Preston, C. G., 44 Albert-street, Kew.
 † Pritchard, G. B., 22 Mantell-street,
 Moonee Ponds. Conch., Geol.
 Quiney, H., Mortlake.
 Randall, Miss M., "Litchfield,"
 Primrose-street, Essendon.
 Robinson, C. A., 257 Auburn-road,
 Auburn.
 Roger, W. H. A., National Bank,
 Collins-street. Ent. (Lep.)
 Rollo, Miss, 65 Tivoli-rd., S. Yarra.
 Ross, J. A., 116 Albion-st., E.
 Brunswick.
 Russell, Arthur, Bourke-street east.
 † Ryan, Dr. C., Collins-street E., M.
 Orn.. Ool.
 o* † Sayce, O. A., Harcourt-st., Haw-
 thorn. Crustacea.
 Scott, W., Fletcher-street, Essendon.
 * Searle, J., 274 Collins-street, M.
 * † Shephard, J., 135 City-road, S.M.
 Pond life.
 † Shepherd, G. E., Somerville. Ornith.
 Simpson, A. W., Cornalla, *via* Den-
 iliquin, N. S. W.
 * Simson, Mrs. J. } "Trawalla,"
 Simson, Miss } Toorak.
 Skeats, Professor E. W., D.Sc.,
 University, Carlton.
 o † Sloane, T. G., "Moorilla,"
 Young, N.S.W. Ent. (Col.)
 Smith, A. J., Port Albert.
 Somers, Dr. Edgeworth, Mornington.
 Somerville, W., 16 Bellevue-street,
 Richmond.
 Spauk, J. M., Isabella-st., Malvern.
 * † Spencer, Professor W. Baldwin,
 C.M.G., M.A., F.R.S., Univer-
 sity, Carlton.
 † Spry, F., Napier-st., S.M. Ent.
 (Lep.), Geol.
 Stephens, J. M., "Croydon," Heidel-
 berg-road, Fairfield.
 Stevens, E. T.
 Stickland, J., 153 Auburn-road,
 Auburn. Pond life.
 * † Stickland, W., 20 Latrobe-st., M.
 Pond life.
 Summers, H., Working Men's Col-
 lege, M. Geol.

† Sutton, Dr. C. S., Rathdown-st.,
 Carlton. Bot.
 Swan, J. B., "Alma," Selborne-
 street, Coburg
 * † Sweet, G., F.G.S., Wilson-st.,
 Brunswick. Geol.
 Tarrant, J. S., Railway Road,
 Malvern.
 Thiele, A. F., Doncaster.
 Thiele, E. O., "Kanowna," 4 Dixon-
 street, Malvern. Geol. and
 Mineral.
 Thiele, O. A., "Kanowna," 4 Dixon-
 street, Malvern.
 Thomson, Dr. J. R. M., Mt. Alex-
 ander-road, Essendon.
 Thonger, C. W., 103 Drummond-
 street, Carlton.
 Thorn, W., Findon-st., Hawthorn.
 * † Tisdall, H. T., Washington-st.,
 Toorak. Cryptogam. bot.
 * † Topp, C. A., M.A., LL.B.,
 South Yarra. Bot.
 Townsend, S. P., "Garrycloyne,"
 Mornington.
 Trebilcock, R. E., "Leopold," Gee-
 long. Ent. (Lep.)
 Tucket, J. H., Neerim-road, Murrum-
 beena.
 Turner, Miss, "Torridge," Domain-
 road, South Yarra.
 Walker, J. B., Mackillop-st., M.
 † Wallis, C. C., Toorak-rd., Toorak,
 Bot.
 Ware, S. M., 3 Lyall-st., Hawthorn
 Waterhouse, G. A., B.Sc., F.E.S.,
 Royal Mint, Sydney, N.S.W.
 Ent. (Lep.)
 † Weindorfer, G., Austro-Hungarian
 Consulate, Flinders-lane. Bot.
 Westley, Rev. A. H., The Vicar-
 age, Loch. Ent. (Col., Bupres-
 tidae, and Cerambycidae).
 Westmoreland, Miss A., Stawell-st.,
 Kew.
 White, Miss J., B.Sc., Observatory
 Quarters, South Yarra. Bot.
 Wilcox, J., 4 Loch-st., Hawthorn.
 Williamson, H. B., Hawkesdale. Bot.
 Wilson, J., 153 Buckley-st. Foots-
 cray.
 o* † Wisewould, F., Imperial Cham-
 bers, 408 Collins-street, M.
 Wisewould, Miss G., 27 Cromwell-
 road, Hawksburn.
 Wollen, A., Killara. Orn., Ent.
 Wood, J. A., 417 Smith-st., Fitzroy.
 Woods, G., Marshall-street, Moonee
 Ponds.

ASSOCIATES.

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Christian, E. J.	Nicholls, Miss J.	Thomson, J. M.
French, C.	Oke, C.	Wilson, F. E.
Gillespie, R. M.	Parson, Miss A. C.	Wilson, J.
Larking, E. K.	Reed, W.	Wilcox, D. H.
Mansfield, A.	Schaefer, F.	

JUNIOR MEMBERS.

Miss J. Bage	<i>From S. School, Brighton-st., Richmd.</i>
„ A. Bage	Masters F. Williams, C. Graham,
„ M. Barnard	A. Langford, F. Hooks, J.
„ J. French	Winter, S. Lewis, S. Cassidy,
„ L. French	J. Campbell, L. Burrows, C.
„ D. Haase	Robinson, H. Smith, L. M'Nabb.
„ N. Hughes	<i>From S. School, Williamstown—</i>
„ E. Jennings	Masters G. Cullen, S. Bradley, R.
„ B. Keartland	Bradley.
„ S. Leach	<i>From S. School, No. 1895—</i>
„ E. Preston	Masters F. Neilson, B. Cantor, W.
„ W. Shephard	Meare, W. Bailye, V. Bull, V.
„ R. Sayce	Sevoir, E. Barby, H. Duncan.
„ E. Sayce	<i>From S. School, No. 112—</i>
„ H. Wilson	Masters J. Colpoys, H. Phillips,
Master N. Barnard	L. Sullivan, L. Briggs, R.
„ W. D. Chapman	M'Dermott, J. Smith.
„ P. Cameron	<i>From S. School, Surrey Hills—</i>
„ T. M. Hall	Masters I. Tassell, J. Billing, R.
„ A. S. Hall	Billing, W. Hooke, N. Brown,
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„ J. Ham	M'Phee, E. Fitts.
„ F. Hill	<i>From S. School, Glenferrie—</i>
„ M. Jackson	Master N. Elmiger.
„ S. G. Johnston	<i>From S. School, Hawthorn—</i>
„ W. Keartland	Master A. Holmes.
„ H. E. Kershaw	<i>From S. School, Camberwell—</i>
„ Gordon Wilson	Masters J. S. Mann, C. J. Mann.
„ A. O. Timms	<i>From S. School, Moonee Ponds—</i>
„ L. N. Kershaw	Masters J. Sweatman, V. Faulke, H.
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„ E. Moore	J. Ison, E. Edwards, M. Evans.
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„ G. Preston	Kerr, E. Fulton, and Masters
„ R. Sterry	W. Spencer, D. Seaton, F.
„ G. Sloggatt	Watson, W. Winn, W. Farr,
„ M. Stephen	W. Shewlow, L. Henderson,
„ A. W. Le Souëf	M. O'Dowd, K. O'Dowd.
„ J. Schreuder	
„ W. T. Wilkinson	

List of Journals to which the Club Subscribes.

Annals and Magazine of Natural History.
 Entomologists' Monthly Magazine.
 Geological Magazine.
 Journal of the Royal Microscopical Society.
 Zoologist.

*List of Publications which the Club Receives
in Exchange.*

Transactions and Proceedings of the Royal Society of Victoria.
 Journal and Proceedings of the Royal Society of New South Wales.
 Publications of the Royal Society of South Australia.
 Papers and Proceedings of the Royal Society of Tasmania.
 Proceedings of the Royal Society of Queensland.
 Transactions of the New Zealand Institute.
 Proceedings of the Linnean Society of New South Wales.
 Publications of the New South Wales Naturalists' Club.
 Publications of the Australian Museum, Sydney.
 Publications of the Victorian Department of Mines and Water Supply.
 " " " Agriculture.
 Hawkesbury Agricultural College Magazine
 Publications of the Queensland Agricultural Department.
 " " " New South Wales Mines Department.
 " " " New South Wales Department of Agriculture.
 Transactions and Proceedings of the Royal Geographical Society of
 Australasia (Victoria).
 The Emu : the Journal of the Australasian Ornithologists' Union.
 The Wombat : the Journal of the Geelong Field Naturalists' Club.
 Nature Notes : the Journal of the Selborne Society, London.
 Nature Study.
 Reports of the Australasian Association for the Advancement of Science.
 Scientific Australian.
 Journal of the Anthropological Society, Sydney.
 Publications of the Smithsonian Institute, Washington, U.S.A.
 Publications of the Field Columbian Museum, U.S.A.
 Proceedings of the Academy of Natural Sciences of Philadelphia.
 Bulletin of the Buffalo Society of Natural Science.
 Publications of the Missouri Botanical Gardens.
 Report of the American Museum of Natural History.
 Transactions of the Wisconsin Academy.
 Minnesota Botanical Studies.
 Proceedings of the Boston Society of Natural History.
 Transactions of the Nova Scotia Institute.

T H E

Field Naturalists' Club of Victoria.

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The Victorian Naturalist.

VOL. XXII.—No. 4. AUGUST 10, 1905.

No. 260

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 10th July, 1905.

The president, Mr. F. G. A. Barnard, occupied the chair, and about 70 members and visitors were present.

THE LATE MR. H. T. TISDALL.

The president said that, before proceeding to the business on the notice paper, he had a sad announcement to make, in that the Club had lost that morning by death one of its best known members, Mr. H. T. Tisdall. He said that the loss was a very severe one, and he felt quite unable to adequately express his feelings regarding their late member, whose unselfish work on behalf of the Club was known to all. He asked those who could possibly do so to meet him the following afternoon at Heidelberg Cemetery, and pay their last respects to their fellow-worker, and moved that the condolence and sympathy of the Club be conveyed to his widow and family.

Mr. F. Wisewould, in supporting the resolution, spoke of Mr. Tisdall's great services to the Club, especially in the help he was always ready to render young workers, and his willingness at all times to do anything he could for the furtherance of the study of natural science.

REPORT.

A report of the visit to the Entomological Branch of the Department of Agriculture on Saturday, 8th July, was received from Mr. C. French, F.L.S., Government Entomologist, who reported that about 20 members were present, and spent the afternoon in examining the numerous specimens of life-histories of insects, the valuable works in the library, and the many other interesting contents of the rooms.

The hon. librarian reported the receipt of the following additions to the library:—"Memoirs Geological Survey of Victoria," No. 3, and "Annual Report (1904) of Secretary for Mines and Water Supply, Victoria," from the Department of Mines, Melbourne; *The Emu*, vol. v., part 1 (July, 1905), from the Australasian Ornithologists' Union; *Nature Notes* (May and June, 1905), from the Selborne Society, London; and "Bulletin New York Botanical Garden," vol. iv., No. 12, from the Director.

ELECTION OF MEMBER.

On a ballot being taken, the Rev. William Fraser, Athol-street, Moonee Ponds, was duly elected a member of the Club.

PAPERS READ.

1. By Mr. T. S. Hall, M.A., entitled, "The Distribution of the Fresh-water Eel in Australia, with Remarks on its Means of Dispersal."

The author said that in view of the comparatively recent conclusions that the fresh-water eel breeds in the sea, it was somewhat remarkable that our only Australian species was confined to the east and south-east coasts of Australia. It had been recorded from Cape York, the northernmost extremity of Queensland, through New South Wales and Victoria, and into South Australia as far as Lake Bonney. Up to the present no authenticated specimen had been received from the Murray basin, though that river entered the sea only some two hundred miles further north than Lake Bonney. This absence from the Murray basin was very remarkable when we recollect that in Victoria the head waters of the streams flowing to the Murray and direct to the sea were often separated by only a few yards. The presence of eels in isolated swamps and lakes was by many persons considered to be a proof of their breeding in such places, but it was now generally conceded that it was possible for eels in their early life to reach such localities by means of the merest trickle of water, or even across wet grass land. He also mentioned having witnessed many years ago at Buckley's Falls, on the Barwon River, near Geelong, what is known as an "eel-fare," *i.e.*, the ascent of thousands of young eels from the salt water to the fresh, and asked for records of other cases of the kind. Finally, he pointed out the differences in the structure of the mouth in the eel and the lamprey, the latter being found in the Murray River, as well as other streams.

Mr. A. E. Kitson remarked that when in New Zealand in January last with Mr. E. O. Thiele they had witnessed an "eel-fare" in the River Mataura, South Island, when thousands of young eels were steadily climbing a rocky barrier some 10 or 12 feet in height in the face of a strong current.

Mr. F. Wisewould remarked that fresh-water eels were very numerous in Tasmania.

Mr. G. A. Keartland stated that at Heidelberg he had noticed an eel some distance from water.

Mr. J. Shephard said, with reference to the large eels that are occasionally found in the Yan Yean water-pipes, that they must have entered the pipes when small, as all the water entering the pipes passes through strainers, which would prevent an eel of any size passing through.

2. By Mr. T. S. Hall, M.A., entitled "A Lizard Mimicking a Poisonous Snake."

The author exhibited a lizard which he had received from Queensland a little time ago, and which at first glance seemed to agree completely with the description of the young stage of the

Brown Snake, *Diemania textilis*, named by Prof. M'Coy *Eurina bicucullata* in his "Prodromus of the Zoology of Victoria," but on further examination it was found to possess the characteristic scales of lizards, and had been identified as one of the legless lizards, *Aprasia pulchella*. The resemblance was very remarkable, and the reason for mimicking a poisonous snake was obvious.

3. By Mr. G. A. Keartland, entitled "The Range of the Alexandra Parrakeet, *Spathopterus alexandra*."

The author said that for many years this bird had been regarded as strictly confined to the intra-tropical portion of Central Australia, but since 1885 had been recorded from various places extending from near Derby, North-Western Australia, to Oodnadatta, in extra-tropical South Australia, and he thought it possible that its range may yet be extended into New South Wales.

NATURAL HISTORY NOTES.

FOXES.—Mr. A. E. Kitson, F.G.S., said that the Geological Survey party, in charge of Mr. W. Baragwanath, jun., recently working in the ranges to the north of Mt. Baw Baw, had noticed English foxes in the locality, which, besides destroying the Lyre-birds in great numbers, had developed a liking for grasshoppers. The animals seemed to show a slight variation from the ordinary fox, being smaller and greyer in colouring.

SOURCE OF YARRA RIVER.—Mr. A. E. Kitson, F.G.S., said that the survey party referred to had also found that our present maps of the source of the Yarra and Thompson Rivers were incorrect, as it had been found that the stream which had hitherto been regarded as the furthest source of the Yarra was really the head of the Thompson. The mistake had occurred through the latter river flowing first west, then north, and east, before taking its southerly course. It was probable that at one time the portion flowing westerly had belonged to the Yarra, but it had been captured by the stream flowing to the north, and was thus lost to the Yarra watershed. The country where this occurred was covered with very dense vegetation, and without the aid of instruments it was quite impossible to ascertain the positions of the ridges and the trends of the valleys. He also said that it had been found that the three peaks of Baw Baw—*i.e.*, Baw Baw proper, Mt. Mueller, and Mt. Erica—all rose from an elevated table-land about 4,800 feet above sea level. Unfortunately another peak, situated at the south-eastern edge of the plateau, was known locally as Mt. Erica, but it was really some five miles distant from the Mt. Erica of the maps.

EXHIBITS

By Mr. W. Baragwanath, jun., per Mr. A. E. Kitson, F.G.S.—Photographs taken on Mount Baw Baw, at over 5,000 feet, by Mr. A. E. Rodda.

By Mr. P. C. Cole.—Carved Wommer, with chisel end, from North-West Australia.

By Mr. F. Chapman.—One hundred and three species of Foraminifera and fourteen of Ostracoda, including two new species and many hitherto unknown in the New Zealand area, obtained from dredgings made by Messrs. Hedley and Suter in 110 fathoms, off Great Barrier Island, North Island, New Zealand.

By Mr. C. French, jun.—Wood of Murray Pine, *Callitris verrucosa*, R. Br., destroyed by Buprestid Beetle, *Diadoxus scalaris*, from Kerang, Victoria.

By Mr. C. J. Gabriel.—Shells—*Myodora ovata*, Reeve, from Victoria; *M. striata*, Quoy, from New Zealand; *M. brevis*, Stutch., from Tasmania; *M. pandoraformis*, Stutch., from New South Wales; *Tellidora burnetti*, Brod. and Sow., from Mazatlan; and *Pandora inequivalvis*, Linn., from England.

By Mr. T. S. Hall, M.A.—Legless lizard, *Aprasia pulchella*, mimicking young form of Brown Snake, *Diemenia textilis*, D. and B. (known as *Furina bicucullata*, M'Coy), from Queensland, in illustration of paper; specimens of cones of Murray Pine, *Callitris*, sp., from Barrabool Hills, three miles west of Geelong.

By Mr. G. A. Keartland.—Princess Alexandra Parrakeets, *Spathopterus alexandrae*, North, from Central Australia, in illustration of paper.

By Mr. J. A. Kershaw, F.E.S.—Feather of extinct Moa, from New Zealand.

By Mr. A. E. Kitson, F.G.S.—Silurian fossils, Palæanatina, sp., and Palæoneilo, sp., determined by Mr. F. Chapman, A.L.S., from Yarra improvement works, near South Yarra railway bridge.

By Mr. F. Pitcher.—Blossoms of *Acacia baileyana*, F. v. M., and *Protea neriifolia*, from Botanical Gardens, Melbourne.

By Mr. C. Oke.—Young Copper-head Snake, *Hoplocephalus superbus*, Gunth., taken at Elsternwick on 1st July.

By Mr. J. Stickland.—Fresh-water Alga, *Spharella (Hematococcus) pluvialis*.

By Mr. A. Tymms. — Coleoptera, including *Schizorhina phillipsi*.

By Mr. G. Weindorfer. — Dried specimens of *Pultenea weindorferi*, Reader, sp. nov., from near Wandin, Victoria.

After the usual conversazione the meeting terminated.

THE LATE MR. H. T. TISDALL.

It is with deep regret we record the death of our fellow-member, Mr. Henry Thomas Tisdall, one of the best known botanical teachers in the State. Mr. Tisdall's connection with the Field Naturalists' Club of Victoria dates from

the second year of its existence, 1881-2, at which time he was head teacher of the State school at Walhalla, North Gippsland. Paying early attention to botany, at the third conversazione of the Club, in April, 1883, he exhibited a series of water-colour drawings of the wild flowers of his district, the results of several years' work, and in September of the same year contributed his first paper, entitled "A Botanical Excursion in North Gippsland," which apparently was not published, being before the establishment of the *Victorian Naturalist*. Having to a great extent exhausted the phanerogams of the district, he was induced by Baron von Mueller to turn his attention to the cryptogams, with the result that he became an excellent authority on fungi, &c., and at the meeting of the Club, in February, 1885, contributed a paper entitled "The Fungi of Mt. Baw Baw," in which he described some twelve species of the genus *Agaricus*, of which he also exhibited water-colour drawings of his own execution. In November of the same year he contributed a further paper on the fungi of North Gippsland, in which he made some remarks regarding the fungus then known as *Mylitta australis*, "Native Bread," which have since become historical, and which he repeated and amplified in May of last year (*Victorian Naturalist*, xxi., p. 56). This was destined to be his last contribution to our proceedings, though present at several subsequent meetings. During the interval of nearly twenty-one years between his first and last paper, and more especially after his promotion to the Albert Park school in 1887, he contributed numerous papers to the meetings of the Club, all relating more or less to botany, either as bearing on a particular branch or descriptive of trips or excursions in search of specimens. He was ever willing to lead an excursion or act as demonstrator at a practical meeting when appealed to by the committee, besides which he took his share in the management of the Club, serving for two years as vice-president, the same period as president (1893-5), and for six years as member of committee. His last act for the benefit of the Club was to take charge of the first excursion for juniors at Sandringham, in October last, when by his clear and simple remarks about the specimens gathered he quite endeared himself to many of the young people present. In addition to his knowledge of our phanerogamic and cryptogamic plants Mr. Tisdall was, at the time of his death, perhaps our best authority on marine Algæ, and in this department alone will be greatly missed. Besides his work for the Field Naturalists' Club he was ever ready to assist organizations of a kindred nature, and delivered several lectures before the Geelong Field Naturalists' Club. He contributed an article on the flora of Walhalla to the Mining Department's report on that goldfield (1902), as also some useful papers to the meetings of the Australasian Association for the Advancement of Science, which included a list of the marine

Algæ of Victoria. After his retirement from the Education Department in 1894, he was appointed lecturer on botany at the Training Institute for School Teachers and the Veterinary College, when he published a student's help called "Botany Notes." This consisted of his own drawings, reproduced by a copying process, supplemented with copious explanatory notes. His work, of whatever nature—whether as lay reader in the Anglican Church, as honorary secretary of the Head Teachers' Association, or as science teacher—always commanded his best efforts, with the result that he made numbers of friends, who will long remember him as one who seemed to live only to serve his fellow man. During late years he had to restrain himself somewhat, and when it was found necessary for him, early in the year, to take a complete rest it was hoped that in a few months he would be restored to his accustomed vigour; but it was not to be, and he passed peacefully away on the 10th July, at the age of 69, leaving a widow and grown-up family of sons and daughters, several of whom have gained University degrees, while one, Miss Constance Tisdall, B.A., having her father's tastes, is the author of "Australian Nature Stories for Children," noticed in these pages about a year ago.

A BOTANICAL TRIP TO MOUNT ERICA, BAW BAW.

By C. S. SUTTON, M.B.

(Read before the Field Naturalists' Club of Victoria, 8th May, 1905.)

ON New Year's Eve (Saturday, 31st December, 1904) three of us, Messrs. H. B. Williamson, G. Weindorfer, and myself, went to Moe (80 miles) by the afternoon Gippsland train, and before leaving the station arranged with Mr. Andy Templeton to be driven the following morning to Upper Moondarra, a distance of 19 miles, whence we were to scale Mount Erica, the nearest peak of the Baw Baw Range.

Accordingly, early on Sunday morning we set off in a three-horse waggon along the Walhalla road, crossing in all five times the track of the Moe-Walhalla line, now in course of construction, and also, in turn, the main drain of the Moe Swamp, the Latrobe—a fine stream, where the notes of the Bell-bird were dinned into our ears—the Tangil, and the Tyers.

Nothing of much botanical interest was seen so far, but *Cassinia aculeata*, *Helichrysum ferrugineum*, *Bursaria spinosa*, *Prostanthera lasiantha*, *Goodenia ovata*, *Dipodium punctatum*, *Melaleuca squarrosa* and *ericifolia*, *Leptospermum scoparium*, *Bauera rubioides*, *Persoonia juniperina*, *Gompholobium huegelii*, and *Dampiera stricta* were still in bloom, and *Ilakea sericea* in full flower. At the Tyers, a fine, quick, clear stream, bordered by a dense scrub, while the horses were being watered at the Cecil Inn, we breakfasted, and afterwards gathered *Leptospermum grandiflorum*,

Kunzea peduncularis, *Lasiopetalum dasyphyllum* (in seed), and *Lomatia longifolia*.

Crossing the bridge over the Tyers we entered the Moondarra district, and soon were passing through a patch of *Acacia mitchellii*. The road was now rising all the time until we passed the post-office, when we turned off the Walhalla road and found the way much rougher. We walked here for a while to relieve the horses when crossing a creek with steep banks, and collected *Helichrysum cuneifolium* on the way. After about five hours' driving we were deposited at Upper Moondarra, and, shouldering our packs, we trudged on to Hotel Creek, where we lunched. With the kind assistance of a local resident we got on to the blazed track along the spur leading to the foot of the mountain, and now felt we were fairly on the way to our goal. The track along the spur has frequent ups and downs, and is in parts not very well defined, but the blazed trees kept us from going astray, and we had no difficulty in finding the water in a branch of the Tyers a little to the left of the track as we approached the mountain. As we went we got *Drymophila cyanocarpa*, then just at the end of its blossoming, and at the water *Lyonsia straminea*.

The smoke of neighbouring bush fires was so thick that we did not see the mountain until we were right on it, and here the track was unmistakable. The going was easy, and hardly any rocks were encountered until we had arrived at our camping ground, about 4,500 feet above sea level. As we ascended we collected *Scaevola hookeri*, *Australina pusilla*, and *Raphanus raphanistrum*, but had very little occasion to halt, excepting to recover our wind.

By the time we had reached the boulders it was nearly dusk, and we had had quite enough exercise for the day, for our packs were heavy and the day was hot. Accordingly, it was with much relief that we dropped our burdens under the shelter of a huge boulder as big as a house, which had conveniently fallen on to another smaller brother, and so formed an excellent shelter. Immediately around here *Prostanthera nivea*, *Scaevola hookeri*, and *Senecio dryaleus* were in profusion. Finding no water among the boulders, we had to retrace our steps to a small spring we had passed in order to fill our billies, which we soon had boiling on the stone floor of our shelter. After refreshing ourselves we soon turned into our solitary blanket, in anticipation of an early start next morning, and seeing that we had to finish the ascent of the mountain, do our collecting on the summit, and make our way back over the 12 miles to where we had left our driver in time to be driven to Moe to catch the evening train, this early retirement was certainly called for. The stone floor was hard, the night fairly cold, and our covering slight, so that we had no difficulty in rising early. In fact, we anticipated the dawn, took a hurried breakfast, and set off to finish the ascent. Our efforts were soon rewarded. First of all we came on *Helichrysum rosmarinifolium*

and *Oxylobium alpestre*, then *Sisyrinchium pulchellum*, and after this *Wittsteinia vacciniacea* gladdened our eyes, all four being in their prime. On the summit the clouds were driving, so that our outlook was limited; but the small open spaces, where water meandered among the sphagnum beds, enclosed by stretches of dry ground littered with boulders and covered with a scrubby Eucalyptus, *E. coriacea*, reminded us of the high plains of the Bogong and Buffalo, and more particularly of the latter, which it very much resembled in miniature. In the open spaces we collected *Drosera arcturi*; *Richea gunnii*, in longer spikes and much more branched than on the Buffalo; *Prasophyllum alpinum*, *Senecio pectinatus*, just about to blossom; *Gentiana saxosa* (one specimen), *Herpolirion nove-zealandiae*, *Aster celmisia*, in very fine condition and very plentiful; *Epacris heteronema*, *Styphelia elliptica* (fruit), also *S. oxycedrus*, and *Pinelea alpina*, better than in the North-East. Among the boulders we got *Pultenaea muelleri*, *Prostanthera cuneata*, *Orites lancifolia*, *Drimys aromatica*, *Callistemon pityoides* (fruit), *Lomaria alpina*, and *Aspidium aculeatum*; and, right in the boulders themselves, *Coprosma nitida*, and very fine specimens of the *Wittsteinia*.

Very well satisfied with our haul, we returned to our camp by about 8 o'clock and transferred our specimens to the portfolios. The thick mist had by this changed to a fine rain, in which we set off down the mountain, and with brushing through the scrub we were soon pretty wet. Unfortunately, too, while on the spur, we took a wrong turn on to a jinker track, and had gone about a mile and a half out of our way before we saw the necessity to retrace our steps to the right road. This we luckily succeeded in doing, with only the loss of some time, and we eventually reached our impatient driver about 1.30 p.m., taking a snack at Hotel Creek on the way. The rain by this was heavier and steadier, and our journey back to Moe, broken only by a meal at the Cecil Inn (a well-known roadside house on the Tyers), was far from pleasant. Although an hour and a half late in commencing our drive, and in spite of the bad and slippery roads, which necessitated very careful driving, we yet succeeded in catching our train, and returned to town after a long and tiring day, very wet, but well satisfied with our experiences.

When the Moe-Walhalla railway is completed there will be a station at Upper Moondarra, very near to where we commenced our walk, and we hope then to renew our acquaintance with Mount Erica, and to extend it to its neighbours, Mounts Mueller and Baw Baw (about six miles from Erica), which will be more accessible than at present in a short holiday.

[Since writing the above I have learned that the mount visited by us, and locally known as "Erica," is not the Mt. Erica of the maps, but, though on the same table-land, is about six miles to the south-east of that peak.]

The following is a list of the plants collected, those marked † being obtained in fruit :—

- | | |
|---------------------------------|-----------------------------|
| Clematis aristata | Aster ramulosus |
| Ranunculus lappaceus | celmisia |
| Hibbertia stricta | glandulosus |
| Drimys aromatica | Gnaphalium japonicum |
| Hedycaria cunninghami | Helichrysum rosmarinifolium |
| Cardamine stylosa | ferrugineum |
| Raphanus raphanistrum (introd.) | cuneifolium |
| Viola hederacea | Cassinia aculeata |
| betonicifolia | Craspedia richia |
| †Billardiera scandens | Senecio velleioides |
| Drosera arcturi | dryadeus |
| †Comesperma ericinum | bedfordi |
| † calymega | lautus |
| †Zieria smithii | odoratus |
| Geranium pilosum | Erechtites prenanthoides |
| †Lasiopetalum dasyphyllum | Lobelia gibbosa |
| Oxalis corniculata | Wahlenbergia gracilis |
| Poranthera microphylla | Candollea serrulata |
| Amperea spartioides | Dampiera stricta |
| Stackhousia lamarifolia | Scaevola hookeri |
| Oxylobium alpestre | Goodenia ovata |
| Gompholobium huegelii | Brunonia australis |
| Pultenaea muelleri | Gentiana saxosa |
| † gunnii | Plantago varia |
| † scabra | Lyonsia straminea |
| † juniperina | Veronica gracilis |
| Dillwynia ericifolia | calymega |
| †Acacia dealbata | nivea |
| † discolor | Euphrasia brownii |
| Rubus parvifolius | Brunella vulgaris |
| Acacia sanguisorbæ | Prostanthera lasiantha |
| Bauera rubioides | nivea |
| Epilobium glabellum | cuneata |
| Lythrum salicaria | Wittsteina vacciniacea |
| Haloragis tetragyna | Styphelia elliptica |
| Leptospermum scoparium | oxycedrus |
| lanigerum (var. grandiflorum) | Epacris mucronulata |
| Kunzea peduncularis | heteronema |
| †Callistemon pityoides | Richea gunnii |
| Melaleuca squarrosa | Dipodium punctatum |
| ericifolia | Prasophyllum alpinum |
| Eucalyptus coriacea | patens |
| Cryptandra hookeri | Sisyrinchium pulchellum |
| Hydrocotyle geraniifolia | Drymophila cyanocarpa |
| Orites lancifolia | Dianella tasmanica |
| Hakea sericea | longifolia |
| Lomatia longifolia | Herpolirion novæ-zealandiæ |
| Persoonia juniperina | Xanthorrhœa minus |
| †Banksia collina | Triglochin procera |
| Pimelea humilis | Juncus pallidus |
| Coprosma nitida | Anthistiria ciliata |
| Sambucus gaudichaudiana | Ehrharta juncea |
| Lagenophora billardieri | Lomaria alpina |
| Brachycome cardiocarpa | Dicksonia billardieri |
| Aster argophyllus | Aspidium aculeatum |
| stellulatus | Pteris aquilina |

THE FRESH-WATER ALGÆ OF VICTORIA.

PART II. (*continued from page 35*).

BY A. D. HARDY.

(*Read before the Field Naturalists' Club of Victoria, 10th April, 1885.*)DESMIDIACEÆ (*continued*).

THE literature relating to Victorian Desmids is, as far as I have ascertained after a careful search, embraced in the following notes, which give the references in chronological order:—

In 1864 there appeared in the *Trans. Roy. Soc. Vict.* a short list of "Confervaceæ" and "Desmidiæ," collected by the late Mr. Henry Watts, and identified in Europe by algologists, to whom the material was sent by the late Baron F. von Mueller. In the list of Desmids some localities were given, but no authors of species—a regrettable omission, in view of the confusion of genera in the history of Algæ, and one that extends throughout all records of these plants in Victoria, with the exception of the few in Nordstedt's list.

The next record was in 1869, when Mr. Sydney Gibbons contributed to the *Roy. Soc. Vict.* (vol. x., old series) a paper entitled "Air and Water Poisoning in Melbourne." In this he dealt with organic matter, living and dead, found by him in an examination of water in gutters, drains, pipe services, &c., of the metropolitan water supply and drainage system. Among a number of Algæ were included eleven species of Desmids, and although little reference appeared in the letterpress, several micro-photographs, which were printed with the paper, show several genera easily recognizable, and an easily identifiable specimen of *Micrasterias furcata*, Ralfs.

In 1880, in F. v. Mueller's "Frag. Phytograph. Australiæ" (supplem. ad vol. undec.), there were recorded thirty fresh-water Algæ, inclusive of several genera of Desmids, but without detail of species.

In 1883 Mr. H. Watts read a paper before this Club entitled "A Trip to Mt. Macedon in Search of Fresh-water Algæ," which was printed in the *Southern Science Record*, vol. iii. (1883). The list of Desmids contained about a dozen species, a few of which were additional to those of previous records, but, as before, the authors' names were omitted, thus leaving the species in confusion.

In 1887 the *Victorian Naturalist* (vol. iii., p. 133) contained a paper by Mr. H. Watts, entitled "Some Recent Additions to our Knowledge of Microscopical Natural History." Included with various matters, the author gave a list of Algæ and Desmidiæ, in which his former lists, dating back to his first record of twenty years earlier, were consolidated, revised, and supplemented, but without localities

or names of authorities. His last list of "Desmidiæ" contained about fifty species, some of which were not Desmids, and others of doubtful generic and specific determination. After gathering from many sources, but mainly from old members of the Field Naturalists' Club—to whom, with the exception of Mr. C. French, jun., acknowledgment has already been made—the scattered fragments of Watts's collection of microscopic slides, I found that, though he mounted a large number of specimens, they comprised only a few species, and that most of them, owing to failure of mountant (glycerine jelly!) used, were practically valueless.

Later Mr. Watts prepared a manuscript which, though unpublished, has been kindly handed to me for perusal by Mr. F. G. A. Barnard. This paper he called "Infusoria Peculiar to Australia;" but the list of Desmids contains only species more or less cosmopolitan, and discrepancies occur which lead me to think that it would have been further revised before publication, and was probably withheld for that purpose. In the absence of names of authors of species, it may be well to mention that in this undated M.S. Mr. Watts says:—"We unhesitatingly state that we have never seen a species that could not be fully identified either by means of 'Ralfs' British Desmidiæ' or Dr. H. C. Wood's work on 'The Fresh-water Algæ of North America.'" This remark, to a large extent, discounts the value of the records of this enthusiastic worker. Accordingly, in the following list, where Watts has recorded a species which I have not collected, I have given with a query in brackets an author's name for the species as found in Ralfs' or Wood's, and these may be taken as the nearest approach at this date possible to identification of Watts's specimens.

In 1896 Dr. Otto Nordstedt published an illustrated list, with descriptions of New Zealand and Australian fresh-water Algæ collected by Dr. Berggren. Of these, the Victorian Algæ in the Australian section were few, and were collected near Fernshaw, in 1875, twenty-one years prior to publication. This list included eight Desmids.

On several occasions Mr. John Shephard and Messrs. W. and J. Stickland have noted an occasional species in reports on pond-life excursions.

The *Victorian Naturalist*, vol. xxi., p. 81 (1904) included a paper by myself, in which I gave a rough general sketch of the fresh-water Algæ, with a view to preparing general members for subsequent notes on families, and the historical sketch given above is calculated to clear the way for the family Desmidiaceæ—the most interesting, perhaps, of the unicellular Algæ. The list which follows is to be regarded as by no means a complete list of collected species, for many others, withheld for further examination, will be presented in supplementary lists.

It will be noted that many species are from the Yan Yean Reservoir. This is due to my having had more opportunities and time to examine that water, through facilities specially afforded me by the Metropolitan Board of Works, during an algological survey, now in progress and extending over a period of twelve months. Other interesting localities less accessible would, if more time were available, give equally good results, and these I hope to report on soon. The reservoir has yielded several new species, varieties, and forms, which appear in the list, accompanied by descriptions by Professor G. S. West.

Of these, one, to which the author of the species has given the name of the collector, is that which has been twice exhibited by me at Club meetings as "a new species of *Micrasterias*." Though it is recorded now for the first time, I remember having taken it in a muslin net at a city supply tap many years ago, when its numerical increase in the lake was abnormal. I have not seen its zygospore, but have noted it in all gradations of increase by vegetative division. The best known representative of the group to which this Desmid, *M. hardyi*, G. S. West, is related is *M. mahabuleshwariensis*, Hobson, a variety of which (figure 3 on the plate) I have collected from the Botanical Gardens lake, Melbourne, and of which a new variety is present in lagoons of the Upper Goulburn at Whanregarwen, Acheron, Eildon, &c.

The presenting of this and following lists has been rendered possible by the kindness of Professor West, England, and Dr. O. Borge, Sweden, who have sent me valuable literature. I have also to thank Miss Hardy and Messrs. W. Muntz, C.E., A. J. Day, H. C. White, J. Shephard, and Scott Sharpe for material forwarded for examination.

The following is a list of the Victorian Desmidiaceæ, compiled from the sources mentioned, arranged according to Professor West's classification:—

EXPLANATIONS OF TERMS AND ABBREVIATIONS USED.

FEATURES:—

- lag. — lagoon — small permanent lake or large pool, having part clear of weeds.
 plank. — plankton.
 pool — pond = small lagoon.
 Res. — large artificial reservoir, with vegetation.
 res. — small artificial reservoir, no vegetation.
 s. — swamp = marsh, more or less vegetated throughout.
 w. — from weeds, at or near margin, or within 2 metres of surface.

LOCALITIES:—

- Ach. = Acheron.
 Alex. = Alexandria.
 Chelt. = Cheltenham.
 H'berg. = Heidelberg.
 Melb. Bot. Gard. = Melbourne Botanical Gardens.
 Melb. W. S. (tap) = house tap of Melbourne Water Supply (more than one source).
 Sandr. = Sandringham.
 Thorn. = Thornton.
 Whan. = Whanregarwen.
 Wlsm. = Willsmere.

Class.—CHLOROPHYCEÆ.

Order.—CONJUGATÆ.

Fam.—Desmidiaceæ.

Sub-Fam. I.—SACCODERMÆ, Lütkemüller.

Tribe I.—GONATOZYGÆ, Lütkem.

Genus 1.—*Gonatozygon*, De Bary.

- G. kinahani* (Arch.), Rabenh. Yan Yean (Res., plankton)
G. minutum, W. West ... Whanregarwen (lagoon)
G. monotænium, De Bary ... Willsmere (lagoon)

Genus 2.—*Genicularia*, De Bary.

Tribe II.—SPIROTÆNIÆ, Lütkem.

Genus 3.—*Spirotænia*, Brèb.Genus 4.—*Mesotænium*, Näg.Genus 5.—*Ancylonema*, Berggren.Genus 6.—*Cylindrocystis*, Menegh.

- C. diplospora*, Lund. ... Yan Yean (Res., plankton)

Genus 7.—*Netrium*, Näg.

- N. digitus*, Ehr. Acheron (swamp)

Sub-Fam. II.—PLACODERMÆ, Lütkem.

Tribe III.—PENIÆ, Lütkem.

Genus 8.—*Penium*, Brèb.

- P. digitus*, Ehr. (?) ... Yarra Glen (lagoon)
P. didymocarpum, Lund. ... Upper Goulburn River (lagoons)
(*P. closterioides*, Ralfs?)
(*P. margaritaceum* [Ehr.],
 Brèb.?)
(*P. jenneri*, Ralfs?)
P. truncatum, Brèb. ... Whanregarwen (lagoon)
P. navicula, Brèb. ... Alexandra (lagoon)
P. nägeli, Brèb. Molesworth (swamps), Cheltenham, Sandringham

Tribe IV.—CLOSTERIÆ, Lütkem.

Genus 9.—*Roya*, W. and G. S. West.Genus 10.—*Closterium*, Nitzsch.

- C. acerosum* (Shrank), Ehr. ... Brighton (s.), Lake Colac
[*C. aciculare*, Tuffen West?]

- (*C. acutum*, Brèb. ?)
C. calosporum, Wittr. ... Yan Yean (Res., w.)
(*C. costatum*, Corda ?)
C. dianæ, Ehr. ... Ach. (s.), Richmond, Kew (river,
backwater)
C. ehrenbergii, Menegh. ... (Common)
C. gracile, Brèb. ... Yarra Glen (lagoon)
C. griffithsii, Berk. ... Heidelberg (lagoon)
(*C. intermedium*, Ralfs ?)
C. jenneri, Ralfs ... Yarra Glen (lagoon)
C. juncidum, Ralfs ... Melb. W. S. (at tap)
C. kutzingii, Brèb. ... Yan Yean Reservoir (plankton)
C. lanceolatum, Kutz. ... Lake Colac (w.)
C. leibleinii, Kutz. ... Eildon (lag.), Yan Yean (Res., w.)
C. lineatum, Ehr. ... Lake Wendouree, Ballarat
(*C. lunula*, Muller ?) ... Ballarat (swamp)
C. malinvernianum, De Not. Kew to Heidelberg (lagoons)
(*C. regulare*, Brèb.)
C. rostratum, Ehr. ... Yarra Glen, Eildon, Molesworth
(lag.)
C. setaceum, Ehr. ... Whan., Alex., Thorn., &c. (lag.),
Yan Yean (Res., w.)
C. striolatum, Ehr. ... Lake Wendouree, Ballarat ; Lake
Colac
C. venus, Kutz. ... Acheron, Eildon (lagoons)

Tribe V.—*COSMARIEÆ*, Lütkem.Genus 11.—*Docidium*, Brèb.

- D. baculum*, Brèb. ... Yarra Glen (lagoon)
(*D. clavatum*, Kutz. ?)
(*D. crenulatum*, Ehr. ?)
D. minutum, Ralfs ... Thornton, Eildon (lagoon)
(*D. nodulosum*, Brèb.)
(*D. truncatum*, Brèb.)
D. undulatum, Bail. ... Heidelberg (swamp)
(*D. verticillatum*, Ralfs ?)

Genus 12.—*Pleurotanium*, Næg.

- P. coronatum* (Brèb.), Rabenh. Geelong (Res.)
P. ehrenbergii (Ralfs), De Bary (Common)
P. mamillatum, sp. n. ... Yan Yean (Res., plankton)
P. nodosum, Bail. (Lund) ... Yarra Glen (lagoon)
P. ovatum, Nordst., var. in-
ermis, Moebius ... Cheltenham (s.), Willsmere (pool)

Genus 13.—*Triploceras*, Bail.

- T. gracile*, Bail., var. ... Whan., Ach., Yarra Glen (lag.),
Yan Yean (Res., w.)

Genus 14.—*Ichthyocercus*, W. and G. S. West.

Genus 15.—*Tetmemorus*, Ralfs.

T. brèbissonii, Menegh. ... Brighton, Sandr., Chelt. (s.)

Genus 16.—*Euastrum*, Ehr.

E. affine, Ralfs ... Melb. Botanical Gardens (lake)
(*E. ansatum*, Ehr.?)

E. ansatum, var. *compactum*,
Wolle.

E. binale, Turp. ... Acheron, Yarra Glen (lagoon)

E. binale, Turp., var. ... Yan Yean (Res., w.)

E. circulare, Hass. ... Yarra Glen (lagoon)

E. cosmarioides, W. and G.

S. West ... Alexandra (lagoon)

E. didelta, Turp. ... Alexandra, Cathkin (swamps)

(*E. pingue*?)

E. verrucosum (Ehr.), Ralfs,
forma ... (?)

E. turgidum (Wallich), Turn. Whanregarwen (lagoons)

Genus 17.—*Micrasterias*, Ag.

(*M. americana*, Ehr.?)

M. angulosa, Hantzsch ... Fernshaw

M. crenata, Brèb. ... Chelt., Ballarat (swamps)

M. decemdentata, Näg. (?) ... Heidelberg, &c. (lagoons)

M. denticulata, Brèb. ... Chelt., Thorn., H'berg. (swamp)

M. hardyi, sp. n. ... Yan Yean (Res., plankton)

M. incisa, Bail. ... Upper Goulburn R. (lagoons)

M. incisa, var. *Wallachiana* ... Upper Goulburn R. (lagoons)

M. mahabuleshwariensis, Hob-
son ... Melb. Botanical Gardens (lake)

M. mahabuleshwariensis, var.
reductum, var. n. ... Whanregarwen (lagoon)

M. oscitans, Ag. ... Whanregarwen (lagoon)

M. oscitans, Ag., var. *pinnati-
fida*, Kutz. ... Whanregarwen (lagoon)

M. pinnatifida, Kutz. ... Ach., Whan., Eildon, Thorn. (lag.)

M. radiosa, Ag. ... Cheltenham, Brighton (swamps)

(*M. truncata*, Corda?)

Genus 18.—*Cosmarium*, Corda.

C. amplum, Nordst. ... (?)

(*C. anceps*, Lund.?) ... (?)

C. bioculatum, Brèb. ... Yan Yean (Res., plankton)

C. biretum, Brèb. ... Melb. Botanical Gardens (lake)

C. botrytes, Borge ... Melb. Botanical Gardens (lake)

C. capitulum, Roy. and Bis.,
var. *australe*, var. n. ... Yan Yean (Res., plankton)

- C. contractum*, Kirch. (with zygospore) ... Yan Yean (Res., plankton)
C. contractum, var. *ellipsoideum* (?), W. and G. S. West... ... Yan Yean (Res., plankton)
(*C. connatum*, Brèb. ?) ... Heidelberg and Yarra River
(*C. cucumis*, Corda ?) ... (?)
C. difficile, Lütkem., var. *sublæve*, Lütkem. ... Yan Yean (Res., w.)
(*C. elegantissimum* ?) ... (?)
C. granatum, Brèb., var. *subgranatum*, Nord. ... Heidelberg (lagoon)
C. hardyi, sp. n. ... Yan Yean (Res., plankton)
(*C. meneghinii*, Brèb. ?) ... (?)
C. moniliforme (Turp.), Ralfs ... Yan Yean (Res., plankton)
C. neapolitanum, Bals., var. *australicum*, Schmidle ... Melb. Botanical Gardens (lake)
C. nitidulum, De Not. ... Whan., Melb. Bot. Gard. (lake)
C. obsoletum, Hentzsch. ... Yan Yean (Res., w.)
C. pachydermum, Lund. ... Yarra Glen (lagoon)
C. porrectum, Nordst. ... Melb. Botanical Gardens (lake)
(*C. præmorsum*, Brèb. ?) ... (?)
C. pseudoconnatum, Nordst. ... Thornton (lagoon)
C. pygmæum, Arch. ... Yan Yean (Res., w.)
C. pyramidatum, Brèb. ... Deepdene (lagoon)
(*C. ralfsii*, Brèb. ?) ... Macedon (pool)
C. reniforme, Ralfs ... Brighton (swamp)
C. scenedesmus, Delph. ... Yan Yean (Res., plankton)
C. tetraophthalmum, Kutz. ... Yan Yean (Res.), Macedon (pool)
C. tortum, Lager. et Nordst., forma *trigona* (?) ... Yan Yean (Res., plankton)
(*C. tumidum* ?) ... (?)
[*C. undulatum*, Corda ?] ... Heidelberg and Yarra River

Genus 19.—*Xanthidium*, Ehr.

- X. hastiferum*, Turner ... Yan Yean (Res., plankton)
X. bifurcatum, Borge, var. ... Cheltenham (swamp)

Genus 20.—*Arthrodesmus*, Ehr.

- A. convergens*, Ehr., forma ... Eildon (lagoon)
(*A. incus*, Brèb. ?)
A. octocornis, Ehr. ... Yarra Glen (lagoons)
A. triangularis, Lagerh. (forma *minor* ?) ... Yan Yean (Res., plankton)

Genus 21.—*Staurastrum*, Meyen.

- S. aristiferum*, Ralfs ... Thornton (swamp)

<i>S. aspersum</i> , Brèb. ...	Acheron (swamp)
<i>S. assurgens</i> , Nordst. ...	Thornton (swamp)
<i>S. brevispina</i> , Brèb. ...	Melbourne Water Supply (tap)
<i>S. corniculatum</i> , Lund. ...	Yan Yean (Res., plankton)
<i>S. corniculatum</i> , var. <i>spinigerum</i> , West ...	Yan Yean (Res., plankton)
<i>S. cuspidatum</i> , Brèb. ...	Yan Yean (Res., plankton)
<i>S. cyrtocerum</i> , Brèb. ...	Yan Yean (Res., w.)
<i>S. dejectum</i> , Brèb. ...	Yan Yean (Res., w.)
<i>S. dilatatum</i> , Ehr., forma <i>australica</i> , Schmidle ...	Heidelberg (lagoon)
<i>S. dickiei</i> , Ralfs ...	Melbourne Water Supply (tap)
<i>S. gracile</i> , Ralfs ...	Yan Yean (Res., plankton)
<i>S. hexacerum</i> (Ehr.), Wittr. ...	Yan Yean (Res., w.)
<i>S. lævispinum</i> , Bis., var. <i>subbrachiatum</i> , var. n. ...	Yan Yean (Res., plankton)
<i>S. leptacanthum</i> , Nordst. ...	Yan Yean (Res., plankton)
<i>S. leptocladum</i> , Nordst. ...	Yan Yean (Res., w.)
<i>S. mucronatum</i> , Ralfs, var. <i>delicatulum</i> , var. n. ...	Yan Yean (Res., w.)
<i>S. muticum</i> , Brèb. ...	Yan Yean (Res., plankton)
<i>S. muticum</i> , var. <i>victoriense</i> , var. n. ...	Yan Yean (Res., plankton)
<i>S. nudibrachiatum</i> , Borge, var. <i>victoriense</i> , var. n. ...	Yan Yean (Res., plankton)
<i>S. orbiculare</i> (Ehr.), Ralfs ...	Melb. W. S. (tap), Wism. (pool)
<i>S. paradoxum</i> , Meyer ...	Macedon (pool), Yan Yean (Res., plankton)
<i>S. paradoxum</i> , var. <i>longipes</i> , Nordst. ...	Yan Yean (Res., plankton)
<i>S. patens</i> , Turn., var. <i>planktonicum</i> , var. n. ...	Yan Yean (Res., plankton)
<i>S. punctulatum</i> , Brèb. ...	Yan Yean (Res., w.)
<i>S. sagittarium</i> , Nordst. ...	Yan Yean (Res., w.)
<i>S. seabaldi</i> , Reinsch., var. <i>ornatum</i> ...	Yan Yean (Res., plankton)
<i>S. sexangulare</i> (Buln.), Rabenh. ...	Yan Yean (Res., plankton)
<i>S. sexangulare</i> , var. <i>productum</i> , Nordst. ...	Yan Yean (Res., plankton)
<i>S. submanfeldtii</i> , W. and G. S. West, forma ...	Whanregarwen (lagoon)
<i>S. tetracerum</i> , West, forma ...	Yan Yean (Res., plankton)
<i>S. tricornis</i> , Brèb. ...	Whan. (lag.), Macedon (pool)
<i>S. vestitum</i> , Ralfs ...	Cathkin (s.), Macedon (pool)

Genus 22.—*Cosmocladium*, Brèb.

Genus 23.—*Oocardium*, Næg.

Genus 24.—*Spherozisma*, Corda.

- S. excavatum*, Ralfs ... Yan Yean (Res., w.)
S. vertebratum, Ralfs ... H'berg. (lag.); Lake Wendouree,
 Ballarat

Genus 25.—*Onychonema*, Wallich.

- O. nordstedtiana*, Turn. ... H'berg., Wism., Alex. (pools)

Genus 26.—*Spondylosium*, Brèb.

- S. papillatum* (?), W. and G. S.
 West ... Willsmere, Deepdene (pools)

Genus 27.—*Phymatodocis*, Nordst.Genus 28.—*Hyalotheca*, Ehr.

- H. dissiliens* (Sm.), Brèb. ... Alex., Whan., Thorn. (lag.),
 Chelt. (s.), Yan Yean (Res., w.)

Genus 29.—*Streptonema*, Wallich.Genus 30.—*Desmidium*, Ag.

- D. cylindricum*, Grev. ... Box Hill (creek, pool)
D. swartzii, Ag. ... Wism. Eildon (lag.) Chelt. (s.),
 Yan Yean (Res., plankton)

Genus 31.—*Gymnozyga*, Ehr.

- G. moniliformis*, Ehr. ... Yarra Glen (lagoon)

DESCRIPTIONS OF THE NEW FORMS.

PLEUROTÆNIUM MAMILLATUM sp. nov. (G. S. West).

Small, moderately elongated, 14-15 times longer than the diameter; semi-cells subcylindrical, slightly and very gradually attenuated towards the apex, with a somewhat prominent basal inflation and 10-11 undulations along each lateral margin, the undulations becoming gradually smaller towards the apex; apices convex-truncate, furnished with 6-7 (4 visible) large, conical-mamillate, somewhat diverging warts; cell wall sparsely punctate.

Length, 372-442 μ : breadth at base of semi-cell, 28-31 μ ; breadth in middle of semi-cell, 27-29 μ ; breadth of apex, without warts, 17-19 μ , with warts, 21-23 μ .

Habitat.—Yan Yean Reservoir, Victoria; in plankton, and amongst weeds at the margin.

This species is distinguished by the large size of the apical warts, which are somewhat mamillate in character and few in number. The semi-cells are approximately cylindrical in their lower half, but the upper half is distinctly attenuated.

MICRASTERIAS MAHABULESHWARENSIS, Hobson; var. REDUCTUM, var. nov. (G. S. West).

A variety with the inferior lobules of the lateral lobes much reduced and very short.

Length, 132 μ ; breadth (maximum), 112 μ ; breadth of polar lobe, 65 μ ; breadth of isthmus, 19 μ . Fig. 4.

Habitat.—Whanregarwen, Victoria; in lagoon of the Upper Goulburn River.

The great reduction of the inferior lateral lobules gives this variety a somewhat peculiar aspect.

MICRASTERIAS HARDYI, sp. n. (G. S. West).

Cells moderately large, a little longer than broad, very deeply constricted, sinus widely opened and acute angled, at the extremity very narrow, semi-cells 3-lobed; polar lobe large and slightly extended, inferior part narrow, with sub-parallel margins, within each of which is a series of about 7 small teeth, apex with 2 emarginate warts and with two small, short, emarginate processes disposed asymmetrically, angles produced into long denticulate, upwardly diverging processes; lateral lobes profoundly bi-lobulate, lobules large, elongate, denticulate, and diverging; apices of lobules and of processes of polar lobe quadridentate; with a series of minute teeth within the lateral lobules and the processes of the polar lobe.

Length, 200-220 μ ; breadth, 163-202 μ ; breadth of isthmus, 16.5-17.5 μ . Fig. 1.

Habitat.—Yan Yean Reservoir, Victoria; abundant in the plankton.

This species belongs to the section of *Micrasterias*, in which the polar lobe is furnished with accessory processes. It is, however, at once distinguished from the species of this section, such as *M. americana*, *M. mahabuleshwariensis*, &c., by the great length and divergence of the lateral lobules and of the processes of the polar lobe. There is at the same time a great reduction of the two accessory asymmetrical processes of the polar lobe.

COSMARIUM TORTUM, Lagerh. et Nordst. in Wittr., Nord. et

Lagerh. Alg. Exsic., No. 1,486, 1903; *fasciculus* 35, p. 16, 17 (*cum* fig.); forma *trigona* (G. S. West).

Cells from the vertical view rounded trigonal, angles very slightly produced (sub-mamillate); cell wall very delicately punctate.

Length, 21-24 μ ; breadth, 15-16 μ ; breadth of isthmus, 10 μ .

Habitat.—Yan Yean Reservoir, Victoria; very abundant in the plankton.

COSMARIUM CAPITULUM, Roy and Biss. in Journ. Bot., 1886, p. 195, t. 268, f. 9; var. *australe*, var. n. (G. S. West).

Lower margin of semi-cells less convex; capitulate angles slightly upwardly divergent.

Length, 16-19 μ ; breadth, 20-23 μ ; breadth of isthmus, 5.5-6 μ ; thickness, 8.5-9 μ .

Habitat.—Yan Yean Reservoir, Victoria; common in the plankton.

The upwardly diverging angles of this variety give the semi-cells a relatively straighter apex than in the type. The ventral part of the body of the semi-cell is also much less developed.

COSMARIUM HARDYI, sp. nov. (G. S. West).

Cells of medium size, about $1\frac{1}{2}$ times longer than broad, moderately constricted, sinus shortly linear, amplified within and widely open towards the exterior; semi-cells sub-spherical, semi-circular, apex very slightly truncate and smooth, lateral margins and inferior angles broadly rounded and furnished with minute granules, within the lateral margins and below the apex with two or three irregular series of minute granules; in the central part of the semi-cells with crowded scrobiculations, occupying a relatively large area, and disposed in oblique series. Side view of semi-cell sub-spherical. Vertical view broadly elliptical, with a very wide inflation on each side.

Length, $85\ \mu$; breadth, $57\ \mu$; breadth of isthmus, $21\ \mu$; thickness, $50\ \mu$.

Habitat.—Yan Yean Reservoir, Victoria, in the plankton.

STAUSTRUM LÆVISPINUM, Bisset; var. *SUBBRACHIATUM*, var. n. (G. S. West).

Semi-cells with the processes narrower towards the base and often emarginate-furcate at the apices.

Length without processes $17.18.5\ \mu$, with processes $30-35\ \mu$; breadth $11-12\ \mu$, with processes $30-32\ \mu$; breadth of isthmus, $6.5-7\ \mu$.

Habitat.—Yan Yean Reservoir, Victoria, in the plankton.

STAUSTRUM MUCRONATUM, Ralfs; var. *DELICATULUM*, var. n. (G. S. West).

Semi-cells elliptic-fusiform in outline, lateral angles sub-mamillate and apiculate.

Length, $32.5-35\ \mu$; breadth, $34-37\ \mu$; breadth of isthmus, $6-7\ \mu$.

Habitat.—Yan Yean Reservoir, Victoria, in the plankton.

STAUSTRUM MUTICUM, Brèb.; var. *VICTORIENSE*, var. n. (G. S. West).

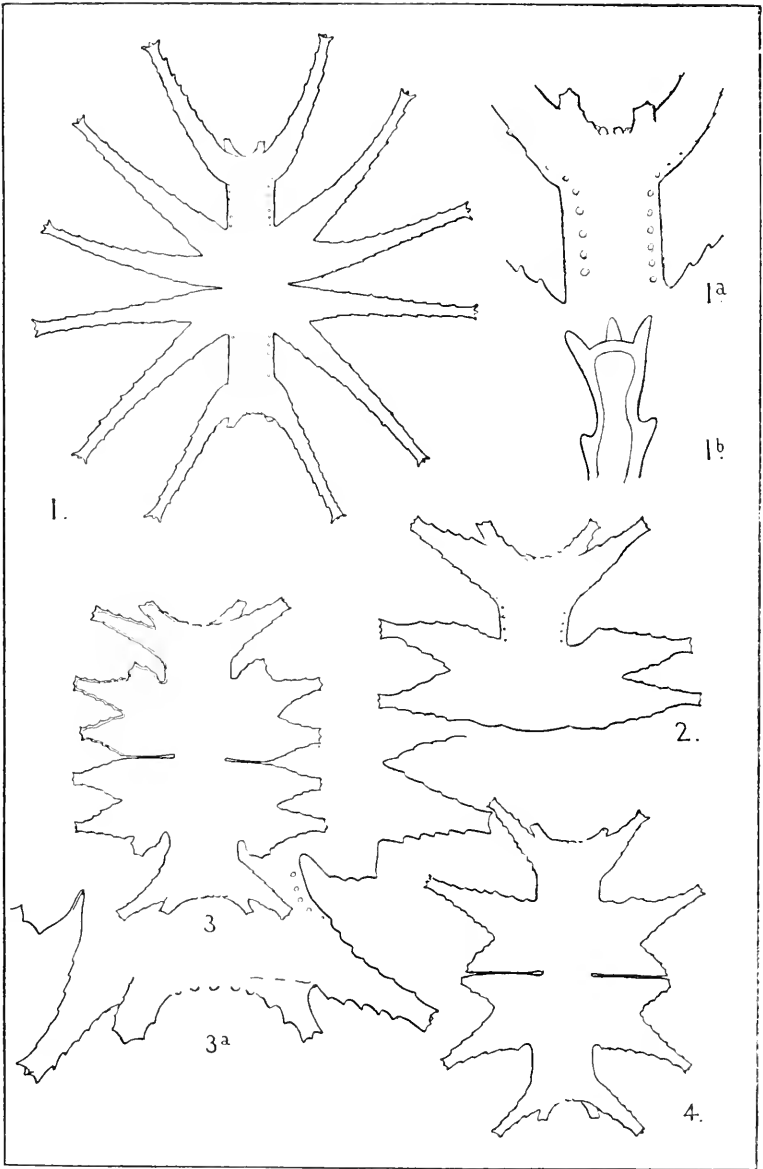
Cells longer than in the typical form; semi-cells broadly elliptic; cell wall delicately punctate.

Length, $30\ \mu$; breadth, $20.5\ \mu$; breadth of isthmus, $7.5\ \mu$.

Habitat.—Yan Yean Reservoir, Victoria, in the plankton.

STAUSTRUM NUDI BRACHIATUM, Borge in Arkiv for Botan. utgiv. of K. Sv. Vet.-Akad. Bd. 1, 1903, p. 109, t. 4, f. 20.; var. *VICTORIENSE*, var. n. (G. S. West).

Semi-cells from the vertical view 10-radiate; processes a little



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VICTORIAN (NEW) FORMS OF MICRASTERIAS.

narrower than in the type, and with the apices of the processes entire and rounded conical.

Length without processes, 45-46 μ ; breadth without processes 35-36.5 μ , with processes 79-96 μ ; breadth of isthmus, 31 μ ; thickness of processes, 4.8-5.8 μ ; length of processes, 25-34 μ .

Habitat.—Yan Yean Reservoir, Victoria; in the plankton and amongst weeds at the margin.

This remarkable *Staurastrum* is by no means uncommon in the material collected in February and March. The Australian specimens differ from the Brazilian forms in the greater number of processes on each semi-cell, and in their entire apices no specimens were observed with any trace of teeth at the apices of the processes.

STAUSTRUM PATENS, Turn. in Kongl. Sv. Vet.-Akad. Handl., 1893, Bd. 25, No. 5, p. 108, t. 14, f. 21; var. PLANKTONICUM, var. n. (G. S. West).

A little smaller than the type, with the angles of the semi-cells slightly produced and trispinate; in vertical view, with the sides almost straight, angles slightly produced and trispinate.

Length without spines 32 μ , with spines 52-56 μ ; breadth without spines 38-44 μ , with spines 58-56 μ ; breadth of isthmus, 11.5 μ .

Habitat.—Yan Yean Reservoir, Victoria, in the plankton.

This variety differs chiefly in the three large spines at each angle instead of the two possessed by the Indian forms.

EXPLANATION OF PLATE.

Fig. 1.—*Micrasterias hardyi*, G. S. West, sp. n., $\times 400$.

1a.—Portion of end lobe, much enlarged.

1b.—Quadridentate end of a lateral lobule, shown in optical section with two teeth, and with one tooth in perspective; much enlarged.

2.—*M. mahabuleshwarensis*, Hobs., Queensland, specimen of typical form for comparison. (Size ?) After Prof. Moebius's drawing of fig. 14, pl. x., Bot. Bull. XI., Centr. Qu. Fl., F. M. Bailey.

3.—*M. mahabuleshwarensis*, Hobs. (var. ?), a form showing partial development of a third pair of lateral lobules on each semi-cell. From Botanical Gardens Lake, Melbourne. $\times 400$.

4.—*M. mahabuleshwarensis*, Hobs., var. *reductum*, G. S. West, var. n., $\times 400$.

BOTANY AT THE UNIVERSITY.—The estimates recently presented to the University Council, amongst other proposals of a scientific nature, contain provision for the erection of a Botanical Laboratory, and the appointment of a Professor of Botany, who, it is proposed, shall also act as Government Botanist. This arrangement should ensure the best use being made of the collection of Australian plants in our National Herbarium, which is unequalled in the world.

A LIZARD MIMICKING A POISONOUS SNAKE.

BY T. S. HALL, M.A.

(Read before the Field Naturalists' Club of Victoria, 10th July, 1905.)

A SPECIMEN was recently sent to me for identification which appeared to be the young stage of the brown snake, *Diemenia textilis*, D. and B., named by M'Coy *Furina bicucullata*. On turning to M'Coy's plate in his "Prodromus of the Zoology of Victoria," the colouring of my specimen appeared almost identical with that of the coloured figure. There were the same velvety black patches on the head and nape, with deep orange between the two bands and behind the last. The back had the exact tint of pale brown in both cases. True, there were no transverse black marks on the body, and the ventral surface was not mottled as in the figure and was of a paler tint. But these markings I knew were variable, and the bands and spots were often absent. The only other noticeable colour difference was a light transverse line cutting the anterior black patch into two nearly equal parts. Still, I felt satisfied as to the identity of my specimen. However, to make quite sure, I examined the plates of the head. They did not agree, and, glancing at the body, I saw that I was the victim of one of Nature's practical jokes, for the specimen was clearly one of the so-called legless lizards.

Having been deceived myself, I suppose it was only in accordance with human nature for me to wish to entrap as many of my friends as possible. One after another they pronounced it to be M'Coy's *Furina*. I shall mention no names; they must confess themselves. I need only say that it was extremely comforting to me to find one naturalist after another falling into the trap which Nature had so cunningly laid. Two people, however, were not to be caught. They were Mr. J. A. Keartland and, needless to say, Mr. C. Frost. I was anxious about Mr. Frost, but it was not to be; the eye of the specialist was too keen. There seems to be what one may term an acquired colour-blindness, which has to be cultivated in many branches of science.

Though so different in colour from the specimen figured by M'Coy, my example was, according to Mr. Frost, the widely-ranging and variable *Aprasia pulchella*.

We can readily see the advantage to be gained by a harmless lizard mimicking a poisonous snake, and it is of interest to find it imitating a growth stage of its own size, for as the brown snake grows it loses the distinctive black colouring of its head, and is quite unlike what it was in the young state.

The specimen came from Queensland, though I am sorry to say I cannot say from what part.

A NEW GEOLOGICAL MAP OF VICTORIA.—The principal feature of interest to the field naturalist in the recently issued "Victorian Settler's Guide," published by the Lands Department of Victoria, is the new Geological Sketch Map of the State, accompanied by an article on Victorian rocks and their resulting soils by Mr. E. J. Dunn, F.G.S., Director of the Geological Survey of Victoria. The map gives considerably more detail than the previous one in Murray's "Geology and Physical Geography of Victoria," published by the Mining Department in 1887. In the present edition twelve colours are used in place of nine, and consequently it has been possible to divide the areas of volcanic rocks into newer and older, likewise the Silurian into Silurian (upper) and Ordovician (lower). Many other changes in determination of various areas have been made, and altogether the map indicates a considerable advance in our knowledge of the geology of the State. A quantity of other useful information is included in the guide, together with illustrations and maps showing water supply, temperature, rainfall, butter factories, and finally the State, on the scale of 16 miles to the inch, classified according to its productiveness. This map is particularly attractive, being coloured to show at a glance, besides many other interesting minor details, whether the land is adapted for agriculture, grazing, fruit growing, or is reserved for forest and timber-growing purposes.

FIGHTING ANTS.—Towards the end of October, 1904, I witnessed an encounter between two species of ants, one of which was probably identical with that mentioned by Mr. J. A. Hill in his interesting paper on the subject in the June *Naturalist*, vol. xxii., p. 35. There can be no doubt from the description that the larger species, *Formica purpurea*, was the same; it is known in many districts as the "Meat Ant," from its well-known predilection for flesh of any kind. The smaller species, *Crematogaster leviceps*, has a black, heart-shaped abdomen, which it turns up in a threatening manner when disturbed; its nests are usually placed in or under pieces of fallen dead timber. The courage of both is of a high order, though *Crematogaster* is the more determined fighter. In this case the larger ants were the aggressors. My attention was first drawn by seeing a constant stream of *F. purpurea*, in a state of great excitement, running swiftly along a footpath; many were returning to the nest laden with the dead bodies of *Crematogaster*. Following the line of march for 20 yards I came to the battle-ground, and a remarkable scene it was. The small ants had established their nests round about the base of a tree from which young "suckers" had grown up, and this tree and bush they were holding against the attacks of their (to them) gigantic foes. The small warriors were drawn up in a dense black line, from 1 to 3 inches in depth, extending in an irregular circle about 3 feet in diameter round the bush. The

line of defence was sharply defined by the shade cast by the bush, and where the shadow of the tree-trunk fell a strong wing was thrown out. The reason of this was that they could not stand the heat of the sun, as was easily ascertained by placing a few of them in the open, when in a few minutes they became quite helpless. The *F. purpurea* hovered in force round this circle, constantly rushing in and seizing one of the small ants and instantly biting it in two, only, however, to be seized in turn by six or eight of the defenders, which held on with bulldog-like tenacity, whilst more of their comrades sawed the hapless prisoner into several pieces. When once the small ants got a good hold they never let go, mutilation, and death even, failing to loosen their grip. Many of them were bitten off at the neck by the powerful jaws of the large species, but still the heads remained clamped on to the legs and antennæ of their adversaries. Where the fighting was fiercest there were rabid masses of both species as large as a pea-nut locked together in deadly combat. The carnage went on for four days, the *F. purpurea* withdrawing their forces about sunset, and marching out again soon after sunrise; but on the morning of the fifth day the purple warriors failed to put in an appearance, leaving to their small but invincible antagonists a well-earned victory.—J. C. GOUDIE. Birchip, 14th July, 1905.

FOWLS AND HAWKS.—Early one morning recently, my attention was drawn to a disturbance in the poultry run. On going out to ascertain the cause, I found a large hawk endeavouring to select his breakfast from among the chickens. In one run I have two hens with chicks, and I noticed that one (a white Wyandotte) had collected both lots of chickens, and was harbouring them underneath some scrub, while the other (a Minorca cross) remained out in the open, keeping guard. Once the hawk alighted upon the ground, then the hen made a rush at him, and they actually came in conflict for about thirty seconds, when the hawk was forced to retire.—J. BOOTH, Carlton.

EARLY BUTTERFLY.—While walking in the Domain near the Alexandra-avenue on 6th August I saw my first butterfly of the season, a nice specimen of the pretty yellow and black *Terias smilax* (Don), flying among the long grass.—N. F. W. B.

EXCHANGE NOTICES.

OOLOGY AND CONCHOLOGY.—Mr. W. N. Atkins, 25 Murray-street, Hobart, member of the Tasmanian Field Naturalists' Club, is desirous of exchanges with Victorian collectors.

CONCHOLOGY.—Mr. Wm. H. Weeks, jun., 506 Willoughby-avenue, Brooklyn, N.Y., U.S.A., is desirous of exchanging lists of duplicates.

LEPIDOPTERA.—Mr. Ross C. Winslow, Santa Clara, California, U.S.A., wishes to exchange North American Lepidoptera for Australian. Specimens named, in papers.

The Victorian Naturalist.

VOL. XXII.—No. 5. SEPTEMBER 7, 1905.

No. 261.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 14th August, 1905.

The president, Mr. F. G. A. Barnard, occupied the chair, and about 80 members and visitors were present.

REPORT.

The leader, Mr. T. S. Hall, M.A., reported that, owing to the rain, the ramble arranged for Saturday, 12th, from Heidelberg to Camberwell, had been abandoned.

ELECTION OF MEMBERS.

On a ballot being taken, Mrs. Cudmore, Murphy-street, South Yarra, Miss D. Fowler, Bamfield-street, Sandringham, and Miss J. Smith, Droop-street, Footscray, were duly elected ordinary members, and Miss Bertha Keartland, Masters Frank, Arthur, and Ernest Cudmore, and F. L. Alcock as junior members of the Club.

GENERAL BUSINESS.

Mr. A. Mattingley said that the letter from the Club which recently appeared in the public press, protesting against the destruction of wattle, appeared likely to give the public the idea that the Club was opposed even to a sprig of blossom being taken from a tree, and thought it would be well if the Club would define what it regarded as destruction of wattle trees.

The president said that his view of the matter, and one which he thought all would agree with, was that the mere picking of small sprays of blossom in the public parks should be overlooked, but it should be considered destruction where boys climbed the trees and broke down the branches with the intention of making up large bunches of blossoms. Such a case he had witnessed the previous day on the bank of the river at Ivanhoe, but being on private property the police could take no action.

The president also said that he had recently been pleased to notice several Silver Wattles in bloom in the Domain, near Brander's Ferry, but, on closer examination, in the case of nearly every tree the trunk had been slightly ring-barked or the bark on the branches cut longitudinally, and asked for information as to whether this was a case of vandalism, or had it been done with the idea of causing the trees to bloom in a young state?

Mr. F. Pitcher (Botanical Gardens) said that so far as he knew no permission had been given to cut the trees, and it

seemed strange that the trees which had been cut appeared to be blooming earlier than the others.

NATURAL HISTORY NOTES.

Mr. E. E. Barker, F.R.M.S., mentioned that for about two weeks he had had under observation a pair of Indian Minahs, which had selected as a site for their nest one of the electric arc lamps in St. Kilda-road, and he had been informed by the electrician who had charge of the lamps that he had several times removed the nest, but on each occasion found it rebuilt the next day. Finally, on the previous day he had found it again rebuilt and an egg deposited within.

Mr. H. J. Coles stated that during the past few weeks seventeen Grass Owls, *Strix candida*, Tick., had been forwarded to him from various localities; fifteen of the birds had been picked up dead, and were in very poor condition, being much emaciated.

Mr. G. A. Keartland said that he had noticed the same thing, and had heard of a number of dead owls being picked up around Melbourne. It seemed that the birds had been attracted from all parts of the country by the recent plague of mice which had appeared in the north-western part of the State, and while the mice were abundant found ample food, and were in excellent condition, but as the mice disappeared the birds seemed to die of starvation.

Mr. G. A. Keartland read an extract from the *Field* (London) describing a collection of living parrakeets in the aviaries of Mr. W. R. Fasey, at Snaresbrook, Epping Forest, which stated that among other well-known species which were breeding there was a pair of the Alexandra Parrakeet, *Spathopterus alexandrae*, of Central Australia.

MICROSCOPICAL EXHIBITS.

As a desire had been frequently expressed that an evening should be set apart for an exhibition of specimens under microscopes, the committee decided to omit the reading of any papers at this meeting, and devote extended time to the conversazione and exhibition of specimens.

Microscopes and exhibits were, among others, provided by Mr. J. Booth, who showed botanical and other objects; Mr. J. Gabriel, Victorian Polyzoa; Mr. A. D. Hardy, fresh-water Algæ, various Desmids, Diatoms, &c., and Euglena, sp., probably new, mounted specimen from Box Hill, 1901, and living forms from Doncaster, 1905; Mr. J. Stickland, a protozoan, *Paramœcium bursaria*, an interesting chlorophyll-bearing animalcule, and another, probably *Colpidium cucullus*, obtained in water which had collected in a tin during the winter; also mounted fresh-water Algæ, including *Pandorina morum*, and a species of *Zygnema* showing lateral conjugation; Mr. P. M. Ware, histological sections.

EXHIBITS.

By Mr. C. L. Barrett.—Young Copperhead Snake, *Hoplocephalus superbis*.

By Mr. J. E. Dixon and Mr. C. French, jun.—Longicorn beetle, *Uracanthus simulans*, found breeding in wood of *Correa speciosa*, at Kororoit Creek, Victoria, July, 1905.

By Mr. J. E. Dixon.—Dried specimens of the plant, *Marsilea quadrifolia*, from same locality.

By Mr. C. French, jun.—Gecko (lizard) with two-pronged tail, collected at Horsham, Victoria.

By Master C. French.—Live Blind Snakes, *Typhlops nigrescens*, collected by Mr. H. W. Davey at Bright, Victoria, July, 1905.

By Mr. A. E. Kitson, F.G.S.—Dried specimens of Chinese tea plant, showing foliage, flower, seed-pod, and seed; guava with leaves and ripe fruit; and licorice root, all grown by Mr. Robinson, at Dutson, near Sale, Gippsland; very large specimens of land crayfish, *Engaeus fossor*, from Moyarra, South Gippsland; skeleton, with skin attached, of a flying squirrel, *Petauroides volans*, found on a barbed-wire fence at Allambee East, South Gippsland. The animal had been caught by the foot on a barb, and had slowly and miserably perished.

By Mr. A. E. Kitson, F.G.S., and Mr. E. O. Thiele.—Three specimens of young eels, 6 to 8 inches long, obtained at an "eel-fare" at Mataura Falls, Mataura River, South Island, New Zealand, January, 1904.

By Mr. A. Mattingley.—Eggs of Cockatoo-Parrakeets, *Calopsittacus novaehollandiae*, laid that day in Melbourne.

By Mr. E. B. Nicholls.—Short-nosed Bandicoot, *Perameles obesula*, Shaw; Lesser Dormouse Phalanger, *Dromicia concinna*, young in pouch; Common Pouched Mouse, *Sminthopsis murina*; growing specimens of Western Australian Pitcher Plant, from Albany, W.A.; fruits of Zamia Palm, on which Wallaby, Bandicoot, and numerous small birds feed; also a number of Western Australian bird-skins (exhibited at July meeting, the record overlooked in last *Naturalist*).

By Mr. F. M. Reader.—The following dried plants (two new varieties):—*Cassinia aculeata*, R. Br., var. *imbricata*; *Lepidium papillosum*, F. v. M., var. *intermedium*.

By Mr. H. B. Williamson.—Dried specimens of plants naturalized in Victoria:—*Amaranthus viridis*, L., from Essendon (waste places); *Chenopodium bonus henricus*, L., from Hopkins mouth; *Senecio elegans*, L., from Hopkins mouth; *Valerianella microcarpa*, from Portland (very common); *Calendula arvensis*, L. (Marigold), from near Geelong; *Chrysanthemum leucanthemum*, L. (Ox-eye Daisy), from Ballan and Strzelecki; *Crepis tectorum*, Sm., from Otway Ranges; *Zostera marina*, L., from

Port Fairy. Also, as new for S.W. Victoria — *Brachycome scapigera*, D. C., from Hawkesdale; *Potamogeton perfoliatus*, L., from Merri River, Warrnambool; *Carex gunniana*, Booth, from Hawkesdale.

THE DISTRIBUTION OF THE FRESH-WATER EEL IN AUSTRALIA AND ITS MEANS OF DISPERSAL.

BY T. S. HALL, M.A.

(Read before the Field Naturalists' Club of Victoria, 10th July, 1905.)

THE presence of eels in isolated dams and waterholes has long been a puzzle to people in general, and they decline to believe that they found their way there by scrambling and wriggling through the grass in wet weather. The explanation is too simple; and whirlwinds, or the transport of eggs by birds, are invoked to account for their presence, it may be, many miles from running water. During the past few years the fact, long suspected, that fresh-water eels breed only in the sea has been proved beyond dispute for the European eel, and there have been no reasons advanced for believing it otherwise in the case of our Australian species. The young eel is quite unlike the adult, being ribbon-like and rather deep, with a small head. By the end of the first year it has practically assumed the adult form, and is about a couple of inches long. It now leaves the deep water, approaches the coast, and begins to ascend the rivers. The young eels pass up in enormous shoals, and their journeys are in parts of England known as "eel-fares."

I remember, as a boy, seeing an eel-fare at the rapids on the Barwon, known as Buckley's Falls, a few miles out of Geelong. We caught dozens of them with our hands as they wriggled up the rocks in the damp places where the current was weak. They were ravenously hungry, and though only a couple of inches long, and as thin as a leather bootlace, we caught them on hooks baited with worms as large as themselves. I regret that I cannot say the time of the year when this took place.

Passing up the streams in these numbers they can in wet weather find their way all over the country, and it is doubtless in this manner that isolated holes are frequently reached. However, the larger eels will also travel over swampy ground for great distances. I quote another observation of my own. At Moolap, some five miles east of Geelong, in a paddock I knew as a boy, was a slight depression, which in very wet weather was covered for about an acre with water up to one's knees. The water drained away along a furrow in a ploughed field, and two miles further on, over almost level country, entered a small drain about two feet deep. This, after a mile or so, entered the Reedy Lakes, which are a series of large swamps along the lower

Barwon. Two small waterholes on the course of this drain were inhabited by two species of Galaxias, the small red-finned perch (*Microperca*), and an occasional eel. During one wet winter we caught an eel 18 inches long in the furrow near the swamp. This was three miles from the lakes, and the eel was in a plough furrow, a quarter of a mile from the nearest waterhole, in a mere trickle of water six inches broad and one or two deep. Naturally, in pouring rain, it could travel more widely and more easily. The furrow contained many Galaxias as well.

Some time ago Mr. W. Hopkins, in a paper read before this Club (*Victorian Naturalist*, xx., p. 46), mentioned several dams on the plains west of the long reach of the Barwon between Winchelsea and Inverleigh. The overflow from these dams runs into Lake Murdeduke, which has no outlet, is salt, and contains no eels. Yet these dams all contain eels. Mr. Hopkins had ridden constantly over these plains in all weathers, and said he had never met an eel travelling over the grass on its way from the Barwon to this inland basin. His conclusion was that the eels bred in the dams. Last year I was at Gnarwarre, where I met Mr. Patrick Corbett, who has lived in the district for over 50 years. He was telling tales of his experiences, and mentioned as a curious fact that he once found in a wet season a fair-sized eel out on the Murdeduke Plains, miles from the river and from any dam. Can there be any doubt how the long chain of swamps from Murdeduke to Lakes Calvert and Colac are populated by eels? One positive observation is worth a hundred negative ones.

Turning from the discussion as to the means of dispersal of eels, let us consider a few facts as to their distribution, or the districts in which they are found. One of the peculiarities of the distribution of life in Victoria is the distinctness of the flora and fauna north and south of the Dividing Range. For the past forty years it has been generally accepted as a fact, and repeatedly stated, that eels, which are present in all the south-flowing streams, are absent from the Murray and its tributaries. It is true that occasionally eels have been reported from some of the affluents of the Murray, but their reporters have evidently considered the fact worthy of record from its rarity of occurrence. It is possible that they were not eels, but lampreys, for no qualified person, as far as I know, has confirmed the identification. Even if they were eels, we should not be surprised at an occasional wanderer finding its way over the small space separating some of the head waters of the northern and southern streams.

A correspondent who lived at Boort, on the Lower Loddon, who is an enthusiastic fisherman, told me that the inhabitants he had spoken to did not know what an eel was like. They had never seen one, and this held true for the Murray and billabongs

to the north. Mr. C. W. Graham Officer, B.Sc., told me recently that an eel had been caught at Bourke, on the Darling. After much discussion as to the nature of the animal, the postmaster, who had lived on the coastal side of the divide in New South Wales, saw it, and identified it as an eel. There was a tradition, Mr. Officer said, that one had been caught years before, but this was generally regarded with suspicion. So eels do not enter into the Darling fauna.

Quite recently a couple of letters on eels in the Murray have appeared in Mr. Donald Macdonald's "Nature Notes" in the *Argus*. A correspondent, writing from, I think, Kilmore, mentioned that eels were found in the south-flowing streams, but not in the north-flowing ones of his district, and suggested that the Murray Cod would not let them occur there. The explanation is highly improbable. Mr. Macdonald called for further information as to eels in the Murray, especially in the lower reaches. The following reply from a correspondent, which appeared in the *Argus* of 7th July, is strongly confirmatory of their non-occurrence in the middle Murray:—

“ ‘B.S.’ (Bethanga), writing about the absence of eels in the Murray, says:—‘I have lived on the river at different times and places for the last fifty years, and know it from Albury to Wentworth. I have fished and netted with the blacks in the river and lagoons, and during all that time never heard of an eel being seen or caught. A few lampreys have been taken, but they are rare. In 1865, when snagging the river near Tocumwal, we caught in a hollow log a fish like an eel, which was sent to Professor M‘Coy, and classed as a lamprey. It is probably in the Museum still. It was shown to the blacks on the river, but they all declared they had never seen one like it before. Later on several were taken between Tocumwal and Swan Hill, all in old snags, and their length varied up to 10 inches.’ The first one caught was, I think, 15 inches or 18 inches long.’ ”

But are eels absent from the lower waters of the Murray? They are common in all the streams of our south coast, and a correspondent at Mount Gambier, in South Australia, tells me they occur about the Mount, as far west as Lake Bonny. As regards the Murray, he sent me a cutting from the *Adelaide Advertiser*, of 24th May, 1905, which said that at Caloote a Mr. Pope caught on the 22nd what was believed to be a conger eel, weighing 19 lbs., and it was stated that such fish were uncommon in the Murray. But this is a sea fish, and of a different genus from the fresh-water eel. No fresh-water eel is known weighing as much as 19 lbs.

In reply to a request of mine for information, Mr. A. Zietz, the Curator of the Adelaide Museum, says:—“Fresh-water eels do not occur in South Australia, except in the Mount Gambier

district, between Mount Gambier and Beachport, in waterholes. I have never seen or heard of any eels being caught in the Murray."

Having seen that eels and blackfish (*Gadopsis*) were being introduced into Western Australian streams, I wrote to Mr. L. Le Souëf, Secretary of the Acclimatization Committee of Western Australia, in Perth. He says there are certainly no eels in the southern streams, and inquiries made by him for me resulted in no evidence of their occurrence in the northern rivers of the State.

The Horn Expedition found no eels in the Finke basin, though other fish were common in places, even up to over a pound in weight.

"The British Museum Catalogue" records eels from Cape York, in the north of Queensland, and right down the east coast. We now know they are absent from all the interior basins, and from the Murray basin. They are unknown in South Australia, except in the south-east, and are absent from Western Australia. I have not been able to find whether they occur in the Northern Territory or in the Gulf country.

Looking at the wider distribution of the genus *Anguilla*, Günther, in his "Introduction to the Study of Fishes," says it occurs throughout Europe, except in the Black Sea and Caspian basin. The genus is unknown in South America, in Western North America, and in West Africa. Now, curiously, this deficiency is extended to the south-west of Australia, and to the greater part of its south coast.

This is an extremely puzzling series of facts. Did the genus breed in fresh water we might guess at a solution, but breeding in the sea, as it does, I can suggest no explanation.

THE RANGE OF THE PRINCESS OF WALES PARRAKEET, *SPATHOPTERUS ALEXANDRÆ*, NORTH.

BY G. A. KEARTLAND.

(Read before the Field Naturalists' Club of Victoria, 10th July, 1905.)

As time elapses we are gradually gaining information regarding the range of these beautiful parrakeets, which proves it to be more extensive than was at first supposed.

These birds were originally discovered by Mr. Waterhouse, over forty years ago, at Howell's Ponds, in the far north. The next specimens, secured about twenty-five years later, were a pair of nestlings taken by Mr. Magarey at Crown Point station, on the Finke River, north-west of Charlotte Waters. Then, during Lord Kintore's overland trip from Port Darwin to Adelaide, Dr. Stirling shot several at Newcastle Waters. On 16th June, 1894,

they were found by the members of the Horn Scientific Exploring Expedition near Glen Edith, on the western extremity of the West Macdonnell Ranges, almost due north of Lake Amadeus. It was on this occasion that I obtained about fifteen specimens, some of which are to be found in the museums of Melbourne, Sydney, and Adelaide. In November, 1894, Mr. Chas. Pritchard found them breeding on the Hale River, near Alice Springs, when he secured a number of nestlings, one of which is still alive in the possession of Mr. Chas. French, jun. In the same month Mr. C. E. Cowle reported seeing them occasionally flying around Illamurta. In August, 1896, these parrakeets were seen and shot in the Great Sandy Desert of North-West Australia, on the route of the Calvert Exploring Expedition, about 300 miles north-east of Lake Way, and on several subsequent occasions as we went northwards towards Separation Well. In March, 1897, I shot two out of a flock about fifty miles north of Joanna Spring. Mr. L. A. Wells, our leader, next saw them within fifty miles of the Fitzroy River, West Kimberley, in May, 1897. About three years ago they were found breeding about forty miles from the Menzies goldfield in Western Australia, and three young ones taken from there have been brought to Melbourne. Last month Mr. L. A. Wells wrote to me saying that whilst on the Alberga River recently he found these birds breeding within eighty miles of Oodnadatta, the terminus of the trans-continental railway. This is the first time they have been noted in South Australia proper, and the most southerly point by several hundred miles of which we have any record. Hitherto Crown Point was the southern boundary.

It is remarkable that they have never been known to breed twice in the same district. They are always found in or near spinifex country, and their food consists chiefly of the seeds of Spinifex Grass, *Triodia irritans*, and Portulaca. The former resembles small canary seed, and the latter is not unlike coarse gunpowder. As spinifex abounds largely in Queensland and New South Wales, it is possible we may yet have reports of the Princess of Wales Parakeets being found in those States. Up to the present their range has been limited to the western side of the continent.

ERRATA.

On page 55, line 5, page 56, line 17, and page 74, line 8 from bottom, for "*Aprasia pulchella*" read "*Delma fraseri*, Gray."

On page 64, par. 4, strike out words "compiled from the sources mentioned," and after "classification" add — "The species in brackets, recorded by Watts, I have not seen."

The Victorian Naturalist.

VOL. XXII.—No. 6. OCTOBER 5, 1905.

No. 262.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 11th September, 1905.

The president, Mr. F. G. A. Barnard, occupied the chair, and about 75 members and visitors were present.

REPORTS.

A report of the excursion to Ashburton on Saturday, 26th August, was read by the leader, Mr. F. G. A. Barnard, who said that, considering the time of year, there was a good attendance of members. However, the results of the outing were not very striking. In a small pool near Gardiner's Creek *Volvox globator* was found in great abundance, in the interesting antheridian stage. Among flowering plants the most noticeable was the orchid *Pterostylis nutans*, which, it was mentioned, makes a capital pot plant, and the irritability of its labellum adds considerably to its interest when cultivated at home.

A report of the junior excursion to Studley Park, on Saturday, 2nd September, was given by the leader, Mr. F. G. A. Barnard, who said that the afternoon turned out wet, and in consequence the attendance was much smaller than anticipated. However, some 30 or more faced the weather, and rambled towards Dight's Falls, where some historical and geological information was afforded. On the top of a neighbouring ridge some remains of Brachiopods were obtained in the outcropping Silurian rocks, and numerous varieties of galls were collected on the shrubs around. The principal plants noticed in bloom were *Hymenanthera banksii*, *Acacia acinacea*, and *Myoporum viscosum*, the former shrub being a pretty sight. The opportunity was taken by Mr. J. A. Leach, B.Sc., to point out the geology of the district and the resulting geography, and finally the reservoir, about 195 feet above sea level, was visited.

A report of the excursion to Eltham on Saturday, 9th September, was furnished by the leaders, Messrs. G. A. Keartland and G. Coghill. The first named dealt with the birds, which, though fairly numerous, were not of sufficient importance to call for any special remarks, with the exception of the White-naped Honey-eater, *Melithreptus lunulatus*, which was remarked as having brown instead of the usual black-capped heads, while the rest of the plumage lacked its usual brilliancy. Mr. Coghill said that the botany of the outing was very uninteresting, as the paddocks traversed were utilized for grazing, with the consequence that

plants were very scarce. A few Silver Wattles were still in bloom near the Plenty and the Diamond Creek.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. F. G. Dombrain, Canterbury, was elected an ordinary member, Masters Roy and John Dombrain as associates, and Masters G. E. Barrett, L. Gomm, J. Snadden, P. Whitfield, H. Dew, Misses Florrie Gray, Lily Carpenter, and Reva Debney as junior members of the Club.

GENERAL BUSINESS.

The president introduced and welcomed to the meeting Mr. E. R. Ford, a member of the recent Antarctic expedition. In thanking the meeting, Mr. Ford alluded to his South Polar experiences, and gave some interesting particulars of the breeding habits of the Emperor Penguins.

The president offered the congratulations of the Club to Mr. O. A. Sayce on his appointment to the position of Demonstrator in Bacteriology at the University, and referred to the possibility of a line of scientific investigation entered upon as a hobby leading to the advancement of the investigator, and lifting him out of the ordinary routine of a business life.

The president called attention to the exhibit of Acacia blooms from the Botanical Gardens, and said that the Australian border there was well worthy of inspection at the present time, as at last a number of the smaller native plants appeared as if they would thrive in their new environment.

PAPERS READ.

1. By Mr. J. H. Maiden, F.L.S., entitled "On Three New Species of *Pultenæa*." (Communicated by Mr. J. F. Haase.)

The author described and named three species of the genus *Pultenæa*, recently found in Victoria—viz., *P. vrolandi*, a diffuse shrub up to six feet in height, found by Mr. A. W. Vroland on a granite hill near Mt. Wombat, Strathbogie Ranges; *P. williamsoni*, a weak-stemmed trailing shrub, also found by Mr. Vroland, near creeks at Strathbogie; and *P. luehmanni*, a trailing, procumbent, straggling shrub, found by Mr. H. B. Williamson in the Grampians, November, 1904. All three species had been forwarded to him by Mr. H. B. Williamson, of Geelong.

2. By Messrs. A. E. Kitson, F.G.S., and W. Baragwanath, jun., entitled "The Source of the Yarra River, and the Geography of the Mt. Baw Baw District."

The authors pointed out that on the published maps the head waters of the Yarra are shown to be mainly two slightly converging streams embraced within a V-shaped mountain region, with its apex in the flanks of Mt. Baw Baw; whereas, in reality, several miles of supposed Yarra are really within the drainage

areas of the Thomson and the Tanjil. These two streams, for the first few miles of their courses, have a generally westerly direction; they then turn sharply, the Thomson to the north and the Tanjil to the south. The explanation, based on their peculiar courses and the character of the country in that region, appears to be that the Thomson has captured the north branch of the Yarra and the Tanjil the south branch. The main mass of Baw Baw consists of a *massif* of grano-diorite that has been intruded into a vast area of Ordovician and Silurian slates and sandstones, which have a generally northerly strike. This has caused the induration of these sediments for some distance back from the contact. The result has been to prevent the east and west streams from cutting through this mass as quickly as the north and south streams, which run along the strike of the strata, and probably along a great fault line. In consequence the Thomson, cutting its way south, and the Tanjil north, were more quickly able to corrode their channels than the Yarra was able to cut its way E.S.E. across the beds. Baw Baw was shown to be a plateau with a general altitude of about 4,800 feet. The whitened remnants of myriads of dead Snow Gums attest the former occurrence of a stunted forest, killed probably by boring insects rather than by bush fires. The Yarra Falls, six in number, 700 feet in aggregate height, as ascertained by Messrs. Walker and Campbell, have hitherto been considered unique, but Mr. Baragwanath's survey has shown that all the streams flowing north, east, and south-east form similar falls, some of them 1,000 feet, near the grano-diorite contact, while those flowing south have a uniform though rapid descent to the much less elevated region, covered with Cainozoic sediments and volcanic deposits.

The paper was illustrated by lantern views of district maps and photos. of the Upper Yarra and Falls, kindly lent by Mr. A. J. Campbell, and of Walhalla-Baw Baw district by Mr. Barnes, of Walhalla, together with those of the Walhalla-Tyers district by Mr. Kitson. By their aid the topography as hitherto known, and as modified by Mr. Baragwanath's survey, was clearly shown.

In the discussion which followed, Mr. C. R. Ford mentioned that on the island of South Trinidad, in the South Atlantic, he had noticed a patch of hundreds of dead trees which apparently had been destroyed simultaneously. Many speculations were made as to the cause of their destruction, but all the theories put forward failed to throw any light upon the subject. The agency of a wood-boring larva was suggested as the cause, but the examination of a considerable number of trees did not reveal any signs of their former presence.

Mr. D. Le Souëf, C.M.Z.S., said that whilst in Western Australia he had noticed that the larvæ of beetles attacked only

the dead wood of trees, and he should like to know whether the authors had observed any signs of a boring insect upon the patch of dead trees on Mt. Baw Baw.

Mr. W. Baragwanath stated that undoubtedly, in his opinion, the patches of dead trees upon Mt. Baw Baw were destroyed through the agency of a wood-boring larva. Upon examination of a number of trees they had found that the larvæ had attacked the roots, and then bored through the centre into the heart of the tree. Unmistakable evidence of their presence was shown by the deposits of sawdust around the trunks of the trees. A considerable amount of young growth was springing up, but not from the old roots, as would be the case if the trees had been scorched by bush fires. From both the green and dead trees live larvæ were taken.

EXHIBITS.

By Miss Laura Cowle.—A large series of shells collected at Circular Head, Tasmania.

By Miss Kate Cowle.—Dried specimens of mosses collected at Otway Ranges, V. : *Dicranum tasmanicum*, *D. setosum*, *Campylopus introflexus*, *Ceratodon purpureus*, *Polytrichum magellanicum*, *Philonotis tenuicola*, *Dawsonia longiseta*, *Tricocolea tomentella*, *Ramalina ekloni*, *Cladonia retipora*, *C. pyxidata*, *Brevetelia atrata*, *Leptostomum inclinans*, *Rhizogonium spiniforme*, *Parmelia perforata*, *Theloschistes chrysophthalmus*.

By Mr. F. Chapman, A.L.S.—Fossil remains of the Victorian Wombat, *Phascolomys mitchelli*, and Gunn's Bandicoot, *Perameles gunni*, from dunes, Spring Creek, Torquay.

By Mr. A. J. Campbell.—Skins of the following birds:—Carter's Honey-eater, *Ptilotis carteri*, Campbell, described in *Victorian Naturalist*, vol. xvi., p. 87 (1899); Lesser White-plumed Honey-eater, *P. leilavalensis*, North; White-plumed Honey-eater, *P. penicillata*, Gould.

By Miss S. W. L. Cochrane.—Wild flowers from Gippsland and Western Australia.

By Mr. C. French, jun.—Orchids, *Acianthus caudatus*, *Pterostylis cucullata*, var. *alpina*, from Grantville, Vict., collected by Mr. J. T. Paul; three rare Victorian beetles—*Dilochrosia* (*Schizorrhina*) *bakewelli* and *Enaphyllus rossi*, collected at Gippsland; also *Stigmodera fortunei*, from the Mallee.

By Mr. C. J. Gabriel.—Shells collected at South Melbourne beach, including live specimens of *Trophori paiva*, Crosse, *Chione cardioides*, Lam.; also *Chlamys lactus*, from Japan.

By Mr. A. Mattingley.—Albino specimen of Black Mountain Opossum.

By Mr. F. Pitcher.—On behalf of the Director, Melbourne Botanic Gardens, blooms of the following foliated Acacias:—*A. acinacea*, *A. lunata*, *A. myrtifolia*, *A. oxycedrus*, *A. spectabilis*, *A. stricta*.

By Mr. F. M. Reader.—Dried specimens of grasses, naturalized and new for Victoria—*Agrostis alba* and *Bromus japonicus*.
After the usual conversazione the meeting terminated.

TRAMPS THROUGH BENAMBRA, VICTORIA, TO MOUNT KOSCIUSKO, NEW SOUTH WALES.

PART I.—VIA CORRYONG.

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

(Read before the Field Naturalists' Club of Victoria, 13th March, 1905.)

THE following notes are made from personal observations during two journeys to Mount Kosciusko in 1895 and 1896. The routes taken are shown on the accompanying sketch map.

The starting point of each trip was Tallangatta (622 feet above sea level), a railway terminus $212\frac{1}{2}$ miles north-east of Melbourne, and reached by a branch line, $25\frac{1}{2}$ miles long, connecting with the North-Eastern line at Wodonga.

The first trip was *via* Corryong to the Murray River near Towong, thence through New South Wales, returning the same way.

At 5 a.m. on 28th March, 1895, Mr. G. J. Bain and I left Tallangatta by coach for Corryong, 50 miles to the east. After running along the Tallangatta Creek Valley to Dry Forest Creek, we climbed up the range separating the former from Koetong (Cooyatong) Creek. Looking S.E. from the summit of this range (2,500 (?) feet high) a glorious view can be obtained on a fine day of Mt. Kosciusko, lying on the horizon to the S.E.; of Mounts Burrowa and Keelangie, a few miles away to the E.N.E., and to the S., where, in the dim blue distance, stands Mt. Benambra (4,840 feet). A steep run brought us to breakfast at Koetong, 18 miles from Tallangatta. The range passed over is chiefly composed of granitoid rocks. Tin and gold mining have been carried on in Koetong Creek. From Koetong we climbed up to Cambourne, and entered a thickly timbered plateau, then wound down through a picturesque cutting into the Berringama valley, getting a delightful view of Ben Lomond and Keelangie. The rocks in this area are granites and porphyries, intersected by dykes of tourmaline-pegmatites. From Berringama to Wabba, 17 miles from Koetong, where we had dinner, we followed Cudgewa Creek for most of the way over alluvial deposits, schists, and granite. From Wabba to Corryong the road traverses chiefly the younger Cainozoic deposits of Corryong Creek, which overlies schists and granitoid rocks. The latter outcrop in Corryong, which place we reached at 4.20 p.m.

29th March.—Here we managed to secure a pack-horse, were initiated into the mysteries of "packing," and left Corryong

about 11 o'clock. The route taken was E.N.E. to Towong (6 miles), near Mt. Elliott, where a good deal of gold-mining was going on in small reefs at and near the contact of granite with Ordovician sediments. Here we saw some Black Jays, *Struthidea cinerea*. Thence descending on to the Murray River flats, we crossed this river two miles on, just below its junction with a large tributary from the S.E., the Gehi. The Murray River commences at this junction; above it the main stream is known as the Indi. We were then in New South Wales, and continued along the broad valley of the Gehi through the Khancoban run, where we were much amused at the antics of a large mob of fat bullocks that galloped over to and surrounded us. As we advanced, those in front opened out and let us through, while those behind broke away and lined up ahead. Thus we had an avenue of tossing heads and whisking tails for several hundred yards. They were very playful, and thoroughly enjoyed themselves till the novelty wore off, when they galloped away. The camp was pitched 'neath a pretty lightwood, and we soon had tea. Late at night we fell asleep to the squawking of two Opossums, *Trichosurus vulpecula*, and the "mopoke" of the Boobook Owl, *Ninox boobook*.

30th March.—Early this morning we were awakened by the lively warblings of Magpies, *Gymnorhina tibicen*. We struck camp early and pushed on. The valley rapidly narrowed, and the track left it and bore over a low granite spur towards Black Creek. The forest here was an open one, principally of Peppermints, *Eucalyptus amygdalina*, and Manna Gums, *E. viminalis*. At Black Creek we found a galvanized iron hut, and two stockmen in temporary occupation. They asked us to stay there that night, but we wished to camp in the Gehi hut, some 8 miles further on, so left them, with the assurance that a "block and tackle" would be needed to get the packhorse safely down the "Gehi Wall." The country was still timbered, like the last passed over, and the rocks granitic, with large bosses standing out in places. A good deal of snow-white manna lay under the gums, and we collected and ate handfuls of it. This forest was as silent as the last; the only sounds heard were the plaintive notes of the King Lory, *Aprosnectus cyanopygius*, and the mellow ones of that typical forest bird, the Grey Magpie, *Strepera cuneicaudata*. In places there were fine patches of Kangaroo Grass, *Anthistiria ciliata*. Suddenly, in one of these places, an "old man" Kangaroo, *Macropus giganteus*, sprang up from his afternoon siesta, and with a few jumps was out of sight. This was the only kangaroo seen during this trip. Near the "Gehi Wall" the character of the timber suddenly improved, and we entered a splendid forest of straight-stemmed, valuable trees, probably over 200 feet high. They were chiefly Blue Gums, *Eucalyptus globulus*,

and Manna Gums, and the change was due to the better soil derived from the slates forming the "Wall." These are vertical, and have a northerly strike. We were now on the top of the "Gehi Wall," at an altitude of about 2,225 feet. To the right was the Gehi canyon, formed by the Gehi River cutting through the spur on which we stood. We descended for some distance on a fairly steep grade, and came to the top of the wall proper, where a glorious view was obtained of the whole Kosciusko range. Peak over peak stood out above the general level of the mountain, softening into lavender under the weakening rays of the setting sun; spur after spur descended from the main mass into the valleys of the Gehi and its tributaries, and were lost in their wealth of verdure; while the streams roared as they rolled their offerings to the gorge.

We gazed on it with admiration, and hastily taking two photographs, set about getting the mare down the "Wall," which clearly promised to be a task of some difficulty. She, however, was quite equal to it, as, sitting on her tail, with her front feet straight in front of her, she quickly followed us to the bottom, with no damage but the loss of some hair.

The place is suitably named, for the difference in altitude between the top and the bottom in some 350 yards is 825 feet. We crossed Bain Creek at the foot, then a short spur and Gehi Creek, which shows a fine contact of slate and intruded granite, and finally came to the Gehi River. The stream here was then about 50 yards broad, with large boulders of granite and altered sediments in its bed. It was very cold, and we were glad when we had forded it. Dusk was now upon us, and it was quite dark when we reached the second ford, which, however, offered no difficulty. But at the third one on the same stream, all within a mile, both banks were heavily timbered, and for some time we could not find the landing place. This wading about, waist deep, in a cold mountain stream in the dark was not altogether pleasurable, and on crossing we decided to camp at once rather than waste time trying to find the Gehi hut.

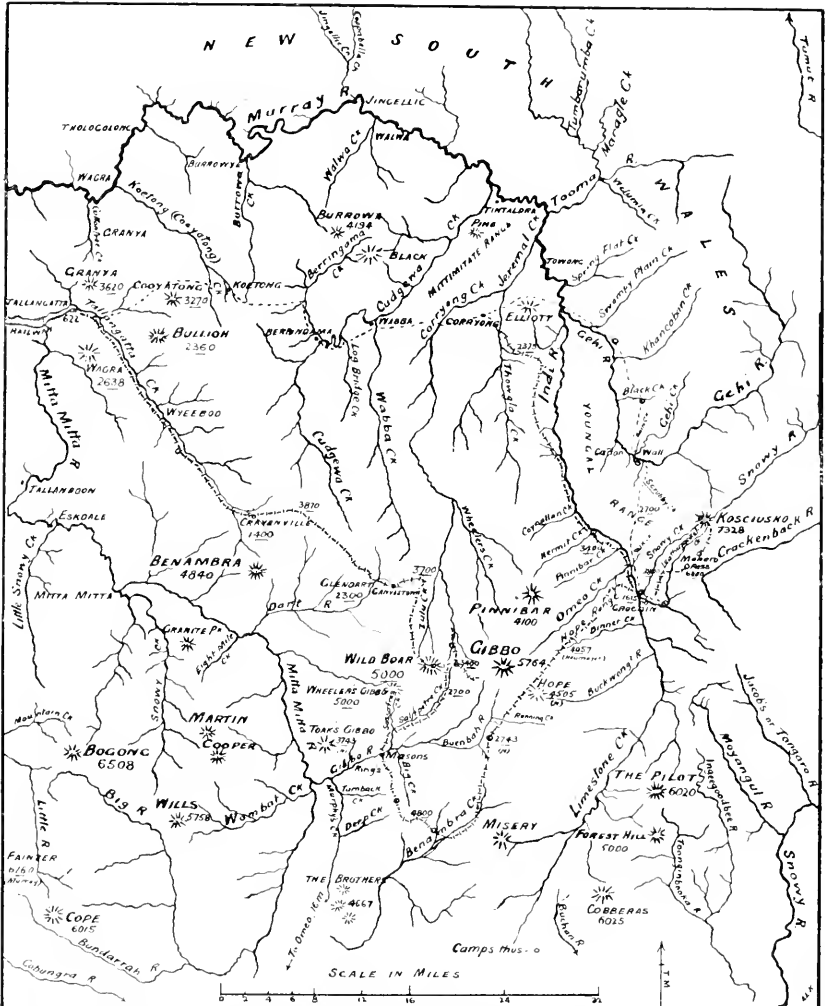
We soon had a roaring fire, and dried ourselves. At this camp we used bracken for a bed, and, as on a previous occasion, found that numbers of "Soldier" or "Bull Dog" Ants, were on it. When a light appeared these ants crawled up the white sides of the tent, and, becoming a nuisance, had to be killed. They had evidently been benighted and taken shelter under the fern fronds.

31st March.—The morning broke very cold and foggy, with the temperature at 34°. While having breakfast a pair of Lyre-birds, *Menura victorice*, quizzed us curiously from the trees near by, but disappeared before the camera was ready. On proceeding up the Gehi Valley a fine plump Wonga Wonga Pigeon, *Leucosarcia picata*, rattled away ahead of us, while several Black

Cockatoos, *Calyptrorhynchus funereus*, flapped sluggishly across the valley, emitting their mournful cries. The river near here was bordered with the usual vegetation — Christmas-tree, *Prostanthera lasiantha*, Musk, *Aster argophyllus*, Hazel, *Pomaderris apetala*, Silver Wattle, *Acacia dealbata*, Tree Ferns, &c. Past the Gehi hut a glorious view of Kosciusko was obtained. Range after range, densely clad with timber, peeped above its fellow for miles back from the river, till with one mighty sweep the bold, bare, granite escarpments of the parent mount reared themselves high above the faint wavy tree-line, while the clouds, departing from the glistening valleys as if loth to vanish, disported their loitering vapours 'mid the crags and battlements. We could not reach Kosciusko up this valley, which is unexplored, but followed the track which runs southerly and crosses the Youngal Range, a western spur from Kosciusko. Wherever the rocks were visible on this range they were granitoid in character. The range where we crossed it was specially noticeable for its stillness, even in these usually quiet Australian forests. Occasionally the twitter of the Scrub Wrens, *Sericornis*, could be heard in the scrubby gullies, the rush of the startled Scrub Wallaby, *Macropus ualabatus*, on the spurs, while in the tall trees the only birds heard were the Laughing Jackass, *Dacelo gigas*, the Grey Magpie, and the King Lory Parrot. Strangely enough, not a Lyre-bird was seen or heard, though traces of them could be seen on every hand.

The forest in part was a splendid one of Peppermint, Messmate, *Eucalyptus obliqua*, and Blackbutt, *Eucalyptus pilularis*, with thick scrubs of Acacias (Wattles, Native Willows, &c.), Hazel, Tree Ferns, &c., especially in the gullies. We soon crossed this range, at an altitude of about 2,700 feet, and descended steadily, waist deep through Native Hop scrub, *Daviesia latifolia*, and Kangaroo Grass, to the Indi River flats below Groggin. The gently sloping strip of country between the range and the river had numbers of small springs in Tea-tree patches, and from them and from the river below numerous cattle tracks led in every direction. Near Groggin this granitoid rock, probably a quartz-mica-diorite, can be seen in the Indi River. It extends up past Groggin, and constitutes part of the ridge between the Snowy and the Leather-jacket (Leatherbarrel) Creeks. Groggin consists simply of an old hut on the New South Wales side and another on the Victorian side. The latter was occupied by old Jack Riley, the stockman of the run; the former is used by drovers and wild horse hunters, and in it we camped.

1st April.—This morning we were astir early, and got directions from Riley for Kosciusko, but, as we found later on to our cost, he omitted the most essential one. This resulted in our missing the proper track after crossing Snowy Creek, and



Highest mountains thus Bogong Routes travelled to Mount Kosciusko in 1895 thus --- in 1896 thus - - - -
 Accurate altitudes in feet above sea level thus-6508; approximate thus-1615

SKETCH MAP OF PORTION OF NORTH EASTERN VICTORIA
 AND THE M^T KOSCIUSKO REGION, N.S.W.

following one of the many cattle tracks in the locality. The track eventually disappeared, and while we wandered along the top of the range between the Snowy and the Leatherjacket we suddenly saw a fine shaggy Dingo, *Canis dingo*, sniffing round a hollow tree. I gave a Dingo howl, which brought the animal at once to attention. It located us on the howl being repeated, and gazed at us curiously for a few seconds till a yell sent it bolting away. Thinking the track wound round this range low down the slope, we descended the spur to the Leatherjacket Creek in a deep gorge, where we had much difficulty in getting the mare on to a small patch of rushes growing on an island in the stream. It was now nearly dark, so, after cutting away the scrub and rolling logs out of the way, we camped on the only available spot on a slope.

2nd April.—After a hurried breakfast the mare was packed as lightly as possible, and with many misgivings we set off back up the slope, 1,400 feet, to the top of the ridge. The creek—or, rather, it is a river—here runs through a gorge with a vertical cliff, fully 60 feet high, of slate. The cliff was capped with loose rocks, forming a bad foothold, and on account of this the mare and I narrowly escaped going over the cliff into the stream below. She slipped, sat down, and slid to within a yard of the edge, where, fortunately, I was able to hold her till she recovered strength and was successfully rushed up the slope to a safe position. On reaching the ridge we could, through a gap in the timber, see Kosciusko away to the N.N.E., and we decided to follow the ridge, which here turned sharply to the north. To the south, on the horizon, the bare prominent peak of the Pilct (6,020 feet) stood out clearly beyond the forested ridges and valleys of the basin of the Indi. We soon found the almost obliterated blazes of the old Manaro track, and pressed confidently on. The track, rarely more than 18 inches wide, was covered with dead leaves, while all the leaves and grass on both sides had been burnt by a recent bush fire. This characteristic of some bush fires is well known to bushmen. About 7 miles from Groggin the track leaves the dividing ridge between the Snowy and Leatherjacket Creeks, and plunges 260 feet down into the leafy depths of the latter creek. This could appropriately be called the Leatherjacket Wall, and is apparently the spot called Woolayian by the late Rev. W. B. Clarke, and described* by him as a nearly vertical wall of slate. The rocks are slates similar to those forming the Gehi Wall. They strike generally N.N.E., and run in a strip along the valley of the Leatherjacket. The country between Groggin and here had been devastated by a recent bush fire, and no animals but the Dingo were seen. Birds also were scarce; they were chiefly Grey Magpies and Laughing Jackasses. The rocks in this area

* "Researches in the Southern Goldfields of New South Wales," p. 121.

are quartz-mica-diorite to within about two miles of the ford, where the slates (of Ordovician (?) age) commence. The slates are considerably altered along the contact by this intrusive mass.

Through the quartz-mica-diorite several dykes from 3 to 25 feet wide can be seen.*

The locality about the ford (3,300 feet) is an ideal one for a camp, being well grassed, sheltered and sunny, with plenty of firewood and water and pretty views. The ridge across the Leatherjacket is much higher than that on the west, and the track winds laboriously up for some 700 feet before getting an easy grade at about 4,000 feet. Here the scrub was exceedingly dense. The orange racemes of the Native Hop, the purple panicles of the Indigo, *Indigofera australis*, blending with the delicate green leaves and white fruit of the graceful Native Elderberry, *Sambucus gaudichaudiana*, the pretty red and green Native Currants, and the blue and yellow flowers and purple berries of the Native Flax Lily, *Dianella revoluta*, scattered among the greens of the Dogwood, *Cassinia aculeata*, Hazel, Wattle, and ever-present Wire-grass, made lovely pictures. Grand old Manna Gums reared their tall white trunks high overhead, and sprinkled the vegetation below with snow-white manna, while all around the scattered humus attested the energy of Lyre-birds. So deep was the humus that only an occasional fragment of slate was found until, 2 or 3 miles on, the slates gave place to gneissic granite and the vegetation became less luxuriant. With increased altitude also the timber showed signs of dwarfing; moss-covered wattles began to appear, and, bursting through the scrub, we came on to a small open saddle in a belt of Snow Gums, *Eucalyptus coriacea* (?), where we pitched camp. The weather since starting the trip had been beautiful, but now the wind was strong, and caused us serious misgivings as we went to rest.

3rd April.—The morning broke fine, but a gale was blowing, and the aneroid showed signs of an approaching change. We struck camp and pushed on in haste up an increasing slope. The trees grew shorter and shorter, the Snow Bush appeared, while white and yellow Everlastings (*Helichrysum*) and purple Flax Lilies flecked the little open patches. Several Gang Gang Cockatoos, *Callocephalon galeatum*, flew from tree to tree along the track, watching us curiously and making their mournful grating cry. The track climbed steadily, while the thick Snow Scrub gave place to detached Snow Gums. We were soon among the great blocks and bosses of granite and coarse mountain grass. High

* For further remarks on the geology of the country passed over on this trip see the following papers:—Kitson, A. E., "Geological Notes on the Gehi and Indi Rivers and Manaro Gap, Mount Kosciusko, N.S.W.," Proc. Roy. Soc. Vict., vol. ix. (N.S.), 1896; Kitson, A. E., and Thorn, W., "Contributions to the Geology of Mount Kosciusko and the Indi-Manaro Track, N.S.W.," Aust. Ass. Adv. Science, Sydney, 1898; Howitt, A. W., "Notes on Samples of Rocks Collected by A. E. Kitson and W. Thorn," *ibid.*

ahead of us loomed mighty bluffs of granite, dotted with Snow Gums in friendly niches and ledges. Their gnarled, knotted boles, o'erhung with white spreading branches and dense, shining, dark green foliage, showed sharply against the smooth, bare surfaces of the granite. Three Crows, *Corvus coronoides*, cawed high overhead, trying to beat against the gale. In a few minutes we reached the Manaro Pass, at an altitude of about 6,000 feet, where glorious views were obtained from S.W. to N.W. across the densely forested ranges and valleys of the Indi basin and Benambra, and from S.E. to N.E. over the high ridges and bleak plateaux of the Australian Alps and the wide, deep valley of the Crackenback River, which, by its numerous smoothed and rounded eminences seems to indicate a typical old glacial valley. How bitterly I regretted, as after events proved, not taking a series of photographs of these magnificent views. Time was so precious that we pushed on as fast as possible, hoping to get a good camp before the storm broke. Near the pass we saw a limb of a Snow Gum that had been ripped open by a Black Cockatoo to get one of the large grubs that bore up the centres of these trees. We struck along an indefinite track through the Snow Gums and long coarse grass, and over lichen-covered granite blocks, to the plateau. Heavy clouds were now dashing against the crags and buttresses, and the wind was a howling gale as we slowly forged our way towards Kosciusko Valley, into which we had great difficulty to get the mare. The slopes of all these ridges are seamed with narrow watercourses several feet deep. These are filled with blocks of granite and covered with long grass and low matted shrubs, which completely hide the cavities and make progress painfully slow and dangerous for a pack-horse. We reached the floor of the valley and crossed the Leather-jacket, here a stream 4 or 5 paces wide, and wound round the southern end of the ridge on which Mt. Kosciusko stands. Near here we disturbed three Black Ducks, *Anas superciliosa*, that were swimming about on a small marshy lagoon. On the southern slope of the Mueller Range, to the north, lay a snow-field shaped like a huge spirifer. The wind had now moderated, but dense black clouds were quickly coming up from the N.W., with frequent flashes of lightning and loud peals of thunder. These hidden watercourses on the slope of the ridge proved such serious hindrances that it was hopeless to attempt to reach the sheltered slopes of the range across Wilkinson Valley before the storm broke, so we hastily unpacked and closely hobbled the mare. Then we tied one end of the tent to tussocks of grass, pulled the other on to the top of the rock, and, tying it to large stones, crawled inside. The storm and darkness came upon us simultaneously, and for a long time talking was impossible. The wind, rain, and hail were

very heavy, while the lightning was almost continuous. About 1 a.m. the storm passed, the wind ceased, a heavy fog set in, and the temperature fell to 24° Fah. The tent had perforce been placed over a watercourse, and the water streamed through, compelling us to sit the whole night crouched up under our blankets, so we were glad when daylight (4th April) came, and we found the mare safe. Her mane and tail were frozen into solid masses, and she was one mass of small icicles, and shivering violently. Under the circumstances we decided to return after climbing to the summit, as our holidays did not allow us to wait for the clouds to clear away. We set off up the steep western slope of the mount, through the perishing wind, which had returned with daylight. As we went higher and higher, under, over, and among the gigantic blocks of gneissic granite we were charmed with the multitudes of multiplaned icicles, with exquisitely beautiful serrated edges pointing to the wind, which were clustered on every possible point of attachment. The icicles on the tussocky grass were even more beautiful than those on the rocks, and crunching over the frozen snow we soon reached the cairn (7,328 feet above sea level) on the summit of the highest mountain in Australia.

The vanes on the long squared pole fixed in the cairn were covered with several series of lovely icicles, like iron filings on a magnet. Unfortunately the camera had been left at the camp. A dense fog, driven before the freezing gale, covered everything, but occasionally a glint of sunshine melted the tips of the finest icicles, and tiny drops of water formed, only to be instantly frozen when the sunlight was past. These rifts in the clouds gave us glimpses down the valley of the Snowy River, rising on the N.E. slope, but the pictures were reserved for those more fortunate than ourselves, and we reluctantly descended to the camp at 6,800 feet. On the summit the only form of life noticed was a Pipit, *Anthus australis*, which quite happily flew about on the frozen grass, while among the rocks on the slope I caught a glimpse of a small Rat. After photographing the camp, we packed up and crossed Kosciusko Valley to the eastern portion of the plateau, whence transient views were obtained of the frozen surface of Lake May, on the eastern side of Mt. Kosciusko, and of the three snowfields on its eastern flank. We reached the Manaro track at dusk, getting a photograph of the Crackenback Valley on the way.

5th April.—We spent another miserably cold night, and found this morning even more unpleasant than the last. Everything inside and out was dripping wet, not frozen as on the mount. The clouds showed no signs of clearing, so, as photography was impracticable, we packed up, and were soon among the timber and sheltered from the cutting wind. The Gang Gang Cockatoos again escorted us for about a mile, while near our old camp we

heard some Lyre-birds whistling and mimicking beautifully. About noon we reached the comfortable flat of the Leather-jacket ford, now bathed in sunshine, and while the camp effects were drying we gazed with vain regrets up the valley to the cloud-capped mass of Kosciusko. A few hours of strong sunshine dried our things, and we resumed the journey to Groggin, where we found the hut occupied by two wild horse hunters. These men had captured 40 horses in the region at the sources of the Indi and Buchan Rivers to the south, and were taking them to the Wodonga sale yards. On inquiry we found that on their strong, wiry ponies they ran these horses down. The method is this: each hunter singles out a horse and lassoes it, then gallops with it till a suitable tree and time appear, when his pony is rushed forward, he jumps off, and, getting the rope round a tree, the wild horse is pulled down. Before it can rise he sits on its head, slips a halter on, and in a little while usually the poor brute is cowed and led away. The horses these men had were yarded up the river a little, and we arranged to photograph them on the morrow. We soon had tea, and were right glad to get a good sleep.

6th April.—The morning broke fine, and we packed up and started off. The hunters and wild horses were to overtake us, but this they never did, for we took the wrong one among the many scores of cattle tracks that leave the flats, and wandered about all day trying to find where it crossed the Youngal Range. Towards evening we decided to return to the valley of the Indi, which we reached near dusk, and camped about two miles below Groggin.

7th April.—This morning we resumed our journey, crossed the Youngal Range, and camped in the Gehi hut. From here a glorious view was again obtained of Kosciusko, then quite clear. A Copper-headed Snake, *Hoplocephalus superbus*, was found near here and disabled, when it bit itself repeatedly and everything near it till it was killed.

8th April.—Another lovely morning appeared, and we were loth to leave the valley, but set off, and soon crossed the three fords on the Gehi River, taking some photographs on the way. At the third ford we found a very large Black Snake, *Pseudechys porphyriacus*, that had been killed by the hunters. The Gehi Creek was forded, the "Wall" safely ascended, and we camped in the Black Creek hut.

9th April.—Nothing special happened this day, and we reached Corryong about 8 p.m., after an absence of eleven days, during which time the only bad weather we had was on Mt. Kosciusko, where it was most undesired.

The next day we returned to Tallangatta by coach, and so ended what was, on the whole, a most enjoyable trip.

The notes of the second tramp, *viâ* Dark River, will follow in a later issue.

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

ON THREE NEW SPECIES OF PULTENÆA.

BY J. H. MAIDEN, Government Botanist, and Director of the Botanic Gardens, Sydney.

(Communicated by J. F. Haase.)

(*Read before the Field Naturalists' Club of Victoria, 11th August, 1905.*)

PULTENÆA VROLANDI, sp. nov.

A diffuse shrub up to 6 feet in height, with terete branches, the young branches very pubescent with woolly white hairs.

Leaves numerous, shortly petiolate, rather stiff but not rigid, broad-lanceolate to oval elliptical, 3 or 4 lines long or shorter, with incurved margins, the young leaves somewhat conduplicate, slightly concave, glabrous or rather granular, rough on the upper surface, hairy beneath, becoming glabrous with maturity. Shortly recurved at the end, especially when young, and terminating in an acute point with often three veins spreading on the under side from the petiole, the middle one being also sometimes more or less penniveined.

Stipules rather narrow and flat, about 1 line long, dark coloured along the centre, scabrous at the sides, becoming setaceous with age; persistent.

Flowers from 3 to 6, apparently forming a head, but really in the axils of the last leaves, on pedicels of 2 lines or rather more, slender and pubescent, the shoot being produced beyond the highest pedicel by the time the pods have matured.

Bracts stipular, *i.e.*, the stipules take the place of bracts; viscid.

Bracteoles inserted rather below the base of the calyx and completely embracing the tube, semi-transparent, very convex and almost orbicular in general outline, the edges overlapping each other and having very much the appearance of a two-leaved cup-shaped involucre, glabrous and very viscid.

Calyx glabrous and very thin, the tube viscid on the outside, seemingly from contact with the bracteoles, the lobes almost as long as the tube, the upper lobes scarcely as long as the others, all acute.

Standard nearly orbicular, with the very narrow claw twice as long as the calyx, the lamina about 4 lines in diameter, the veins purple in their lower parts.

Wings about as long as the standard, scarcely 1 line broad.

Keel slightly broader than the wings, but scarcely as long, obtuse, with purple markings.

Ovarium sessile, villous, oval.

Style leaving the ovarium rather abruptly, subulate, sparingly pubescent to half-way up.

Stigma very small.

Pod almost oblong, hairy, half as long again as the calyx, the pedicels lengthening to about 3 lines.

On summit of a granite hill about 12 miles from Euroa and 2 from Mt. Wombat, in the Strathbogie Ranges, Victoria. Collected by Mr. Anton W. Vroland, teacher of Strathbogie State school. No. 974 of herbarium of Mr. H. B. Williamson, then of Hawkesdale, Victoria, by whom it was forwarded to me.

In the ordinary sense of the term, the species does not possess bracts; what pass for such are the stipules situated at the bases of the pedicels and in the axils of the leaves. The cup-shaped involucre-like bracteoles are very distinctive, and are similar to those of *P. involucreata*, which character, together with its slender pedicels and the viscosity of the calyx, bracteoles, stipular bracts, and to some extent the young stipules, make it a very distinct species. Its aspect is similar to that of the short-leaved typical form of *P. villosa*, Sm.

PULTENÆA WILLIAMSONI, sp. nov.

A weak-stemmed shrub "trailing amongst shrubs."

Leaves not numerous, up to 1 inch long, oval to elliptical or oblong-lanceolate or even slightly oblanceolate, shortly petiolate, with slightly recurved margins or almost flat, with a small recurved point, frequently worn off in the old leaves; silky pubescent underneath, sparingly so in the older leaves.

Stipules broadish, appressed, up to 3 lines long; much broader than those of *P. palacea* usually are; with scarious margins.

Flowers in dense terminal heads, say half an inch in diameter. Rhachis of the flower-head much elongated.

Bracts imbricate, glabrous or ciliate, scarious, pointed, keeled in the upper part and often three-pointed by splitting along both sides of the keel.

Bracteoles inserted at the very base of the calyx but free from the tube, broad and keeled, completely enveloping the calyx, in shape and texture like the bracts, obtuse but mucronate, and also often splitting along both sides of the keel, thus appearing three-cleft.

Standard about twice as long as the calyx, say 3 lines in diameter, the base with spreading purple markings.

Wings as long as the standard, scarcely a line broad; the *keel* broader than the wings.

Ovarium sessile, silky, compressed.

Fruit sessile, sub-triangular, curved, but not seen perfectly ripe.

Near creeks, Strathbogie, Victoria. Anton W. Vroland November, 1902 (No. 921 of H. B. Williamson).

Its closest allies seem to be *P. pycnocephala*, F. v. M., and *P. palacea*, Willd. Herbarium specimens bear a superficial resemblance to *P. stricta*, Sims, but the latter has never such large stipules, and the habit is very different. The shape of bracts and bracteoles is much like those of *P. palacea*, but the bracteoles are distinctly free from the calyx. It is a stronger and more robust grower than *P. palacea*, although of the same habit. The leaves are very much broader than those of *P. palacea* and almost flat. The difference as regards the bracteoles is very marked, and seems of itself sufficient to remove it from that species. From *P. pycnocephala* it differs in the less abundant tomentum and in the greater length of the leaves.

PULTENÆA LUEHMANNI, sp. nov.

A trailing procumbent straggling shrub with very slender glabrous branches.

Leaves opposite, though sometimes irregularly opposite in some shoots, linear to narrow-lanceolate, with so much incurved margins that they appear often terete and grooved above, 4-6 lines long, quite glabrous. Stipules small.

Flowers in small few-flowered terminal heads (or rather umbels) surrounded by a few stipulary imbricate bracts, hardly as long as the pedicels, and by a few, generally 4, floral leaves.

Bracteoles very small, lanceolate, inserted at the base of the calyx, but free from it, densely silky-hairy outside as the calyx and the pedicels. Calyx-teeth lanceolate, acute, about as long as the tube, the two upper ones united half-way up.

Petals of about the same length; the *wings* and the margins of the *standard* orange-coloured, the *keel* and central part of the standard dark brown.

Ovarium sessile, densely silky-hairy.

The most striking character in this graceful plant is the slender branches, almost filiform in the side-branchlets and the distant leaves; the leaves are on the flowering branches from $\frac{1}{2}$ to above 1 inch apart, though they are denser on leafy shoots; but I have seen only a few specimens.

Grampians, Victoria. H. B. Williamson, No. 1160. November, 1904.

The systematic position of the species is in Section iii., *Euchilus*, on account of its opposite leaves and branches, but it is distinguished from all species of this section by the head-like inflorescence. Its closest affinity appears to be *P. tenella*, Benth.

I dedicate this beautiful species to the memory of my friend and colleague J. G. Luehmann, Government Botanist of Victoria, whose death, following too closely on that of Mueller, leaves a great gap in the sparse ranks of Australian botanical systematists.

The Victorian Naturalist.

VOL. XXII.—No. 7. NOVEMBER 9, 1905. No. 263.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 9th November, 1905.

The president, Mr. F. G. A. Barnard, occupied the chair, and about 90 members and visitors were present.

REPORTS.

In the absence of the leader, Mr. G. Weindorfer, the chairman reported that the botanical results of the excursion to Sandringham on Saturday, 23rd September, were not of much importance, only the ordinary spring flowers being noted. Mr. J. Shephard said that the pond-life section of the party visited several ponds, but, doubtless owing to recent rain and the influx of water, little of interest was found, the most notable being a rotifer of the genus *Asphanchnopus*, and the alga *Apiocystis browniana*. Specimens of *Nostoc* were fairly plentiful.

A report of the excursion to Braybrook on Saturday, 7th October, was given by the chairman, in the absence of the leaders, Messrs. G. Weindorfer and R. A. Bastow. The day was very fine, and a fair number of members attended, but as was anticipated flowering plants were not numerous, *Ptilotus spathulatus* being the most novel. The outing was devoted principally to a search for mosses and lichens, the latter being very conspicuous on the basaltic rocks bordering the Kororoit Creek, and six mosses and fourteen lichens were collected by Mr. Bastow during the afternoon.

The hon. secretary reported that the junior excursion to Sandringham, on Saturday, 7th October, under the leadership of Miss R. Cowle and Miss J. White, B.Sc., was in every way a success. Between 40 and 50 juniors were in attendance, who, under the guidance of the leaders, were soon busily engaged in collecting botanical specimens. At the close of the afternoon Miss White gave a short lesson on the structure of a plant, taking as an example the pretty liliaceous flower, *Chamaescilla corymbosa*.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Marjorie Friend and Messrs. G. H. and A. G. Carter were elected as ordinary members; Miss Vera Carter, as an associate; and Misses Leura M. and Dorothy Andrews, V. Minford, R. Johnston, F. Swan, J. M'Kechnie, F. Barfus, O. Barfus, H. Bowles, N. Shappere, G. Gibson, D. Gibson, J. Roberts, Masters, E. H. Coghill, N. Farmer,

A. Lawrence, B. Leach, T. Finding, G. Silk, and E. Mead were elected junior members of the Club.

GENERAL BUSINESS.

In the absence of the mover, Mr. A. J. Campbell, Mr. F. G. A. Barnard moved *pro formâ* the motion standing in Mr Campbell's name on the notice paper, viz. :—1. "That as Melbourne is the geographical as well as the commercial metropolis of the Commonwealth, and as it stands on the Yarra, which river's source has not yet been properly surveyed, for the credit of the State of Victoria, and in the interest of geographical knowledge generally, it would be advantageous were the source or sources of such an important river determined." 2. "That copies of this resolution (if carried) be forwarded to the Surveyor-General, Victoria, and to the Royal Geographical Society of Australia."

Mr. Barnard said that, while moving the resolution, he was not pleased with the phraseology employed, and would prefer that the motion stand over until Mr. Campbell's return from Adelaide.

Mr. A. D. Hardy, in seconding the motion, remarked that the determination of the source of the Yarra might have been left with the Royal Geographical Society to deal with, though the actual source of the river was of great interest to all the members of the Club

Mr. J. Shephard suggested that the motion be left over until next meeting, to enable the mover to be present. He was opposed to the wording of the resolution, and stated that, as the Government Surveyors were now in close proximity to the supposed source of the river, it was quite probable that before very long the actual source would be discovered.

Mr. T. S. Hall, M.A., was opposed to the Club taking any action in the matter.

Mr. F. Wisewould and Mr. A. E. Kitson also took part in the discussion.

Mr. J. C. Kauffman, LL.D., moved, as an amendment—"That the motion be postponed until the next meeting." This was seconded by Mr. T. S. Hall, M.A., and carried.

PAPERS READ.

1. By Mr. Robt. Hall, F.L.S., C.M.Z.S., entitled "Birds and Fishes: a Comparison."

The author said that he had often remarked a likeness of habits between birds and fishes which did not appear to exist between any other two classes of animal life. For instance their migrations—the bird from the mountain to the valley, the fish from the river to the sea, while each migrates from south to north. Colour protection seems equally evident in lorikeet and pilchard. Certain birds and fishes so place their eggs as not to need their

personal attention during the period of incubation, while plovers, ground-parrots, penguins, &c., amongst birds, and salmon, herrings, catfish, &c., among fishes, have their special ways of providing for their eggs and young.

The paper was illustrated with a number of specimens bearing on the different points mentioned.

Owing to the lateness of the hour, Mr. T. S. Hall's paper, entitled "The New Rules of Zoological Nomenclature," was postponed until next meeting.

NATURAL HISTORY NOTE.

CUCKOOS.—Mr. C. French, jun., inquired whether other members had heard the Pallid or Fan-tailed Cuckoos uttering their well-known notes during the night, as recently he had heard several of these birds at Camberwell late in the evening.

Mr. G. A. Keartland said he had recently heard these cuckoos in the University grounds at nearly midnight.

EXHIBITS.

By Mr. F. G. A. Barnard.—Flowers of Red Ironbark, *Eucalyptus leucoxydon*, from Bulla; eucalyptus twigs with particularly large galls, from Broadmeadows.

By Mr. R. A. Bastow.—Typical lichens of the Braybrook district.

By Miss L. Cowle.—Dried plants from Northern Tasmania.

By Mr. A. Coles.—Ornaments and native weapons from the Bismarck Archipelago, including shell armlets, money shells, wooden club, bone knife, &c.

By Miss S. W. L. Cochrane.—Orchids in bloom, *Lyperanthus nigricans*, *Prasophyllum elatum*.

By Mr. C. J. Gabriel.—Shells, *Limopsis rubricata*, Tate, dredged in Western Port Bay, about 5 fathoms, associated with the Polyzoa *Cateneccella hastata*.

By Mr. J. Gabriel.—Nest of Buff-rumped Tit, *Geobasileus reguloides*.

By Mr. A. D. Hardy.—Fruit of Native Cherry, *Exocarpus cupressiformis*, early fruiting, from Yan Yean.

By Mr. G. A. Keartland.—Skin of *Apteryx owenii*.

By Mr. J. A. Kershaw, F.E.S. (for National Museum).—Nest and clutch of eggs of the White-throated Scrub or Fern Wren, *Oreoscopus (Sericornis) gutturalis*, De Vis. The nest was built partially in a hole in the ground in a deep gully at Mount Williams, N.E. Queensland. In the *Agricultural Gazette* (N.S.W.) for March, 1905, Mr. A. J. North created a new genus (*Oreoscopus*) for this bird, and at the same time described the nest and eggs.

By Mr. F. Pitcher.—Scorpion, *Scorpio afer*, from India.

After the usual conversazione the meeting terminated.

FIELD NATURALISTS' CLUB CONVERSAZIONE.

THE fifteenth conversazione of the Field Naturalists' Club of Victoria was held in the Masonic Hall, Collins-street, Melbourne, on Thursday and Friday, 19th and 20th October, 1905.

According to the programme the proceedings should have been inaugurated by the Hon. John Murray, Minister for Lands, but he was unable to carry out his promise, and an opening ceremony was dispensed with.

During the three years which had elapsed since the last exhibition of specimens, the Club membership has been greatly increased, in a great measure by the enrolment of a large number of junior members, who with their young friends attended in large numbers, and showed a decided interest in the various exhibits. There was also a good attendance of members and of the general public.

Since last used by the Club, some sixteen years ago, the Masonic Hall has been greatly improved, and when the numerous exhibits had been staged presented a very interesting sight. The platform was decorated with pot plants, of Australian vegetation, kindly lent by Mr. W. R. Guilfoyle, F.L.S., Director of the Melbourne Botanic Gardens, who also sent a fine series of cut blooms of Victorian and other Australian shrubs and plants grown in the Botanic Gardens, which were greatly admired; amongst these may be mentioned a fine Waratah, *Telopea speciosissima*.

One of the features of the conversazione was the exhibition of wild flowers, which, though very good, was, owing to the unfavourable season, hardly as attractive as on some former occasions. Individually members had been to considerable trouble, either in collecting the flowers themselves or getting their friends in distant parts of the State to forward specimens for exhibition. Mr. F. Wisewould tried the experiment of removing some of the plants as growing specimens with the soil attached, but the result was hardly commensurate with the trouble taken.

Very great interest was shown in the display made by the microscopists of the Club, whose well-known good nature was heavily taxed by the inquiries of the wondering public.

On Thursday evening a lecturette, entitled "The Geology and Scenery of the Eastern Suburbs," illustrated by lantern views, was given by Mr. T. S. Hall, M.A., who pointed out in a popular manner the probable origin of what was once a sandy plain on the eastern and south-eastern side of the Yarra, now converted into more undulating country by the cutting down of the creek valleys to nearly sea-level, and contrasting the resulting scenery with that of the basaltic plain on the western side of Melbourne.

The lecturette on Friday evening was entitled "The Upper Waters of the Yarra," and was delivered by Mr. A. E. Kitson,

F.G.S. This was illustrated principally by a fine series of lantern slides, kindly placed at his disposal by Mr. A. J. Campbell, Col. Memb. B.O.U., who was away in Adelaide attending the annual congress of the Australasian Ornithologists' Union. The lecturer, after illustrating the character of the scenery of Falls and other creeks in the vicinity of the Yarra's source, briefly sketched the geological features of the Baw Baw district, and exhibited some slides of the country in which the Yarra was formerly supposed to rise.

On Friday morning the exhibition was honoured by a visit from Her Excellency Lady Northcote, who had expressed her desire for a private view of the wild-flower exhibits. The president, Mr. F. G. A. Barnard, with Messrs. F. Wisewould, G. Coghill, and J. A. Kershaw, was in attendance, and conducted Her Excellency round the hall, giving briefly such information as was possible about the exhibits. Lady Northcote expressed great pleasure in the display of flowers, and made inquiries as to what species were capable of cultivation, and also took particular interest in Miss Cochrane's paintings of the native orchids and wattle, so that an hour hardly sufficed to inspect the flowers only.

The Club was once more indebted to Mr. J. Searle for his services and the use of his lantern for illustrating the lectures; while the programme distributed to the visitors was a distinct advance on those of previous years, as it included the excursion list for the year, as well as specimens of the illustrations from a recent *Naturalist*, thus enabling non-members to gain some idea of the aims and objects of the Club.

EXHIBITS.

The following is a list of the exhibitors, with the particulars of their exhibits as furnished by them:—

- BARNARD, F. G. A., Kew—Growing Victorian Ferns, including *Lomaria alpina*, *L. fluviatilis*, *Woodwardia aspera*, *Osmunda barbara*, *Gleichenia flabellata*, &c.; also early stages of a fern (growing).
- BARRETT, C. L., and NICHOLLS, E. B.—Collection of Birds' Nests.
- BEST, D., Hawthorn—Five cabinet drawers of Australian Beetles (Coleoptera). One drawer of Australian Wasps, Hornets, &c. (Hymenoptera).
- CHAPMAN, F., A.L.S., Camberwell—Samples of Deep Sea Soundings taken around the Atoll of Funafuti by H.M.S. *Penguin*, with illustrations of their contents. Collection of Minerals.
- CAMPBELL, A. G., Armadale—Soil Charts.
- CARTER, Mrs., Brighton—Case of Seaweeds.
- COCHRANE, Miss S. W. L., Melbourne—Paintings of Orchids and Australian Wild Flowers.
- COLFES, A., Melbourne—Mounted Specimens of Emu, Kangaroo, Dingo, Fox, Wallaby, Tiger Cat, Group of Iguanas, Native Companion, Wedge-tailed Eagle, case of White Hawks, case of Chestnut-breasted Sheldrake and young, case of Brown Quail, case of Snipe, &c. &c. Mounted Fish.—Murray Cod, Murray Perch, Murray Cod Perch, Blackfish, Yellow-tail, Rock Ling, Flathead, Flounder, Sergeant Baker, and Mackerel.

- COLE, PERCIVAL C.—Aboriginal Sacred and Ceremonial Sticks and Stones, "Bull-roarers."
- COWLE, Miss K., East Melbourne—Collection of Victorian Dried Plants.
- DEPARTMENT OF AGRICULTURE, Entomological Branch—Five cabinet drawers of Life-Histories of Insects. One drawer of Scale Insects (Coccidæ).
- DIXON, J. E., Richmond—Case of Oligocene (M'Coy) Fossils from Balcombe's Bay, near Mornington. Case of Older Pliocene (M'Coy) Fossils from Beaumaris; also Photographs of First "Camp-out" of Club at Olinda Creek, 9th November, 1884.
- FRENCH, C., F.L.S., Malvern—Four cabinet drawers of Foreign Lepidoptera (Butterflies).
- FRENCH, C., jun., Camberwell—Collection of Aboriginal Stone Implements.
- FRENCH, Mrs. C., jun., Camberwell—Collection of Spondylus Shells
- GABRIEL, J., Abbotsford—Collection of Australian Birds' Eggs.
- GABRIEL, C. J., Abbotsford—Collection of Marine Shells.
- GATLIFF, J. H., Carlton—100 species of Japanese Marine Shells.
- HALL, R., F.L.S., C.M.Z.S., Box Hill—Australian Birds' Skins.
- HARDY, A. D. and A. F. W., Melbourne—Botanical Specimens in a fluid preservative.
- KEARTLAND, G. A., Preston—Collection of Australian Birds' Skins.
- KERSHAW, J. A., F.E.S., Windsor—Six cabinet drawers of Australian Butterflies.
- KIELY, Miss, South Yarra—Case of Minerals.
- KITSON, A. E., F.G.S., Melbourne—Collection of Geological Specimens.
- KINANE, C. P.—Photographs of Australian Birds and Nests.
- LE SOUEF, D., C.M.Z.S., Parkville—Australian Birds' Nests and Eggs, Live Snakes and Lizards.
- MATTINGLEY, A., Melbourne—Australian Echinoids (Starfish and Sea Urchins).
- NEWELL, J., Fitzroy—Eleven cases of Foreign Butterflies and Moths.
- PITCHER, F., South Yarra—Complete Collection of Victorian Ferns (dried).
- ROLLO, Miss J., Wonga Park—Case containing Petrified Plants from South Australia, Lava from Herculaneum, Glass, Antimony from Ringwood (Victoria).
- SPRY, F. P., South Melbourne—Two cabinet drawers of Life-Histories of Butterflies and Moths.
- WEINDORFER, G., Melbourne—General collection of Australian Plants (dried), in herbarium cases.
- MICROSCOPIC SECTION.—Microscopic exhibits were made by the following:—
Miss F. Bage, B.Sc., and Miss J. White, B.Sc., development of chick embryos.
Mr. F. Chapman, A.L.S., microcline felspar under polarized light.
Mr. J. Gabriel, circulation in tail of tadpole.
Mr. A. D. Hardy, living and mounted fresh-water algæ; Vallisneria, showing circulation of protoplasm.
Mr. H. Hartnell, crystals of fatty acids under polarized light.
Mr. J. C. Kaufmann, LL.D., building rotifers, hydra.
Mr. J. Shephard, pond life.
Mr. J. Stickland, pond life.
Mr. W. Stickland, pond life.
Messrs. W. Watson and Son, various choice mounted objects.
- WILD FLOWERS.—Exhibits were staged by—
Miss M. H. Montgomery, from Echuca.
Mr. F. Wisewould, from Carrum, South Gembrook, Springvale, and San Remo.
Mr. A. Collingwood, from Belgrave.
Miss L. Foot, from Bendigo.
Mrs. Hume, from the Mallee, near Swan Hill.

- Miss S. W. L. Cochrane, from Sandringham.
Mr. C. Oke, from Beechworth.
Mr. J. P. M'Lennan (teacher) and Pupils of State School, from Emerald.
Mr. J. Paul, from Grantville.
Mr. G. Coghill, from Echuca, Mansfield, Portarlington, Tunstall, and Castlemaine.
Mr. F. G. A. Barnard, from Benalla and Frankston.
Mr. C. Ashley, from Adelaide.

TRAMPS THROUGH BENAMBRA, VICTORIA, TO MOUNT KOSCIUSKO, NEW SOUTH WALES.

PART II.—VIA DART AND GIBBO RIVERS.

BY A. E. KITSON, F.G.S.

(Read before the Field Naturalists' Club of Victoria, 13th March, 1905.)

ON the second journey * a party of three, Messrs. W. Thorn, jun., J. Walker, and I, left Tallangatta at 10 a.m. on Saturday, 14th March 1896, for Cravenville, 27 miles to the S.E. We started with two pack and two saddle horses, but before many miles had been done one of the saddle horses had to be impressed into pack service. The first $4\frac{1}{2}$ miles were along the Corryong road over river terraces and alluvium and the ends of low spurs of metamorphic rocks. At the State school these rocks are silky, pitted and nodular mica-schists of various shades of grey, brown, yellow and red, with a N.W. strike and S.W. dip of from 75° to 80° . A short distance past here the valley of Tallangatta Creek takes a sharp bend to the S.E., while the road crosses it near the junction of Dry Forest Creek. Here a dyke of granitoid rock can be seen in schist. About half a mile from the crossing the Cravenville road leaves the Corryong road and runs down the valley of Tallangatta Creek. About $1\frac{1}{2}$ miles from this junction a massive quartz reef, 3 to 15 feet wide, outcrops from mica-schists, similar to those at the State school. The reef strikes N. 47° W. with the containing schists. The quartz is opaque white and laminated with reddish-brown mica. Continuing along the creek flat for about a mile we passed over a tongue of granite, and here recrossed the creek. This granite is, in part, of white to grey colours, with muscovite, while in others it is a reddish variety, with biotite; some of it shows foliation. We continued over alluvium, 15 to 20 feet deep, for some distance, then over the second terrace till the stream impinged against the western edge of the valley. Here fine mica-schists and slates were visible, with a S.E. strike and S.W. dip of 80° to 85° . About 7 miles from the Corryong road we passed the Wyeboo State school, and then the creamery, over slates having the same strike and dip; then for about 3 miles over the terraces of the stream, and crossed Honey-suckle Creek. The camp was made $1\frac{1}{2}$ miles further on, near Macklin's crossing at Polmea's.

* See map published with Part I. in the *Victorian Naturalist*, October, 1905.

15th March (Sunday).—The morning broke cloudy, and it soon began to rain, and continued steadily all day, so we did not shift camp. The rocks near at hand proved to be olive-green, grey, brown and yellow slates, showing great jointing and numerous threads and veins, up to 3 inches, of quartz. The beds appeared to have a similar strike and dip to those near Wyeboo.

16th March.—The rain ceased during the previous evening, and early in the morning we resumed our journey. For some 3 miles we passed over the stream terraces, then crossed Waterfall Creek, and Tallangatta Creek for the last time, about $6\frac{1}{2}$ miles further on. There was at that time no surface running water in the latter—only a mass of pebbles, with the water probably beneath them. The track now bore to the east, along the valley of Buckeen Creek, and about $2\frac{1}{2}$ miles on we reached Goodwin's Hotel, in the small, remote township of Cravenville. The low spur between these two streams consists of grey, yellow and blue slates and fine sandstones. The blue slates are exceedingly like the graptolite shales near Lancefield, but no Graptolites were found in the outcrops examined. Mr. W. H. Ferguson, of the Department of Mines, did, however, some years later, find some in this locality.* They have been determined† by Mr. T. S. Hall, M.A., as belonging to the genera *Climacograptus*, *Diplograptus*, *Glossograptus* and *Dicellograptus*, and prove that the beds belong to the Upper Ordovician series. The strata strike N.W. and dip to N.E. at about 87° , showing that an anticline occurs, and that Tallangatta Creek runs for at least some 20 miles along approximately the crest of it.

A noticeable feature on the road between the crossing and Cravenville was the large number of ant beds of the common "Meat Ant," *Formica purpurea*. It is puzzling to know why these ants so often settle on hard roads, where, owing to their habit of pouring forth from their holes in hundreds when disturbed by passing traffic, multitudes of them are killed and maimed.

Tallangatta Creek valley is a wide open one, with farms on both sides, up to the junction of Buckeen Creek; above there to its source at Mt. Benambra it is narrow, and lies in wild, uncleared country. From Cravenville onwards the route taken was through the forests of the mountains of Benambra, where in over 200 miles of country traversed we saw only 10 habitations. Cravenville lies in the narrow valley of the Buckeen, amidst a forest of living timber consisting chiefly of Peppermints, and here we camped.

17th March.—We had found our horses not quite able for the

* "Report on the Geology of Portion of the County of Benambra," Monthly Prog. Rept. Geol. Surv. Vict., No. 11, Feb., 1900, p. 21.

† "Report on the Graptolites of the Dart River and Cravenville District," *ibid*, Nos. 6 and 7, Sept. and Oct., 1899, p. 13.

camp material for a three weeks' trip, so obtained another pack-horse, and leaving Cravenville began a long, steep climb of about 700 feet up a spur of fine-grained pink and pinkish-grey granite for about a mile, where dark blue and grey slates and shales occur, with strikes of W.N.W. to E.N.E. and dips of 75° to 85° to N.N.E. and S.S.E. These strata show well in side cuttings on the track. At an altitude of 770 feet above Cravenville very fissile grey slates appeared, dipping to W.S.W. at 87° , and striking N.N.W. A fine view of north-western Benambra was obtained from this point, also a glimpse of Mt. Benambra (4,840 feet) to the S.S.W. From here to about 4 miles from Cravenville the strata comprise olive-green and highly ferruginous slates, micaceous shales and thick-bedded siliceous sandstones. They strike from N. to N. 30° W., and dip to E. and S. 60° W. at from 75° to 89° , thus indicating two synclines and one anticline.

Between this place and the top of the cutting on the range, about 2,470 feet above Cravenville, there is a most interesting series of sections disclosed by the cuttings on the track. The main mass of the rocks consists of red, brown, yellow and white contorted, pitted and nodular micaceous and argillaceous schists, quartzites, and altered sandstones, containing not fewer than 18 dykes of granite,* varying in width from 5 to 130 feet. Most of them have a general N.E. and S.W. strike; one has a N. and S. strike, and another an E. and W. one. They have undoubtedly been intruded into Ordovician slates and sandstones, changing these rocks into metamorphic ones. The dyke-rocks consist very largely of orthoclase, quartz and muscovite, with here and there some biotite, while one of them contains a considerable quantity of schorl. Reefs and veins of quartz occur in this strip, the largest noticed being 3 feet wide and bearing N.E. Payable gold does not, however, appear to have been obtained here or in Tallangatta valley. Whether that is due to its scarcity or the want of careful prospecting remains to be proved.

About 5 miles from Cravenville, at about 3,900 feet, the track to Glendart reaches its highest point, the side cuttings disappear, and it passes south easterly over an undulating plateau of quartz and quartz-felspar porphyry, covered with good grass, Black-butts, and Snow Gums. The Grey Magpie, Laughing Jackass, and the King Lory were the only birds heard, and, though good country for kangaroos, not one was noticed. About 5 miles further on we reached the Half-way Spring (about 3,380 feet). One of the led horses, apparently suffering from the effects of an old fistula, had been standing on his hind legs every now and then and lashing out without warning, so we changed the pack to

* The term "granite," wherever appearing in this paper, is used in its popular sense. The rock probably contains hornblende in some places, and appears to merge into porphyry, as is the case in various parts of the State.

the saddle horse. As it was getting late, Mr. Walker went ahead with 3 horses, while we made the change and followed later on. About 2 miles further the porphyry gave place to altered then normal siliceous and argillaceous sandstones, forming an anticline, with a strike of N.N.W. Another 2 miles brought us to Moran's Lookout, whence the track commenced to descend into the valley of the Dart River. It was now quite dark, and in rounding a fallen tree, burnt down by a recent bush fire, we lost the track for some time. On regaining it we found several examples of a highly phosphorescent Fungus, giving light enough to read print. The forest here was quite lively with the "Mopoke" of numerous Boobook Owls, the "Oohh, oohh" of the Podargus, *Podargus strigoides* (?), and the howls of a Dingo far down in the Dart valley. The track descended steadily to "Starvation Camp," where a side cutting commenced, and we were soon fording the Dart River, about 1,300 feet lower than the plateau. Though the rocks could not be examined carefully, some highly jointed light-coloured ones, like the cherts of the Heathcoteian series, were seen near the top of the cutting. They strike N. and dip to W. at 85°. Near the ford we found the first habitation since leaving Cravenville, and continuing up the valley for about 1½ miles we reached the Dart River Hotel, at Canvastown, near midnight, and found Mr. Walker had arrived without mishap.

18th March.—During the morning we spent a little time looking about the place. This little mining settlement is one of the most inaccessible in the State, and though much gold occurs in the district, it is principally contained in rather refractory ores (the sulphide ores below the zone of surface decomposition), which have not yet been treated economically on this field. The strata are Upper Ordovician slates and sandstones, striking N.N.W. and dipping to W.S.W. at high angles, while 2 miles lower down the river they dip to the N.E., showing the presence of an anticline. At Glendart* similar Graptolites to those at Cravenville have been found by Mr. Ferguson—see reports quoted. Leaving this place we followed the valley of the Little Dart along a cutting through similar strata and over a syncline. At the top of the cutting, 2 miles from the settlement, the track to Dart River joins that from La Mascotte. We were then on the divide between the Dart River and Zulu Creek, a tributary of the Corryong Creek. The ridge trends S.E., and along it runs the track from Omeo to Corryong, connecting Gippsland with the North Eastern district. Two miles along this ridge the track to Zulu Creek branches off to the east, and plunges down 2,000 feet to the township. While we were passing the miners of the district were proceeding to a rendezvous to act as self-appointed porters of a sick woman at

* For further notes on this district see "Report on the Dart River and Zulu Creek Goldfield," R. A. F. Murray, Prog. Rept. Geol. Surv. Vict., No. viii., pp. 64-65, 1894.

Zulu Creek. She was to be carried first up from that creek, 2,000 feet, to the main ridge, then along the ridge to where a wheeled conveyance could be brought, thence to Corryong, 30 miles, for medical attention. Such is the fellowship of the mountains! This Dart-Zulu divide consists largely of siliceous sandstones, which weather into sharp points and litter the surface with jagged fragments, making it a serious matter for unshod horses. Quartz veins are numerous, but not auriferous. The ridge owes its shape to these hard rocks, which have resisted weathering so much that the soft slates of the Zulu valley have been worn away 2,000 feet deeper than those of the ridge. This is a good example of the influence of strata upon the sculpturing of a country; also of the occurrence of gold belts, for, while the main ridge is barren, Zulu Creek has yielded a great deal of gold.

We followed this ridge for about 4 miles past the Zulu Creek turn-off to a point about 4,450 feet above sea level, then, leaving the Omeo track, bore away S.S.E. $\frac{1}{2}$ mile down a steep hill to a saddle 350 feet lower. White, yellow, bluish-grey and olive fissile slates were here seen, with a strike to E. and dip to S. at 45° . Another mile over a high point brought us to the saddle where a blazed track goes down to Zulu Creek. From here our track steadily ascended the N.W. slope of Mt. Wild Boar for about a mile, to an altitude of close on 5,000 feet. The strata passed over were bluish-grey slates and sandstones, striking from N. to N.N.W. and dipping to W. and E.N.E., at from 86° to 51° , indicating a syncline and an anticline. From the slope of Wild Boar we had a most glorious picture of the sun near the horizon peeping out from behind a lovely cloud before setting behind Mt. Benambra. The camera was hastily set up and a good photograph taken.

Fine views were also obtained from the summit of this peak of the greater part of Benambra. From N.W. to N.E. could be seen the deep valleys of the Mitta Mitta, Dart, Cudgewa, Wabba, Zulu, Wheeler's, Corryong and Jeremal, with their high dividing ridges. In the N.W. Mt. Benambra (4,840 feet) formed a prominent figure against the bright light of the western sky; over Pinnibar (4,100 feet) to the N.E. Kosciusko and the Snowy Mountains north of it could be dimly seen in the light blue haze of distance; in the E. the bold Gibbo Range, with its highest peak, Mt. Gibbo (5,764 feet), almost devoid of timber on its summit, formed a barrier to anything beyond; while to the S. the ridges between the Mitta, Gibbo, Buenbah, Indi and Benambra stood out clearly over the dull green of their dark valleys. From N.E. to S.E. there lay a thousand square miles of forested mountain and valley, with no resident save the stockman and one selector of the far back Groggin run, and the old hermit of the Indi. Much of this country is still unexplored. It has not yet been trodden by the foot of even the most enter-

prising prospector and trapper. What an immense area of probable mineral wealth awaiting development! The top of this mount is about 5,000 feet in altitude, and covered with stunted examples of the Snow Gum, *Eucalyptus coriacea*? It is much exposed, so we pushed onwards along the ridge, and camped at an altitude of about 4,850 feet. The place was so littered with fallen timber that out of consideration for the horses we merely put small chains instead of hobbles on them. As the sequel shows, this was a great mistake.

19th March.—The morning broke with such a dense fog that nothing could be seen 20 yards away. No bell was audible, and the horses had disappeared in quest of water. After a tedious search four of them were found, some 800 feet down in Zulu Valley, but the Cravenville mare was missing. While looking for the horses I had the rare pleasure of seeing two male Lyre-birds, attended by a female bird, dancing on one of their well known dancing grounds.* I rode back to Dart River (14 miles) in the hope of finding the mare, but was unsuccessful. She had not returned (though eventually she did do so), and, getting a billy of water at Dart River, I got back to camp. The horses had then been 30 hours without a drink, and were very restless, so after boiling the billy we had tea and took them down to Saltpetre Creek. This descent proved a serious matter, for in about a mile we descended 2,300 feet. Fortunately we had a small lantern, and got down without mishap. Here we watered the horses and let them feed on good grass for two hours. We left the creek about midnight, and after hard climbing for three hours reached the camp with a billy of precious water. That night and thenceforward the horses were closely hobbled to prevent any recurrence of trouble.

20th March.—About 7 a.m. I was awakened by a spirited whistling at the tent door, and found a male Lyre-bird mimicking the various birds of the bush. It was on a fallen tree within a few feet of the door, and out of curiosity was peering into the tent. Trembling with anxiety, I put the camera together—a slow process, as my two companions were lying on either side—when, just as the photograph was about to be taken, the bird suddenly and silently disappeared. My feelings had better be imagined than described. Some photographs were taken after breakfast, and we continued in a northerly direction over the mount, then descended steeply, 1,500 feet, along a line of old blazes, to a low saddle at the source of Saltpetre Creek, where we met a newly blazed track. Mt. Wild Boar consists of olive and bluish-grey slates and micaceous sandstones, with strikes of N. to N.N.W., and general dips of 64° to 84° to E.N.E., though a small syncline also occurs. This new track we followed north for about 2 miles till it ran down into a branch of Wheeler's Creek, when we found

* For further notes on this, see my paper, "Notes on the Victoria Lyre-bird, *Menura victorice*," *The Emu*, vol. v., part 2, October, 1905, p. 63.

it was leading away from Mt. Gibbo, so camped near the remains of an old hut.

21st March.—During the morning Mr. Thorn followed the track for 2 miles north, while I examined the valley to the east, when we decided to return to the source of the Saltpetre and follow the main ridge to Gibbo. On the return journey Mr. Walker was violently kicked on the leg by one of the horses and crippled for the remainder of the trip. On reaching the saddle of the range, therefore, we camped on a knoll overlooking both valleys, and found good water a few hundred yards from camp.

22nd March.—This was Sunday, so, while Mr. Walker rested, Mr. Thorn made a traverse of the spur to Wild Boar, while I pushed on along the main range towards Gibbo, hoping to find a practicable route for the horses. A Copper-headed Snake 3 feet 3 inches long was killed on a very rocky ridge far from water. One part of this range was covered with a dense growth of Native Hop, *Daviesia latifolia*, about 15 to 20 feet high. The prevailing timber on these lower spurs was Peppermint, Blackbutt, Wattle, *Acacia dealbata*, and Native Hop, which grew profusely on a reddish-yellow loam, derived from argillaceous slates. As the ridge grew higher the vegetation described gave place, about 5 miles from camp, to gnarled and stunted Snow Gum scrub, up to 25 feet high, richly clothed with moss. There was no track, but only a few old blazes, most of them obliterated by decay and moss. Many of the trees were dead, and the ridge was strewn with pieces of this timber, rendering progress tedious and slow. Whether these trees had been killed by bush fires or insects was not ascertained. Numerous male and female Lyre-birds were perched among the trees, and were not at all shy, but rather inquisitive. A very extensive view to the west, showing the Victorian Alps and Mounts Bogong and Feathertop was obtained from the top of one of the trees, but the outlook towards Gibbo was by no means promising along the ridge, though, probably, the flanks of the range below the Snow Gum limit might have been practicable. With this unsatisfactory information a return was made to camp, where we decided to try on the morrow to cut our way through the dense Hop scrub. The rocks noticed in this area were slates and sandstones similar to those on Mt. Wild Boar, while about the camp the strata were principally bluish-grey slates and fine to coarse yellowish micaceous and siliceous sandstones, having a general N.N.W. strike and high dip to E.N.E.

A sharp syncline occurs about 3 miles down one of the branches of Wheeler's Creek. To the west of this creek, on the track, there is a small area showing evidence of contact metamorphism. In passing over this patch from south to north the following rocks are observable :—(1) normal blue slate, (2) slightly spotted slate, (3) fine sandstone, (4) spotted slates, (5)

finely foliated schist, (6) spotted slates, (7) normal blue slate. Here the metamorphism has not advanced to the stage of coarse schists and gneiss or granite, and the occurrence is probably due to a subjacent boss of intruded plutonic rock. Some of these sandstones have an abundance of decomposing felspar, and have a strong resemblance to decaying dyke-stones. On the knoll at the source of Saltpetre Creek there are highly jointed siliceous slates, which break into various geometrical figures. These rocks are full of veins of quartz. In general character they resemble some of the beds in the Heathcoteian series, and may represent a small inlier of this series. All the Ant nests here were covered with small pieces of this slate, instead of bits of twigs, as is usually the case. They are much cleaner and neater in appearance than those with wood, and are safer from destruction by fire and rain.

23rd March.—The morning broke cold and foggy. We struck camp early and tried to get through the Hop scrub, but progress was so slow that after several miles had been done we abandoned the attempt, and followed Saltpetre Creek down for some 3 miles, crossing an old mining water race, and came to the place where we had watered the horses when at the Wild Boar camp. This is the site of the old Lady Loch (Federation) mine, which originally had a quartz reef, said to have been from 5 to 15 feet wide and to have yielded 15 dwts. of gold (about £3) to the ton of ore. It bears north and underlies to east. An old stamp battery was rusting in its shed, and, save for two prospectors working lower down the creek, the place was deserted. The transport of this quartz-crushing battery from Cravenville to this spot forms an example which, for a feat of bush engineering, can hardly be excelled. After great difficulty the machinery was brought by bullocks for about 40 miles over high mountains to the top of Mt. Wild Boar, where it was 2,100 feet above its destination in a distance of a little over a mile. It was then very slowly and carefully lowered by gravitation with strong chains from tree to tree, while the team of splendid bullocks backed steadily, yard by yard, till the goal was reached. It is said that, just when everything was in readiness to treat the large quantities of ore from the reef, further working proved it to "pinch out," and operations were abandoned. Another reef, the Mountaineer, near at hand, has also been partially worked.

We continued down the creek to the alluvial workings of Messrs. Curry and Rowe, who were sluicing the gravels of the creek about $1\frac{1}{2}$ miles below the old Lady Loch mine, where we camped. Mr. Curry, who was living here, kindly invited us to make use of his hut, which we gladly did. He and Mr. Rowe showed us about half a saucerful of good gold, probably about 15 ozs., worth £60, which they had obtained. While having a quiet chat over the fire we were greatly amused on hearing that

we had been mistaken for horse "duffers" the night we brought our horses down to water from the Wild Boar camp. Mr. Rowe, who lived in a hut near the mine, had heard us that night, and naturally concluded something was wrong, for, he thought, no sane and honest men, after descending such a spur at such an hour, would climb it again the same night. On our second visit, however, the sight of an umbrella, borne by one of our party, dissipated the only lingering doubt as to our respectability, for no horse duffer would be seen with such an article!

24th March.—We packed up and left about 10 a.m., and some 5 miles below the Lady Loch mine crossed Sassafras Creek, just above its junction with Saltpetre Creek. At this place the track up the Sassafras to Zulu Creek, Dart River and Corryong meets the Saltpetre track. An accommodation house, kept by a Mrs. Lawrence, stands here. It is probably the most out-of-the-way residence of a woman in Victoria.

This Saltpetre valley affords a fine example of successive river terraces of pebbly gravels extending to about 150 feet above the present level of the stream. The higher portions had been worked by adits, the lower by shafts and drives. The strata forming the bed rock are slates and sandstones, similar in character and general dip to those higher up the valley. One place in this valley afforded a small but fine example of the damage done by a waterspout. The bed rock had been denuded of soil and loose rock, which had been left in heaps lower down the valley.

From the Saltpetre-Sassafras junction the Omeo track climbs over a spur between the latter creek and the Gibbo River, and about 2 miles further on it crosses the Gibbo on a bridge at Mr. Peter Mason's sluicing claim. On this spur near the bridge there is a large "buck" reef—*i.e.*, one which does not contain gold. The river gravels in Mason's claim were about 50 feet thick, and were being ground-sluiced into the river. The water was being brought by a race from the Buenbah River. This river is apparently the main branch of the Gibbo, and becomes known as the Gibbo below the junction of Saltpetre Creek. Here we had another example of the energy and indomitable spirit of the miner of the Victorian mountains. This race, 6 miles long, with numerous flumes across the gullies, had taken 18 months to construct. Much of the timber had to be carried to the places where used, and all the work was done solely by Mr. Mason. Just after the water had been turned into the race a bush fire raged through the district and burnt a good deal of the fluming. Repairs were effected, and when we passed through Mr. Mason had the race again in working order, bringing in a good stream of water, and was getting satisfactory yields of gold.

In this locality the strata are yellow slates, dipping to N.W. at

62°, showing that an anticline occurs somewhere about Sassafras Creek. Mr. Mason kindly offered to show us a short cut over the range to the Benambra valley, to save the long route down the Gibbo River and up Morass (Murphy's) Creek. This offer was gladly accepted, and about 1 p.m. we set off southwards up a steep spur. Between 3 and 4 miles from Mason's claim we reached a point about 1,500 feet above the river, where the ridge takes a sharp turn to the east, and we lost some time through taking a wrong spur. When the right course was recovered it was getting late, and darkness found us at an altitude of about 4,300 feet at the head of Turnback Creek, on a very rocky, narrow ridge. The strata along this range are chiefly indurated siliceous sandstones with a few thin beds of bluish-grey slates. They strike generally N.N.W., and dip to W.S.W., still showing the western limb of the Sassafras anticline. This was a sorry camp in every way. There was no water, very few shrubs, and little grass for the horses, but we close hobbled them and turned them loose; then pitched camp on the least rocky place. Mr. Mason disappeared into the blackness of the Big Creek valley, returning after a long, stiff climb with a billy of water, and we soon had tea. Here the Bull-dog Ant, *Myrmecia sanguinea*, again came into evidence. While drinking some tea, Mr. Thorn was bitten and stung on the tongue and lip by one of them. On going into the tent to put down the blankets we discovered numbers of these ants. A candle had been left burning, and the light had deceived them. They were over everything—blankets, pack saddles, provisions, walls of the tent—but we were not inclined to shift, so simply killed all visible and lay down. A startled whinny roused us, and we found that three of the horses were missing. A faint tinkle of the bell showed where they were—far down the ridge to the river—and we were compelled to bring them back and tie them to trees near the camp. Another lost day was thus narrowly averted.

25th March.—In the morning we continued our journey along the steadily rising ridge, covered with Mountain Peppermints and Snow Gums, and rounded the source of Big Creek. The ridge here trends N.E. to a high point, close on 5,000 feet, about 700 feet higher than the last camp, and from this point we had a fine view of the Omeo district. The strata, still the same kind of rocks, dip to E, indicating the eastern limb of the anticline. Near here Mr. Mason left us, and we descended 1,900 feet into the Benambra Valley. On the way another Copper-headed Snake, 3 feet 3 inches long, was killed, at an altitude of about 4,600 feet, and far from any water. The timber on this slope consisted of Peppermint, Blackbutt and Messmate, with very dense Native Hop and Hazel scrub; while near the floor of the valley there was a strip of Blue Gums, *Eucalyptus globulus*. We found a splendid place for a camp at a fine spring coming from a

Tea-tree patch in the midst of an open place in the forest, where, among plenty of good grass, we pitched camp early in the afternoon and gave the horses a much needed feed and rest.

26th March.—The morning broke fine, and we soon packed up and crossed the marshy flats, partly through Tea-tree, *Leptospermum scoparium*, coarse Swamp Grass, &c., and about 2 miles on crossed Benambra Creek. About half a mile further we met the old Omeo-Manaro track, about 1 mile above the outpost of settlement. We were now on the main track to Kosciusko, and following it in a N.E. direction for about 2 miles, over low spurs of slates and sandstones, we recrossed Benambra Creek at the head of the morass. From here we went in a generally northerly direction up a small creek to the divide between Benambra Creek and the Buenbah River. Benambra Creek at the crossing showed sand and pebbles of slates, sandstones, quartz and mica, indicating a metamorphic area towards its source. The strata of the creek to the divide are indurated siliceous slates, similar to those of the possible Heathcotic series at the source of Saltpetre Creek, and of which they are probably the southerly extension along the strike. They dip to S.W. at 58° , but further on have a dip to E.N.E., showing the occurrence of an anticline. Only one Kangaroo, *Macropus giganteus*, was seen, though this was an open gum forest with good grass and just the country for kangaroos.

The track crosses this divide over a low saddle, only about 500 feet higher than the crossing over Benambra Creek. On the Buenbah fall there is a great deal of broken quartz wash, in which a shaft, 10 feet deep, had been sunk, obviously with no encouraging prospects of gold. Heavy clouds were now gathering fast from the north. About 2 miles from the saddle we reached the fine flat of the Buenbah, the site of the old Buenbah cattle station. A small empty hut and some yards were all that was left of the buildings. The threatened thunderstorm burst as we neared the hut, so we took refuge in it. Between the Benambra divide and the Buenbah flats the visible strata are argillaceous and siliceous slates, dipping to S. 60° W. at 75° . On the opposite side of the Buenbah the spur terminates in steep cliffs at the river. After the storm ceased we resumed the march along the flat in a generally N.E. direction for about half a mile, and came to the point of a spur abutting on the stream. Here the strata are fissile slates and sandstones, dipping to N. 80° E. at 45° , indicating another anticline. A second thunderstorm passed over as we continued our journey. The track left the river and crossed a small creek in a marsh, then an open forest, covered with fine Kangaroo Grass, *Anthistiria ciliata*, to the ridge overlooking Running Creek. A short descent of 120 feet brought us to Running Creek, where we pitched camp on its small grassy flat.

27th March.—This was a lovely morning, and we looked for-

ward to reaching the Indi River at Groggin on the next march, so hastily packed up and sent the horses to the ford. Three of them crossed without the slightest difficulty, but the timid, clumsy brute, that had given us the trouble near Cravenville, refused to do so. He was finally got over by tying a coat over his head, leading him up to the ford, and dusting his back at the crucial moment.

Several mining shafts, 8 to 12 feet deep, occur on the north side of the creek, but payable gold has not been found. The strata in the vicinity are siliceous sandstones and slates, considerably contorted, dipping to N. 60° E. at 62°. Running Creek is a strong stream of beautiful water, and is about 15 feet wide. It evidently drains a good extent of country, though its course is not visible for more than a quarter of a mile above the ford, where, in a series of small falls and rapids, it descends from the plateau to the east.

We now crossed a small gully and ascended a long, steep spur over unaltered slates dipping to N. 60° E. Here another Copper-headed Snake was killed, and a little later two more. Further on slightly spotted slates and siliceous sandstones appeared, still with the same dip; then very fine mica-schists, and, finally, coarse and fine nodular and wavy mica-schists of yellow, brown, red, olive-green and grey colours, with a few bands of quartzite. All of them are greatly jointed, and have numerous veins and patches of vitreous barren quartz running obliquely across their strike. The dip is of foliation, and is to the west at 78° to 80°, indicating a conformance between the dips of the strata and of foliation and the presence of a syncline. These mica-schists form the summit and upper portion of Mt. Hope, which lies about 4 miles from the ford on Running Creek.

Two fine photographs of Mt. Gibbo were here obtained. In passing on, contorted, crinkled and pitted mica-schists were seen, but nowhere on the track was there any evidence of gneiss or granite. Proceeding 3 miles further to Dinner Creek, the reverse gradation to normal slates was observed. Mt. Hope itself is about the centre of this metamorphic area. Its summit is somewhere about 4,700 feet, and from it a fine view can be obtained across N.E. Benambra.

The track followed the main ridge to within about half a mile of Dinner Creek hut, where it left the ridge in a belt of dense Hop scrub and continued north easterly along the shallow valley of this creek to the hut near a spring amongst Tea-tree. This is at an altitude of some 4,400 feet. The hut was empty at the time, but was apparently being used by an opossum-trapper, as skins of these animals were nailed out on the trees. At this place we had lunch and rested the horses, so as to reach Groggin, 10 miles on, if possible, that night. After an hour's rest we pushed on again just before dusk. A short distance N.E. from

the hut a small gully runs into Dinner Creek, and this is about the easterly limit of the metamorphic area, for on the opposite slope normal sandstones appear, still with a W.S.W dip. This Mt. Hope area is another example of the presence of a subjacent boss of intrusive plutonic rock. In this case, judging by the greater degree and extent of the metamorphism, this boss is nearer the present surface than that at the source of the Saltpetre. To the north of the main ridge Omeo Creek takes its rise, and we followed the ridge in a N.E. direction, parallel with that creek. The country between here and Groggin had to be traversed in the moonlight, and this, and the absence of observed outcrops, prevented the character of the strata from being ascertained. Some dips taken, however, seem to point to another syncline and anticline occurring there. The rocks seen were principally slates, with a few beds of sandstone. Along this section of the trip we had much difficulty in keeping the track. The long shadows of the trees often lay parallel with the ridge, and the intervening shafts of light, like tracks, were continually leading us astray. This ridge has a special interest, inasmuch as it furnished the original of the beautiful picture by Eugene von Guerard, "Mt. Kosciusko, from the Mt. Hope Ranges in Victoria," now in the National Gallery in Melbourne. We could not, of course, identify the point of view of this picture, but doubtless splendid glimpses could be obtained during daylight of Mt. Kosciusko from this range. Near midnight we reached the end of the range, crossed Boggy Creek in an almost flat area of granite, and were on the flats near Groggin. We camped on the side of the stream in a finely grassed patch, where the horses had a good feed and rest.

28th March.—Though rising early, it was not till near noon that we set off across the low quartz-mica-diorite ridge that separates Boggy Creek from the Indi. Two miles of open undulating country, clothed chiefly with Peppermints and good grass, brought us to the Indi at Groggin. Here we saw one of the only two inhabitants of the place, Jack Riley, and renewed our acquaintance of the previous year. The river was fortunately not in flood, so we forded it easily, and pushed on past the old Groggin hut, across Snowy Creek, and along Leatherjacket Range to the ford on Leatherjacket Creek. At this place we had a late lunch, and resumed our march about 6 p.m. to Manaro Pass. As this part of the journey had already been travelled by me the previous year, we had no difficulty in finding our way in the moonlight. Save for the "mopokes" of several Boobook Owls and the squawk of an occasional Mountain Opossum, *Trichosurus caninus*, no sounds of animal life broke the silence of the forest, and we reached the Pass, 7 miles from the ford, about 10 o'clock. We camped on the north eastern fall of the range, near the

old camping-place of the previous year, and had a very cold night.

29th March.—On rising we found, as on the previous trip, that the unwelcome change in the weather was coming, so decided not to shift camp, but to try and reach Mt. Kosciusko on horseback. Mr. Walker, who was still lame, remained in camp, while Mr. Thorn and I pushed on northwards, up a wide, grassy gulch, between abrupt bluffs of granite. The clouds were rapidly settling down on the mountain, and before we reached the plateau a snowstorm came on before a driving wind. When the snow ceased a heavy fog obscured everything a few chains away. We pressed on for some miles, hoping the clouds would clear off, but in vain, so we regretfully returned to camp, full of misgivings as to the prospects for the morrow. The previous night had been so cold that one of the horses, though closely hobbled, had shuffled down into the warm timber, a mile back along the track, so, to prevent the risk of losing them all, we reluctantly tied them up at the camp.

30th March.—The night proved very cold. The morning broke with a heavy frost on the ground. After the sun rose, thick banks of fog collected from the moist ground. We set off for the mount, Mr. Walker riding, Mr. Thorn and I walking, so as the better to examine the country. All the shrubs and coarse grass were beautiful under a thick covering of frost till afternoon. We reached the plateau and climbed up one of the numerous bluffs that occur in parallel lines on it, with grassy saddles between them. Here a fine example of a rocking stone was found, and on passing between this bluff and the next one to the north we found that the former gave such a fine echo that we called it Echo Point. These bluffs are due to weathering along vertical joints, which occur in great numbers through the granite mass of Kosciusko. On the S.W. slopes of Mt. Etheridge we found some pebbles, which, though not showing any distinct striæ, were distinctly grooved, faceted, and polished, and so much resembled glacial stones that we felt no doubt they were of glacial origin. A large patch of snow rested on the S.E. slope of Mt. Kosciusko, while in Kosciusko Valley the clear, still waters of Lake May, with eight Black Ducks swimming about, glistened under the mount. We crossed Ram's Head Pass and rapidly climbed up the slope to the summit of the mount, which we reached about 2.30 p.m., but the views were fleeting, as the big clouds continued their endless procession under a strong gale from the N.N.W. Photography under such circumstances was not promising, but, two of us holding the camera, a panorama from the "Roof of Australia" was obtained, besides a few other views about the valley. Frost action is evidenced everywhere by the sharply cleaved blocks of rock. Viewed from the summit of Kosciusko the absence of arboreal vegetation renders

the landscape rather uninteresting from the N.N.E., down the valley of the Snowy River to the S. along the whale-backed ridge running from the summit. But from the N.N.W. to the S.S.W. the view is over the wooded valleys of the Gehi and the Indi, and across the great expanse of mountains in Benambra and Bogong in Victoria; in these directions glorious views were obtained. During our return to camp sleet came on, and the hairs on our faces became frozen together. Near Ram's Head Peak we were surprised to see what we all believed to be a Rabbit. It ran across our track for about 100 yards and disappeared among some rocks. We reached camp about dusk, and again tied up the horses, though with guilty consciences. The poor beasts were shivering, and the hair on their bodies standing straight out. We passed an unpleasantly cold night, shivering and dozing fitfully, for sleep was out of the question, and were right glad to welcome the daylight.

31st March. — Fortunately the morning broke fine, and developed into a lovely day, with scattered clouds floating about. Mr. Thorn and I set off once more to the mount. This time, on reaching the plateau, we went northwards, crossed a small grassy plain half a mile long, and before getting down the steep fall into Kosciusko valley, clambered over large blocks of granite, which give the place the appearance of the "Ploughed Field" of Mt. Wellington, Tasmania. We examined parts of the eastern side and floor of the valley, and found the former to be littered with masses of granite and indurated slates and sandstones, while the latter consists of these indurated sediments, covered with large blocks of granite and a detritus consisting of boulders, pebbles, gravel, &c. All these sedimentary rocks dip to the east at high angles. The presence of these masses of granite, far out on an area of sedimentary rocks, points to a glacial origin for them. Moreover, the valley, terminating in a very steep outfall to the south, is a broad one, with a flat floor—a U-shaped valley—in which the present stream—the Leatherjacket—has cut a shallow channel. The eastern side has no well defined gully cutting into it, but possesses numerous small, narrow channels, which seam its slope. The western side consists of a line of disconnected bluffs, once continuous, but eaten through apparently by backward corrasion from the lower regions of the mount. The evidence points to a geologically recent period for the denudation, such as would be accounted for on the assumption that in recent times a glacier filled the valley. Undoubted glacial evidence has been adduced by Mr. R. Helms, in 1893,* and by Professor David, B.A., F.R.S., and Messrs. E. F. Pittman, A.R.S.M., and R.

* "On the Recently Observed Evidences of an Extensive Glacier Action at Mt. Kosciusko Plateau," Proc. Linn. Soc. N.S.W., viii., part 3, Oct., 1893.

Helms, in 1901,* as occurring to the north, and they prove, as we suspected from our hasty examination, that Lake May is a glacial lake.

On returning to the camp we passed between the wrong bluffs on the plateau, but fortunately the evening was fine, and just on the edge of dusk we came on to the Manaro track, about half a mile away from the camp, which we soon reached. The wind was very cold and blowing a gale, so that, with the experience of the past two nights, we decided to strike camp and try to reach the Leatherjacket ford that night, since our holidays were fast drawing to a close. After tea, while making a supply of scones, we were surprised to find that some water, taken from a running stream and standing in a basin for a few moments, close in front of the intermittent heat-blasts from a large fire, had been frozen. We packed up, and at 9 o'clock left this cold spot, and were soon over the Manaro Pass and among the warm timber. Now, it is an easy matter following a rapidly ascending ridge, but quite a different one descending a ridge, especially in the dark. About a mile from the ford we took the wrong spur for a hundred yards before discovering our mistake. The moon was now up, and on returning to the main ridge, here almost flat, we searched for the track for a long time without success, till, at 3 a.m. on 1st April, we decided to camp till daylight. On this trip, as on the same day last year, we had lost our way. The only sounds of animal life heard were the peculiar squawk of a Mountain Opossum and the never-failing "Mopoke."

1st April.—Daylight showed us the missing blazes, and we packed up, reaching the ford at 10.30 a.m. Here we had breakfast, rested the horses, and dried our things. Leaving here about noon, we made no delay in reaching Groggin, where we arrived about 2.30 p.m. Our provisions were very low by this time, but we were able to get some salt meat from Mr. Riley. This we cooked, and made some scones, so as to lose no time during the forced marches necessary to cover the remaining distance, about 40 miles, to Corryong, along a newly cut track on the Victorian side of the Indi. We left Groggin about 6 p.m., and, after following an ill-defined track for about 2½ miles along the Indi flat over a river terrace, crossed Omeo Creek near its junction with the Indi; then for about 1½ miles over a lower river terrace and marshy ground to where a steep spur joins the river. This place we reached at dusk and found a large unnamed creek, which we called Pinnibar Creek, as it rises on the flanks of Mt. Pinnibar, flowing from the west into the river. In the creek partially metamorphosed slates were visible in a small outcrop,

* "Geological Notes on Kosciusko, with Special Reference to Evidences of Glacial Action," *op. cit.*, xxvi., part 1, March, 1901.

For further information on the geology of this district the papers specified in the appendix to the latter paper should be consulted.

due to the proximity of an intrusive mass. Crossing the creek we commenced a very arduous and steep zig-zag climb for 1,700 feet in the dark, first over chloritic slates, then red and grey mica-schists. Reaching the top of this ridge about 10.30 p.m., and winding round it for some distance, we were dismayed to find the track descending almost in a straight line into the depths of a deep gorge. We promptly readjusted the packs on the horses, girthed them as tightly as possible and, with some trepidation, began the scramble down. After slow, careful travelling over schist and granite we were fortunate in getting the horses down nearly 2,000 feet without mishap, and found ourselves at the junction of a large swiftly running creek with the Indi. Both streams were roaring so much that ordinary conversation could not be heard, so we silently unpacked and let the horses go. The tent was then pitched on a raised bed of river drift, we had an early morning tea, and, wondering how any man could expect a track of this kind to be used by horses, fell asleep to the music of the rushing waters.

2nd April.—The morning increased our astonishment, for we were in the canyon of the Indi. Both sides of the river were formed of steep cliffs, between which the stream ran roaring from the east in a series of rapids to meet its still more turbulent tributary from the S.W., before it turned to the N.W. to continue its rushing course onward. There is a romance attached to this place, as we found out later. It appears that, while the track was being cut, the men on reaching this spot found, to their amazement, a hut, a small clearing and a man, clothed almost entirely with opossum and wallaby skins. On this small clearing he had, it is said, grown some tobacco and wheat, and, resenting the encroachment on his privacy, he at once disappeared, no one knows whither, taking his history with him, to some other inaccessible part of the mountains. A bush fire had ravaged most of the locality, and burnt the hut, which had stood on the spot where we camped. The creek had no name, so we called it Hermit Creek. The locality is interesting geologically, for the stream runs approximately along the line of junction between granite on the S.E. and schists on the N.W.

We had a long, hard day's tramp of about 30 miles before us to reach Corryong and catch the coach next day, so we hurried away and climbed 500 feet up the slope across Hermit Creek, over quartz and mica-schists, then wound along the side cuttings by the Indi till we came to another large unnamed stream, to which the name Coynallan Creek has been given. This country is composed of schist, caused by the intrusion of the granite mass at Hermit Creek, and through it run granite dykes. About the junction of this creek with the Indi the vegetation was extremely dense, consisting mainly of Hazel, *Pomaderris apetala*, Musk, *Aster argophyllus*, Blanketwood, *Senecio bedfordi*, Tree-ferns,

Alsophila australis, matted together with Clematis, *Clematis aristata* and Wire-grass, *Ehrharta juncea*, affording a strong contrast to the burnt hillsides.

As we progressed down the canyon, the track wound through side cuttings made in the slates, with here and there strips of Swamp Tea-tree, where corduroy of tree-ferns, saplings, and tea-tree had been made. The cliffs gradually became less steep, while the rocks merged imperceptibly into normal slates and sandstones, with numerous quartz veins, until, some 7 miles down stream, the gorge opened into a fairly wide flat, where Barlow's Creek joins the Indi. The strata are probably Ordovician. They have a general N. to N.W. strike, and dip to the E., S.W., and W., showing, as far as noticed, a syncline and an anticline, though probably more occur. The natural section is a grand one for the geologist, and the canyon most pleasing to the photographer, but our time did not admit of examination or photography, so we hurried on. For a more detailed description of the area between Groggin and Corryong, see a former paper* by me.

Leaving the Indi River, we passed over the alluvium of Barlow's Creek valley and came on low spurs of intrusive granite, like that at Hermit Creek, forming the divide between Barlow's and Bunroy Creeks. This gave place in about 2 miles to slates and sandstones, considerably indurated near the granite contact. The track from here continued north for several miles, crossing Bunroy Creek and M'Ilree's Gap, then turned west across the Elliott Range. The strata about M'Ilree's Gap are probably Ordovician, but granite occurs on the eastern flanks of the range. It gives place to metamorphic rocks, principally schists, on the western slope into the Thowgla Creek valley. It was long after dusk before we crossed the Elliott Range and reached the valley, where we had some difficulty in finding the way to Corryong.† Finally, near midnight, we reached that township, had tea, packed up ready for the morrow, and retired to rest.

3rd April.—Early in the morning the coach to Tallangatta (50 miles) took Messrs. Thorn and Walker, with the camp material, while I rode one of the horses and drove the other three to the camp of their owners, between Cambourne and Koetong, and, leaving them there, reached Tallangatta about 6 p.m.

So ended a useful trip of three weeks, comprising some 300 miles of mountain travel, of which 250 miles had been done on foot, with good weather during most of the time.

* "Geological Notes on the Lower Indi River District, Eastern Benambra," with map, Prog. Rept. Geol. Surv. Vict., vol. ix., 1898, pp. 67-70.

† For further notes on this district, see "Report on the Corryong Gold-field," R. A. F. Murray, Prog. Rept. Geol. Surv. Vict., No. viii., p. 47, and "Report and Plan of Geological Survey of the Parish of Towong," W. H. Ferguson, Monthly Prog. Rept. Geol. Surv. Vict., Nos. 6 and 7, Sept. and Oct., 1899, pp. 6-8.

The Victorian Naturalist.

VOL. XXII.—No. 8. DECEMBER 7, 1905. No. 264.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 20th November, 1905.

The president, Mr. F. G. A. Barnard, occupied the chair, and about 90 members and visitors were present.

REPORTS.

A report of the excursion to Ringwood on Saturday, 28th October, was forwarded by the leader, Mr. C. French, jun., who said that there was a large attendance of members and friends. The party rambled for about two miles along the railway line towards Bayswater, and then turned to the right to a series of hills, which were searched for flowers, with very good results. Altogether during the afternoon some sixty species of plants were found in bloom, of which no less than twenty-three were orchids. Among the latter may be mentioned *Thelymitra carnea*, *T. ixiooides*, *Caladenia suaveolens* (very fine), *C. cairnsiana* (usually rare, but here a patch of thirty-five specimens was found), and *Prasophyllum fuscum*. Other noteworthy plants were—*Phylloglossum drummondii*, *Utricularia dichotoma*, *Stackhousia linarifolia* (with pink flowers), *Bossia prostrata*, and *Acacia juniperina*. Entomological specimens were scarce, doubtless owing to the recent exceptionally cool weather. Three Copper-headed Snakes, *Hoplocephalus curtus*, were seen during the afternoon, two of which were killed.

A report of the three-days' excursion to Warburton, on Saturday, 11th November, and following days, was given by the leader, Mr. F. G. A. Barnard, who said that the attendance was rather small, and, owing to the wintry weather, plants and insects were very backward. A number of interesting planarian worms were secured, and, under the guidance of a geological member, some attention was devoted to the geology of the district.

A report of the junior excursion to the Botanic Gardens on Saturday, 4th November, was given by the leader, Mr. F. Pitcher. Owing to threatening weather the attendance was not so large as was expected. However, about forty-two members put in an appearance. Many of the useful trees and plants were pointed out, and their various uses explained. Among the interesting plants noticed was a fine specimen of the Banana, *Musa ensete*, bearing flowers and developing fruit—*i.e.*, seeds—the leader explaining that, though not the same species as the edible

banana, the mode of flowering and the development of the fruit was similar.

The hon. librarian reported the receipt of the following donations to the library:—"Department of Mines, Victoria, Bulletin 17: Newbridge Goldfield," from the Secretary for Mines, Melbourne; *Journal of Agriculture of Victoria*, July and August, 1905, from the Secretary for Agriculture, Melbourne; "Department of Mines, New South Wales: Records, vol. viii., part 1, and Annual Report, 1904," from the Secretary for Mines, Sydney; *Agricultural Gazette of New South Wales*, July and August, 1905, from the Secretary for Agriculture, Sydney; "Proceedings Linnean Society of New South Wales, vol. xxx., part 1, and Supp.; also Rules and List of Members," from the Society; "Queensland Flora: Index and Supplements," from the Government Botanist, Brisbane; "Proceedings Royal Society of Queensland," vol. xix., part 1, from the Society; *Journal of West Australian Natural History Society*, part 2, May, 1905, from the Society; *Nature Notes*, July, 1905, from Selborne Society, London; also "Proceedings Royal Society of New South Wales," 1877, "Transactions New Zealand Institute," vol. xi., 1878, and "Proceedings Royal Society of Tasmania," 1876 (imp.), 1877, 1878, 1879, 1880, 1881, and 1882, from the University Library, Melbourne.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. A. H. Tricks, Victoria-street, Camberwell, Mr. Thos. Mahood, *Argus* office, Mr. H. Kendall, *Argus* office, Mr. F. G. Cormack, General Post-Office, Mr. F. Cornall, Lorne-parade, Surrey Hills, and Capt. R. J. Dawes, Williamstown, were elected ordinary members; Eric Mansfield as an associate; and Misses Phillis Vale, W. Larard, W. Shappere, Masters Alex. Godfrey, A. M. Hall, O. Childers, H. Mullett, H. Monk, L. J. Lodge, J. Stewart, and A. P. Flockhart as junior members of the Club.

GENERAL BUSINESS.

The chairman stated that the members would be pleased to learn that the Director of Geology had instructed Mr. W. Baragwanath, junior, to extend the survey of the Baw Baw district to the north and west of the area already surveyed; this would probably cover the supposed source of the River Yarra, and so settle the uncertainty at present existing on that point.

PAPER READ.

By Mr. A. Mattingley, entitled "A Naturalist's Notes in North Queensland."

In an interesting paper, illustrated by about seventy lantern slides, the author described many of his experiences during

several trips to the Great Barrier Reef and the adjoining coast of North Queensland. Some fine views of the reef and its inhabitants were shown, including one of a very large rookery of Sooty Terns.

Mr. W. H. M'Mahon mentioned that the author, during his recent sojourn at Warrnambool, had been the means of stimulating the interest in natural history in that district.

The chairman remarked that the members were indebted to Mr. Mattingley for his paper, and complimented him upon the excellent series of slides shown, which recalled to him pleasant memories of a brief visit to that part of Australia.

Owing to the lateness of the hour, Mr. T. S. Hall's paper, entitled "Notes on Zoological Nomenclature," was held over until next meeting.

EXHIBITS.

By Mr. R. A. Bastow.—Hermit Crabs, *Nectocarcinus tuberculosis*, in shell of *Voluta roadknightie*, and a so-called petrified mushroom (a root of sea-weed), from Cape Schanck.

By Miss Cochrane.—Paintings of nine varieties of orchids collected at Ringwood excursion, 28th October, 1905; also *Lyperanthus burnetti*, from Emerald.

By Mr. A. Coles.—Pair of Warbling Grass-Parrakeets—male in normal plumage, from Swan Hill; also a female, imported from England, showing change in colour of plumage, caused probably by in-breeding.

By Mr. C. French, jun.—Cut-worm moths, *Agrotis spina*, appearing during October and November in many parts of Victoria in countless thousands.

By Mr. F. G. D'Ombraïn.—Hybrid Scarlet Lory and Rosella shot at Mooroolbark.

By Master J. D'Ombraïn.—Black Snake, *Pseudechis porphyriacus*, killed at Croydon in October.

By Mr. C. J. Gabriel.—Shells, *Ranella perca*, Perry, from Japan, and *Cypræa physis*, Broc., from Algeria.

By Mr. J. R. M'Lennan.—Orchids in bloom, *Lyperanthus burnetti*, *Microtis porrifolia*, *M. atrata*, and *Pterostylis cucullata*, from Emerald.

By Mr. J. Tovey, for National Herbarium.—Dried plant, *Emex australis*, found growing in the Brighton district. A native of South and Western Australia.

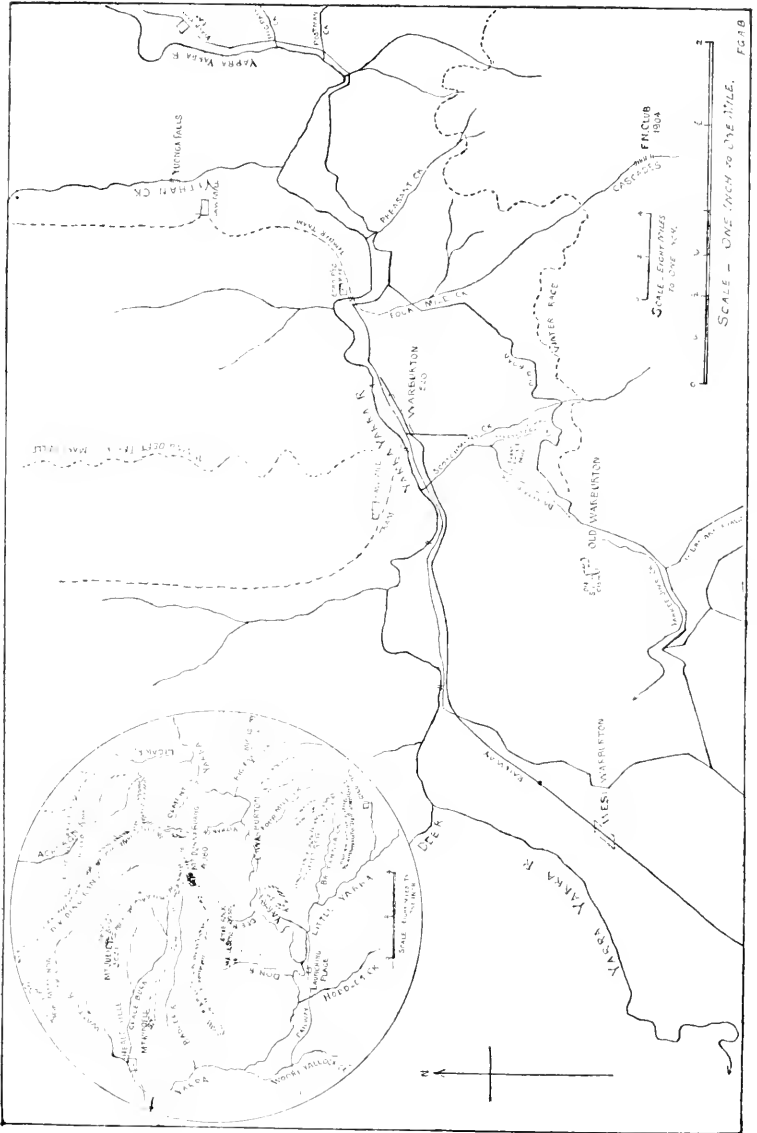
By Mr. F. M. Reader.—Dried specimens of plants, *Stellaria multiflora* and *Stipa pubescens*.

By Mr. F. Schafer.—Native stone axe found at North Brighton.

After the usual conversazione the meeting terminated.

EXCURSION TO WARBURTON.

FOR the second year in succession Warburton was the locality chosen for the three-day excursion which has become an annual fixture for the King's Birthday season. It had been anticipated that a large party would have gone up to Warburton this year, but from various reasons only seven members took part in the outing, and this full complement was not made up till the Saturday evening, 11th November. Those who went up by the early train spent the day in exploring the river banks in the immediate vicinity of the township. Owing to recent rains, the river was extra noisy as it rushed over its stony bed, and a ramble by moonlight to one of the numerous bridges crossing it showed that the stream was running at a great rate. During the night several showers of rain occurred, and it was with grave fears that we turned out in the morning. Two members who went for a stroll before breakfast returned with wet jackets as their reward for early rising. After breakfast, the weather having cleared, it was decided to make a start for the Yuonga Falls on the Yithan Creek, and, if possible, reach the summit of Donnabuang (4,080 feet), the peak which dominates the township on the northern side of the Yarra; but we had no sooner crossed the Wonwondah Bridge than a heavy shower came on and necessitated shelter being sought under a friendly roof. The owners being piscatorially inclined, natural history items naturally filled up the conversation. The weather clearing a little, the crustacean division made towards a backwater of the river to set their traps for "Yabbies" (fresh-water crayfish), *Astacopsis serratus*, var. *yarraensis*, M'Coy, and dig for the land forms (*Engæus*, sp.) on the adjacent hillside, where they secured several specimens. Three others, representing entomology, botany, and geology, with photography, followed the tram track to Robertson's Sawmills, where shelter had to be again sought from a sharp hail-storm. Here we had a chance of admiring the handiwork of some of the operatives who devote their spare time to manufacturing walking sticks from "fiddle-back" Blackwood, *Acacia melanoxylon*. A short scramble along a slippery path brought us to the falls, but they are being despoiled of their lovely surroundings of vegetation more and more every year, and shortly much of the water will be conducted across the hillside to drive the machinery of the Echo Printing Works, in course of construction near the Wonwondah Bridge. It was now time to return to the hotel for lunch, but, as we had climbed some 750 feet, it seemed a pity to go down without doing more; we therefore decided that lunch was unnecessary, and determined to follow the tram track higher up the mountain. At the falls *Tecoma australis* and *Clematis aristata* were festooning the shrubs with their beautiful flowers.



MAP OF WARBURTON DISTRICT.

The fine bushes of *Correa lawrenciana* are still not far from the track, but the variety of small ferns did not seem so good as noted in the *Naturalist* of February, 1903 (xx., 116). The tram track is very steep, a wire rope and winding plant being required to transport the logs, consequently we rapidly increased our elevation, and in half a mile came to a junction at about 1,250 feet. The vegetation was too wet to allow us to venture far from the track, so few plants were noted, the only novelty being *Zieria smithii* (Rutaceæ), with white flowers, resembling an *Eriostemon*, which keep very well when picked. Following the tram for another stage, we reached the locality where the trees were being felled, and almost the head of the Yithan Creek, and found that the current maps of the county of Evelyn are considerably wrong, as the Yithan does not nearly reach Mt. Juliet, the Dividing Range approaching much nearer the Yarra than shown on the latest maps. The sketch plan of the district taken from a recent survey, showing the Acheron rising much nearer the Yarra Valley than it is usually marked, is probably almost correct. Our photographer wanted to get a view up the Yarra Valley, so we struck off to the right, towards a ridge which seemed to offer the best look-out, but we had not reached it before a heavy hailstorm lasting quite half an hour came on, and caused us to seek what shelter we could find among the tall, straight trees (here we were at an elevation of nearly 2,000 feet by the barometer). The stump of one recently felled exhibited a splendid series of rings, which were counted, in order to ascertain its age, but yielded only 125 rings, which, if representing one year each, seemed to us too short a life for such a fine stem, about 5 feet through. The wind blew from all quarters, and it was difficult to escape the driving hail or dripping trees, while the hillside became a watery slope. At length the weather cleared, and we decided to descend and leave the conquest of Donnabuang for some future day. This was quickly accomplished to the upper winding engine, when another hailstorm stuck us up. From here some fine cloud effects were noticed over the valley of Big Pat's Creek, and duly transferred to a negative. The feeders of the Yithan were running their best as we regained the tram line, and we several times involuntarily sat down to contemplate the scene. The descent of the tram track was soon made, but a further wait was necessary at the sawmill while another hailstorm passed over. Then we made for our comfortable quarters at the Alpine Retreat Hotel, which we reached about 5.30, and a change of clothing soon removed all traces of our adventures.

Late in the evening heavy rain again came on, and made us despair for the morrow. However, the morning broke fairly fine, and as flowers and insects were scarce the majority of

the party turned their attention to geology, under the able guidance of Mr. A. E. Kitson, and wended their way up Scotchman's and Backstairs Creeks to a tunnel in the hillside, with a miniature battery alongside, known as the Evans Reward mine, romantically situated, with a background of tree-ferns. Here we went the length of the tunnel, some 170 feet, and inspected the face, obtaining samples of the decomposed granite of which the payable portion consisted. A dish of this was afterwards washed off, and yielded a nice little sample of gold. We then went further up the hill to the Old Warburton road, which we followed to the site of the old sluicing works on the hill called "Little Joe," carried on in the early sixties. The gulch washed out is now filled with trees and shrubs, and is a sort of concentrated botanical museum of the district, and there the fern collector can get seedlings of all kinds in abundance. We were astonished to find trees 40 to 50 feet high growing in the bottom of the cutting, and on the hillside we were shown fine trees at least 2 feet in diameter which have grown up during the last 40 years. Signs of the scratching of Lyre-birds were noted in the bottom of the cutting. Samples of the highly coloured clays, &c., occurring in the walls of the gulch were secured, as well as a number of fern seedlings, and then we returned down the eastern side of the valley. This locality, as reported last year (*Vict. Nat.*, xxi., 136), is undoubtedly the best all-round locality for the field naturalist at Warburton, and we greatly regretted we had not longer time to devote to its exploration. Two additional ferns were noted here, *Pteris arguta (tremula)* and *P. falcata*, making thirty-six now noted for the district, which list could probably be increased by further search. Fine specimens of the orchid *Caladenia carnea* were plentiful, and numerous planarian worms were collected from under the fallen logs. After lunch at the hotel it was time to pack up and catch the afternoon train for town. On our way down so many queries were put to our geological member that the journey seemed to pass more quickly than it really did, and we parted at our various suburban stations thoroughly satisfied with our three days on the Upper Yarra. As an example of the difference in the seasons, it may be mentioned that last year the Black Wattle, *Acacia mollissima*, was in full bloom about Woori Yallock and elsewhere, this year the buds only were to be seen; last year the Tecoma was over, this year it was in full bloom; now *Leptospermum scoparium* did not seem to have a single beetle feeding on it, while a few Painted Ladies were the only butterflies seen.

I am indebted to members of the party for the following additional results of the excursion.—F. G. A. BARNARD.

The following are the more important Coleoptera noted by Mr. J. A. Kershaw, F.F.S.:—*Notonomus besti*, Sl., *N. peroni*, Castel.,

N. chalybeus, Dej., *Ceneus chalybeipennis*, Chaud., *Loxodactylus carinulatus*, Chaud., *Cestrinus trivialis*, Erich., *Lissotus furcicornis*, Westw., *Crepidomenus filiformis*, Cand., *Apasis howitti*, Pasc., *Adelium similtatum*, Germ., *A. punctipenne*, Bdv., *Seirottrana proxima*, Pasc., *Saphron inornatus*, Newm., and *Lemodes coccinea*.

Several species of Myriapoda were collected by Mr. W. J. M'Caw, among them being *Scutigera maculata*, *Henicops maculatus*, *Cormocephalus esulcatus*, *C. westwoodii*, and *Necrophloephus antipodum*.

Of land planarians Mr. Kershaw reports that six species were collected. One of these, a small specimen found under a log on the side of a hill, was unknown to him, but, on being forwarded to Mr. T. Steel, F.L.S., of Sydney, who is devoting his attention to this group, it was identified as *Geoplana ventropunctata*, Dendy. This pretty little species has also been recorded from Ferntree Gully, where it was taken plentifully by Dr. Dendy on the Club's excursion to that place in March, 1891. Several specimens of *Geoplana sugdeni*, Dendy, were found crawling along the open tracks, and one was taken on a tree trunk about 18 inches from the ground. The following is a full list of the species taken:—*Geoplana ventropunctata*, Dendy, *G. sugdeni*, *G. mediolineata*, *G. alba*, *G. spenceri*, and *G. frosti*.

Regarding the geology of the excursion Mr. A. E. Kitson, F.G.S., furnishes the following notes:—

The locality about Warburton possesses interesting geological features. The rocks represented are Silurian sediments, comprising marine claystones, mudstones and sandstones; Lower Devonian grano-diorite, Upper Mesozoic or Lower Cainozoic dacite and volcanic ash; a series of clays, sandy clays and clayey gold-bearing sands of probably Lower Cainozoic age and of fluvio-lacustrine origin; remnants of the Yarra River terraces of pebbly gravels of Upper Cainozoic age; and Recent alluvium and hill wash.

The Silurian strata can be seen in railway cuttings between Yarra Junction and Warburton, and up the Yarra, a short walk above this township. The beds are probably the same as those of the Melbourne area, and reappear here owing to the folding of the strata by earth movements. Those beds have been grouped together by Professor Gregory, D.Sc., F.R.S., and called the Melbourne Series or Melbournian—see "The Heathcotian—a Pre-Ordovician Series—and its Distribution in Victoria," Proc. Roy. Soc. Vict., Vol. xv. (N.S.), part ii., 1902 (1903). Where noticed here they have a strike of about N., and dip to E. at high angles.

The grano-diorite occurs close behind the railway line at Warburton, and extends back for many miles, forming the mountainous country in Beenak and Tonimbuk. It has been

intruded into the Silurian strata, altering these rocks considerably along the contact. It is auriferous in parts, and from it has probably been derived the gold that has been and is still being found along Scotchman's Creek. At the present time a specially interesting occurrence of gold can be seen in the Evans Reward mine, on Backstairs Creek, a western branch of Scotchman's Creek, where decomposed grano-diorite is being crushed from a strip between 2 and 3 feet wide, yielding $\frac{1}{2}$ oz. of gold to the ton of material. There is no trace of any vein or reef of quartz; the gold is simply distributed among the decomposed and disintegrating grains of felspar and quartz of the grano-diorite, which lie between what appear to be two parallel fault planes or master joints, and are partially bound together by infiltrated oxide of iron, derived from the decomposition of the hornblende and biotite (black mica) of the grano-diorite.

The dacites join the grano-diorite close to the Warburton railway station and stretch northwards across the Yarra, forming the high mountain, Donna Buang, about 4,080 feet above sea level, which overlooks Warburton from the N., as well as the mass of ranges about the head waters of the Graceburn, Maroon-dah (Watts), Acheron, Ligar and other streams. Beds of volcanic ash occur at various places along the flanks of this great volcanic mass, which has been referred to by Professor Gregory—see "The Geology of Mt. Macedon, Victoria," Proc. Roy. Soc. Vict., Vol. xiv. (N.S.), part ii, 1901 (1902)—as the stump of an ancient volcano. The dacite shows well in railway and road cuttings in the township of Warburton, and usually decomposes into a red soil of good quality, supporting a splendid forest.

The Lower Cainozoic (?) sediments can be best seen in some old gold workings, now about 60 feet deep, on the southern slope of Little Joe, a high point between Warburton and Warburton West. Here the upper deposits are red and yellow clays, with pebbles and angular fragments of indurated Silurian rocks; the lower ones are yellow and pink finely sandy clays. The latter have probably been deposited in a shallow lake, while the former appear to be of fluvial origin, and to have been brought down by a river into a rapidly shallowing lake, perhaps formed during the dacite eruptions by the damming of some valley. They are auriferous, and at this place have yielded a great deal of gold. The upper beds are visible in railway cuttings between Warburton and Warburton West.

The old Yarra terraces can be seen in several places in the valley, while the Recent alluvium forms the present flats of the streams.

There are many points of geological interest not mentioned in these brief notes, but they could not be examined in the very short time available during the excursion.

A NATURALIST'S NOTES IN NORTH QUEENSLAND.

BY A. H. E. MATTINGLEY.

(Read before the Field Naturalists' Club of Victoria, 20th Nov., 1905.)

As one approaches North Queensland from the south, on reaching the Tropic of Capricorn you pass Lady Elliot Island, the southern extremity of that stupendous structure, the Great Barrier Reef—the greatest piece of animal architecture at present existing, whether constructed by the human or other species. Beside it the Great Wall of China sinks into insignificance. For over 1,300 miles, stretching from Rockhampton to New Guinea, this coral reef buttresses the rollers that sweep in from the wide Pacific towards the Queensland coast. As the reef lies from 20 to 130 miles from the mainland, there is a large and almost pellucid lake lying between the reef and the coast-line. It is there that those who suffer from *mal-de-mer* can take a trip in comfort amidst most enchanting scenery, the boat threading its way through a maze of pine-clad islands that scintillate like gems on the ocean, appearing to rest in mid-air when you are some distance off, owing to the refraction of light which prevails in those latitudes.

It is a mistake to think that coral reefs themselves afford bewitching scenery as one passes them in a steamer. Lying, as they do, almost level with the surface of the water at low tide, they might be mistaken for ordinary mud-flats; but land on them and they assume a different aspect—life, palpitating life, is everywhere visible, and both the naturalist and the excursionist will find much to interest them.

Before dealing with some of the sights on this Great Barrier Reef a few remarks on the nature of the reef itself may not be out of place. According to the theory of that greatest of all naturalists, Charles Darwin, which has not been disproved, that coral reefs are built upon the submerged land, we find that the line of the Great Barrier Reef was once the foreshore of North Queensland, and that the land has subsided about 2,000 feet. This we judge from the fact that the coral insects, as they are usually called, cannot live at a lower depth than 200 feet, nor at a higher level than extreme low water, while they must have a winter temperature not lower than 60° F. Now, as the water alongside the reef is 2,000 feet deep, and coral is found on the bottom—a greater depth than it is possible for the creature to exist in—the question arises, how was it formed? Simply this: the foundation on which the animals commenced their work was once near the surface of the ocean, and has gradually sunk to its present depth, the coral polyps building upwards as the foundation sank. Again, we find in some places the reef is above high water level, and able to sustain vegetation. This is caused by the breakers,

which constantly fall on the outer parts of the reef, breaking off large masses of coral and heaping them on to the top of the living coral, to which they become cemented, and so the surface of the reef is raised above high water level, and on it *débris* of all descriptions accumulates, and, disintegrating, forms a suitable soil for the germination of seeds of plants and trees carried there by the waves, wind, or birds, and thus plant and other life finds a home.

Owing to its isolation, many birds, particularly the Sooty Terns, *Sterna fuliginosa*, repair to the Barrier Reef to breed, and on approaching their "rookeries" thousands upon thousands of birds can be seen sitting in compact masses on their nests.

Frigate-birds, *Fregata aquila*, are also found frequenting the same rookeries. These birds have been utilized by the traders and missionaries of the South Sea Islands as letter carriers. Captured when young they have an attachment for the home in which they were reared, and, if taken away to another island, will, when liberated, invariably return to their home. Taking advantage of this fact, the missionaries forward birds by the trading schooners to such places as they may desire communications from, and, when the necessity arises, such as a hostile visit from the natives, or pressing business communications, a letter is tied to the leg of a Frigate-bird and it is released from its place of captivity. Being strong fliers—in fact, the swiftest and most powerful of all the ocean-roaming birds—they soon reach their home, and alight on the perch where they had been fed during their infancy. So powerful are these birds that they have been observed to fly against the strongest cyclones that sweep across the ocean.

Crabs frequent the reef in large numbers, and act as scavengers, but they can be a trouble to the naturalist, as on one occasion, when camped on the reef, some valuable specimens which I had left exposed were entirely destroyed by these voracious creatures.

Many different kinds of coral are found on the reef, and may in future years prove a valuable asset to the Commonwealth, as from its calcareous nature it is a useful manure for exhausted soils. It can also be used for the preparation of lime for building purposes, and, as the reef is, as I mentioned, some 1,300 miles long, the supply is practically inexhaustible. One must not suppose that the coral reef resembles the bleached specimens usually seen. When alive—that is, when tenanted by the polyps by which it is formed—it assumes the most varied colours, and to watch the animals in some calm pool expanding and retracting their tentacles in search of food is indeed a fascinating sight.

Holothurians, generally known as *Bêche-de-mer* or *Trepang*, abound everywhere along the reef. They are greatly prized by the Chinese as an article of food, being considered a great

delicacy. From 250 to 300 tons of the prepared fish, valued at nearly £30,000, are annually exported from the reef by the Chinese, in whose hands the trade entirely is. They are prepared by being gutted, boiled for about twenty minutes, and then dried; sometimes they are smoked in addition, and are undoubtedly very palatable. Some very large Holothurians are found on our Victorian coasts, and would probably be just as edible as their northern congeners. They belong to the Echinoderms or prickly-skinned animals, along with the star-fish and sea-urchins.

An animal which it is most necessary to avoid when walking over the reef is the Giant Clam, *Tridacna gigas*, a shell-fish which often grows to over a ton in weight. Should one accidentally put his foot into the open shell of this creature as it lies open amongst the coral awaiting its food it is more than likely that it would break his ankle with the great pressure which it exerts when closing its thick and solid shell, which it invariably does when interfered with, besides which he would be slowly but surely drowned as the tide rose, since it would require the use of a sledge hammer and chisel or a strong crowbar to force open the shell sufficiently for his release.

A peculiar animal found along the Queensland coast is the Dugong or Sea-Cow, *Halicore australis*, which sometimes weighs as much as 16 or 17 cwt. The male Dugong is furnished with a pair of tusks set in its head somewhat like those of the Walrus, but not so protuberant. The oil of this animal has been largely used in place of cod liver oil for lung and nerve troubles, and was some years ago a universal household remedy, but of late years has fallen somewhat into disfavour owing to its adulteration with shark oil. The cow Dugongs contain a greater quantity of oil than the bulls, and are so assiduously hunted that, unless some protection is afforded them, it is only a matter of time when they will be exterminated. From the fact that the Dugong sits upright in the water when suckling its young, holding the calf to the breast with the forearm or flipper, and also to the human facial expression which they bear, has arisen the stories of the mermaids of the old Dutch navigators.

One of the methods adopted by the natives for their capture is, when they discover where the Dugongs come in to browse on the Sea-grass, an alga, *Posidoina australis*, which grows on the mud-banks near the shore, to erect a staging on which to stand and then on moonlight nights to take up their position on the staging with a harpoon and coil of rope. The harpoon consists of a long pole with a hollow in one end, into which is fitted a wooden head, which is attached to the middle of the pole by a grass rope. Upon espying a Dugong they plunge the harpoon into it, whereupon the animal immediately rushes off; the harpoon head becomes dislodged from the pole, but, being tied to the pole at its

centre, retards very effectively the animal's progress through the water. The native paddles after it in his canoe, waiting till the animal becomes exhausted before finally despatching it.

Another method is to spear them from a canoe in the daytime as they are making their way to some feeding ground. The spear used for this purpose is composed of a light wooden shaft in which is imbedded a piece of sharpened fencing wire. This is easily plunged through their gutta-percha-like hide, and, as the animal dashes off, the wire bends like a fish-hook, and tows the shaft or some other float behind, and is easily followed by the natives in the canoe. The spear thrust is, however, not sufficient to fatally injure the animal, and it is therefore necessary for the natives to kill it, which is done by suffocation. Being a mammal, it is necessary for the Dugong to come to the surface to breathe. One of the natives dives overboard, and endeavours to insert a wooden plug into the animal's nostrils, and so cause suffocation; failing this, they usually tie a rope round its tail and drag it down under the surface of the water, and so drown it; in the event of both these methods failing, they spear it through the nostrils.

White men adopt a different method for their capture. A huge, thick net of large mesh (over a mile in length) is spread along the outside of the mud-banks on which the Sea-grass grows. The net is set when the tide is out, and is held up by stout stakes. When the Dugong comes in to feed it does so on the high water of the flood-tide, thereby passing over the net. On the ebbing of the tide the animal tries to return, but finds its course barred by the net. It swims up and down the net until, driven to desperation, it thrusts its head through the mesh in its vain endeavours to get past, and, becoming tangled up in the net, is at last drowned.

Crossing over to the mainland we find the mouths of the tidal streams lined with mangroves, the roots of which are usually covered with oysters. These require a hammer and chisel to detach them, and, if one has the other necessary additions, a splendid lunch can be obtained. Fireflies are often seen flitting about these streams. At night the light emitted by them when flying appears as if someone was walking about carrying a lantern. When boating at night, what with the fireflies, the phosphorescence of the water, running from the oars like streams of liquid fire, and the crackling of the molluscs on the mangrove roots as they are left bare by the tide, one gets a very weird, uncanny impression of these tidal estuaries.

Colonies of huge destructive bats, *Pteropus poliocephalus*, known as Flying Foxes, make the Mangroves their home, and in the daytime can be seen hanging to the boughs by their hind toes, head downward, by thousands. They sally forth at night to any orchard in the vicinity, and feed upon and destroy large

quantities of fruit. They also eat the different kinds of mangrove nuts and other edible wild fruits, such as those of the various species of *Ficus* (fig-trees) so plentiful in the scrubs. They move about silently, but, should a contention arise among them, they make weird, piercing shrieks. Their presence can be readily detected when resting in the daytime by the pungent musky odour they emit. They appear very large when flying, and specimens have measured $4\frac{1}{2}$ feet from tip to tip of the extended wings. On the ground they are extremely helpless, and in the daytime appear to be blinded by the light. Their general appearance is uninviting, and it is no wonder that it is recorded that, when Captain Cook was voyaging these parts, and one day sent a boat ashore to obtain fresh water, one of the sailors while searching for water came suddenly upon a large Flying Fox flopping about on the ground, whereupon he rushed back to the boat and breathlessly announced that he had seen the devil.

In the tropics, owing to the great heat, one usually sleeps with the window wide open, and on one occasion I was rudely disturbed from my slumbers by one of these uncanny creatures. They are very fond of the fruit of the Paw Paw tree. One of these trees laden with ripe fruit was growing alongside my window, and attracted the attention of some of these animals, when one of them, perhaps mistaking the opening for the entrance to a cave, where they also like to sleep, entered and commenced flying round my room, when, discovering its mistake, it vainly endeavoured to get out again, and in doing so brushed over my face, waking me. On lighting my candle I found the intruder to be a large Flying Fox, which I quickly despatched with a boot. Further sleep that night was out of the question, and next night I awoke in a terrible nightmare, and from the appearance of the bedclothes I must have been wrestling with another of these gruesome creatures in my dreams.

Crocodiles, *Crocodilus porosus*, infest the tidal mouths of the streams and vie with sharks in gobbling up the large Sand Mullet and other fish which abound in those genial tropical waters. Crocodiles—they are usually called alligators, but there are no alligators in Australia—lay from 60 to 70 eggs, in a nest composed of mud and vegetable rubbish in the mangroves; the eggs are covered over by the mother with this vegetable material, which, as it rots, assisted by the sun, generates sufficient heat to hatch out the eggs. The mother lies in a wallow alongside the eggs, in order to protect them from the depredations of wild pigs and other enemies.

One day, whilst collecting birds in the mangroves, I stumbled across a female crocodile in a wallow by her nest, and as I was looking upwards in search of birds I got within a dozen yards of her without knowing it. She soon let me know of her

presence by making a savage rush at me, uttering at the same time a kind of hissing, grunting noise; quick as lightning I discharged the contents of my gun, consisting of No. 8 shot, into her eyes, completely blinding her; then running back I hastily loaded the gun with No. 2 shot, and approaching within about 25 feet I discharged the contents into her under the forearm—the softest part—and so despatched her.

It is a common error to suppose that a bullet will bounce off the skin of a crocodile. The best weapon undoubtedly to shoot them with is a shot-gun, provided you use large shot and can get near enough to them. A crocodile's skin on the animal is as soft as raw bullock hide, but when removed it dries and assumes a hard and horny appearance. Of course the serrated ridges on the back, composed of plates of bone, will turn a bullet if fired sideways.

On one occasion a friend of mine secured some crocodile eggs for blowing, and having placed them in a hat-box under his bed, forgot all about them. One day some time afterwards he was surprised to hear a great commotion in the house, and on rushing in found his wife and the black nurse-girl on top of the bed screaming. It appears they were cleaning out the room, and happening to open the hat-box, some 25 little crocodiles started out and rushed round the room snapping at everybody in a vicious manner, but they were soon despatched.

The young crocodiles when born are provided with a small knob, as it were, of egg-like material, attached to their stomach, to enable them to survive until such time as they can assist themselves. This egg-sac is assimilated by the system, and takes the place of food, slowly disappearing as the little creature grows older, and is finally absorbed after about a month. It was this provision of nature which enabled them to live in the hat-box for some time without other nourishment.

In the open country Termites' or White Ants' mounds are frequently met with, and it is a remarkable fact that one of the parrakeets, *Psephotus pulcherrimus*, the Beautiful Parrakeet, selects them to nest in. The bird bores a hole through the hard exterior into the honeycombed interior, in which it forms a chamber to receive the eggs. The Termites do not appear to in any way interfere with the young parrakeets, but they often desert their mounds.

The Megapode, *Megapodius duperreyi*, or Scrub-Hen, makes its large nest or mound of leaves and rubbish in the dense scrub. They are often of considerable size, being about 25 feet in diameter at the base, and 8 feet high. The birds collect all the materials together by scratching, which entails a considerable amount of labour. The eggs are always laid in the mound upright, with the smaller end downwards, and are covered over

with more leaves, &c., so that the heat of the decaying vegetation may hatch them out. The young ones make their exit by scratching with their specially adapted feet as they lie on their backs in the mound.

Where the giant creepers and climbing plants are found in the densest part of the scrub there is to be found the Cassowary, *Casuarinus australis*, Australia's noblest bird. Specimens have been recorded weighing nearly 250 lbs., compared with which the heaviest Emu weighs about 120 lbs. They are proud of mien, and have been known to jump a fence 8 feet high for the purpose of fighting an adversary. They are provided with a large horny casque, to enable them, whilst running through the thorny scrub, which they do with the head thrust forward, to push aside the prickly boughs, and so save the neck, which is bare. The wings perform the same duty for the body. It must be remembered that the Cassowary is a flightless bird, and is provided with long, hard quills instead of feathers on its wings. The feathers, too, are hard and bristly, and specially adapted for traversing thorny country.

These birds are easily hunted, owing to their plucky nature—that is, provided you have dogs accustomed to them. After a short run through the scrub they will turn and face the dogs, and gradually drive them back to their owner for protection, the dogs knowing full well that one kick from a Cassowary's huge leg would be instant death. Their leg development is two or three times that of an average Emu, and as Emus have been repeatedly known to break a strong wire fence, one can imagine the force of a Cassowary's kick. On one occasion a turkey-hunter was out looking for Scrub Turkeys when his dogs killed a young Cassowary close to the road along which he was walking, when out rushed the mother and attacked him so fiercely that he had to shoot it for his own protection.

Cuckoos are well represented in the north, and conduct themselves as in other parts, in that they do not burden themselves with the hatching of their eggs or rearing of their young, getting other birds to do so for them. Laying an egg on the ground the cuckoo takes it in its bill and places it in the nest of a wren or some other small bird, which hatches out and faithfully rears the young cuckoo. A few hours after being hatched the young cuckoo commits wholesale murder by throwing out the other occupants of the nest, whether they be birds or eggs. This action is caused by the sensitive nerves with which nature has endowed the skin of the young cuckoo receiving a stimulus or irritation on coming into contact with the heated surface of the skin of its puny fellow-nestlings, and urging it to eject its foster-brethren. It seems impossible that such a small, featherless mite could at this stage of its existence instinctively know that the nest would

be too small to hold all the other occupants later on, when they had grown larger, and that the foster-parents would be incapable of feeding all the family. Besides which the young cuckoo is blind at this stage of its existence, and incapable of seeing the opening of the nest, which is a covered-in one, with a side entrance, out of which it ejects the eggs or nestlings as the case may be, and were instinct or reason the predominating faculty operating nature would assuredly have brought into power the most important organs of the bird and those closest to the brain—in short, the visual organs, or use of its eyes. Hence it is safe to assume that neither instinct nor reason is the faculty which operates in the young cuckoo, but that its action is a guiding propensity or physiological law more fundamental even than instinct.

Many species of lizards are to be found in North Queensland. One known as the Diamond-tailed Lizard or Gecko, *Phyllurus platurus*, is frequently met with in rocky country, and is always found with its head downwards on the rocks. It assumes this position in order to make its enemies, such as hawks, believe that its tail is its head, and when they attack it, as they usually do, at the supposed head, they pull off the tail instead, and the lizard wriggles away and survives. Insects creeping about the rocks frequently fail to distinguish between the rock and the lizard, and, walking over it, are licked off by its long tongue and swallowed. Iguanas 6 and 7 feet long are not uncommon in the open forest country, and give one a considerable start as they make for the nearest tree up which to scramble.

Turning to the vegetation found in North Queensland, one finds many singular forms. One of the most unpleasant sensations in travelling through the scrub is to come in contact with the Giant Nettle, or Stinging Tree, *Laportea moroides*. It has large soft-looking leaves like a geranium, and fruit like a raspberry. The sting of this plant causes excruciating pain, and its effect can be felt for months afterwards, especially should the part stung be bathed with water. If a person be riding a horse through the scrub and it should be accidentally stung, the rider has to shin up the nearest tree as fast as he can, as the pain drives the animal almost mad, causing it to bite and tear at everything in its paroxysms of agony, and one therefore runs the risk of being killed should he remain on the ground.

When staying at a sugar plantation up north I was awakened by piercing shrieks and howls, and upon hastening to ascertain the cause found a Hindoo yelling at the top of his voice being carried off to his hut by some fellow-countrymen, who informed me that he was bewitched and possessed of a devil. It appears that the Hindoos are inveterate thieves, and as the stores on the plantations are built on piles, to prevent the white ants from

eating the floors and to keep the goods dry in the wet season should floods occur, the Hindoo had conceived the plan of getting into the store by cutting out some of the flooring. The first night he did not succeed in getting through, but his marks were observed by the manager, who determined to teach the would-be robber a lesson, more particularly as the Hindoos were unacquainted with some of the peculiarities of Australian vegetation. Accordingly he went into the scrub and cut down some stinging trees, and carefully placed them so that the coolie, creeping up to his unfinished work of the night before, would come in contact with them. As he wore very little clothing it is needless to say the lesson was effective.

One of the most curious, and at the same time valuable, trees growing in the open country is the Bottle-tree, *Sterculia rupestris*, so called from the trunk of the tree being thick and rotund at the bottom, and gradually tapering to a bottle-neck above. This tree is capable of withstanding the severest droughts, and when all other vegetation has disappeared the Bottle-tree still flourishes. It is then its value becomes apparent. The trunk, being composed of a soft, spongy, moisture-laden fibre, affords sustenance when cut down for starving stock, which greedily eat it, and its contained moisture to some extent overcomes the terrible thirst of the unfortunate animals. It is in times of stress that the value of protecting our native flora becomes more apparent, and such valuable trees as these *Sterculias* should be jealously guarded as a last resource in times of drought.

The "Lawyer" Palms, *Calamus muelleri*, form a great hindrance to one's progress through the scrubs. They climb in all directions, and should one try to force his way through them he is soon hooked up by the thorny tendrils which this palm uses to climb its neighbours in the forest. They derive their name from the tenacity of their grip, which resembles that of their human namesakes, but they are, nevertheless, charming and extremely graceful objects in the landscape.

The many varieties of fig-trees (genus *Ficus*) form a considerable portion of the vegetation of these northern scrubs, and a number of species are parasitic—that is, they grow on other trees, to which they firmly attach themselves, and slowly but surely strangle their foster-parent, eventually assuming their foster-parent's shape. They will even envelop rocks in their rambling roots, as depicted in the slide. Most trees bear their fruit on the smaller branches and twigs, but here one of the figs produces its fruit in compact bunches on the main trunk. The fruit is very dry, and only eaten by birds or rats. It is probable, were cheap labour available, much could be done among the fig-trees in the way of rubber-getting, as the juice of the bark when

collected and properly prepared should equal the india-rubber of commerce.

The Match-box or Queensland Bean vine is found growing in moist places along the streams, preferably over the Melaleuca or Paper-bark tree. The pod is often 2 to 3 feet long and 4 inches broad, and contains six or eight large hard-shelled seeds. These are utilized by jewellers to form into match-boxes, hence the popular name.

The natives, in times of scarcity, utilize the fruits of the Pandanus or Screw Pine to prepare a coarse flour, out of which they make a damper of a most indigestible character. The fruit grows in huge bunches of hard nuts, resembling an enormous pineapple. *Zamia* nuts are another article of food used by the natives. These are the product of the cycads or "fern-palms," and occur on the stem, just at the bases of the leaves. They are a very favourite article of food with the natives, and large heaps of the shells of the nuts are often found near their camping spots.

Beautiful water-lilies grow in the pools, while the Burdekin Plum, *Pleiogynium solandri*, Engl., is usually found in the vicinity. It bears dark-looking acid fruit, of which the blacks are very fond. These pools are usually the home of numerous fish, which the natives have a very simple way of obtaining, if a poison tree is growing near by. They cut a few of the branches, and, having bruised the leaves, throw them into the water. The poison quickly acts on the fish, which rise stupefied to the surface, when they rake out the fish, and cook and eat them, with seemingly no bad effects.

There is a species of harmless fresh-water crocodile, *Phylas johnsoni*, found in some of the streams. They do not grow as large as the crocodile previously mentioned, but to a new-comer they look more formidable on account of their longer jaw and sharper teeth. Their food is principally fish. On one occasion we came across several of these creatures in a stream. It was a hot, humid day, and my companions had dived in for a swim; not to be outdone, I reluctantly followed; a great sense of insecurity, however, overcame me in the water, and I was glad when my friends, who knew the habits of the creatures, went on shore again, so that I could do likewise.

But I would weary you were I to recount a quarter of what interested me during several visits to tropical Queensland, which is a veritable naturalist's paradise, and should be visited by all who wish to see Nature in her most bewitching moods.

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

BOTANY AT THE UNIVERSITY.—Dr. A. J. Ewart, who has just been appointed by the Council of the University of Melbourne to the new chair of Botany, will occupy that position in conjunction with the post of Government Botanist for Victoria. Both the University and the Government were anxious to secure a botanist who would be of especial assistance in agricultural matters, and, in recommending Dr. Ewart's appointment, Professor Marshall Ward, of Cambridge, and Professor F. W. Oliver, of London, laid stress upon the fact that his very extensive knowledge of physiological botany placed him in a situation of peculiar advantage as regards agricultural teaching. Professor Ewart was trained at Liverpool University, and obtained an 1851 Exhibition scholarship for agricultural research. This he held for three years, two of which were spent at the Leipzig Botanical Institute, and one as a travelling student in Java, Ceylon, and Singapore, in which places Professor Hillhouse, of Birmingham, says that Dr. Ewart carried on research with brilliant success. From March, 1902, to March, 1905, he was a tenant at Hurst Green Farm, near Birmingham, carrying out commercial and experimental farming operations on a small scale, in order to gain a practical acquaintance with agriculture. The new professor has also had considerable teaching experience; five years' herbarium work in Liverpool, three years as extension lecturer in the University of Oxford, two years as Deputy Professor of Botany in Birmingham University. Dr. Pfeffer, the distinguished Director of the Botanical Institute in Leipzig, whose standard work on "The Physiology of Plants" Dr. Ewart translated into English for the Clarendon Press, says:—"It is also a special pleasure to me to be able to state that Dr. Ewart, in virtue of his critical spirit, his skill, knowledge, and iron industry, possesses in the highest degree the power of successfully attacking and solving the most difficult problems and researches." It has been arranged that Dr. Ewart will devote half of his time to the work of the Government Botanical Department, and half to that of the University, and we need hardly add that the new professor will be warmly welcomed by all who are interested in botanical work in Victoria.

WESTERN AUSTRALIAN PITCHER PLANT.—Some little time ago I exhibited at a Club meeting some growing specimens of the Dwarf Pitcher Plant, *Cephalotus follicularis* (N.O. Saxifragæ), found only in the vicinity of Albany, W.A. Several inquiries having been made about the habits of this plant, I append the following particulars. The plants grow in damp, swampy ground, in small clumps of about a dozen pitchers in each. As many as twenty such clusters were noticed on a piece of ground only three yards square. Growing as they do under the shelter of small shrubs on a slope, which keeps the pitcher almost perpendicular, with the mouth uppermost, the

plants receive a regular supply of moisture, mainly from the dripping branches above, since for the greater part of the year the climate is such as would appear to favour a nightly condensation of moisture. Some of the plants under observation in a garden did not close the lids or trap-doors of the pitchers every evening, and were fed every second day with finely minced raw meat. The contents of the pitchers of those examined in the field consisted of the chitinous remains of insects, such as sand-flies, ants, as well as a few small white grubs. The inflorescence is white, small, and inconspicuous.—E. B. NICHOLLS.

CRYPTOGAMIC BOTANY OF BRAYBROOK.—The following mosses and lichens were collected during the Club excursion to Braybrook on Saturday, 7th October, principally on the basaltic rocks along the Kororoit Creek. The locality is a good one for such plants, and further search would doubtless reveal additional species :—Mosses.—*Grimmia basaltica*, *Hedwigidium drummondii*, *Syntrichia princeps*, *Phascum cylindricum*, *Leptodontium papillatum*. Lichens.—*Leptogium tremelloides*, L., *Endocarpiscum guipini*, *Stictina crocata*, L., *Parmelia cœrulea-alba*, *Parmelia physodes*, L., *Parmelia conspersa*, Ehrh., var. *isidiata*, *Parmelia imitatrix*, *Xanthoria parietina*, *Amphiloma murorum*, *Lecanora atra*, Huds., *Lecanora umbrina*, Ehrh., *Diploschistes actinostoma*, *Lecidea subulatum*, *Lecidea geographica*, L.—R. A. BASTOW.

PLAGUE OF MOTHS.—In many parts of Victoria one of the Cut-worm moths, *Agrotis spina*, often known as the Bogong Moth, has recently been a veritable plague. At Queenscliff particularly the moths entered the houses by thousands, causing much annoyance by flying on to curtains, bedding, &c., the scales of their wings covering everything as with a brownish dust. Similar reports come from all directions, such as Frankston, Dookie, Sandringham, Amphitheatre, Bendigo. 1st November, 1905.—C. FRENCH, JUN.

GEELONG FIELD NATURALISTS' CLUB.—This society, which recently celebrated its 25th anniversary, emboldened by the success of the nature study exhibition held last Easter, has issued the prospectus of another exhibition of a similar character to be held in Geelong on Thursday, 12th April, 1906, and following days. A liberal prize schedule has been adopted, and full particulars can be obtained on application to the secretary, Mr. A. B. F. Wilson. The Club has devoted the September number of its quarterly journal, *The Geelong Naturalist*, to a complete record of its first exhibition. Besides a full list of the prize-takers, it contains the lectures and addresses delivered during the currency of the exhibition, together with an introduction by Mr. Frank Tate, M.A., I.S.O., Director of Education, the whole forming a very interesting number. Copies may be obtained from the hon. editor, Mr. R. E. Trebilcock, Hopetoun Chambers, Rynie-street, Geelong, at 1s. 3d., post free.

The Victorian Naturalist.

VOL. XXII.—No. 9. JANUARY 11, 1906. No. 265.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 11th December, 1905.

The president, Mr. F. G. A. Barnard, occupied the chair, and about 65 members and visitors were present.

REPORTS.

A report of the excursion to Rosstown on Saturday, 25th November, was given by the leader, Mr. O. A. Sayce, who said that for some reason or other the ponds did not yield the usual abundance of animal life.

A report of the excursion to Ferntree Gully on Saturday, 9th December, was given by the leaders, Messrs. J. A. Kershaw, F.E.S., and R. A. Bastow, who had charge of the entomological and cryptogamic botanical sections respectively. Each reported an interesting day, though the specimens obtained were not of any great rarity.

A report of the junior excursion to Brighton Beach on Saturday, 2nd December, was given by the leader, Mr. J. Shephard, who said that some thirty juniors were present, the attendance being smaller than usual, doubtless on account of the threatening weather. Unfortunately, owing to a high tide, little else than a few sea-weeds and hydroids could be collected, and an approaching storm caused an early retreat to the station, consequently the outing could hardly be considered a success.

The hon. librarian reported the receipt of the following donations to the library:—*Journal of Agriculture of Victoria*, September, 1905, from the Secretary for Agriculture; "Proceedings Royal Society of Victoria," vol. xviii. (new series), part 1, from the Society; *Geelong Naturalist*, September, 1905, from the Geelong Field Naturalists' Club; *Emu*, vol. v., part 2, and Supplement, October, 1905, from the Australian Ornithologists' Union; "Forest Flora of New South Wales," vol. ii., part 7, and "Revision of Genus *Eucalyptus*," part 7, by J. H. Maiden, F.L.S., Government Botanist, from the author; *Agricultural Gazette of New South Wales*, September, October, and November, 1905, from the Secretary for Agriculture, Sydney; "Annals of the Queensland Museum," No. 6, from the Curator; "Transactions New Zealand Institute," vol. xxxvii. (1904), from the Institute; *Nature Notes*, August, September, and October, 1905, from the Selborne Society, London; *Nature Study*, August, September, and October, 1905, from the publisher.

ELECTION OF MEMBERS.

On a ballot being taken, Mrs. Day, Toorak-road, South Yarra, Miss Young, Tivoli-road, South Yarra, Mr. Kerr Grant, M.Sc., Ormond College, Parkville, Mr. H. Grundt, Collins-street, Melbourne, Mr. J. T. Hamilton, Heidelberg-road, Ivanhoe, Mr. J. H. Harvey, 128 Powlett-street, East Melbourne, and Mr. J. S. Morrison, Eglinton-street, Moonee Ponds, were duly elected as members; Mr. Wm. Wallace, Grantville, as a country member; Mr. J. E. Marshall as an associate; and Masters J. Frey, G. Taylor, J. Maxwell, A. Day, J. Minifie, C. Nixon, H. Rabling, R. Elder, A. Gaye, C. Young, G. M. Hall, H. Deniston, A. Adams, H. Adams, and R. Green as junior members of the Club.

GENERAL BUSINESS.

Mr. A. J. Campbell wrote suggesting that the Club approach the Minister of Public Works with a view to having a track cut from the Matlock track to Mt. Baw Baw, a distance of five miles, which he considered would enable tourists to reach the principal peak of the mount from Melbourne in a day's journey, going by way of South Neerim instead of the Moe and the old Tanjil track.

Mr. A. E. Kitson, F.G.S., said that Mr. Catani, Engineer of the Public Works Department, was desirous of having a track cut between the Tanjil-Matlock track and Mt. Baw Baw, but that before taking any steps to have this done he would await the result of the geological survey of the district now being carried out by Mr. Wm. Baragwanath jun., of the Department of Mines, so as to utilize the information furnished by that survey; and in view of this statement no action was taken on Mr. Campbell's letter.

The hon. secretary read a letter—received from Mr. J. T. Paul, of Grantville—relative to the alleged destruction of Black Swans in Western Port Bay, in which he stated that the statements made in the press did not apply to that part of the bay extending from Lang Lang to Corinella, where the birds could be seen in hundreds throughout the year.

PAPERS READ.

1. By Mr. T. S. Hall, M.A., entitled "The Rules of Zoological Nomenclature."

The author pointed out the need of rules and the necessity there was for those who attempted to write with scientific exactness to obey these rules. Some points in the new code issued by the International Zoological Congress were drawn attention to, and it was urged that we should fall in with other countries in adopting them. A name is regarded as a mere label, and as such it has no meaning, just as people's surnames have no

meaning. There is, therefore, no excuse for altering a name on account of its being improperly formed or being inappropriate. The distinction between a homonym—the same name for two or more things—and a synonym—a different name for the same thing—was explained and illustrated by examples. The distinction made in the code between rules and recommendations was commended, and in the case of the recommendations it was stated that the custom of the journal might well be followed, and that most of the points dealt with in them were questions for the editor to decide.

In reply to a number of questions by Mr. A. E. Kitson, the author said that the use of capitals for specific names in the genitive (in the possessive sense) was optional, and that the custom of the journal or editor should rule, to produce uniformity in the publication. The rules applied to groups of all rank, from sub-kingdom to species, and further if it was wished to go further. The rules were zoological only, and did not apply to botany, for the botanists had their own rules. All questions of type or mode of printing were dealt with under recommendations and not under rules. There was no distinction between recent and extinct animals, for zoology dealt with both.

Messrs. Shephard, Sayce, Mattingley, Kendall, and the President also spoke, and the author dealt with the points raised by them.

2. By Mr. A. J. North, C.M.Z.S., entitled "Description of New Bird of Paradise."

The author described as *Paradisea granti* a new Bird of Paradise from German New Guinea, the type specimen of which is in the collection of the Australian Museum, Sydney. The new species somewhat resembles *P. intermedia*, De Vis, and *P. augusta-victoriae*, Cabanis, but certain differences of plumage appear to warrant its being regarded as a distinct species.

3. By Mr. F. M. Reader, F.R.H.S., entitled "Contributions to the Flora of Victoria, No. 15—Description of *Pultenaea maideni*, sp. nov."

The author described as *Pultenaea maideni*, in honour of the Government Botanist of New South Wales, a new species of *Pultenaea*, collected in the Victoria Ranges, Dundas, Victoria, by Mr. J. B. Williamson, of Hawkesdale. The new species is closely allied to several other members of the genus *Pultenaea*, but differs principally in the shape and size of the bracteoles.

EXHIBITS.

By Mr. F. G. A. Barnard.—Orchid (epiphytal) in bloom, *Sarcochilus parviflorus*, collected on Ferntree Gully excursion.

By Mr. E. E. Barker, F.R.M.S., on behalf of Mr. E. E. Green, F.L.S., Government Entomologist, Ceylon. — Gigantic spider,

Pæciliotheria subfusca, probably a bird-eater; porcupine quill measuring $29\frac{1}{2}$ inches in length.

By Mr. R. A. Bastow.—Fourteen species of mosses, two hepatics, and seven lichens, collected at Ferntree Gully excursion, in illustration of report.

By Mr. C. French, jun.—Three species of rare Victorian longicorn beetles—*Distichocera macleayi*, from Dandenong Ranges; *Microtragus mormon*, from Mallee; and *Cerægidion horrens*, from E. Gippsland.

By Messrs. J. H. Gatliff and C. J. Gabriel.—Shells, *Pinna tasmanica*, T.-Wds., encrusted with several species of Polyzoa, dredged in Western Port Bay.

By Mrs. Hardy.—Mountain Opossum skins from the Blacks' Spur, near Marysville, showing tawny (abnormal) colouring in fur.

By Mr. G. A. Keartland.—Skins and eggs of Yellow-tinted Honey-eater, *Ptilotis flavescens*.

By Miss Grace Leishman, Albany.—Painting of Western Australian Pitcher Plant.

By Mr. A. Mattingley.—Twigs of the Quandong, *Santalum acuminatum*, with fruit attached, collected at Nhill; Little Falcon, *Falco lunulatus*, from Kangaroo Island.

By Mr. F. M. Reader.—Dried specimens of plants, *Pultenæa maideni*, nov. sp., in illustration of paper; also *Brachycome ciliaris*, Less., var. *subintegra*, and *Vittadinia australis*, A. Rich., var. *platycephala*.

By Mr. C. Walter.—Water plant, *Utricularia flexuosa*, from Murray River, near Kerang, not previously recorded from the N.W. of Victoria; collected by Mr. C. French, jun., November, 1905.

After the usual conversazione the meeting terminated.

EXCURSION TO UPPER FERNTREE GULLY.

THIS excursion, which took place on Saturday, 9th December, was attended by nine members (including two junior members). Of these five devoted themselves to entomology, the others taking up cryptogamic botany. On arrival at the Gully a consultation was held as to the procedure, and it was decided that as the work planned out for the botanical section would be confined chiefly to the Gully itself, and the entomological section required a wider field, the party should separate.

ENTOMOLOGY.—Leaving the botanists at the Gully, therefore, the entomologists followed along the Gembrook railway towards Belgrave. The weather, which was dull and rather uncertain at the start, brightened up, and there now seemed every prospect of a warm day. The air was filled with the

incessant shrill song of the large green Cicada, *Cyclochila australasiae*, Don., numbers of which were seen in the small gum saplings along the line. A variety of this species, having a black abdomen and black markings on the head and thorax, was frequently met with. This variety has recently been separated from the typical form under the name of *Cyclochila spreta*, God. and Frogg. Intermediate forms, however, are occasionally met with, which causes one to doubt the necessity for separating these two forms. Little opportunity occurred for collecting until we had passed Upwey station, when we found some isolated clumps of *Leptospermum scoparium* in full flower. Most of these yielded a fair supply of insects, but only a limited number of species.

The common lively little Mordellids, *Mordella communis*, Waterh., and *M. inornata*, Lea., were present in great numbers, and among others we took three species of Buprestids, two species of Longicorns, and a good number of the tiny little Cetonid, *Valgus lapeyrousei*, Gory. The pretty green moths, known as "Foresters," *Procris viridipulverulenta* and *P. subdolosus*, which are so fond of flying in the hot sunshine, were also found on the flowers of this shrub. In places the brilliant little jumping beetle, *Haltica pagana*, covered the heads of the common rushes, in company with the well-known white Rush Moth, *Scirpophaga patulella*, Walk., and an odd specimen here and there of *Euryssa vittata*, Baly., a beetle which seems to confine itself to this plant. It was here we saw our first Skipper butterfly, *Hesperilla donnysa*, and shortly afterwards captured our first butterfly, *Epinephile abeona*, Don., a fine specimen. A short time was devoted to searching among the Sword Grass (*Cladium*) for the larvæ and pupæ of Skippers, with, however, no success. We then decided to leave the railway, and follow a rather rough road leading to Sassafras Creek, some three or four miles distant. Some log-rolling was indulged in whenever opportunity offered, but very little was obtained in this way. Before we had gone very far the weather became dull and the sky clouded over, and what few insects had been on the wing or on the flowering shrubs now seemed to disappear.

We now had lunch and a rest in a beautiful fern gully near the road, and then followed the track to Sassafras Creek, turning logs, searching under bark, and, as far as was possible, among the undergrowth, with very little success. The bush fires of last summer had traversed most of this part of the country, and seems to have spoilt the district as a collecting ground for some time to come. Nearly all the logs lying on the ground were charred, and very little life of any kind was to be found under them. Not a single land planarian was seen during the day. After spending a short time working the more open parts along

the Sassafras Creek, we came to the conclusion that while our botanical friends would probably have been delighted with this locality for their work, we were only wasting good time. We therefore decided to work back to Belgrave station, and continue our search along the railway line. Following the main road to Belgrave, which we reached about 4.30 p.m., we worked along the more open part within the railway fences towards Upwey. We soon found we had made a change for the better, and our nets were again brought into use. Our only umbrella had met with an accident which prevented its being opened, so we had to make our nets serve its purpose for beating. A number of additional beetles, &c., were taken in this way, while the microlepidoptera, together with larvæ hunting, kept us fairly well occupied. About a mile from Upwey station we left the railway for more open country on the south of the line. Here we devoted the remaining couple of hours at our disposal, and were so well satisfied with this locality that we regretted we had not reached it earlier in the day. After a rest and another meal we sauntered along towards the railway line and thence to Ferntree Gully, carefully forgetting our unfortunate umbrella, which is lying somewhere in the bush—still another sacrifice to the cause of science.

The results of the excursion, if calculated from the value of the specimens taken, were not very good; but when it is remembered that, with the exception of the leader, all the members of the party were beginners, and that a great majority of the specimens met with, together with the method of searching and handling, were quite new to them, and that the opportunity was freely availed of for asking and answering questions and pointing out the various objects of interest, familiar to the experienced collector, but new and strange to the beginner, then we must regard the results as very satisfactory.

We reached the station in good time for the 8.15 p.m. train to Melbourne (our botanical friends having preceded us by the 5.30 p.m. train), all being thoroughly satisfied with the results of the day's ramble.

Of Coleoptera about 30 species were taken, of which the more important were:—*Percosoma montanum*, Castel.; *Notonomus chalybeus*, Dej.; *N. peronii*, Castel.; *Ceneus chalybeipennis*, Chand.; *Loxodactylus carinulatus*, Chand.; *Ceratognathus niger*, Westw.; *Phyllotocus rufipennis*, Bdv.; *Valgus lapeyreusei*, Gory; *Apasia howitti*, Pasc.; *Stigmodera burchelli*, Gory; *S. varia*, Macl.; *S. signata*; *Pempsamacra pygmaea*, Newm.; *Hesthesis plorator*, Pasc.; *Euryspa vittata*, Baly.; *Cherrus infaustus*, Oliv.; *Thallus vinula*, Erich.

Some 20 species of Lepidoptera were secured, among which may be mentioned:—*Scoliacma bicolor*, Bdv.; *Termessa nivosa*,

Walk. ; *Tortricopsis euryphanella*, Meyr. ; *Heliocausta euselma*, Meyr. ; *Zonopetala decisana*, Walk. ; *Mosoda consolatrix*, Ros. ; *Philobota iphigenes*, Meyr. ; *Anestia ombrophanes*, Meyr. ; *Bondia nigella*, Newm. ; *Epidesmia tryxaria*, Gn.—JAS. A. KERSHAW.

BOTANY.—On leaving our entomological friends at the entrance to the Gully proper the botanists at once began their search for such lowly forms of plant life as mosses, lichens, and hepatics, and with considerable success. The Gully, doubtless owing to the number of holiday-makers which visit it, is hardly the cryptogamic botanist's paradise it used to be, still the ramble through its shady nooks and corners revealed many species we thought would have long since disappeared. Charmed by the delightful aroma of the surrounding vegetation, slowly and almost imperceptibly we reached the head of the main gully, and betook ourselves to the excellently graded path which crosses its head and finally takes the tourist out on to the top of the ridge, from whence extensive views of the Mornington Peninsula and Western Port Bay are easily obtainable.

Short descriptions of some of the more prominent mosses will, I hope, be of service to some of our members, and perhaps induce them to become students of this charming group of plants.

One of the first mosses to attract the attention in almost any of our fern gullies is probably the lovely species *Cyathophorum pennatum*, which presently we found in fruit. The fronds here were about 3 inches long, but at the Blacks' Spur I have obtained them 6 inches long, and 12 inches long at Mt. Wellington, in Tasmania. This plant has frequently been collected as a fern, but with ferns it has nothing in common except locality. It will be well, therefore, to give some description of it. It is peculiarly well named, for the name means cup-bearing feather; it hangs on the old logs that have seen their day and have at last fallen over the stream, when this plant steps in and throws a mantle over them in feathery masses of greenery, very often in the company of the filmy ferns *Hymenophyllum* and *Trichomanes*, and sometimes dipping into the water. The leaves are distichous, very flat, bright green and translucent, whilst the smaller dorsal leaves are rounded. The fruit-stalk is very short, and is inserted in a cup-shaped sheath on the under surface of the stem. The capsules are large, ovoid, and pale brown, with a magnificent double peristome. This peristome will reward close examination; it is a row or rows of teeth around the mouth of the capsule, and is a good guide in many instances to the genus of a moss plant; they are arranged in series of 8, 16, 32, 64, &c., and are sometimes double and treble. They are also of various colours—brown, red, yellow, or white, with intermediate tints; when placed under the microscope as opaque objects they are exquisite.

The antherideæ may be found mixed with club-shaped paraphyses. The cellulation of the leaves is comparatively open.

After a little more climbing we came across the little lichen *Beomyces heteromorphus* on a clayey bank; it very much resembles a minute mushroom with a rose-pink head. This plant may be easily passed over as a fungus, but it is a true lichen, with minute simple spores, which may be seen by reducing the head to powder on a glass slip with water; it should then be examined with a $\frac{1}{4}$ -inch objective; the spores are beautifully regular, and are about .01 x .006 millimetres in size. The whole plant is not more than a quarter of an inch in height.

We afterwards collected some good specimens of *Hypnodendron spininervum* in fine fruit and about three inches high. This moss is not unlike a miniature palm-tree, but with the fruit rising above the plant on long setæ or fruit-stalks. The branches and the fruit are disposed very gracefully, and make beautiful specimens when neatly laid out. The leaves are deeply serrated, both on the margins and on the back, and are consequently easily identified.

On examining an old log at the top of the Gully we found *Campylopus introflexus* in the interstices; it was in excellent fruit. This moss is specifically named in allusion to the bent fruit-stalk, and there cannot be a more charming object for dark-ground illumination if well mounted in glycerine jelly. The form of the capsule is perfect, and the calyptra (enclosing veil) is exquisitely fringed. Unfortunately no other plant has, I think, so many synonyms as this.

Another moss, *Acanthocladium extenuatum*, was also plentiful, with its peculiar pale green shining leaves, each leaf with a long piliferous point as long as the leaf itself. This will always be remembered when once seen. It forms large light green patches on the old logs.

Many beautiful Hepaticæ have been collected in this gully, but the disastrous fire eight or nine years ago appears to have nearly exterminated them.

In addition to the foregoing we found the following plants:—

Mosses.—*Rhizogonium spiniforme*, *Macromitrium erosulum*, *Polytrichum undulatum*, *Bryum pseudo-pallescens*, *Hookeria rotundifolia*, *Porotrichum cochlearifolium*, *Meteorium flexicaule*, *Pogonatum tortile*, *Thuidium furfurosum*, *Fissidens*, sp.

Hepatics.—*Chiloscyphus laxus*, *Marchantia polymorpha*.

Lichens.—*Parmelia tenuirima*, *Biatoropsis lutea*, *Peltigera polydactyla*, *Stictina crocata*, *Trypethelium fumosa-cinerea*, *Thelotrema lepadina*.

On reaching the refreshment-house above the head of the Gully we rested awhile, and then paid a visit to the new look-out tower recently erected by the Government on the summit of One Tree

Hill, about 1,500 feet above sea level, from which we obtained a magnificent outlook, embracing Melbourne and suburbs and the whole of Port Phillip Bay, with the Dividing Range as a background to the north. The afternoon was fairly clear, and many landmarks were easily picked out. We then leisurely followed the road down the eastern side of the valley, admiring the many charming views on the way, and gathering some of the more prominent flowers as reminders of a very pleasant day spent in the midst of Nature's handiwork.

The following notes about some of the phanerogams and ferns noticed during the day have been given me by Mr. F. G. A. Barnard:—The most important find was a plant of the epiphytal orchid, *Sarcochilus parviflorus*, in bloom, on a hazel which had been blown down by a recent storm. After emerging from the gully the little Violet, *Viola hederacea*, was found to be flowering in great profusion on the hillside, along with *Glycine clandestina*. On our way back by the road we found *Pimelea ligustrina* and the charming climber *Clematis aristata* in full bloom, and on reaching the lower country the beautiful white iris, *Diplarrhena moraea* was fairly plentiful. Magnificent specimens of the Victorian Staghorn Fern, *Polypodium pustulatum*, were seen growing on some Blackwoods, *Acacia melanoxylon*, near the head of the gully, while a fine growth of *Polypodium punctatum* occurred on the roadside as we descended.

We reached the station in ample time for the 5.30 train, but the entomological section was not there to join in the return journey.—R. A. BASTOW.

THE RULES OF NOMENCLATURE.

BY T. S. HALL, M.A.

(Read before the Field Naturalists' Club of Victoria, 11th Dec., 1905).

ABOUT seven years ago I read a short paper before the Club entitled "What's in a Name?" (*Vict. Nat.*, xv., 15). In this article some account was given of the rules by which the fixing of a name on any particular organism are agreed upon. There is not, and cannot be, any supreme power which shall settle these things, and punish, by the arm of the law, offenders against the rules. Rules, if any be used, must therefore rest merely on the agreement of naturalists. The only penalty to be exacted is that, if the rules are disobeyed, then the name violating the rule shall be ignored by the great body of the scientific public. There have been several codes of such rules drawn up, but, in spite of the care with which they have been compiled, difficulties have arisen and confusion has occurred.

Two rules are self-evident as of prime importance, which must

be obeyed if confusion is to be avoided. They are that the same name must not be applied to more than one group of objects, and that once a thing has a name properly applied to it it must not be renamed. Yet even here we are met with a difficulty, and the first rule is not held to have universal application, for all modern codes agree that a plant and an animal may have the same name. Thus we have a plant and an animal called *Orthoceras*, and no confusion is likely to arise. Still, though there is no rule against this, we are urged not to repeat the process in future.

In zoological nomenclature an important code was drawn up some sixty years ago, known as the Stricklandian. The rules devised were formally adopted by the leading British and American scientific bodies, and long held unquestioned sway. We need not discuss their shortcomings, but they have, to a certain extent, lost universal acquiescence.

Of late years there has been held a series of International Zoological Congresses, and it was felt that it would be a valuable thing if these congresses would draw up a new code, which, thus having the support of zoologists the world over, would put an end to confusion. Such a code has now been agreed upon, and is being formally assented to by leading societies everywhere. We all have our little fads, even the most open-minded of us, and I may say that one of my own little fads—not my own only, of course—has been objected to, and I must amend my ways.

Space would, of course, not allow us to discuss the rules in detail, but authors have no more right to disobey them than they have to neglect the laws of grammar or spelling. If they expect to be listened to with respect on scientific matters, the least they can do is to master what is after all for the most part a simple lesson.

Just as the zoologists have drawn up a list of rules, so an International Congress of Botanists has done, though I believe the new rules have not yet appeared, and the old rules are still being followed.

With regard to the new rules of zoological nomenclature a few points may be drawn attention to. There are thirty-six rules. In addition there are attached to most of these certain "recommendations" which it is advisable to follow, but no compulsion is to be exerted in the matter. Thus the first rule says that zoological nomenclature is independent of botanical, but a "recommendation" says "it is well to avoid introducing into zoology as generic names such names as are in use in botany." As regards names and their origin, it is clearly laid down, in effect, that a name is a name only; it is an indication of a certain group of objects and nothing more. Our right to get names where and how we choose is expressly allowed in the recommendations.

They may be from any language or from none. We may make up a word out of any jumble of letters we choose, as in the case of *Clanculus*, or we may twist words round, as in the name *Alcedo*, and get *Dacelo*. Once a name is "published and accompanied by an indication, or a definition, or a description; and . . . the author has applied the principles of binary nomenclature," then, provided the group of objects has not been previously named in accordance with these rules, the name is valid. Once a name is thus given, it can never be recalled; the question of appropriateness cannot be raised. It is now merely a name, and as such has no meaning. Thus, for example, Ogilby, in 1838, described the Pig-footed Bandicoot as *Chæropus ecaudatus*, the Tailless Chæropus. Four years later Gray found that it had a tail, and that Ogilby had worked on a mutilated skin. He said *ecaudatus* was then inapplicable, as it meant having certain qualities, and so renamed it *castanotis*, the Chestnut-backed. But according to the rule we must go back to Ogilby's name, for *ecaudatus* ceased to have a meaning as soon as it became a name.

Another point may be noticed. The author of a scientific name is he who first used it according to the rule mentioned above. We quote an author's name for two reasons—firstly that we may be guided where to look for the original description, and secondly that in the case of two things having been accidentally described under the one name we may know which is meant. In the case of a species the specific name carries about the name of its author, even if we put it in another genus. As an additional guide, if it be so transferred, we put the author's name in brackets. Thus Gould described *Polytelis alexandrae*. North made the species the type of a new genus, *Spathopterus*. If we accept the genus, which is a point I have nothing to do with, we now write *Spathopterus alexandrae* (Gould), and if we like we may put the name North after (Gould), thus:—*Spathopterus alexandrae* (Gould) North, no commas or other stops being used. We may use a capital for *alexandrae* or not as we choose, and may print the name of the bird in any type we like, though we are recommended to use some other type than that of the text. The question of type, and that of writing out diphthongs in full, seem to be matters to be left to the editor, who will be guided by the custom of his publication. They are unimportant.

Space will allow of the notice of only one more rule. There are two words in use which may be defined. A "synonym" is a different name for one and the same thing; a "homonym" is the same name for two or more different things. Rule 36 says:—"Rejected homonyms can never again be used; rejected synonyms can again be used in case of the restoration of erroneously suppressed groups." There has been some con-

fusion about this, but the issue is now clearly stated. Some authors have revived homonyms; the rules state that the homonym never lived, and it cannot be revived. To take an example: "Trichina, Owen, 1835, nematode, is rejected as homonym of Trichina, Meigen, 1830, insect." Supposing that it were thought that Meigen's insect genus had previously been named something else, then his name would be a synonym, and would be suppressed; but this would not validate Owen's name for the worm. Supposing, again, that after further examination it was found advisable to separate the group Meigen indicated from the older genus in which it had been merged, then his Trichina would be revived. You cannot kill a synonym—you can only suppress it; and it may always come to life again. My impression is that a good many names in use amongst us will be changed by this rule, for the clear distinction between homonym and synonym has not been clearly appreciated by some previous rules.

The constant changes made in the past in nomenclature are a crying evil; but it is not easy to suggest any ready way out of the difficulty and to prevent further changes. It has been suggested by those who would cut the Gordian knot that if a name had not been used for some years—say, fifty—it should be regarded as dead; but even if this were a rule we should be still likely to be disturbed by the discovery that in some obscure publication some author had used it, perhaps through ignorance. Another suggestion is that a definite list of genera and species should be drawn up and accepted as authoritative. This implies that all views on classification must be settled correctly, at once and for ever—that new work must never unsettle the old; but science will cease to be science when it submits to the impress of the dead hand, and we must consent to changes in names, but may still hope to considerably limit them.

DESCRIPTION OF A NEW BIRD OF PARADISE.*

BY ALFRED J. NORTH, C.M.Z.S., Ornithologist, Australian Museum, Sydney.

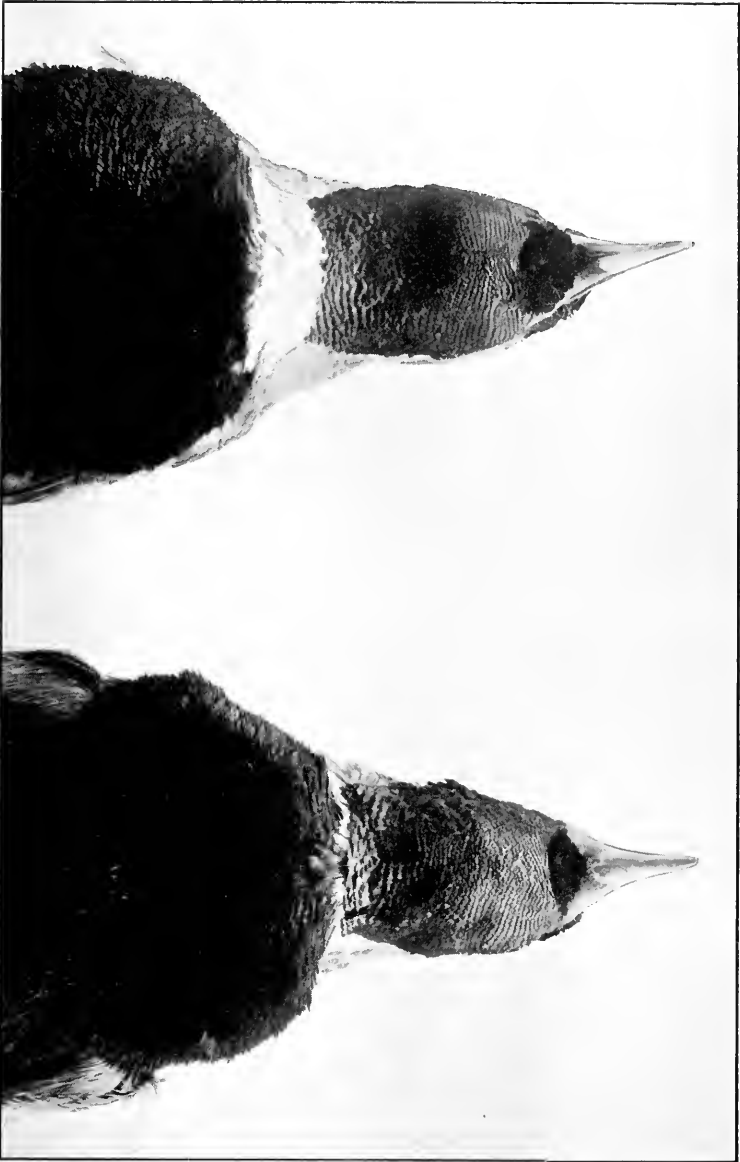
(With plate.)

(Read before the Field Naturalists' Club of Victoria, 11th Dec., 1905.)

PARADISEA GRANTI, *sp. nov.*

Adult male.—General colour above rich straw colour; sides of lower back vinous-brown; scapulars and least wing-coverts vinous-brown, with an ashy shade and washed with straw colour; median coverts rich straw colour; greater coverts and quills chestnut-

* Contributions from the Australian Museum, by permission of the Trustees.



H. BARNES, JUN., *Photo.*]

PARADISEE AUGUSTA-VICTORIÆ.

[*Australian Museum.*

PARADISEE GRANTI.]

brown, washed with straw colour, barely visible on the latter except on the edges of the outer webs of the secondaries; tail chestnut-brown, the two centre feathers greatly elongated and passing on their terminal portion into bare thread-like shafts; crown of head, neck, and a collar on the lower throat rich straw colour, slightly paler on the latter; base of forehead, lores, cheeks, and throat metallic-green; chin velvety-black, dull metallic-green in certain lights; foreneck and upper breast very dark vinous-brown, the plumage, although stiffened, is of a rich velvety texture; remainder of the under surface, thighs, and under tail coverts vinous-brown; elongated flank plumes reddish-orange, paler on their apical portion and passing into a dull or a very faint orange-white on their long attenuated tips, the side plumes being shorter, and some of them dark blood-red on their apical portion; shafts of the plumes orange, their basal portion golden-yellow, and paler at their extreme base; bill bluish horn-colour; legs and feet (of skin) brown. Total length, 14 inches; wing, 7 inches; tail, 6 inches; the two centre elongated tail feathers, 20 inches; longest flank plumes, 19 inches; exposed portion of bill, 1.25 inches; tarsus, 1.6 inches.

Habitat.—German New Guinea (?).

Type.—In the Australian Museum, Sydney.

Remarks.—*Paradisea granti* is closely allied to *Paradisea intermedia*, De Vis, and *Paradisea augusta-victoriae*, Cabanis. All bear a strong resemblance one to another on the upper parts, and in the upper aspect of the flank plumes, *P. intermedia* being slightly richer and darker. The average measurements of the three species are almost similar. On the under parts *P. intermedia* has the flank plumes crimson, in *P. augusta-victoriae* they are golden orange, and in *P. granti* they are a reddish-orange, the yellow collar on the lower throat also being broader than in either of the preceding species. The colour of the flank plumes in *P. granti* is almost similar to that of the crest plumes of the adult male of the Orange-crested Bower-bird, *Amblyornis subalaris*, Sharpe, of New Guinea; if anything, they have a slightly more pronounced reddish shade. Of the bird described here under the name of *Paradisea granti* being a distinct species there can be no question. My only doubt is that so large and an attractive species could have so long escaped observation and description. The latter, so far, however, I have been unable to discover. On reading Dr. Cabanis's original diagnosis of *Paradisea augusta-victoriae*, copied by Count Salvadori into his Supplement to "Ornitologia della Papuasie e delle Molucche,"* wherein it is stated the flank plumes are reddish-

* Part III., p. 241 (1891).

orange, I was inclined to believe it referable to that species. In Dr. R. B. Sharpe's excellent "Monograph of the *Paradiseiidae* and *Ptilonorhynchidae*," however, he states that the flank plumes of *P. augusta-victoriae* are golden-orange, and that it has a narrow yellow collar on the throat like *P. raggiana*. This description agrees with a specimen of *P. augusta-victoriae* in the Australian Museum collection, except that the flank plumes are not quite so highly coloured as is shown in Dr. Sharpe's plate. The broad yellow collar on the lower throat and distinct reddish-orange flank plumes of *P. granti* preclude it from being confused with *P. augusta-victoriae*. The yellow collar on the latter measures 0.1 inch in breadth, in *P. granti* it is 0.5 inch. The comparative difference in the width of the collar on the lower throat may be seen in the accompanying plate, reproduced from a photograph of the skins of these species laid side by side.

The specimen from which the above description is taken is a native-prepared one, and is said to have been obtained in German New Guinea. With it I have much pleasure in associating the name of Mr. Robert Grant, Assistant Taxidermist of the Australian Museum, who first brought it under my notice, and who has been instrumental in acquiring several rare specimens of *Paradiseiidae* for the Museum collection. Should not the present species already have a vernacular appellation bestowed on it, I propose to distinguish it under the name of Grant's Bird of Paradise.

CONTRIBUTIONS TO THE FLORA OF VICTORIA, No. XV.

BY F. M. READER, F.R.H.S.

(Communicated by J. F. Haase.)

(Read before the Field Naturalists' Club of Victoria, 11th Dec., 1905.)

PULTENÆA MAIDENI, F. M. Reader, sp. nov.

An erect shrub from 2 to 3 feet high; young branches slender, almost terete, more or less pubescent or hoary.

Leaves nearly flat, broad linear or oblong, frequently narrowed towards the base and verging into a cuneate form, more rarely obcordate-ovate, usually less than $\frac{1}{2}$ -inch long; rounded obtuse or slightly emarginate, or with a minute callous point, usually paler and hairy underneath, with a prominent nerve; glabrous above. Stipules small, lanceolate. Flowers few in small terminal sessile heads; each flower shortly pedicellate.

Bracts imbricate, covering the pedicels, trifid; middle lobe very narrow and ciliate, the other much broader; outer bracts shorter, inner about $1\frac{1}{2}$ lines long.

Bracteoles inserted on the base of the calyx tube, about two lines long, obliquely broad linear, narrowed towards the apex, hairy on the back.

Calyx silky hairy, about three lines long; lower lobes narrow and rather longer than the tube; upper lobes more connected and somewhat falcate.

Standard about half as long again as the calyx, emarginate; wings and keel a little shorter than the standard. Ovary villous tapering into the flattened, sparsely ciliated style. Pod not seen.

Collected by Mr. H. B. Williamson at the Pipehead Reservoir of the Hamilton Waterworks, on the Victoria Range, Dundas County, Victoria. November, 1904.

When the leaves of the species classed in section *Eupultenæa* are nearly flat, the recurvature of the margin of the leaves is usually more noticeable in the withered leaf. In cases where this characteristic is absent, the leaves are generally paler underneath instead of darker, and more hairy. In *P. maideni* no recurvature of the margin of the leaf in the specimens examined exists, and the tendency of the leaf is to be concave or folded together rather than recurved, revolute or convex, but the under surface is paler and more hairy than the upper; hence this species will find a place in section *Eupultenæa*.

P. maideni is related to *P. retusa*, *benthami*, *scabra*, *stricta*, and *gunnii*, and much resembles the two latter species. From these it differs in the bracteoles, being larger, and fixed on close to the base of the calyx, larger calyx, in the bracts being trifid, &c. From *P. retusa* it is distinguished by the difference in the position and shape of the bracteoles and larger calyx. In *P. benthami* the calyx is about of the same size, but the upper lobes are united above the middle, the flowers are larger, and the leaves are different in shape, &c.

The bracts in *P. scabra* are very small, or there are none, the calyx is smaller, and the position and shape of the bracteoles different.

The species is named in honour of Mr. J. H. Maiden, Government Botanist of New South Wales, and Director of the Botanic Garden, Sydney, eminent for his researches in Australian botany.

ST. JOHN'S WORT, *Hypericum perforatum*, Linn.—The record of this introduced plant, so far as Victoria is concerned, is very bad, and is dealt with in full by Mr. C. French, F.L.S., Government Entomologist, in the November number of the *Victorian Journal of Agriculture*. The article emphasizes the danger likely to occur if this pest becomes established in the fertile

lands of Gippsland. An accompanying map shows that it has already crossed the Alps from its place of origin, the Bright district, and has been found near Grant, towards the Dargo valley. Several illustrations are given showing how it entirely usurps the land, and a coloured plate by Miss S. W. L. Cochrane should enable the most indifferent botanist to recognize it and destroy it at once. The results of numerous experiments are given, but all would be very costly, on account of the rough country into which it is spreading. Curiously enough, a native plant—the Dodder, *Cuscuta australis*, R. Br.—has proved itself able to strangle it, but Mr. French questions whether the remedy is not as bad as the disease. A coloured plate of the Dodder, by the same artist, is also published.

TASMANIAN FIELD NATURALISTS' CLUB.—This Society has entered on its second year, and promises to become firmly established. It has recently distributed copies of an interesting paper on the Tasmanian orchids by Mr. L. Rodway, Govt. Botanist, with illustrations of eight or nine species. Mr. Rodway has made as much use of popular names as possible in drawing attention to the different species, but, unfortunately, several misprints occur in the spelling of the scientific names.

AUSTRALIAN JOURNAL OF SCIENCE.—We regret to learn that sufficient promises of support have not been sent to the publishers to warrant the founding of the proposed *Australian Journal of Science*. We feel sure that had the journal been started, as proposed, under the editorship of Prof. Liversidge, LL.D., of Sydney, it would have filled a decided want among Australian science workers, and would have done much to assist the work of the Australian Association for Advancement of Science. However, the time is not far distant when such a journal must come, and so bring workers all over Australia more in touch with one another.

THE EUCALYPTUS AS A TIMBER PRODUCER.—An article by Mr. J. Blackburn, Assistant Inspector of Forests, in the *Agricultural Journal of Victoria* for December last, gives some idea of what has been done in the Maryborough district in the way of re-establishing arboreal growth in denuded forest country, and the accompanying illustrations forcibly demonstrate to the reader the wonderful quickness of growth of such valuable timber trees as the Red Ironbark, Blue Gum, Sugar Gum, &c. Mr. Blackburn remarks that the carefully protected plantations have become quite a home for numerous species of native birds, exhibiting a marked contrast to the quietness of the surrounding ring-barked areas.

The Victorian Naturalist.

VOL. XXII.—No. 10. FEBRUARY 8, 1906.

No. 266.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 15th January, 1906.

The president, Mr. F. G. A. Barnard, occupied the chair, and about 70 members and visitors were present.

REPORTS.

The President, in calling upon Mr. A. D. Hardy, F.L.S., leader of the Club excursion to Wilson's Promontory during the Christmas holidays, to give a brief outline of the work done, said that the committee, finding complete reports of the outing could not be prepared in time for this meeting of the Club, had decided to present the pictorial results at a public meeting to be held in about three weeks' time, reserving the scientific results for the next ordinary meeting. Mr. Hardy then said that the excursion had been a great success so far as gaining a knowledge of the characteristics of the country embraced in the National Park area, but that the collections made did not contain any specimens of particular rarity.

A report of the excursion to Heidelberg on Saturday, 13th January, was given by the leader, Mr. W. Stickland, who said that the party was favoured with a lovely day. The ponds on the right-hand side of the road, near the bridge over the Yarra, were found to be in good condition. A small, but very deep and quiet pool, surrounded by trees, yielded many specimens. The rotifer genus *Lacinularia* was much in evidence, beautiful growths of *L. socialis* and one of the pendunculate species being obtained. A number of free-swimming rotifers, amongst them the somewhat rare *Pterodina reflexa*, were noted, and a variety of Baker's *Brachionus* with unusually long posterior spines. Amongst protozoa the bell animalcules were the most flourishing, *Carchesium polypinum* being very abundant; but the most remarkable growths were those of *Epistylis flavicans*, some of which could be measured by the inch. *Hydra viridis* was also plentiful.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. Wm. M'Kay Cannon was elected an ordinary member, and Miss H. Le Souëf and Master J. W. Collings were elected junior members of the Club.

GENERAL BUSINESS.

The chairman announced that Mr. C. L. Barrett, owing to pressure of business, had resigned from the position of hon.

assistant secretary and librarian, which he had so efficiently filled for over three years.

On the motion of Mr. G. Coghill and Mr. J. F. Haase, a unanimous vote of thanks was accorded to Mr. Barrett for his services to the Club.

Mr. W. H. A. Roger was nominated to fill the position vacated by Mr. Barrett.

PAPERS READ.

1. By Mr. A. D. Hardy, F.L.S., and Mrs. Hardy, entitled "Notes on the Botany and Ornithology of the Healesville and Buxton Districts."

The authors described the incidents of a tramp over the Blacks' Spur at the end of September, just after a heavy snowfall, noting the various birds and flowers seen during the walk. Particular attention was called to the many beautiful species of Acacia to be seen in bloom in the district at that period of the year.

Some discussion was aroused as to whether the male Coachwhip-bird made the whip-note, or if the latter part of the call was made by the female.

Mr. G. A. Keartland said that his observations led him to the conclusion that the male bird made both notes of the familiar whip-note, and that the female very often followed this by a lower two-note call.

Mr. Robert Hall, F.L.S., Mr. A. Mattingley, and the chairman took part in the discussion.

The paper was illustrated by a number of dried specimens of Acacias collected during the trip; also a beautiful series of photographs of the district, taken by Messrs. Lindt and Caire.

Mr. Hardy mentioned that he was informed by Miss Keppel, of the Marysville Hotel, that the Lyre-birds were increasing in the Marysville district.

2. By Dr. C. S. Sutton, entitled "A Botanical Collector in the Mallee."

The author introduced his remarks on the results of several days' collecting around Lake Hindmarsh and at Dimboola by some comparison of the Mallee flora with that of other portions of the State, and stated that for variety and colour he doubted if it was equalled by that of any other locality in the State.

NATURAL HISTORY NOTE.

Mr. F. Pitcher called attention to his exhibit of a white-flowering variety of the Fringed Lily, *Thysanotus tuberosus*, R. Br., which he had collected at Emerald, and stated that he had not come across the variety before.

Dr. Sutton said that he had noticed several during a trip to the Buffalo Mountains.

Mr. F. Chapman mentioned that he had obtained some specimens during the Christmas holidays at Hamilton.

EXHIBITS.

By Mr. F. G. A. Barnard.—Wild flowers from South Wandin, including *Grevillea alpina*, *Persoonia juniperina*, and *Lomatia ilicifolia*; young fry of fish, probably *Galaxias*, from Yarra River at Kew.

By Mr. C. French, jun.—Rare Victorian bird, *Hylacola pyrrhopygia*, collected by Mr. G. E. Shepherd and himself in the Dandenong Ranges (new locality); rare Victorian orchid, *Caleya sullivani*, collected near Gisborne by Mr. G. Lyell, January, 1906. Only previously found at the Grampians.

By Mr. C. J. Gabriel.—Shells, *Sunetta excavata*, Hanley, *Dosinia crocea*, Desh., *Glycimeris australis*, Quoy and Gaimard, and *G. itabellatus*, T. Wds.

By Mr. A. D. Hardy, F.L.S., and Mrs. Hardy.—Dried specimens of various Acacias from the Blacks' Spur; also photographs, taken by Messrs. Lindt and Caire, of the Fernshawe district.

By Mr. F. Pitcher.—White-flowered Fringed Lily, *Thysanotus tuberosus*, var. *alba*, collected near Emerald, 31/12/05.

By Dr. C. S. Sutton.—Dried plants from the Mallee, in illustration of paper.

By Mr. C. Walter.—Plant, *Mitrasacme pilosa*, collected by Mr. C. French, jun., in the Dandenong Ranges. Only previously recorded from the Grampians

After the usual conversazione the meeting terminated.

A TRAMP FROM HEALESVILLE TO BUXTON.

BOTANICAL AND ORNITHOLOGICAL NOTES FOR SEPTEMBER.

BY A. D. HARDY, F.L.S., AND MRS. HARDY.

(Read before the Field Naturalists' Club of Victoria, 15th Jan., 1906.)

TOWARDS the end of September last year (1905) we crossed that part of the Dividing Range known as the Blacks' Spur. Our starting point was Healesville, situated at the junction of the Yarra and Watts Rivers, 38 miles from town, and our pace was a leisurely one, as befits the nature student, on foot, by a route which passed through Fernshaw and Narbethong to Marysville, and on horses to Buxton, which lies in the Acheron Valley, eight miles northerly from Marysville, on the road to Alexandra. The distance by road from Healesville to Buxton is, roughly, about 30 miles. It will be seen by those who know something of the locality that we had a well-formed road all the way, to which we kept, except for the hundred and one small deviations in search of bird or plant life—deviations which added to the length and interest of the journey.

The object of our paper is to tell something of a district which

is a little beyond the ordinary holiday rambles of our club, and to assist in the recording of the regional distribution of plants and birds.

In the immediate environment of Healesville the country is settled, and in many places quite denuded of timber, in other parts only partially, so that in some of the paddocks there still remains sufficient shrubby vegetation to shelter a number of birds.

For one ramble we chose the road to the Coranderrk Aboriginal Settlement, but had a bad day for natural history, the muddy road, frequent showers, and wet grass considerably interfering with our researches.

In this locality the eucalyptus trees are stunted, and of little use for shade or ornament. The largest trees other than eucalypts were Blackwoods, or Lightwoods, which were in full bloom. *Acacia verticillata*, known by bushmen as Prickly Moses, was just beyond its prime. The two tea-trees, *Leptospermum lanigerum* and *Melaleuca squarrosa*, were represented. Of smaller plants, those seen in bloom were common enough, but are recorded for the purpose of comparison with other districts and seasons.

In the doubtful shade of some young eucalypt saplings the orchid *Pterostylis longifolia* grew well, but few in number. This was the only orchid seen, either on the lowlands or at higher altitudes, during our outing. Other lowland plants were *Wurmbea dioica*, the "Purple Runner," *Kennedyya monophylla*, *Hypoxis glabella*, *Drosera whittakeri*, *D. menziesii*, *Craspedia richea*, *Brachycome graminea*, *Viola hederacea*, and *V. betonicifolia*. Along a water-race the ferns *Lomaria discolor* and *Gleichenia circinata* grew luxuriantly, as did also the Maiden Hair, *Adiantum athiopicum*.

Of the few species of birds seen about Coranderrk and Healesville several were represented by large numbers. Blue Wrens were wherever a patch of scrub or bracken gave that harbour to insects, for which they are ever on the search. The Ground Lark, *Anthus australis*, was plentiful, but only a few of the Spotted Pardalote were visible. A few of two common birds were noticed, these being the Mud Lark, *Grallina picata*, and the White-backed Magpie, *Gymnorhina leuconota*, but the "Kookaburra," *Dacelo gigas*, was numerous, and, though no thrushes were seen, the melody of the Harmonious Thrush came from many a clump of scrub near the road.

The walk from Healesville up the Blacks' Spur demands at any time a fair amount of exertion, but on this occasion, with 2 inches of snow on the road at Healesville, the conditions of the tramp at higher altitudes might be anticipated to present some difficulty. Notwithstanding the advice of old residents, who declared the Spur to be impassable on foot, we set out prepared for a rough

time, cold feet, and a pedestrian achievement of some novelty. That a member of our Club should be the first lady to cross the Spur to Marysville with a reported foot depth of snow to walk through, and thereby establish a record, was a temptation irresistible.

At the Maroondah or Watts Bridge, the former site of Fernshaw, the snow depth had perceptibly increased, and we were soon convinced that botanical inquiry was for the time almost impossible, as all but the tall trees and larger shrubs were completely hidden. Further on small branches from the overhanging eucalypts littered the ground, and here and there a great limb, unable to resist the increasing weight, had fallen and grounded the telephone wire. Creaking and cracking branches overhead warned us to get from under in time to avoid the impending danger, while from the more flexible twigs there came frequent and sudden showers of snow, and often heavier masses that fell without warning and drove one's hat down over the ears in a way that was more exciting than pleasant.

With the crooked horn end of an alpenstock we endeavoured to shake many shrubs free of their white load, in order to recognize them, but the loitering in snow up to the boot tops was not encouraging, and the falling of the cold powder into our sleeves decided us to push on, and examine the plants if possible on the return journey. The temporarily altered habit of many plants—if the expression be allowed—was remarkable, as many shrubs of normally erect growth and acutely angular branching now appeared like weeping willows, and some of the smaller eucalypt bushes were depressed and flattened on top in imitation of their alpine kindred. The tree ferns, *Dicksonia* and *Alsophila*, had lost their graceful appearance, for while the circinate young fronds still remained erect the radial, expanded fronds were borne down at a sharp angle from the trunk and weighed to the ground with snow.

When half-way up the Spur we halted for early lunch, which we ate while we perched on the top rail of a fence, with very wet, cold feet, suggesting that the halt should be as short as possible. There we measured the snow which capped the fence rail and post tops and noted $12\frac{1}{2}$ inches. A solitary mosquito, *Culex*, sp., appeared to be benumbed with the cold as with difficulty it picked its steps amongst the snow crystals. Its appearance surprised us, but on attempting to secure it for our entomological friends at home it flew away as airily and healthfully as though it were a summer evening. A little further on we noticed an earthworm crossing the road on snow over a foot above the ground, but having some difficulty where it sank in some of the newly fallen and powdery parts. There was no disturbed surface within many yards of the creature, and we wondered whether it had

strayed or was instinctively pursuing some course with an object in view.

After pouring half a flask of whisky into our boots to warm our numbed feet, with successful results in about twenty minutes, we continued, the walking becoming heavier at each mile, ploughed our way through close on 18 inches of snow on the summit, and descended, through deep drifts in places, till we reached Mr. Lindt's well-known Hermitage, where wet clothes were soon dried and good cheer obtained. We found Mr. Lindt busily engaged in securing photographs of the snow scenes. Copies of these pictures, and some taken expressly for us, are exhibited to-night, and will convey an idea of the beauty of the scene better than any word-painting. The summit of the spur is about 1,960 feet above sea level, and in the three miles from the Maroondah Bridge we had ascended some 1,200 feet.

During the ascent few species of birds were seen. These were mostly robins; but one young Kookaburra, which had curiously watched us at lunch and refused the crumbs we offered it, continued with us a considerable distance up the road, as it flew from post top to post top, and fence to twig, often only a few feet from us.

From the Hermitage a fine view of the surrounding country is obtained. To the south-east Mt. Dom Dom, about 2,600 feet, appears like a blunt cone. Looking north-easterly, a great expanse of undulating country is seen stretching across to the Cerberean Range. In the valleys of these undulations run the various streams from the Blacks' Spur and the foothills of the Cerberean Range, which feed the Goulburn River with water, that ultimately finds its way by a circuitous route *viâ* the Murray to the sea. About twelve miles off, and between us and the Cerberean Range, the Cathedral Mount is seen peeping above the low hill of the foreground. A photograph on the table, by Mr. N. J. Caire, taken from a more southerly point—Mt. Bismarck—shows the Cathedral with Marysville in middle distance.

About the Hermitage and along the road up and down the Spur grow the Golden and Silver Wattles, *Acacia pycnantha* and *A. dealbata*, and we do not remember having seen these wattles anywhere to better advantage. One of the photographs shows the two side by side in cultivation and snow-covered. It will be noted that Baron von Mueller made no record of *A. pycnantha* in the east or north-east portion of Victoria, but Mr. Lindt assured us that these were selected from amongst self-sown plants of the locality, and that they appeared, as acacias are known to do in other parts, mysteriously, after a bush fire.

For some miles our way had been over a porphyritic area, the resulting soil supporting a growth of timber trees for size unequalled in Australia, but the aspect of the vegetation changes

considerably as one approaches the lower Silurian country beyond the Blacks' Spur. Axe and fire have left their mark, while the results of different conditions of soil and climate are seen in the plant life. The tall trees are replaced by shorter and scrubbier growths, and the undergrowth is of a coarser and stronger nature. Crossing a few miles of undulating country through which run several headwater streams of the Acheron River, and on one of which (Fisher's Creek) the little village of Narbethong is situated, we climbed a high spur before dropping down into Marysville. This spur has been burnt out as regards all undergrowth, but the large trees had not been altogether destroyed, as from the blackened trunks young foliage was again sprouting. On the ground between the snow concealed very little else than bracken and grass-like plants, with a few hardy legumes, such as *Platylobium*, &c., of very recent growth. About Narbethong there are in cultivation many fine Blackwood trees, *A. melanocylon*, in bloom, better than we had ever seen before, of splendid symmetry, and affording excellent shade, in every respect different to their asymmetrical, stragglingly foliaged kindred of the gullies a few miles away, and suggesting possibilities of successful experiment with other of Victoria's gully vegetation.

Leaving Narbethong and Fisher's Creek behind, we climbed the spur beyond. The third animal, other than birds, we saw here—a Wombat, *Phascolomys mitchelli*, Owen, standing with its legs deep in snow, and with the ends of a grass-like plant projecting from its mouth, being a very conspicuous object. It was far from any cover, and stood motionless, and apparently numbed with cold, until we stood within six feet of it. Our voices, however, caused it to beat a precipitous retreat down the steep hillside, a shower of snow following as the weighed down bracken fronds were released and the stems acted like springs. Everywhere the stems of buried bracken fronds appeared like countless croquet hoops. We followed back the Wombat's tracks to ascertain what plant the animal had been eating, and found it to be *Xerotes longifolia*, of which the leaves had been pulled up, and the sweet, white, succulent parts near the root eaten. Here and there we found this *Xerotes* with the comparatively hard green leaves cropped off to the surface of the ground, the root parts being neglected.

At Marysville on the following day the roadway was free of snow, except in sheltered parts, but the vegetation was mostly covered, so we set off to visit the well-known Stevenson Falls. This once beautiful gully had also been burnt out. It was once filled with tall timber and fern trees up to 40 feet in height, and with much of the best of our valley shrubs, but now there remained nothing but the blackened trunks of burnt trees, and the frondless stems of tall fern trees, which, silhouetted against the

white coverlet, stood like sentinels over the grave of the magnificent vegetation which flourished here a few years ago. A solitary group of three young trees, *Panax sambucifolius*, each exhibiting different foliage, grew on a slope. But why the difference of foliage? Being so close together, neither soil nor climate could claim any influence. Bracken, of course, grew everywhere, though concealed for the time. The spoliation of this once beautiful valley reminded us of the devastation in the Otway Forest, and especially of the scene where the fine fall on the Little Aire River had been robbed of its pretty and interesting vegetation by bush fires. The horses grew steadily more nervous, because of the insecure foothold, and at last stood snorting and trembling, and refused to be ridden further, so had perforce to be led through knee-deep snow along a track rendered treacherous by holes and boulder faces being concealed by drifts. The only birds seen here were Ground Thrushes and Robins, but a couple of Sparrow-Hawks circled overhead. After a fruitless search for mosses and ferns of more than passing interest, and after selecting some probably algæ-bearing material for subsequent examination, we returned to Marysville.

Our intention had been to visit the Cumberland Creek district, where the giant trees grow, but we found the road practically snow-bound, and so, attracted northerly by the report of a pair of new birds in the Buxton district, we set out in that direction, an additional attraction being a grove of *Acacia pravissima*, from which one Christmas season we had collected fruit specimens. A few miles of undulating country road crossed one stream several times, and a short gallop along the magnificent avenue known as the "Long Reach," an excellent photograph of which, by Mr. N. J. Caire, is on the table, brought us to the acacia, which, to our delight, was in full bloom. Of all the wattles which we have seen in bloom, we do not remember having seen anything prettier than this graceful shrub or small tree. From the saddle we were able to reach up and collect fine specimens for the herbarium.

A few miles further on we reached some wooded and scrubby paddocks near Mr. Keppel's farmhouse, and, with the owner's permission, rode through these, searching the locality for the reported pair of birds. Here we found small birds numerous—Scrub Wrens, Robins, Blue Wrens, Acanthizas, Pardalotes, &c.—while, unseen, the Coachwhip-bird kept whistling near us in a grove of *Cassinia aculeata* and *Helichrysum ferrugineum*. After much patient searching and watching we discovered the birds we sought, and found them to be a pair of Black-faced Cuckoo-Shrikes, *Graucalus melanops*. Mr. Keppel is giving the birds every chance of breeding in that part—where they are said to be quite new—by disturbing the scrub there as little as possible.

This was the end of our journey north. Further on the road runs down the almost flat lands of the Acheron Valley, crosses the Goulburn near the Acheron junction, and reaches Alexandra $1\frac{1}{4}$ miles beyond that river. On the way, near Taggerty, the road skirts the base of the Cathedral Mount, a rugged mass of sandstone which has intruded into the prevailing Silurian. The creek at the base of the mount carries gravel from the granite of the Cerberean Range away to the east, whence the Rubicon River flows northerly. Recently two venturesome residents of Alexandra—Messrs. Muntz, C.E., and Leckie—ascended the Upper Rubicon with much difficulty and discovered there a splendid fall which, with attendant fernery, eclipses both the Stevenson Falls at Marysville and the Banyambite Falls on a tributary of the Goulburn near Thornton, about 10 miles east of Alexandra, which by many have hitherto been considered the best falls in the State.

An interesting account of the bird-life of the lower Rubicon River was given to the Club some time ago by Mr. F. Billingham in a paper entitled "A Day on the Rubicon River" (*Vict. Nat.*, xix., p. 77).

With the thawing of the snow birds became more plentiful. Robins were very abundant, the bushes at times appearing to be in bloom with scarlet and pink flowers. Four species were noted—viz., the Rose-breasted, *Erythrodryas rosea*, Scarlet-breasted, *Petroica leggii*, Flame-breasted, *Petroica phoenicea*, and the Yellow-breasted, *Eopsaltria australis*. These were common from Fernshaw to Buxton, both on the mountain and the flat. Of the four, the most plentiful was the Scarlet-breasted bird.

An interesting point noticed was the protective instinct which caused these birds, after a flight from supposed danger, to perch, often at some inconvenience, with their conspicuously coloured breasts turned away from the source of danger. In this position they remained motionless for a time until reassured, when they hopped and flew about as gaily and familiarly as before.

On our return journey we saw many plants which had previously been invisible, and other birds. In the undulating country between Buxton and Marysville large flocks of Grey Jays were busily poking their beaks into holes in the ground in search of larvæ, grubs, &c. Some Red Lories, in their brilliant plumage, flashed past here and there, while occasionally a King Lory crossed our path. Smaller birds, such as Wrens, Tits, Tree-creepers, Robins, and Waxbills seemed to be specially active after a protracted fast, while the introduced Starlings were numerous. Between the spur near Marysville and the Blacks' Spur the undulating Silurian country supported, besides eucalypts, *Leptospermum lanigerum*, *L. scoparium*, *Melaleuca squarrosa*,

Hakea ulicina, *Goodia lotifolia*, *Acacia verticillata*, and *Acacia linearis* (known as Willow Scrub). Amongst these shrubs small birds were innumerable. The four robins, the Blue Wren, the White-shafted Fantail being most prominent, while Ground Thrushes, Ground Larks, and Waxbills were also numerous. The discordant cawing of a Crow or Raven out of sight entitles one or the other to a place in our list, but we are not sure which.

Apart from the taming effect of the snow on the birds generally, and this was marked, we found a Wagtail busily feeding on the flies and mosquitoes which were annoying an old teamster horse, the Wagtail being quite indifferent to our presence; and a Yellow Robin, rummaging on the footboard of a wrecked waggon on the Spur, but whether for seed or insects we could not determine, allowed us to approach within arm's length.

About the foot of the Blacks' Spur, on the northern side, the bracken is almost ousted in places by *Acacia verticillata*, *A. linearis*, *A. oxycedrus*, *Platylobium formosum*, *Hakea ulicina*, and *Daviesia latifolia* which grew about eight or ten feet high, whilst almost up to the Hermitage *Acacia linearis* was abundant, and *Goodia lotifolia* in fair quantity. The bark of the eucalypts showed the characteristic tearing and ripping done by Black Cockatoos seeking for grubs. We saw only a few of these birds on the wing. Both Gang Gang and White Cockatoos screeched angrily at our intrusion.

Acacia oxycedrus grows luxuriantly here, but with a smaller leaf than the spreading bushes found about Sandringham, &c. *Tetralochea ciliata* was poor; *Kennedyia monophylla*, *Goodenia ovata*, *Billardiera scandens* and *B. longiflora*, *Pimelea axiflora*, *Hymenanthera banksii*, *Bossia cinerens*, *Veronica derwentia*, *Aster ramulosus*, *A. stellulatus*, *Hovea heterophylla* were all more or less common. From many of the tall eucalypts hung bunches of Mistletoe, *Loranthus pendulus*, and already much good timber is threatened by this pest.

On the Spur heights we observed much that had been previously overlooked, and small birds were twittering in every bush, delighting in the thickets of *Pomaderris apetala*, &c. *Aster argophyllus*, Musk, was in bud. The Native Mulberry, *Hedycarya cunninghami* was in flower. *Glycine scandens* in bloom twined about *Pimelea axiflora*, but of *Pimelea ligustrina* we saw nothing. *Exocarpus cupressiformis* bore young fruit.

The deep, cool gullies are filled with Native Beech or Myrtle, *Fagus cunninghami*, Musk, Sassafras, *Atherosperma moschatum*, *Pomaderris apetala*, a little Native Olive, *Notelva ligustrina*, Blanketwood, *Senecio bedfordii*, in bud, and the Christmas Tree, *Prostanthera lasiantha*. The rich fernery of these gullies is well known, but the photograph by Mr. Lindt shown to-night pictures beauty in fernland which would be hard to equal

elsewhere in the State. The ferns seen were *Alsophila australis*, *Dicksonia billardieri*, *Lomaria capense*, var. *procera*, *Polypodium punctatum* and *P. pustulatum*, *Pteris incisa*, *P. aquilina*, *Adiantum athiopicum*, *Asplenium flabellifolium*.

The Sassafras tree was in fine bloom between Fernshaw and the top of the Spur, and perfuming the air with a scent which reminded us of that of the Syringa or Mock Orange. Some specimens of the sticky *Acacia leprosa* were seen in bloom about Fernshaw. The Native Pepper Tree, *Drimys aromatica*, was seen along the roadside; young plants brought away are still growing in the open in our garden.

Of hepatics, mosses, and algæ we have made no reference here, as several require further examination in order to be determined, and the fern list might have been considerably increased had we explored the deep gullies carefully, but at this season, as we have shown, this was impracticable.

Although we saw nothing of the Lyre-bird, *Menura victoriae*, we were informed by Miss Keppel, of Marysville, that, despite the fact that foxes had increased rapidly of late, the Lyre-bird was more numerous this year than it had been for many years past. At Marysville, too, we were informed that Wombats are becoming a nuisance because of their interference with cultivated grasses, &c. The Satin Bower-bird, also, is reported to be increasing in numbers, but we did not see any.

There was, as before remarked, very little Native Olive, *Notelua ligustrina*, and no sign of the Satin or Stinking Box, *Eriostemon squameus*, while *Pittosporum bicolor*, if present, was not prominent, and this, together with the conspicuous presence of the Sassafras, *Atherosperma moschatum*, the Lyre-bird, *Menura victoriae*, Gld., the reported frequency of the Satin Bower-bird, *Ptilonorhynchus violaceus*, Vieill., and the large number of Wombats places the Blacks' Spur region in marked contrast to the Otway Forest district, which, however, is an area of Jurassic formation and geographically isolated, as reflected by its animal and plant life recorded in the *Naturalist*, vol. xxi., p. 149, a few months ago.

Although this paper is primarily a series of notes on the botany and ornithology of the districts visited, some generally descriptive notes have been added in order that the general reader may be able to gain some idea of the country passed through.

PLANTS OF THE HEALESVILLE, NARBETHONG, MARYSVILLE, AND BUNXTON DISTRICTS, INCLUDING THE BLACKS' SPUR.

(* in bloom, † in fruit, § specially referred to in foregoing description.)

Ranunculaceæ—

Clematis aristata, R. Br.
microphylla, Cand.

*Ranunculus lappaceus, Smith
aquatilis, Dodoens

Magnoliaceæ—

§Drimys aromatica, F. v. M.

Monimiaceæ—

*Atherosperma moschatum, Lab.

*Hedycarya cunninghami, Julianse

- Lauraceæ—
Cassytha glabella, R. Br. (?)
- Violaceæ—
 **Viola betonicifolia*, Smith
 * *hederacea*, Lab.
 **Hymenanthera banksii*, F. v. M.
- Pittosporæ—
Bursaria spinosa, Cavanilles
 †*Billardiera longiflora*, Lab.
 † *scandens*, Smith
- Droseraceæ—
 **Drosera whittakeri*, Planchon
 * *peltata*, Smith
- Polygalæ—
 **Comesperma volubile*, Lab.
 * *ericinum*, Cand.
 **Tetradthea ciliata*, Lind.
- Rutaceæ—
Zieria smithii, Andr.
 **Correa speciosa*, Andr.
lawrenciana, Hooker
- Urticaceæ—
Urtica incisa, Poiret
- Sapindaceæ—
Dodonea viscosa, Linn.
- Stackhousiæ—
 **Stackhousia linearifolia*, Cunn.
- Portulacæ—
Portulaca oleracea, Linn.
- Amarantaceæ—
Altermanthera triandra, Lamarck
- Polygonaceæ—
 **Polygonum minus*, Hudson
 **Muehlenbeckia adpressa*, Meissner
- Leguminosæ—
Daviesia latifolia, R. Br.
Pultenæa daphnoides, Wend.
stricta, Sims
Dillwynia ericifolia, Smith
 **Platylobium obtusangulum*, Hooker
 § *formosum*, Smith
 * *Bossicea emerea*, R. Br.
 **Hovea heterophylla*, Cunn.
Goodia lotifolia, Salisbury
Indigofera australis, Willd.
 **Glycine clandestina*, Wend.
 **Kennedyia monophylla*, Vent.
prostrata, R. Br.
 * $\frac{1}{2}$ *Acacia leprosa*, Sieber
 * $\frac{1}{2}$ *pyncantha*, Bentham
 * $\frac{1}{2}$ *pravissima*, F. v. M.
myrtifolia, Willd.
 * $\frac{1}{2}$ *melonoxylon*, R. Br.
 * $\frac{1}{2}$ *oxycedrus*, Sieber
 * $\frac{1}{2}$ *verticillata*, Willd.
 * $\frac{1}{2}$ *linearis*, Sims
 * $\frac{1}{2}$ *dealbata*, Link.
- Rosaceæ—
 **Rubus parvifolius*, Linn.
 **Acæna sanguisorbæ*, Vahl.
- Saxifragæ—
 **Bauera rubioides*, Andr.
- Halorogææ—
 **Myriophyllum variifolium*, Hooker
- Myrtaceæ—
Leptospermum lanigerum, Smith
scoparium, R. and G. Foster
 **Melaleuca squarrosa*, Donn.
 †*Eucalyptus leucoxydon*, F. v. M.
 † *meliadora*, Cunn.
 † *amygdalina*, Lab.
- Rhamnaceæ—
Pomaderris apetala, Lab.
 **Cryptandra hookerii*, F. v. M.
- Araliaceæ—
 §*Panax sambucifolius*, Sieber
- Umbelliferæ—
 **Hydrocotyle vulgaris*, Linn.
 **Apium prostratum*, Lab.
- Santalaceæ—
 †*Exocarpus cupressiformis*, Lab.
- Loranthaceæ—
 §*Loranthus pendulus*, Sieber
- Proteaceæ—
Hakea ulicina, R. Br.
Lomatia fraseri, R. Br.
- Thymelææ—
 **Pimelea axiflora*, F. v. M.
- Caprifoliaceæ—
Sambucus gaudichaudiana, Cand.
- Compositæ—
Helichrysum ferrugineum, Less.
Aster argophyllum, Lab.
stellulatus, Lab.
ramulosus, Lab.
Cassinia aculeata, R. Br.
Senecio bedfordii, F. v. M.
odoratus, Hornemann
dryadeus, Sieber
velleioides, Cunn.
- Goodeniaceæ—
 **Brunonia australis*, Smith
 **Goodenia ovata*, Smith
G. geniculata, R. Br.
- Gentianæ—
 **Limnanthemum exaltatum*, F. v. M.
Erythraea australis, R. Br.
- Plantaginæ—
 **Plantago varia*, R. Br.
- Jasminæ—
 §*Notelæa ligustrina*, Vent.
- Solanaceæ—
Solanum aviculare, G. Forster
- Scrophularinæ—
Veronica derwentia, Littlejohn

- Labiate—
 **Mentha australis*, R. Br.
 **Brunella vulgaris*, Linn.
Prostanthera lasiantha, Lab.
 Epacridæ—
Styphelia virgata, Lab.
 **Epacris impressa*, Lab.
 Orchidæ—
 **Pterostylis longifolia*, R. Br.
 Amaryllidæ—
 **Hypoxis glabella*, R. Br.
 Liliacæ—
 **Wurmbea dioica*, F. v. M.
 **Burchardia umbellata*, R. Br.
 §*Xerotes longifolia*, R. Br.
 Lemnaceæ—
Lemna minor, Linn.
 Fluviales—
 **Triglochin procera*, R. Br.
Potamogeton natans, Linn.
 Alismacæ—
Alisma plantago, Linn.
 Juncæ—
 **Luzula campestris*, Cand.
Juncus communis, Meyer
- Cyperacæ—
Cyperus lucidus, R. Br.
Cladium glomeratum, R. Br.
 Gramineæ—
Anthistiria ciliata, Linn. *fls*
Arunda phragmites, Dodoens
 Lycopodinæ—
Selaginella uliginosa, Spreng.
 Filices—
Gleichenia circinata, Swartz
Alsophila australis, R. Br.
Dicksonia billardieri, F. v. M.
Adiantum æthiopicum, Linn.
Pteris aquilina, Linn.
incisa, Thunb.
Lomaria discolor, Willd.
lanceolata, Spreng.
capensis, Willd., var. *procera*
 **Asplenium umbrosum*, J. Smith
Aspidium aculeatum, Swartz
Polypodium punctatum, Thunb.
pustulatum, G. Forster.

A. D. H.

LIST OF AVIFAUNA (46 SPECIES), BY MRS. HARDY.

(* Indicates species referred to in foregoing general account of excursion.)

- Uroaëtus aulax*, Lath., Eagle-Hawk
Cerchneis cenchroides, Vig. and Hors., Nankeen Kestrel
Accipiter cirrhocephalus, Vieill., Sparrow-Hawk
Ninox boobook, Lath., Boobook Owl
Petrochelidon nigricans, Vieill., Tree Martin
 **Dacelo gigas*, Bodd., Brown Kingfisher, or Kookaburra
Halcyon sanctus, Vig. and Hors., Sacred Kingfisher
 **Strepera cuneicaudata*, Vieill., Grey Jay
fuliginosa, Gld., Sooty Crow-Shrike
Grallina picata, Lath., Magpie Lark
Collyriocinclia harmonica, Lath., Harmonious Shrike-Thrush
 **Graucalus melanops*, Lath., Black-faced Cuckoo-Shrike
Micrœca fascinans, Lath., Brown Flycatcher
Rhipidura albiscapa, Gld., White-shafted Fantail
 **tricolor*, Vieill., Black and White Fantail
 **Petrœca leggii*, Sharpe, Scarlet-breasted Robin
 **phœnicia*, Gld., Flame-breasted Robin
 **Erythrodryas rosea*, Gld., Rose-breasted Robin
 **Eopsaltria australis*, Lath., Yellow-breasted Shrike-Robin
Malurus cyaneus, Ellis, Blue Wren
Geocichla lunulata, Lath., Mountain Thrush
 **Ptilonorhynchus violaceus*, Vieill., Satin Bower-bird
Acanthiza pusilla, Lath., Brown Tit
chrysorrhoa, Quoy and Gaim., Yellow-rumped Tit
 **Psophodes crepitans*, Vig. and Hors., Coachwhip-bird
Gymnorhina leuconota, Gld., White-backed Magpie
Cracticus destructor, Temm., Butcher-bird
Pachycephala gutturalis, Lath., White-throated Thickhead
rufiventris, Lath., Rufous Thickhead

Climacteris leucophaea, Lath., White-throated Tree-creeper
Acanthochæra carunculata, Lath., Red Wattle-bird
Zosterops cœrulescens, Lath., Silver-eye
 **Menura victorizæ*, Gld., Lyre-bird
Anthus australis, Vig. and Hors., Ground Lark
Pardalotus punctatus, Temm., Spotted Pardalote
Zonæginthus bellus, Lath., Fire-tailed Finch
Ægintha temporalis, Lath., Red-browed Finch or Waxbill
Ptilotis leucotis, Lath., White-eared Honey-eater
Cuculus pallidus, Lath., Pallid Cuckoo
 flabelliformis, Lath., Fan-tailed Cuckoo
Chalcococcyx plagosus, Lath., Bronze Cuckoo
Cacatua galerita, Lath., Sulphur-crested Cockatoo
Callocephalon galeatum, Lath., Gang-Gang Cockatoo
Platyercus elegans, Gmel., Pennant Parrakeet
 eximius, Shaw, Rosella
Aprosmitus cyanopygius, Vieill., King Lory.

NEW SOUTH WALES FORESTRY BRANCH.—The recently issued report of this Department for the period ended 30th June, 1905, provides some interesting facts which should help to stimulate the authorities with regard to making the best use of the forest resources of Victoria. The revenue of the Branch for the six months of 1905 exceeded the expenditure by nearly £10,000! The timber exported was valued at £174,000, and amounted to about 25,000,000 super. feet—New Zealand, India, the United Kingdom, Cape Colony, and Germany being the best customers. Such a result speaks volumes for the way in which the timber industry of New South Wales must be managed. The value of the report is greatly enhanced by some splendid plates of the principal timber trees and an appendix on the suitability of New South Wales timbers for railway construction. An additional feature is a map showing the State divided into four timber zones—coastal, brush, highland, and interior—which are again divided into twenty-one sub-zones, with a reference table giving the principal timbers occurring in each of the sub-zones, so that it can be seen at a glance where certain timbers can be obtained. Taken altogether the report shows that in forestry New South Wales is far ahead of its southern neighbour, notwithstanding its apparently limited area of forest country. In connection with this, attention may be called to another extremely interesting publication, "Notes on the Commercial Timbers of New South Wales," by Mr. J. H. Maiden, F.L.S., Government Botanist (1904, 1s.), in which a great deal of valuable information, much of which is applicable to Victorian timber trees, is given. This is also well illustrated with plates of some of the more useful of the indigenous timber trees.

NOTE ON THE OCCURRENCE OF MARSUPIAL REMAINS IN THE SAND-DUNES OF TORQUAY.—Whilst searching amongst the sand-dunes between Spring Creek and Bird Rock, some short while ago, some bones of marsupials came to light. Amongst these remains were numerous bones of the common rabbit, and the left mandibular ramus of a Gunn's Bandicoot, *Perameles gunnii*. This latter showed by its condition and association with the rabbit bones near the surface, that no great period had elapsed since it was covered by the sand. The species is still to be found in the coastal districts of Victoria. The remainder of the bones are all referable to the common Wombat, *Phascolomys mitchelli*. They represent the greater part of the trunk and limb bones. Some of the vertebral bones are cemented in a continuous series by the incrusting dune sand. The surface of these bones shows a large amount of corrosion, and this, together with their partial calcareous incrustation, would lead one to conclude that these remains are probably contemporaneous with the weird incrustated fossil tree-stems which are so abundant on this part of the coast.—F. CHAPMAN, A.L.S.

THE EYES OF ANIMALS.—Some very interesting statements were made at a lecture recently delivered in London before the Institute of Ophthalmic Opticians by Dr. G. Lindsay-Johnson. The lecturer said that he had been induced to take up the study of the eyes of animals on account of the conflicting statements in text-books as to the existence of the macula lutea in animals. To settle the point he examined the eyes of the monkeys and other animals at Jamrach's menagerie, and had not gone very far in his studies before he realized that the eye of every animal is a kind of trade mark, so distinct that, as is now known, the order, genus, and family of any animal can be told by examining its eye. This discovery added a method of identification to those already known, and, moreover, applies equally to birds, fishes, and mammals. He found by ophthalmoscopic examination that certain animals had been wrongly classified—the rodents, for instance—and on communicating with Haeckel of Jena his conclusions were confirmed from totally different sources. Another curious discovery was that only man and monkeys had parallel vision, and as animals descend in the usual scale of arrangement the outward squint of the eye increases. The lecturer said that his researches had confirmed the truth of the theory of evolution, one singular fact being the great similarity of the fundus of the eye in a Nubian youth and in a chimpanzee. He considered reptiles the ancestors of the mammals, and hence of the human race, while rodents are the lowest known type of all the families of mammals.—Condensed from a report in the *Chemist and Druggist* (London), 14th October, 1905.

BIRDS OF BRITISH INDIA.—We have received from the author, Mr. E. R. Skinner, St. Mary Cray, Kent, England, "A List of the Birds of British India," published in pamphlet form (44 pages, 7 x 4¾ in.) at 1s. 1d., post free. The list enumerates some 1,687 species, or over 900 more than the vernacular list of the Australasian Association (1886). The vernacular name of each bird is given, and, as may be imagined, so many species provide some rather complicated names—*e.g.*, Black-breasted Yellow-backed Sun-bird; but names indicative of local origin are very few. The systematic arrangement is somewhat different to our Australasian list, which is based on the British Museum Catalogue. The list under notice commences with the Passeres, which is the largest order, and claims more than half the total species. This order contains some very large families and sub-families; thus the Brachypodinæ—bulbuls—contains 70 species, many of which have four-worded vernacular names. Another large family is the Sylviidæ—warblers; in this 90 species are listed, some with equally long common names—*e.g.*, White-throated Flycatcher-Warbler. Of flycatchers there are 51 species, and of finches 40. India is well known as the stronghold of the Phasianidæ (pheasants), 75 being enumerated, 14 of which are silver pheasants. The parrot family, Psittaci, is comparatively small, only 18 species occurring in India. In a hurried glance through the list one Australian species was noticed—No. 1,420, *Esacus magnirostris*, Australian Stone-Plover. The list is based on Messrs. Blanford and Oates's work on the birds of India, and has evidently been prepared in a very careful manner. It may be mentioned that the familiar bird of our streets is recorded as the "Black-headed Myna," and while the only species of its genus (*Temenuchus*), there are twenty other mynas.

THE HUTTON MEMORIAL RESEARCH FUND.—It has been determined by the scientific societies of New Zealand to establish a fund in memory of the late Captain F. W. Hutton, F.R.S., president of the New Zealand Institute, for the purpose of encouraging original research in natural science in New Zealand. Than Captain Hutton perhaps no man has done more to increase our knowledge of the geology, zoology, and botany of New Zealand, and an appreciative notice of his work appeared in *The Emu* for January last. Dr. Chilton, Canterbury College, Christchurch, has undertaken to act as hon. treasurer of the fund, and it is requested that subscriptions be sent to him as early as possible.

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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 February, 1906.

The president, Mr. F. G. A. Barnard, occupied the chair, and about 80 members and visitors were present.

REPORTS.

A report of the excursion to Beaumaris on Saturday, 3rd February, was given by the leader, Mr. J. Shephard, who stated that fifteen members and friends were present. The party were fortunate in arriving at low tide. Shells were fairly numerous, and a number of calcareous sponges were found. From some sea-weed collected, Mr. Stickland had been fortunate in finding a number of diatoms. Altogether an interesting and profitable afternoon was spent by those present.

A report of the junior excursion to Fairfield on Saturday, 3rd February, was given by the leader, Mr. J. A. Leach, B.Sc., who said that about twenty-five juniors were present. The object of the excursion was set down as pond-life, but, owing to the ponds having dried up, the afternoon was principally spent in examining the cuttings of the Outer Circle railway line, where some interesting features in the geology and geography of the district were pointed out and notes taken for future reference.

The hon. librarian reported the receipt of the following donations to the library :—*Journal of Agriculture of Victoria*, December, 1905, from Department of Agriculture, Melbourne; *The Emu*, vol. v., part 3, January, 1906, from the Australasian Ornithologists' Union; *Geelong Naturalist*, vol. ii., No. 2, from the Geelong Field Naturalists' Club; *Agricultural Gazette of New South Wales*, December, 1905, January and February, 1906, from the Secretary for Agriculture, Sydney; "Forest Flora of New South Wales," vol. ii., part 8, by J. H. Maiden, F.L.S., Government Botanist, from the author; "Proceedings Linnean Society of New South Wales," vol. xxx., part 2, from the society; "Annual Report of the Australian Museum, Sydney, 1905," from the trustees; "Transactions of Royal Society of South Australia," vol. xxix., from the society; *Nature Notes*, November and December, 1905, January, 1906, from the Selborne Society, London; and *Nature Study*, November and December, 1905, from the publisher.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Barnett, Post-Office, Abbotsford, and Mr. A. A. Henderson, B.Sc., Mines Department, Melbourne,

were elected ordinary members ; Miss Keppel, Marysville, as a country member ; Master R. Brettschneider as an associate ; and Miss H. Ramsay and Master T. Riordan were elected junior members of the Club.

GENERAL BUSINESS.

Mr. A. D. Hardy, F.L.S., stated that a rumour was current that it was the intention of the Government to remove the botanical collection from the National Herbarium to the University for teaching purposes. He feared, if such were the case, that the collection, which contained many rare and valuable plants, would be in great danger of being destroyed through rough handling by the students.

Mr. J. A. Leach, B.Sc., said that, from his experience as a student of the Melbourne University, he found that very great care was taken of specimens used for teaching purposes.

On the motion of Messrs. Hardy and W. Stickland, the honorary secretary was requested to write to the Minister of Agriculture to ascertain if it were true that the collection was to be removed to the University.

Mr. A. H. Mattingley said that it was desirable that the Government be approached with a view to having the Waranga Basin permanently reserved as a breeding-place and an asylum for waterfowl, and pointed out that this sheet of water was being frequented largely by duck and other water-birds.

On the motion of Messrs. Mattingley and Robt. Hall, F.L.S., the honorary secretary was directed to forward a letter to the Minister of Public Works requesting that the area be proclaimed a permanent reserve for waterfowl.

WILSON'S PROMONTORY.

Mr. A. D. Hardy, F.L.S., as leader of the recent excursion, gave a general account of the proceedings of the party, and then a more detailed report on the botany of the Promontory. During the outing some 180 species of plants were observed in bloom, the Composites being the prevailing order. He also gave some information as to the suitability of the country for the proposed asylum for indigenous animals, and put forward suggestions whereby a revenue might be eventually obtained from the park.

Mr. J. A. Kershaw, F.E.S., gave an interesting report on the zoology of the trip, in which he called attention to the more noticeable species seen, and said that, though no species of absolute novelty or even great rarity was obtained, it is possible that a party with more time at its disposal could add many more species to the lists presented.

Mr. T. S. Hall, M.A., then briefly explained a number of slides illustrating some of the more interesting portions of the

Promontory, and said that the geological portion of the report, together with a list of the mollusca, was in the hands of Mr. G. B. Pritchard, who was unavoidably absent.

EXHIBITS.

By Master Frank Cudmore.—Fossil crab, from Beaumaris.

By Mr. J. E. Dixon.—Twenty-seven species of Coleoptera recently collected.

By Mr. J. F. Haase.—Orchid in bloom, *Dipodium punctatum*, from Belgrave.

By Mr. T. S. Hall, M.A.—Lower jaw of young seal; tourmaline, from Oberon Bay.

By Mr. C. French, jun.—Rare Coleoptera, collected during month of January last—*Cardiothorax aureus* (new to science), *Tragocerus lepidopterus*, from Alps, Victoria; *Stigmodera menalias*, from Dandenong Ranges; *Esiotyche favosa*, from South Gippsland.

By Mr. J. A. Kershaw, F.E.S., for National Museum.—Collection of Coleoptera from Launching Place, collected by Mr. G. Coghill; also entomological specimens collected during Wilson's Promontory excursion.

By Mr. H. Jeffery.—Stone axe.

By Mr. A. Mattingley.—Photograph of nest, young, and adult of Coachwhip-bird, *Psophodes crepitans*.

By Mr. F. Pitcher, for the Director.—Blooms of two Australian Flame Trees now flowering in Melbourne Botanic Gardens—*Sterculia acerifolia* (New South Wales and Queensland), *S. tricosiphon* (Queensland and North Australia).

By Mr. F. M. Reader.—Dried specimens of unrecorded varieties of Victorian plants.

After the usual conversazione the meeting terminated.

EXCURSION TO WILSON'S PROMONTORY.

IN response to the invitation of the committee of the Field Naturalists' Club of Victoria, quite 1,000 ladies and gentlemen were present at the Masonic Hall, Collins-street, on Thursday evening, 8th February, when a popular description was given, with lantern illustrations, of the country at Wilson's Promontory visited during the Christmas excursion of the Club.

The president, Mr. F. G. A. Barnard, occupied the chair, and, in introducing the lecturer of the evening, Mr. T. S. Hall, M.A., said that the reservation at Wilson's Promontory should not be considered merely as a National Park for Melbourne, or even for Victoria, but must be regarded as an Australian sanctuary for representatives of the larger forms of its unique fauna, where they can be studied in a state of nature by naturalists of other countries, and instanced the success which had attended the preservation of the North American bisons

from extinction by the establishment of the great Yellowstone Park in the United States. He hoped that under certain restrictions it might even become a tourist resort, for many of our own people had never seen a kangaroo or an emu outside the limits of a zoological garden.

Mr. T. S. Hall first of all traced the path of the excursion party on a map displayed on the screen (see *Victorian Naturalist*, vol. xxii., p. 44), and then described the views, which had been selected from a large series taken by members of the party. These numbered about 120, and well illustrated the varied characteristics of the Promontory, such as the sand dunes of the northern portion, the tea-tree flats along the Derby River, the bold granite masses of Mounts Oberon, Norgate, &c., the sandy beaches of Oberon Bay, hemmed in with rugged cliffs on either side, and the grassy table-land lying between it and Waterloo Bay on the east coast. This portion he considered the only fair land on the Promontory, but of too small an extent to be worth while throwing open for settlement, and even then would always be inaccessible for wheeled vehicles. On the whole the country was eminently suited for the purposes desired by the Club, and in course of time, under proper control, could be made a most valuable asylum for examples of our rapidly diminishing indigenous animals. Owing to want of time, the party could not visit the most southern portion of the Promontory, but, through the kindness of Dr. Fred. Bird, a number of views of Roaring Meg Creek, not far from the lighthouse, were shown, which indicated a wealth of vegetation along the stream resembling that of our finest fern-gullies. Sealers' Cove and the coast-line further north was also unvisited, and, as this district is known to contain the best timbered portions, no doubt many more picturesque scenes could have been obtained had time allowed. The beauty of many of the pictures appealed to the tastes of the audience, and the lecturer was frequently interrupted by expressions of approval.

A vote of thanks to the lecturer concluded the proceedings.

A BOTANICAL COLLECTOR IN THE MALLEE.

BY C. S. SUTTON, M.B.

(Read before the Field Naturalists' Club of Victoria, 15th Jan., 1906.)

BEFORE dealing with the flora of north-west Victoria in general, and with that of the district lying to the south and east of Lake Hindmarsh in particular, it is perhaps advisable to briefly enumerate, for the benefit of those who have had no actual experience of the Mallee, some of its leading features.

The north-west region is described in the "Key to the System of Victorian Plants" as extending from the sources of the watercourses in the north-west to the Murray River. This

definition leaves us in some doubt as to its eastern boundary. Seeing that much of the country lying to the east of the Loddon, Campaspe, and Goulburn, is so similar to the Mallee country, it might reasonably be said that the north-west region extends even to the Lower Ovens. Be this as it may, the great bulk of the north-west is covered by the Mallee, and this very characteristic scrub is more or less precisely contained, in as far as this State is concerned, between the Loddon and the South Australian border, and between the Murray and a line running from Mount Egbert, near Korong Vale, through Mount Arapiles. It occupies, in fact, part of that great estuary into which in the dim past the Darling, the Murrumbidgee, and the Murray entered as independent streams. At no point within its area does the height above sea-level rise to as much as 500 feet, the average being hardly more than half of this, and Sea Lake, though nearly 200 miles from the sea, is only 176 feet above it. The surface of the country consists of belts of more or less good land, mainly of a light and porous character, separated by low sand-hills running generally in a south-east to north-west direction; the whole overlying beds of limestone and occasionally quartzites and ironstones, which follow the contour of the country, and are nowhere very far from the surface. These beds are ascribed by Professor Gregory to the evaporation of subterranean waters containing bicarbonate of lime, alkalis, and iron salts, which are left behind as the water is drawn through the sand by the great heat of the sun.

Considering the flatness of the country, the small rainfall, and the nature of the soil, it is not to be wondered at that the water-courses have no visible outlet to the sea, all of them ending in lakes or dying away in the sand in their unsuccessful efforts to reach the Murray. The general appearance of the country is not so monotonous as one would expect. The low undulations, clothed mainly with *Eucalyptus gracilis* and *E. incrassata*, with clean, bright foliage and abundant blossom, are relieved and diversified by salt flats covered with saltbushes and bordered by patches of blazing Mesembrianthemum and by the frequent ridges and sand-hills, where the pines are most often in evidence. These handsome trees, of which most of the oldest specimens were killed in the latest drought, give sometimes quite a park-like aspect to the scene. Often, too, the sand-ridges, being more or less bare of all else but coarse grass and occasional small plants and shrubs, give the impression that the sea is close at hand, and time and again one is found straining one's ears for the sound of the surf, which it is difficult to think is not beating on their further side.

The flora of the north-west, which I was able to study on the spot for the first time during a stay at Jeparit in the latter half of October, is perhaps more interesting than that occurring

in any other part of the State. Its interest, apart from the beauty of many of its species, mainly arises from the fact that in it are so many forms which are restricted to the Mallee—many, indeed, being found only in very circumscribed areas therein—and also as the direct consequence of this restriction that many of these forms are being wiped out of existence as the country is brought under cultivation. In comparing the Mallee flora with that of Victoria as a whole, several points are quickly noticeable. In the first place, it is extremely rich in salsolaceous plants, all but three of the total species being found in it, and nearly 70 per cent. being restricted to it. Next, nearly one-half of all the Composites is confined to the north-west, and the number of very small forms is much greater there than elsewhere. In Zygophyllaceæ it numbers 80 per cent., in Crucifers 60 per cent., in Santalaceæ 33 per cent. of the total as its very own, and all but one of the Amarantaceæ are found there.

Leguminous plants are well represented, more particularly by Swainsonias, Cassias, and Acacias, 20 of the latter out of 67 being peculiar to the region. In the Myrtaceæ one is struck by the prevalence of *Eucalyptus gracilis* and *E. incrassata*, which, with *E. oleosa*, *E. uncinata*, and *E. behriana* form the Mallee scrub, and by the comparative scarcity of the taller species, though *E. rostrata*, *E. capitellata*, *E. leucoxydon*, and others are occasionally seen.

Contrary to one's expectations, proteaceous plants, which would seem to be peculiarly fitted for such a dry, hot country, are not very numerous, and about 70 per cent. of the Victorian representatives of this order are unknown to the north-west. Only *Grevillea aquifolium*, *G. rosmarinifolium*, and *Hakea vittata* were collected in flower, *Grevillea huegelii* in bud, *Banksia ornata* and *Hakea*, sp., in fruit. Umbellifers, except in genus *Hydrocotyle*, are infrequent. In Rhamnaceæ there are many Cryptandras, but only one *Pomaderris* occurs. For the rest, Goodeniaceæ and Boraginaceæ are well represented, Rutaceæ and Labiatae only poorly; one Epacrid alone is peculiar to this flora, but in Myoporinæ the genus *Eremophila* almost entirely belongs to it. Grasses are present in great variety, Cyperaceæ chiefly seen in *Cyperus* and *Scirpus*, and ferns are practically absent.

As a result of the existing conditions—viz., a sandy soil containing a large proportion of soluble salts, a small rainfall, averaging 14 inches (only slightly exceeding the maximum of 300 mm. set down by Schimper for a desert formation), the frequent droughts, the high temperature, dry atmosphere, and intense illumination—the vegetation is markedly xerophilous. This is seen in the small and proportionately thick leaves or their entire absence (reduction of transpiration surface), in their often leathery (sclerophyllous) or succulent (chlyophyllous) nature, in the dry and hard axes, and in the presence of thorns, hairs, or

tomentum. In addition, families which prevail in deserts elsewhere, such as Salsolaceæ (mainly halophytes), Zygophyllaceæ, Leguminosæ, Compositæ, Euphorbiaceæ, Amarantaceæ, Cruciferae, Malvaceæ, &c. (all containing large numbers of halophytes), make up the great bulk of the flora.

Although the sand-hills, the salt-pans, the scrub itself, and the shores of the lake all furnished me with species I did not find elsewhere, the locality which was perhaps richest in flowering plants was a red gravel ridge some miles out on the Rainbow road. Here the banks on each side of the road were veritable flower gardens. The two varieties of *Dampiera rosmarinifolia* were growing profusely, the blue, with its fine masses of colour, rivalling even the garden Lobelias; shapely bushes of *Logania linifolia* scented the air; *Calycotrix tetragona* and *Thryptomene ciliata*, with more blossom than foliage, varied from almost pure white to a delicate pink; *Lasiopetalum baueri* and *L. behrii* intermingled their stems, and *Boronia cœrulescens*, *Eriostemon pungens*, *Cryptandra subochreatea* and *C. leucophracta* rioted luxuriantly. The latter showed in two forms, one a trailing variety (*microcephala*) with very small headlets of flower. Others present were *Grevillea aquifolium*, *G. rosmarinifolium*, and *Prostanthera coccinea*, forming trim little bushes of bright green aromatic foliage, against which the vivid scarlet blossoms showed to advantage.

Just away from the road was *Bæckeia crassifolia* nearly past its flowering, so that it was difficult to find good specimens. A little further from the road, in sandy soil, *Eriostemon sediflorus* was in full bloom with *Beyeria opaca*, and a well-grown example of *Santalum acuminatum* loaded with ripe fruit and a solitary plant of *Styphelia cordifolia* in bud were chanced upon. Returning to the ridge, *Eutaxia empetrifolia* was noticed, a variety of which of larger growth and with yellow flowers was got later. *Westringia rigida*, with its lax variety, which is so different from the unbending form that it looks a distinct species, was plentiful, as was also *Dodonæa viscosa* with its seed-cases showing bright colour.

Continuing along the Rainbow road, plants of *Halgania cyanea* and *H. lavandulacea* commenced to appear, and were afterwards frequently seen. In drying specimens of "sticky" plants like the Halganas, Beyerias, Dodonæas, Helichrysums, &c., I might here say that the use of a smooth brown paper of hard texture is much more satisfactory than the ordinary blotting paper, and with its aid quite respectable specimens of even the most sticky kinds of plant may with a little trouble be obtained.

At the sides of the road small bushes of *Dodonæa bursarifolia* were met. *Eremophila brownii* had passed its best days, but *Prostanthera chlorantha*, whose grayish foliage and blue-green

flowers make a rather inconspicuous and unshapely plant, *Pimelea elachantha*, *P. microcephala*, and *Goodenia varia*, another sticky plant of trailing habit, mostly seeking support from the Mallee clumps, were all in fine flowering condition.

Just before reaching the vermin-proof fence which crosses the country from east to west at Pullut railway station, *Aster muelleri* (sticky) and *A. decurrens* were obtained, and beyond the fence the interesting little labiate *Teucrium sessiliflorum*, owning a very agreeable musk-like odour, was growing abundantly on the roadside.

Near to Rainbow were *Angianthus tomentosus*, with a pleasant lemon-like aroma; fine specimens of *Helipterum jesseni* (seen frequently previously), with pretty old gold flowers; and *H. corymbiflorum*, seeming to have a predilection for cultivated ground.

Returning to Jeparit by a road skirting Lake Hindmarsh, less success was met with, but a fine shrub of *Hakea vittata*, several of *Acacia salicina*, with orange-coloured flowers, and *Lavatera plebeja* were seen, and a salt flat almost covered with *Kochia villosa* provided my portfolio with specimens of *Bussia bicornis*, *Calocephalus sonderi*, *Myosurus minimus*, *Plagianthus spicatus*, *P. microphyllus*, *Brachycome pachyptera*, and *Swainsonia procumbens*. *Frankenia levis* was present in form as we know it near Melbourne, but on another salt flat to the west of Jeparit it was found growing in low bushy plants of pale grey-green colour, with very minute white flowers. Just away from this other salt-pan was *Aster ramulosus*, with a very distinct pig-sty odour, and very different from the species as we know it in the south, along with its congeners, *A. microphyllus* and *A. lepidophyllus*; also *Humea squamata*, with buds yet unopened; *Helichrysum decurrens*, *Aster pimelioides*, *A. exul*, *Zygophyllum billardieri*, and at some little distance, on rising ground, *Z. fruticosum*. This takes the shape of numerous smallish bushes of light green succulent foliage and bright yellow flowers. Its appearance would lead one to suppose that it would make a useful fodder plant in this dry district, but no stock will touch it, and even the rabbit leaves it severely alone.

Close to Lake Hindmarsh were fine lush bushes of *Solanum simile*, *Muehlenbeckia cunninghami*, and *Anthocercis myosotidea*, and huge examples, quite two feet high, of *Ajuga australis*, the introduced tree tobacco, *Nicotiana glauca*, an ugly straggling shrub, and nearing the water many plants of our only poppy, the charming little brick-red *Papaver aculeatum*.

Just near where the Wimmera empties into the fine expanse of Lake Hindmarsh an extensive area is covered with shapely shrubs of *Acacia brachybotrya*, growing in the loose sand. This species is so abundant in blossom, which is such a happy contrast to the younger grey-green leaves, and is so prodigal of its odours,

that it had little difficulty in displacing its predecessor of the genus—perhaps because it was not also in evidence—from pride of place in my estimation. Right near the edge of the water, in close association and almost buried in the sand, were *Mimulus repens* and a minute *Heleocharis*, probably *acicularis*.

In one of my excursions I made a fruitless search for the rich patch near Antwerp from which Mr. St. Eloy D'Alton gathered the fine collection he so kindly sent to our show a couple of years ago. I was, however, rewarded, in prospecting a sand-ridge running alongside the road, by finding quite a number of those very interesting small Composites so characteristic of the Mallee. In the moister parts, near the base of the ridge, were *Angianthus strictus* and the not very different *Myriocephalus rhizocephalus* and *Isoetopsis graminifolia*. On the ridge, *Podotricha angustifolia*, its curiously elongated headlets constricted near the summits and barely showing their few and inconspicuous florets, was pretty common. This and *Toxanthus muelleri*, looking more like the wraith of itself than a real plant, and which would appear to be somewhat rare, as I only gathered three or four specimens and only in this place, had minute grains of sand closely adherent to their every part. *Gnaphalodes uliginosa* was in close communities, sometimes consisting of a mere headlet, sometimes of several, on slender straggling branches with withered leaves, radiating from the very short stem. The headlets, with their pale slate-green leaf bracts, white tomentum, and minute straw-coloured florets, made a very attractive picture against the clean white sand. Near by a few specimens of the very small brownish *Helipterum exiguum* and a couple only of *Calotis hispidula* were gathered, but *Gnephosis skirrophora* and the slender *Millotia tenuifolia* were in greater numbers.

A sand-hill in another locality presented quite different features. All these small Composites were conspicuous by their absence, and instead I found clumps of Mallee, bushes of *Banksia ornata*, with black, ugly cones, and low bushes with contorted branches of the *sub-spinescens* variety of *Aotis villosa*. The grasses were solely represented by *Triodia irritans*, and right in the tussocks, illustrating the proverb about birds of a feather, was growing *Eriostemon pungens*. In fact, each tussock seemed to have its pretty little *protégé*, and it was only by discreetly stamping on the mass that one could gather a specimen without getting wounded in the process. Alongside, and seemingly also under the protection of the Porcupine Grass, was usually to be seen the little Crucifer, *Sisymbrium cardaminoides*. *Loudonia behrii*, in big clumps, crowned with beautiful fluttering yellow pennons, and a species of *Stackhousia* with yellow flowers, either *flava* or *viminea*, and growing also in tussocky form, helped to give colour to a somewhat harsh landscape. Other plants noticed were *Pultenea laxiflora* (the only species met with),

Leptospermum myrsinoides, and, which were quite in keeping with the scene, *Daviesia ulicina*, *Acacia spinescens*, *Xerotes leucocephala*, and *X. glauca*.

Of the other plants met with, it will be sufficient to mention that all the *Hibbertias* known to the north-west were in flower. An introduced poppy, *P. incisa*, was well established in the gardens and in some of the crops, *Billardiera cymosa* was just beginning to hang out its bells, and *Bertya oleifolia* was found in bud. *Acacia rigens*, *A. acinacea*, *A. microcarpa*, *A. montana* var. *d'altoni*, *A. tineura*, and *A. stenophylla* were all nearly past their flowering time.

Other species, which are more or less confined to the district, were *Dillwynia patula*, *Haloragis ceratophylla* in bud, *Leptomeria aphylla* in fruit, the small *Didiscus cyanopetalus*, growing on the river flats, *Leptorrhynchus pulchellus*, *L. waitzia*, *Helipterum pygmaeum*, *Goodenia cycloptera* in seed, *Teucrium racemosum*, and a plant of *Styphelia sonderi* with belated flower.

On my way to Jeparit I called on Mr. D'Alton at Dimboola, and was fortunate enough, during my stay, to spend three long evenings with him, and learn many interesting facts about the plants of the north-west region. Mr. D'Alton shares with Mr. Reader, of Casterton, and Mr. H. B. Williamson, formerly of Hawkesdale, and now of Geelong, the distinction of possessing perhaps the widest knowledge of the north-western flora. His knowledge is all the more intimate, seeing that his occupation of engineer to the Lowan Shire has led him into the very recesses of the Mallee, and all his life he has been a lover of plant-life. He expressed his intention of writing a paper in which he will set down what he knows about the rarer species, many of which he was the first to collect, and it is greatly to be desired that he will very soon be induced to give to the journal what cannot fail to be an extremely interesting and valuable contribution.

In the following list of the plants observed or collected * indicates the species confined to the N.W., and † those observed in fruit only :—

Ranunculaceæ—

- †*Clematis microphylla*, Cand.
- †*Myosurus minimus*, L.

Dilleniaceæ—

- Hibbertia densiflora*, F. v. M.
- stricta, R. Br.
- fasciculata, R. Br.
- virgata, R. Br.

Lauraceæ—

- Cassytha glabella*, R. Br.

Papaveraceæ—

- Papaver aculeatum*, Thun.
- incisa (introduced)

Cruciferae—

- Nasturtium aquaticum*, Bock. (introduced)

Cruciferae—

- **Sisymbrium nasturtioides*, F. v. M.
- cardaminoides, F. v. M.
- *†*Stenopetalum sphaerocarpum*, F.
- †*Capsella elliptica*, Meyer [v. M.
- Lepidium ruderales* (two forms)
- Violaceæ—
- †*Hybanthus floribundus*, F. v. M.
- Pittosporæ—
- †*Bursaria spinosa*, Cavan.
- Billardiera cymosa*, F. v. M.
- Rutaceæ—
- Boronia cœrulescens*, F. v. M.
- Eriostemon pungens*, Lind.
- **capitatus*, F. v. M.
- sediflorus*, F. v. M.

- Rutaceæ—
 **Eriostemon stenophyllus*, F. v. M.
- Zygophyllæ—
 **Zygophyllum billardieri*, Cand.
 * *fruticulosum*, Cand.
- Geraniaceæ—
Geranium pilosum
Oxalis corniculata, L.
- Malvaceæ—
Lavatera plebeja, Sims
Plagianthus spicatus, Benth.
 * *microphyllum*, F. v. M.
- Sterculiaceæ—
 **Lasiopetalum behrii*, F. v. M.
baueri, F. v. M.
- Euphorbiaceæ—
Poranthera microphylla, Brong.
Beyeria opaca, F. v. M.
Bertya oleifolia, Planch.
- Casuarinææ—
Casuarina distyla, Vent.
- Sapindaceæ—
 †*Dodonæa viscosa*, L.
 * *bursarifolia*, Behr. & F. v. M.
- Stackhousiææ—
Stackhousia viminea, Smith
linarifolia, Cunn.
- Frankeniaceæ—
Frankenia lævis, L. (two forms)
- Portulacææ—
Claytonia calyptrata, F. v. M.
pygmaea, F. v. M.
- Caryophyllææ—
Spergularia rubra, Cambess.
- Amarantaceææ—
 **Ptilotus exaltatus*, Nees
spathulatus, Poirel.
- Salsolacææ—
Rhagodia nutans, R. Br.
Chenopodium microphyllum, F.
Kochia villosa, Lind. [v. M.]
Enchylæna tomentosa, R. Br.
Salicornia arbuscula, R. Br.
- Ficoideææ—
Mesembrianthemum æquilaterale,
 Haw.
- Polygonaceææ—
Muehlenbeckia cunninghamii, F.
- Leguminosææ— [v. M.]
Viminaria denudata, Smith
Daviesia ulicina, Sm. [cens
Aotus villosa, Sm., var. subspines-
Pultenæa laxiflora, Benth.
Eutaxia empetrifolia, Schlecht.
 (two forms)
 **Dillwynia patula*, F. v. M.
ericifolia, Sm.
Swainsonia procumbens, F. v. M.
- Leguminosææ—
Kennedyia prostrata, R. Br.
Cassia eremophila, Cunn.
 * *sturtii*, R. Br.
 **Acacia spinescens*, Benth.
 * *rigens*, Cunn.
acinacea, Lind.
 * *microcarpa*, F. v. M.
 * *salicina*, Lind.
 * *montana*, Benth., var.
d'altoni
 * *brachybotrya*, Benth.
 * *trineura*, F. v. M.
 * *sclerophylla*, Lind.
- Rosaceææ—
Acæna ovina, Cunn.
- Crassulacææ—
Tillea, sp.
- Haloragæææ—
 **Loudonia behrii*, Schlecht.
Haloragis ceratophylla, Zahl.
Myriophyllum variifolium, J. Hook.
- Myrtaceææ—
Calycotrix tetragona, Lab.
Thryptomene ciliata, F. v. M.
 **Bæckea crassifolia*, Lind.
Leptospermum myrsinoides, Schl.
Melaleuca parviflora, Lind.
 *† *uncinata*, R. Br.
 **Eucalyptus gracilis*, F. v. M.
leucoxylon, F. v. M.
 * *incrassata*, Lab.
 † *rostrata*, Schlecht.
- Rhamnaceææ—
 **Cryptandra leucophracta*, Schlecht.
 * *leucophracta*, var. *microcephala*
subochreatea, F. v. M.
- Umbelliferææ—
 **Hydrocotyle medicaginoides*, Turc.
 **Didiscus cyanopetalus*, F. v. M.
Daucus brachiatus, Sieber
- Santalacæææ—
 *†*Santalum acuminatum*, Cand.
 †*Leptomeria aphylla*, R. Br.
- Proteaceææ—
Grevillea aquifolium, Lind.
rosmarinifolia, Cunn.
 * *huegelii*, Meiss.
Hakea rostrata, F. v. M.
 † sp.
Banksia ornata, F. v. M.
- Thymelæææ—
Pimelea humilis, R. Br.
 * *microcephala*, R. Br.
elachantha, F. v. M.
glauca, R. Br.
octophylla, R. Br.

Rubiaceæ—

- Asperula oligantha*, F. v. M.
Galium umbrosum, Solander

Compositæ—

- Lagenophora emphysoptera*, J. Hook.
Brachycome diversifolia, Fischer
 *† *pachyptera*, Turc.
graminea, F. v. M.
ciliaris, Less.
calocarpa, F. v. M.
Minuria leptophylla, Cand.
 * *Calotis hispidula*, F. v. M.
Aster ramulosus, Lab
microphyllus, Persoon
lepidophyllus, Persoon
 * *pimeleoides*, Cunn.
muelleri, Sonder
 * *decurrens*, Cunn.
exul, Lindl.
huegelii, F. v. M.
Vittadinia australis, A. Rich.
Gnaphalium luteoalbum, L.
Podotheca angustifolia, Less.
 * *Ixiolæna tomentosa*, Sond.
Leptorrhynchus squamatus, Less.
pulchellus, F. v. M.
waitzia, Sond.
 * *Helipterum corymbifolium*, Schl.
 * *pygmæum*, Benth.
exiguum, F. v. M.
 * *jesseni*, F. v. M.
Helichrysum leucopsidium, Cand.
lucidum, Henck.
apiculatum, Cand.
 * *Humea squamata*, F. v. M.
Millotia tenuifolia, Cass.
 * *Toxanthus muelleri*, Benth.
Myriocephalus rhizocephalus,
 Benth.
 * *Angianthus tomentosus*, Wend.
strictus, Benth.
Carduus pycnocephalus, Jacq. (intro-
 duced)
Centaurea melitensis, L. (intro-
 duced)
 * *Gnephosis skirrophora*, Benth.
 * *Calocephalus sonderi*, F. v. M.
Gnaphalodes uliginosa, Gray
Senecio lautus, Soland.
brachygllossus, F. v. M.
Erechtites arguta, Candolle
Microseris fosteri, J. Hook.
 Campanulaceæ—
Wahlenbergia gracilis, Cand.
 Goodeniaceæ—
Dampiera rosmarinifolia, Schl. (two
 forms)
Goodenia geniculata, R. Br.

Goodeniaceæ—

- *† *Goodenia cycloptera*, R. Br.
 * *varia*, R. Br.
pinnatifida, Schlecht.

Loganiaceæ—

- * *Logania linifolia*, Schlecht.

Plantaginæ—

- Plantago varia*, R. Br.

Convolvulaceæ—

- Convolvulus erubescens*, Sims

Solanaceæ—

- * *Solanum simile*, F. v. M.
Nicotiana suaveolens, Lehm.
glaucia, Graham (introduced)
 * *Anthocercis myosotidea*, F. v. M.

Scrophularinæ—

- Mimulus repens*, R. Br.

Asperifolia—

- * *Halgania cyanea*, Lind.
 * *lavandulacea*, Endlich.

Labiatae—

- Prostanthera coccinea*, F. v. M.
 * *chlorantha*, F. v. M.
Westringia rigida, R. Br. (two
 forms)
Ajuga australis, R. Br.
 * *Teucrium racemosum*, R. Br.
 * *sessiliflorum*, Benth.

Myoporinæ—

- * *Eremophila brownii*, F. v. M.
gibbosifolia, F. v. M.

Epacridæ—

- Styphelia sonderi*, F. v. M.
 * *cordifolia*, F. v. M.
 † *Brachyloma ericoides*, Sond.

Coniferæ—

- Callitris verrucosa*, R. Br.
cupressiformis, Vent.

Orchidæ—

- Thelymitra longifolia*, Forster
Prasophyllum fuscum, R. Br.

Liliaceæ—

- Dianella revoluta*, R. Br.
Burchardia umbellata, R. Br.
Bulbine semibarbata, Haw.
Thysanotus patersoni, R. Br.
Arthropodium minus, R. Br.
Xerotes leucocephala, R. Br.
glaucia, R. Br.
thunbergii, F. v. M.

Cyperaceæ—

- * *Heleocharis acicularis*, R. Br.
Scirpus pungens, Vahl.
maritimus, L.

Graminæ—

- Stipa crinita*, Gaud.
Danthonia penicillata, F. v. M.
 * *Triodia irritans*, R. Br.

The Victorian Naturalist.

VOL. XXII.—No. 12. APRIL 5, 1906.

No. 268

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 12th March, 1906.

The president, Mr. F. G. A. Barnard, occupied the chair, and about 85 members and visitors were present.

CORRESPONDENCE.

The hon. secretary read a letter from the hon. the Minister of Agriculture, stating that there was no foundation for the rumour that the Government proposed to remove the National Herbarium to the Melbourne University.

A letter was read from the Department of Public Works, stating that the Waranga Basin had been proclaimed as a permanent reserve for the protection of wild-fowl.

REPORTS.

A report of the excursion to the Botanical Gardens on Saturday, 24th February, was given by the leader, Mr. F. Pitcher, who reported that the attendance was rather small. The afternoon was chiefly devoted to the examination of the flora of the southern portion of the Gardens, when the distinguishing characteristics of several of the fine oaks were pointed out. A pretty sight was presented by the numerous shades on the trunks of the eucalypts, due to the outer bark having dried and peeled off, owing to the long spell of dry weather, thus revealing the many beautiful tints of the inner bark. The palms were found with their floral envelopes developed and in the fruiting stage. The non-edible bananas, which were noticed in flower at the junior excursion last November, were now seen in fruit.

A report of the junior excursion to Port Melbourne beach on Saturday, 3rd March, was given by the leader, Mr. T. S. Hall, M.A., who reported that about 30 junior and 12 senior members were present. The ground covered was the same as that gone over during the junior excursion in March last. The most notable find of the afternoon was a dead specimen of the King or Crested Penguin in fairly fresh condition.

ELECTION OF MEMBERS.

On a ballot being taken, Miss E. Waugh, Lyndhurst-crescent, Hawthorn; Mr. Henry B. Coles, Mercantile Chambers, Collins-

street; and Mr. S. J. A. Fripp, 120 Wattletree-road, Malvern, were elected ordinary members; Miss Elsie Stewart, Masters F. Seelenmeyer and S. Johnston were elected junior members of the Club.

GENERAL BUSINESS.

The president took the opportunity of introducing to the meeting Professor J. A. Ewart, D.Sc., the recently appointed Professor of Botany in the Melbourne University, and expressed the hope that he would prove a zealous guardian of the valuable collections contained in the National Herbarium.

Professor Ewart thanked the members for the kind reception given him, and trusted that he would be able to fulfil all that was expected of him. He was in the difficult position of being among strange faces, and surrounded by a strange flora, but he felt that he could confidently look to the members of the Field Naturalists' Club for their assistance and hearty co-operation in matters relating to the local flora, and he would be very glad to assist the Club in the furtherance of the knowledge of Australian botany.

PAPERS READ.

1. By Mr. F. Chapman, A.L.S., entitled "On an Abnormal Leaf of *Gangamopteris spatulata*, M'Coy."

The author drew attention to an impression of a leaf found at Bacchus Marsh by the Rev. A. W. Cresswell, M.A., some years ago, which in many respects resembled a leaf of *Glossopteris*, though this genus, usually found associated with *Gangamopteris*, has not been found in the Bacchus Marsh beds. A careful consideration of the specimen showed, however, that it must be regarded as an abnormal leaf of *Gangamopteris spatulata*, M'Coy. The paper was illustrated by lantern slides.

2. By Mr. E. O. Thiele, entitled "Notes on the Upper Macallister Valley, North Gippsland."

The author gave an interesting account of an exploration of the Upper Macallister Valley made in January last, and by means of a fine series of lantern slides graphically described the difficulties of the trip, which was through some of the roughest and wildest country in Victoria, many miles from any habitation, and for the most part at an elevation of about three thousand feet above sea level.

Mr. A. E. Kitson, F.G.S., congratulated the author on the good work he had done in the district, and supported his view that the valleys of the Barkly, Macallister, and other streams in the district probably occupied fault lines.

(Continued on page 224.)

EXCURSION TO WILSON'S PROMONTORY.

GENERAL.—BY A. D. HARDY, F.L.S.

THE last annual report of the Club contained the statement (*Vict. Nat.*, xxii., p. 41) that the greater part of Wilson's Promontory had at last been permanently reserved for the purposes of a National Park, mainly as a refuge for those members of our Australian fauna which are so rapidly disappearing before the march of civilization, and later, when framing the annual list of excursions, the committee felt it incumbent upon them to arrange a visit to the Park as the extended excursion, which has become customary at Christmas time, so that the Club might be in a position to speak with authority on the present condition of its fauna and flora and future possibilities.

The history of the movement leading up to the permanent reservation has been well detailed by Mr. T. S. Hall, M.A., in our journal some time ago (*Vict. Nat.*, xxi., p. 128), and needs no further mention now. Much disappointment was, however, felt when from the *Gazette* notice it was found that nowhere had the Park any sea-frontage, though some sixty miles of coast line was available. In other words, that a strip of land half a mile in width, temporarily reserved only, extended all round the Park, completely cutting it off from the sea.

Also included in the excluded portion is the Seaforth township site, situated at the north-eastern extremity of the Promontory, which is locally known as the Singapore Peninsula. This includes Mounts Singapore and Hunter, the peninsula and mount being named after the barque *Singapore*, wrecked there many years ago.

Before giving any details of the journey made by the Club party, I will briefly refer to the physiography and general characteristics of the Promontory, and in considering these it will be helpful to refer to the map published in the *Naturalist* for July last (*Vict. Nat.*, xxii., p. 44), in which are indicated the positions of the principal physical features.

Wilson's Promontory forms part of what appears to be the remains of an old land-bridge between Australia and Tasmania, and at no distant date was probably an island. Now it is a rugged and irregular mass of granite, connected with the mainland by a narrow isthmus of sand dunes, &c., about fourteen miles long by four wide. (See the geological and ethnological reports.)

Wind and wave have piled the sand in dunes along the coast in such a way that the water which falls from the granite hills in innumerable small streams is dammed back and imprisoned to form extensive and often densely vegetated morasses or swamps. Through these the water finds its way, often by much meandering, until it breaks through the sand dunes and escapes to the sea; its

course through the dunes being as a rule well defined, and the channels in places of considerable depth. Such are the morasses of the Derby River, Tidal River, and that on the south side of the Oberon Ridge. (See botanical report.)

The highest point of the Promontory is probably Mt. Latrobe, with a recorded height of 2,434 feet. Other prominent heights are Mt. Wilson (2,350), Mt. Vereker (2,092), Mt. Oberon (1,965), Mt. Leonard (1,860), Mt. Norgate (1,390), Mt. Hunter (1,136), Bishop Rock (1,057), Mt. Boulder (1,010), &c. These peaks, some of which are masses of bare granite boulders, are the culminations of ranges which in many cases bear a fair growth of eucalyptus trees, but the timber is poor and of no commercial value.

The gullies of the west side are poorly vegetated. The botanical members of our party made several side excursions in search of anything like the typical gully vegetation of Gippsland or the Otway Forest, but without success. With the exception of Roaring Meg and a few other small streams in the far south, luxuriant gullies appear to be confined to the eastern side of the Promontory.

In a few places there is good grass land, notably at the Derby River and easterly from Oberon Bay; the parts suitable for kangaroo and emu amount to about 2,000 acres. The total amount of grazing land of good and medium quality, such as would support kangaroos, emus, and wallabies of several sorts, would be perhaps 10,000 acres, but much of this country is of a quality unsuitable for stock and useless from a commercial point of view because of the difficulties in the way of access.

Some of the sand dunes bear low "heathy" scrub, but others support small trees of eucalyptus, sheoak, and banksia, with grass-trees of over ten feet in height. Tea-tree predominates on the sand dunes of the coastal belt at low elevations, but where the dunes are high, this gives way to low "heathy" scrub.

The shore is much incised in places with rocky tongues running far out to sea, some of which give shelter to sandy beaches at the mouths of the valleys. The sand of many of the beaches, such as those of Waterloo Bay, Oberon Bay, Leonard Bay, &c., has that peculiar quality which gives a metallic screeching sound when it is struck or scratched with a stick or disturbed by the feet when walking, and is known as "musical sand." This peculiarity is to be found, however, on other parts of the Victorian coast. The sandy beaches terminate usually at either end against rocky projections of high ridges. The shore of Corner Basin, however, is more regular and of a totally different character; the sands and mud of this shallow sea forming an extensive mud flat round the margin, which is vegetated with Spurious Mangrove (see botanical report), and has isolated granite rocks in places.

There is no settlement on the Promontory excepting the lighthouse quarters at the south-eastern corner, and around a sawmill, which is cutting into the fine gullies on the eastern side at Sealers' Cove; the township site of Seaforth, excluded from the Park, surveyed at the northern end of the Promontory, never having been utilized.

The only good track in the reserve at present is that of the Post and Telegraph Department. This connects Foster by way of the isthmus with the lighthouse, passing through Yanakie, across the Derby River, over timbered hills and heathy sand dunes, across the Tidal River and morass, over the Oberon ridge by the easterly of the two "bad saddles," skirting the summit of Mt. Oberon on the way, then hugging the low saddle to the east of the Oberon-Norgate Valley, and escaping the morass except a portion which is "logged," it ascends a ridge near Martin's Hill, and descends on the southern side to cross Roaring Meg Creek and trend south-easterly to South-east Point.

Along this route are at least two suitable camping grounds. One is on the south bank of the Derby River, reached by crossing the river by the footbridge, and dropping down behind the sand hummocks, where the telegraph line repairers' hut is enclosed in a small horse paddock. The other is behind the sand hummocks of Oberon Bay, on Fraser's Creek. At both places good water and grass for pack horses is plentiful. Other camping grounds exist, but for want of cut tracks are not accessible. Such are the mountain-locked enclosures at Sealers' Cove, Refuge Cove, &c., which can be reached more conveniently by boat from Welshpool or Port Albert, but are otherwise isolated from the rest of the Park.

Our party commenced the journey from Foster, on the South-Eastern railway line, distant 107 miles from Melbourne, where supplies of fresh bread and meat were obtained, and sent by pack horse *via* the Yanakie isthmus. We walked to "Foster Landing" on Stockyard Creek, a distance of about two and a half miles. This landing was once of greater importance than at present, the railway extension to Welshpool and Port Albert having left it in the lurch. There we boarded Mr. Taylor's well-equipped yacht *Albatross*, and passed between the mangrove-covered mud banks out into Corner Basin, which we crossed, and cast anchor at the unimproved "landing," as near the dry land as the gradually sloping mud flat would allow. By wading we removed our baggage, &c., to a place of safety, and were soon joined by Mr. W. Barker, who, with his assistant, Mr. Bena Claverino, brought our five pack horses round from Foster *via* Yanakie. Crossing a low sandhill, vegetated with eucalyptus, honeysuckle, grass-tree, &c., at the foot of the Vereker Range, we struck across the open heathy country and swamp lands to the

telegraph line track, and by this continued southerly, up and down sand hummocks—vegetated in places, while to others the fine sand drifting before the wind gave the appearance of smoking volcanoes—to the Derby River camp. Owing to the courtesy of the Post and Telegraph Department, we were enabled to use the repairers' hut as a storehouse for provisions, and pitch our tents in the fenced grassy enclosure on the river bank. Having explored the Derby River flats, the sand hummocks, and the coast of this part, we moved southerly across the timbered hills, heathy undulations, and Tidal River swamp to the Mt. Oberon ridge. The main party crossed this ridge by what is known as the "Bad Saddle," and had a steep climb before the beauty of Oberon Bay lay spread beneath them to the south. Meanwhile the botanical members had spent much time about the Tidal River and swamp, and had climbed round the summit of Mt. Oberon by a saddle on the eastern side, and descended into the valley about the head of Growler's Creek. Notwithstanding the simple "lay of the country," the obstacles to progress presented by jungles and swamps were of too formidable a nature to be overcome, and a detour by the south too long. They slept on the mountain side, and rejoined the main party in camp at Oberon Bay, after having been without food for nearly twenty-four hours, though with many additions to the plant collection. At the Oberon Bay camp much energy was displayed by the photographers, who climbed the surrounding bouldered hills to obtain views. After examining the shoreward end of this wide valley, we crossed the Promontory to Waterloo Bay, examining as we went the grassy sand dunes, which extend far inland, and crossing the low saddle which bridges the valley from Mt. Wilson Range to Martin's Hill. The trip from Oberon Bay camp to Waterloo Bay and return can be done in a day, and pack horses can, but with some difficulty in absence of a cut track, be got over most of the marshy ground on the east side to within a mile of the shore.

Long before the collectors and photographers were satisfied, our time limit had expired, and we returned *via* the Derby River to the landing at South Corner by almost the same route, but by small deviations examining fresh country. There the *Albatross* lay heeled over in the mud, to be righted by the incoming tide, which done, we waded to her, and with a favourable wind were at Foster Landing in less than three hours.

Our work occupied eight days, and our tracks totalled altogether some fifty miles. The expenses of the trip were by economy kept within an average of £4 10s. per member, which is about 10s. more than that for a similar term in the Otway the previous Christmas, but taking into consideration the difficulties in the way of provisioning and transport the expenses may be

considered as very moderate. The original arrangement of 10 lbs. per member for personal effects outside blankets, &c., was abandoned for what amounted to much the same thing, 30 lbs., including everything but tents and provisions, and this was found to be ample. The whole of our tents, provisions, collecting apparatus, bedding, &c., carried by the five pack horses, reached nearly half a ton.

The party comprised six members of the F.N.C. and some of their friends. The members were the following:—Mrs. A. D. Hardy, and Messrs. T. S. Hall, M.A., J. A. Kershaw, F.E.S., J. A. Leach, B.Sc., G. B. Pritchard, F.G.S., and A. D. Hardy, F.L.S. (leader).

Reports on sectional work will be furnished as follows:—Zoology (exclusive of mollusca), J. A. Kershaw; geology and mollusca, G. B. Pritchard; ethnology, A. S. Kenyon, C.E. (Mr. Kenyon also re-marked the northern end of the western boundary of the Park, in order that posts might be erected by the Ports and Harbours authorities as a guide to sportsmen and others); and botany, A. D. Hardy.

The photographs with which to-night's reports are illustrated are from the cameras of Mrs. A. D. Hardy and Messrs. T. S. Hall, G. R. Macey, and Thomas.

Our inquiries have resulted in the following information, briefly summarized, as full detailed reports will be given separately:—

The only objectionable animals in the Park are wild dogs and snakes. Rabbits, we were glad to find, had not reached the Promontory. The dogs are not true Dingoes, but have escaped from fishermen, hunting parties, and selectors, and have interbred with the Dingo to such an extent as to have almost effaced the latter. The snakes are Copperheads chiefly, if what we saw are an index of the whole. Of large animals there is a diminishing quantity of Black-tailed Wallaby and Koala, or Monkey-Bear. These, and especially the former, are being destroyed by the dogs. Authorized by the Minister of Lands, we laid over 100 strychnine baits to lessen the number of this pest, but as this was always done when breaking up camp or on the homeward march, we do not know with what result. We saw nothing and could hear nothing of the Kangaroo, Lyre-bird, or Platypus, but the Porcupine, *Echidna aculeata*, Shaw, is not infrequent, and Grey and Ring-tailed Opossums are to be found. Of birds, Pelicans and Black Swan find a home on Corner Basin, and Black Duck are plentiful on the rivers, while perching birds are numerous.

We found the Promontory lands to be well adapted for the purpose for which the Park has been reserved, provided the half-mile strip of foreshore be included, for without this strip the country will be almost valueless for natural history purposes. By the exclusion of the strip, not only is the picturesque coastal scenery omitted, but all the interesting marine and shore life is

shut out. We know of no other case in which such an anomaly exists. A park with a natural sea-frontage of about 60 miles, but held back from the shore, and having no access to the sea whatever! It is to be hoped that the Government will see its way to make the strip referred to part of the Park, as being essential to its welfare. The Seaforth township site should also be added, for the same reason. Although in existence as a *site* for the past 15 years, and surveyed in 1892, there is not a single resident. The township, except for the *Gazette* notice and the overgrown survey marks, is a myth.

Granted this modification of boundary, then the work of preparing the Park for future use could be begun. First would necessarily come the poisoning of the wild dogs and the erection of a dog, fox, and rabbit proof fence across the isthmus. The introduction of kangaroos, emus, other species of wallabies than exist at present, and smaller marsupials would follow. Lyre-birds from Gippsland could be transferred to the gullies of the eastern side at Sealers' Cove, Refuge Cove, &c., and at Roaring Meg Creek in the south, while the Platypus could be acclimatized in many of the streams. There is in all about 10,000 acres of good and poor grazing land, which would suit kangaroos and emus in parts and wallabies throughout.

The sawmill which, at Sealers' Cove, is opening up and destroying the best gullies and "Lyre-bird" country of the Park, should be stopped before further irreparable damage is done. It is reported that another mill is at work south of Mt. Norgate, but the report has not been confirmed.

There are many kangaroos, wallabies, and a few emus on Snake or Latrobe Island, which could be conveniently transferred to the Park, while from many parts of the State could be procured native fauna suitable for the populating of this large area. The trustees and directors of the various State Zoological Gardens will doubtless assist in providing such native animals as they have in captivity but are now scarce or hard to procure. In many cases the security and peace of the Park will result in overbreeding, but the surplus could be easily disposed of in the re-stocking of zoological gardens, &c., and, when the source of supply became known, it is probable that applications from zoological and acclimatization societies abroad would be made for Australian native animals, especially marsupials, and from the surplus these could be supplied as exchanges, the return for which would benefit our own societies, or for cash, which would aid the revenue and lessen the cost of upkeep of the Park.

However, before any practical steps can be taken, the half-mile strip of foreshore and the Singapore Peninsula excision should be added, saw-milling stopped, and trustees appointed. To the trustees could confidently be left the appointment of experienced rangers, erection of staging at the south corner of Corner

Basin, the cutting of bridle or pack tracks to give access by land to Sealers' Cove, &c., and other necessary and more or less urgent works. To complete the examination of the Promontory it would be necessary to make a complementary excursion, approaching by sea, and landing on Singapore Peninsula, in Corner Basin, and in Bass Strait, Refuge Cove, Sealers' Cove, and at the lighthouse. This would complete the survey for most purposes, and the progress of the Park after the commencement of operations could be more easily gauged. There is little fear of the "coast disease," as, though we saw stock there suffering from the effects of it, and "coasty" wallabies have been seen nearer Yanakie station, no animals, other than introduced stock, have been troubled with it south of the isthmus. One of the best tests of the health of animals is the condition of skin and fur and the market demand for the same. The demand for skins of wallaby and koala from the Promontory has been so great in the past that over 2,000 of each have been removed in one year.

The illustrations which accompany this report have been chosen from a large series as characteristic of the features of the National Park. They embrace the approach to the Park, showing the Derby River flats, one of the granite-capped hills, a scene in the grass-tree country, and a view in the banksia forest. Coastal views have not been selected, as such are not really in the Park reservation.

GENERAL ZOOLOGY (EXCEPT MOLLUSCA).—BY J. A. KERSHAW,
F.E.S.

The zoological results of this excursion were not, as a whole, important from a collector's point of view. Nothing new, or even very rare, was noted. The class of country traversed was, generally speaking, not such that one would expect to find very prolific in animal life, and it was not always possible to devote much time to searching the more favourable-looking spots which we passed through. Our time was limited, and much of the collecting had to be accomplished while journeying from one place to another. It must be remembered that our attention was practically confined to the western side of the Promontory as far south as Oberon Bay, and while much more might have been accomplished had time permitted us to have more thoroughly worked some of the better-timbered spots, and along some of the creeks and valleys, the country was not, on the whole, the most favourable to enable one to obtain the best idea of the fauna of the Promontory. From information obtained from our guides, who know the country well, and have spent months there shooting and trapping, we learned that a greater abundance of animal life would probably be found in the more heavily timbered ranges along the eastern side. The difficulty, however, of

travelling through these ranges, covered in parts with dense and almost impenetrable scrub and undergrowth, would have been very great, and under our circumstances was altogether out of the question. Again, from what could be learned of the country to the south of Oberon Bay, the prospects seemed still more favourable. Here the character of the country seems to change, the vegetation becomes richer and more varied, with well timbered gullies, which remind one more of many parts of Gippsland, and would no doubt well repay careful search. To have properly investigated these parts, however, would have necessitated a much longer time being spent than was at our disposal. As one of the chief objects of the Club, in urging the permanent reservation of the Promontory, was to preserve the native fauna, it was wisely decided that no shooting would be permitted during the trip. The list of birds appended therefore only includes such as could be identified on the spot. It can readily be understood that many species cannot be correctly identified without a much closer examination—in fact, without shooting a specimen—but I do not think that very many additional species would have been added to our list had this restriction not been decided upon.

Mammals.—The mammals met with during our stay were extremely few. Dingoes, or as they are more commonly known, wild dogs, are plentifully distributed all over the promontory. Several were seen, and their tracks were to be met with in every direction. These were particularly noticeable on the beach, which they evidently visit regularly in search of fish, &c., which may be washed up. By reason of their numbers they must be responsible for the destruction of great numbers of the indigenous animals, and particularly wallabies, the bones of which, together with those of Native Bears and an occasional Blue-tongue Lizard, were frequently met with. The wallabies, particularly, must have had a hard struggle to exist in the presence of such an enemy, and it would seem to be folly to attempt to preserve our indigenous fauna here until something is done to reduce or altogether exterminate this pest from the Promontory. Owing to interbreeding with the domestic dog, a typical Dingo is now a rarity, if one is really to be found. They vary in colour from reddish-brown to black, but it is said to be difficult to obtain a good skin owing to the prevalence of mange. Foxes and hares have obtained a footing here, the former of which is becoming fairly numerous among the sand dunes along parts of the coast. Rabbits have not yet found their way here, though it can only be a matter of a short time before they will be firmly established unless precautions are soon taken to prevent them. The body of a Fur Seal, *Euoturia cinerea*, was found on the beach near the Derby, which bore evidence of having provided a recent meal for the Dingoes, while it served to provide us with a nice series of one of the carrion beetles, *Saprinus latus*. Portions of the skull and

skeleton were also found on the sand dunes in company with the bones of fish, wallabies, and a species of bush rat, the accumulations of one of the many old camping places of the blacks. Of marsupials, wallabies are numerous, and several were seen. These proved to be the common Black-tailed Wallaby, *Macropus ualabatus*. Kangaroos do not seem to exist on the promontory, though they, as well as the Emu, would do well here. The Native Bear or Koala, *Phascolaretos cinereus*, were very plentiful, their characteristic grunt being heard every evening. A fine example seen at Whisky Creek had a very conspicuous dark line running down the centre of its back—a rather unusual feature. Hundreds of these most interesting creatures have been shot in the past by hunters for their skins. As an instance of their wholesale slaughter, our guides informed us that they made as much as £10 per week during about a month's shooting. Both the Common and the Ring-tailed Phalangers or Opossums were fairly plentiful. None of the smaller marsupials were seen, but many, such as the large and small Flying Phalangers, Native Cats, Phascogales, Dromicia, &c., are sure to exist here.

Birds.—Mrs. Hardy has kindly furnished me with the following notes on the birds, together with a list of the species noticed during the trip, and to which I have added a few additional species :—

“Whilst crossing Corner Basin hundreds of Black Swan, *Chenopsis atrata*, were seen. Some of them were scarcely more than flappers, and one or two of the older birds appeared to have been wounded, as their flight was laboured, and they were unable to keep up with the main body. Further in, towards the shore, a large flock of Pelicans, *Pelecanus conspicillatus*, were observed, and White-breasted Cormorants, *Phalacrocorax gouldi*, were numerous.

“On the flats about the Derby River, Black Ducks, *Anas superciliosa*, were plentiful, and amongst the sedges along the river banks that restless little bird, the Reed-Warbler, *Acrocephalus australis*, was flitting in and out, attracting attention by its cheerful song. Pennant Parrakeets, *Platycercus elegans*, were frequently noticed feeding in the *Leptospermum* and *Exocarpus* bushes; while cockatoos were numerously represented by the Black, *Calyptorhynchus funereus*, and the White Cockatoo, *Cacatua galerita*.

“Honey-eaters were plentiful in the scrub and amongst the eucalypts. I noted four different species in a single myoporum tree, evidently feeding on the nectar of the sweet-scented blossoms. In this tree, by the way, we found a large nest about 10 feet from the ground, composed wholly of dead bracken fronds, approximately round, unlined, and with the rough opening

situated between the top and the side, the structure appearing to have been abandoned before completion. Can any member say whether Ring-tailed Opossums ever make nests of bracken fronds, and of this shape, as the nest described was not familiar to us? This was near a tea-tree marsh, where a pair of White-shafted Fantails, *Rhipidura albiscapa*, were building in an adjacent scrub. One nest of a Honey-eater we found cleverly hidden in a stunted banksia, which grew almost concealed by a eucalypt shrub, the nest being about a foot from the ground, and containing two fresh eggs of slightly different size, shape, and marking. The bird flew off so swiftly on being disturbed that we were unable to identify it. This was well up the N.E. slope of Mt. Oberon.

"We observed both kinds of Swifts—the 'Spine-tailed' and the 'Australian'—wheeling in all directions. In a banksia grove we flushed three Frogmouths from a resting-place on the ground, where they were sheltered by an overhanging shelf of a charred log, and which in the glare of sunlight were almost too stupid to fly away—in fact, one allowed us to approach within a few feet before resuming its clumsy and noiseless flight.

"In the grass land Quail were fairly common, usually in flocks of about half a dozen, both Stubble and Brown.

"Grey Jays, *Strepera cuneicaudata*, were often seen in the vicinity of our camps in fair numbers, and their loud notes were some of the first sounds to be heard in the early morning.

"The Boobook Owl was heard almost every night uttering its dismal cry, usually about the trees near our tents—nocturnal serenades not altogether appreciated by sleepy naturalists.

"Towards sunset what sounded like a Bittern's loud booming issued from a neighbouring tea-tree swamp, but we never got near enough to the locality to identify the bird."

LIST OF AVIFAUNA.

Circus gouldi, Bon.	Chthonicola sagittata, Lath.
Accipiter cirrhocephalus, Vieill.	Ephthianura albifrons, Jardine and Selby
Uroæetus audax, Lath.	Gymnorhina leuconota, Gld.
Haliaæetus leucogaster, Gmelin	Cracticus destructor, Temm.
Ninox boobook, Lath.	Eopsaltria australis, Lath.
Strepera cuneicaudata, Vieill.	Pachycephala gutturalis, Lath.
Grallina picata, Lath.	Zosterops cerulescens, Lath.
Collyriocincla harmonica, Lath.	Acanthorhynchus tenuirostris, Lath.
Rhipidura albiscapa, Gld.	Meliphaga phrygia, Lath.
tricolor, Vieill.	Melithreptus lunulatus, Shaw
Microeca fascians, Lath.	Myzomela sanguinolenta, Lath.
Malurus cyaneus, Ellis	Acanthochæra carunculata, Lath.
Acrocephalus australis, Gld.	mellivora, Lath.
Geocichla lunulata, Lath.	Pardalotus punctatus, Temm.
Megalurus gamineus, Gld.	Hirundo neoxena, Gld.
Acanthiza pusilla, Lath.	Petrochelidon nigricans, Vieill.
chrysoorhoa, Quoy and Gaim.	Anthus australis, Vig. and Hors.
Sericornis frontalis, Vig. and Hors.	Chætura caudacuta, Lath.
Psophodes crepitans, Vig. and Hors.	

Micropus pacificus, Lath.
Podargus strigoides, Lath.
Dacelo gigas, Bodd.
Halcyon sanctus, Vig. and Hors.
Chalcococcyx plagiatus, Lath.
Cuculus pallidus, Lath.
Trichoglossus novæ-hollandiæ, Gmel.
Calyptorhynchus funereus, Shaw
Cacatua galerita, Lath.
Platycercus elegans, Gmel.
Coturnix pectoralis, Gld.
Synœcus australis, Temm.
Hæmatopus unicolor, Wagler

Ægialitis cucullatus, Vieill.
Tringoides hypoleucus, Linn.
Gallinago australis, Lath.
Gabianus pacificus, Lath.
Botaurus pœciloptilus, Wagl.
Phalacrocorax carbo, Linn.
 gouldi, Salvad.
Sula serrator, G. R. Gray
Pelecanus conspicillatus, Temm.
Chenopis atrata, Lath.
Cereopsis novæ-hollandiæ, Lath.
Anas superciliosa, Gmel.

ADDITIONAL.—BY J. A. KERSHAW.

Hæmatopus longirostris, Vieill.
Lobivanellus lobatus, Lath. (Derby R.)
Larus novæ-hollandiæ, Steph.
Daption capensis, Linn.
Puffinus assimilis, Gld.

Limonites ruficollis, Pallas
Ptilotis leucotis, Lath.
Eudyptula minor, Forst.
 Starling (nesting)
Thalassogeron cautus, Gld.

I might add that the introduced Starling has found its way on to the Promontory. Several were seen on the journey from the inlet to the Derby River, and one was noticed carrying food to its young in the spout of a dead eucalypt. There are no Lyre-birds on the Promontory, and in view of the universal interest attached to this peculiarly Australian bird, so fast disappearing, it is to be hoped that some experiments will be made to prove whether they cannot be established here. Judging by the character of the country it is doubtful if these birds could thrive on the western side north of Oberon Bay. One misses the rich deep soil, the plentiful supply of insect life, and particularly the myriads of small sand-hoppers, so characteristic of the secluded haunts of the Lyre-bird. To the south, however, where richer and more secluded fern gullies occur, and most probably along parts of the eastern coast, these birds would, no doubt, thrive. Emus are absent, but would do well if introduced. On the beach at Oberon Bay, while on our way back to the Derby River, we noticed a solitary Cape Barren Goose, *Cereopsis novæ-hollandiæ*, quietly resting. It was quite unconcerned at our approach, and allowed us to get within six feet of it before it deigned to move away a few feet. We stood admiring it for a few minutes, when it occurred to our photographer to secure a picture. As he slowly approached the bird equally slowly sauntered along the water's edge, seeming determined not to give the view required, until, patience becoming exhausted, the snapshot was taken, when, tucking its leg up under its feathers, it immediately resumed the quiet resting position so long waited for. Both species of Oyster-catchers were common. At low tide, in company with numbers of sea-gulls, they were noticed digging their bills into the sand for the bivalve shells, *Meretrix pauci-*

lumellata, Dunk., which they soon emptied of their contents. Two dead specimens of the Shy or White-capped Albatross, *Thalassogeron cautus*, were found on the beach at Oberon Bay, while three specimens of the Allied Petrel, *Puffinus assimilis*, and two Little Penguins, *Eudyptula minor*, were picked up on other parts of the coast. Two broken eggs of the Hooded Mutton-bird, and a fairly perfect one of the Mutton-bird, were found near the Derby River.

Reptiles were poorly represented. The only snakes seen were Copper-heads, *Denisonia superba*, a species also found in New South Wales and Tasmania. On opening one of those killed we found in the stomach a small lizard, *Liolepisma guichenoti*, a small frog, and two earthworms. Although I have often examined the contents of the stomach of our larger snakes this is the first instance in which I have found earthworms. All specimens were in good preservation, and had evidently been but recently swallowed. About ten species of lizards were noted. A specimen of the Stump-tailed Lizard *Trachysaurus rugosus*, was reported to have been seen on the track at Oberon Bay. This is an unusual occurrence so far south, as I have always thought it to be confined to the north and north-west parts of the State. I did not see the specimen myself, but it was carefully described to me by Mr. Leach, who saw it, and is well acquainted with the species. The Southern Blue-tongue, *Tiliqua nigrolutea*, was occasionally seen, and the common *Egernia whitii* was plentiful everywhere.

Only two or three species of frogs were taken, one of which was rescued from the stomach of one of the snakes killed.

Snakes—

Denisonia superba, Gthr.

Lizards—

Amphibolurus muricatus, White

Egernia whitii, Lacep.

Trachysaurus rugosus, Gray

Tiliqua nigrolutea, Gray

Hinulia quoyi, Dum. and Bibr.

Liolepisma mustelinum, O'Shaugn.

trilineatum, Gray

guichenoti, Dum. and Bibr.

metallicum, O'Shaugn.

Siaphos maccoyi, L. and F.

Fishes.—No attempt was made to deal with the larger marine fishes, as we had no means of preserving them. A number of rock-fishes, consisting of Leatherjackets and Parrot Fish, were hooked, and several fresh Barracouta were found on the beach. Other kinds were noticed both in the sea and at the mouths of rivers, but none were secured. The common Toad Fish (*Tetrodon hamiltoni*), the flesh of which is considered to be poisonous, were seen in Stockyard Creek and at the mouth of the Tidal River. In the few available rock-pools was found a small Cling Fish (*Diplocrepis*, sp.), and a few young Blennies (*Cristiceps*, sp.) The only freshwater fish seen were Galaxias. These were numerous in almost every creek visited, and, as far as could be

ascertained, all belonged to one species. An attempt was made to secure some of the larger specimens with the hook and line, but although all sorts of bait was tried we were unsuccessful. The butterfly net, however, enabled us to get three or four nice-sized specimens. Shoals of the young were seen in a shallow creek, and by making a temporary dam across, we were able to secure as many as were required. I refrain, for the present, from naming the species, as I hope to be able to deal more fully with this group at a later date.

Insects, generally speaking, were not plentiful, nor were any rarities secured. Those seen were such as are found at Beaumaris, Frankston, and along the Mornington Peninsula. The most favourable localities visited were the grass-tree flats on the south-east corner of the inlet and the valleys between Oberon and Waterloo Bays. Lepidoptera, chiefly micros, were most noticeable at the former locality, but although several of the well-known forms were fairly plentiful, the number of species was very limited. Among the butterflies, the Common Brown, *Heteronympha merope*, was very numerous on one of the ridges behind our landing-place, but, strange to say, we saw very few during the remainder of the trip. The Mountain Brown, *Tisiphone abeona*, as well as the Painted Lady, *Pyrameis kershawi*, and the Australian Admiral, *P. itea*, were met with every day. Amongst the "blues," *Neolucia agricola*, our Williamstown friend, was fairly common on Tongue Point, and still more so at Waterloo Bay. This species, which is also found in Tasmania and South Australia, seems to delight in situations exposed to strong sea winds. Five species of "skippers" (Hesperiidæ) were taken, the rarest being *Hesperilla dispar* and *Mesodina halyzia*. The wood-boring larvæ of *Heptalus lignivora* were plentiful and in all stages of growth, but only one was found to have changed into the chrysalis stage. This emerged on the 12th January following. The larvæ of the well-known moth *Mamestra ewingi* were extremely plentiful, particularly on the beach at Oberon Bay, where they were seen in dozens crawling down from the grass tussocks over the sand, only to be caught by the incoming tide or eaten by the sea-birds. About 80 species of Coleoptera were taken, among which were 7 species of Buprestidæ, none of which require special mention. Among the other orders, 6 species of Cicadas were bottled, including several of the brilliant little *Cicada aurata*, which was numerous on the grass flats on the Derby River, and kept up their continuous shrill song from daylight till dark.

COLEOPTERA.

Notonomus chalybeus, Dej.
Lacoperum loculosum
Clivina victoriæ, Sl.

Cenogmus rotundicollis, Cast.
waterhousei, Cast.
Gnathaphanus, sp.?
Homceodytes scutellaria, Germ.

Staphylinidae, 2 sp. undetermined
Scaphidium quadripustulatum, Oliv.
Saprinus letus, Erich.
 sp. ?
Lamprima rutilans, Erich.
Aulacocyclus edentulus, Macl.
Chiropatys maculus, Erich.
Xylonychus eucalypti, Bdv.
Isodon australasice, Hope
Heteronyx piceus, Blanch.
 sp. ?
 sp. ?
Scitala, sp. ?
Liparetrus bicolor, Blkb.
Aphodius, sp. ?
Onthophagus granulatus, Bohem.
Diphucephala colaspidiodes, Gyll.
Polystigma punctata, Don.
Machidius latus, Waterh.
Cryptodus paradoxus, Macl.
Anopolognathus vetulinus, Gory
olivieri, Dalm.
Stigmodera xanthospilosa, Hope
cyanicollis, Bdv.
bicincta
australasice, Lap. et Gory
Cisseis nolochalcea, Laf.
Melobasis purpuraceus, Fabr.
Monocrepidius punctato-striatus, Can.
Crepidomenus filiformis, Cand.
Metriorrhynchus rhipidius, Macl.
Selenurus sydneyensis, Blkb.
Laius mastersi, Macl.
Carphurus cyanopterus, Bohem.
Natalis porcata, Fab.
Phycosecis australis ?
Sphargeris physoides
Adelium virescens, Bdv.
helopioides, Bdv.
punctipenne, Bdv.
Nyctobates lotteni ?
Saragus emarginatus, Guer.
Lagria grandis, Gyll.
Copidita punctatum, Macl.
Rhnota hemoptera, Kirby
Sclerorrhinus riverinæ, Macl.
Prypnus canaliculatus, Gyll.
Psalidura, sp. ?
Aoplocnemis suturalis, Pasc.
Rhinaria, sp. ?
Coptocercus rubripes, Bdv.
Hesthesis plorator, Pasc.
Hebecerus marginicollis, Bdv.
Disterna lugubris, Pasc.
Trichomesia newmani, Pasc.
Chalcolampra sp. ?
Edusa, sp. ?
Halyzia mellyi, Muls.
Paropsis, sp. ?

LEPIDOPTERA.

Tisiphone abeona, Don.
Pyrameis kershawi, M'Coy
itea, Fabr.
Junonia vellida, Fabr.
Xenica achanta, Don.
Heteronympha merope, Fabr.
Neolucia agricola, Westw.
Zizera labradus, Godt.
Hesperilla donnysa, Hew.
flammeata, Butl.
dispar, Kirby
Mesodina halyzia, Hew.
Taractocera papyria, Bdv.
Agarista lewini, Walk.
Procris viridipulverulenta, Guer.
dolens, Walk.
Hepialus lignivora, Lew.
Entometa ignobilis, Walk. (larvæ)
Sorocostia albalis, Walk.
servilis, Meyr.
Anestia ombrophanes, Meyr.
Asura lydia, Don.
Darala ocellata, Walk. (larvæ)
Antheraea eucalypti, Scott (larvæ)
Chloridea armigera, Hubn.
Caradrina atra, Gn.
Syntheta nigerrima, Gn.
Cosmodes elegans, Don.
Mamestra ewingi, Westw. (larvæ)
Agrotis spina, Gn.
Phrissogonus denotatus, Walk.
Euchæca rubropunctaria, Dbld.
Hydriomena subochraria, Dbld.
correlata, Walk.
anthracinata, Gn.
Epidesmia hypenaria, Guer.
chilonaria, H.S.
Xanthorhoe subidaria, Gn.
Taxeotis delogramma, Meyr.
Dichromodes ainaria, Gn.
Acidalia rubraria, Dbld.
Scirpophaga patulella, Walk.
Mecyna polygonalis, Hb.
Ocraea albidalis, Walk.
Talis pleniferella, Walk.
relatalis, Walk.
bivitella, Don.
pedionoma, Meyr.
Halterophora lativittalis, Walk.
Scoparia philonophes, Meyr.
Eucarphia tritalis, Walk.
Platyptilia emissalis, Walk.
Dichelia isoscelana, Walk.
Acropolis dolosana, Walk.
Cacrecia postvittana, Walk.
responsana, Walk.
Tortrix glaphyrana, Meyr.
Xylorycta luteotactella, Walk.

Tortricopsis euryphanella, Meyr.
 Zonopetala clerota, Walk.
 Heliocausta triphenatella, Walk.
 euselma, Meyr.
 hemiteles, Meyr. (larvæ)
 Eulechria brachypepla, Meyr.
 xyloptereella, Meyr.
 Philobota herodiella, Feld.
 pretiosella, Walk.
 interlineatella, Walk.
 hypocausta, Meyr.
 Ocystola paulinella, Newm.
 Coesyra parvula, Meyr.
 Nysmatodoma guildingi, Scott (larvæ)
 Lepidoscia arctiella, Walk. (larvæ)
 Timæa bivittatella, Walk.
 Hypertropha tortriciformis, Gn.

ORTHOPTERA.

Gryllus australasie, Leach.
 Opsomala sordida
 Gryllotalpa australis, Erich.
 Calolampra notabilis, Walk.
 Syntomaptera tepperi, Kirby
 Oniscosoma granicollis, Sauss.
 Panesthia lævicollis, Sauss.

NEUROPTERA.

Lestes analis, Ramb.
 Plectotarsus gravenhorsti.

DIPTERA.

Asilus plicatus
 Dexia (Rutula) buscha?
 regalis.

HYMENOPTERA.

Perga dorsalis, Leach
 Pterygophorus cinctus, Klug
 Myrmecia pyriformis
 sanguinea
 Formica consobrina
 Bembex furcata?
 Rhagigaster unicolor
 Thynnus variabilis
 læviceps
 obscurus
 Alurus abdominalis
 Pimpla intricatoria?
 Mesosternus albopictus.

HEMIPTERA.

Amorbus robusta
 Notius depressus
 Pæcilometis strigatus
 Acatalectus, sp.?
 Mictis profana, Fabr.
 Mononyx annulipes?

HOMOPTERA.

Cyclochila australasie
 Cicada multifascia, Walk.
 aurata, Walk.
 Melampsalta encaustica, Walk.
 interrupta, Walk.
 denisoni, Dist.
 Stenocotis corticalis
 Pæcilopectera acuta
 Certorius australis, Fairm.

Crustacea.—The beaches of clean white sand, with great masses of granite rocks at the bases of the cliffs, were not very favourable for collecting marine specimens. About a dozen species of marine crustaceans have been noted, and most of these, together with the land and freshwater forms, have been kindly identified for me by Mr. S. W. Fulton, whose notes are attached. The Common Crayfish, *Palinurus lalandi*, and a crab, *Platyonychus bipustulatus*, were hooked by some of our party while fishing off the rocks. In some instances only dead specimens could be found.

During an afternoon spent wading in the Fraser Creek searching for small mollusca, &c., some specimens of a burrowing crab were taken. These are similar to one dug out of the bank of a creek near Shoreham by Mr. Fulton, and which he is so far unable to determine. It constructs its burrow in the bank, just above the water, the entrance being small, about an inch in diameter. The tunnel generally took a downward direction to below the level of the water, then inward and upward.

Sometimes the hole followed upward and then inward, above the water, and in some instances travelled fully 18 inches, at the end of which the crab would be found. Their presence was usually indicated by a sharp nip on the finger, to which they generally adhered, and in this manner were drawn out of their holes. During this search a very interesting capture was made, in the shape of two very small, flat fresh-water crabs, measuring little more than $\frac{1}{4}$ -inch across the carapace. These Mr. Fulton identified as *Hymenosoma lacustris*, a species only previously taken at Norfolk Island, Lake Pupuke, Auckland, N.Z., and Lake Colac and Moorabool River, in Victoria. They were found among fine, very short weeds on the edge of a sandy patch, in perfectly fresh running water. A number of the curious Mangrove Crabs, *Heloccius cordiformis*, were taken at the inlet, while waiting for the tide to rise. It was a curious sight to see these creatures scurrying along sideways, with their two long arms extended in the air, and disappearing one after another into the nearest holes.

I am indebted to Mr. S. W. Fulton for the determination of the following crustaceans:—

Palinurus lalandi, Lamk. (Common Crayfish).

Cryptodromia wilsoni, Fulton and Grant.

Young male.—It differs somewhat from the type in that the two last pairs of legs are bilaterally subequal and do not alternate, and the wrists are more nodose.

Lomis hirta, Lamk.

Very common on Victorian coast about low tide line.

Paragrapsus quadridentatus, M. Edw.

Common on Victorian and Tasmanian coasts between tide lines, also in deeper water.

Paragrapsus gaimardi, M. Edw.

Common on Victorian coast.

Platyonychus bipustulatus, M. Edw.

Large swimming crab, fairly common in Port Phillip and Western Port, also New Zealand.

Pilumnus, sp.? Young male, allied to *P. tomentosus*, M. Edw.

Pseudomiccippe varians, Miers.

Fairly common in Port Phillip and Western Port.

Mycteris platycheles, M. Edw.

Common on Victorian coast.

Heloccius cordiformis, M. Edw.

Common on east coast of Australia in mangrove swamps. I have odd specimens from Port Phillip and Western Port.

Paramithrax peronii, M. Edw.

Ibacus peronii, Leach.

Engæus cuniculatus? Erich. Loc., Foster.

This is allied to the form found at Warburton and specimens received from N.E. Tasmania. In the generic definition stress is laid on the length of the antennæ. In the above they reach to the cervical groove, while in the Tasmanian specimens the antennæ reach to the base of the telson, and in Warburton form to the base of the second joint of the pleon.

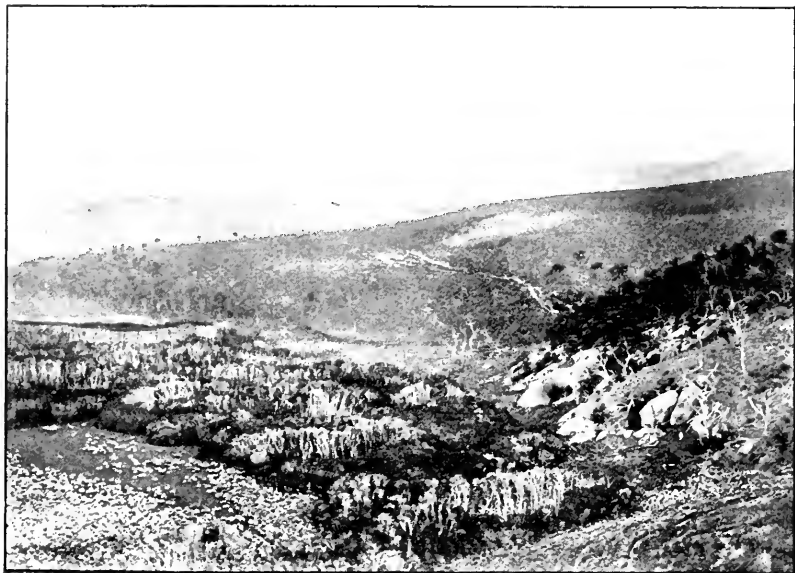


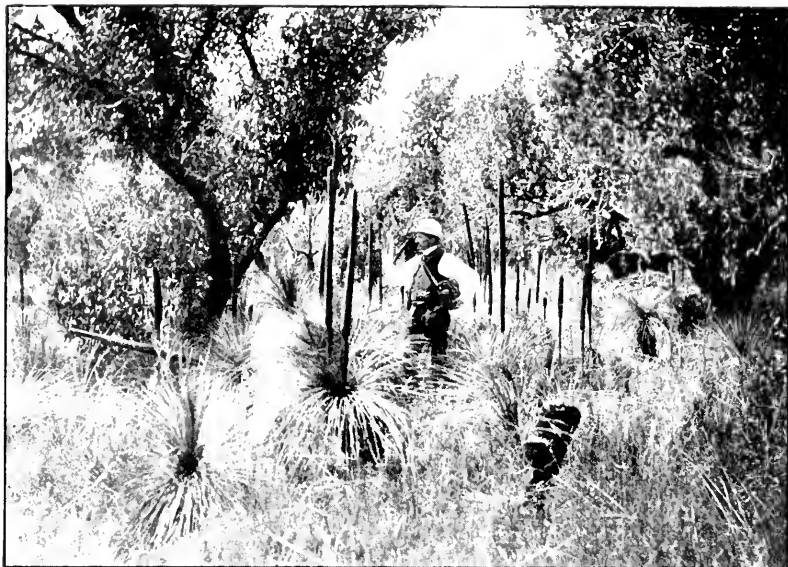
Photo. by G. R. MACEY.

APPROACH TO NATIONAL PARK, SHOWING DERBY RIVER FLATS.



Photo. by G. R. MACEY.

BISHOP ROCK (FROM THE SOUTH-WEST).



Photo, by G. R. MACEY.

IN THE GRASS-TREE COUNTRY.



Photo, by T. S. HALL.

GLIMPSE OF BANKSIA FOREST.

WILSON'S PROMONTORY.

Engæus? A variety not yet determined.

Genus.—The specimens taken from the banks of the Fraser Creek have not yet been described. I have one specimen, dug out of the bank of a creek between Shoreham and Flinders.

Hymenosoma lacustris, Chilton.

This is an interesting find. So far this fresh-water species has only been taken at Norfolk Island; Lake Pupuke, Auckland, New Zealand; and Lake Colac and the Moorabool River in Victoria.

Examples of the well-known sand-hoppers (Amphipods), both marine and land forms, were collected, the latter being only found in a few isolated spots under logs. These have been kindly identified for me by Mr. O. A. Sayce, who writes:—

“Those collected inland are identical with *Talitrus sylvaticus*, Haswell, common throughout the scrub lands of Victoria, and also in Tasmania and New South Wales. Those from the seashore are referable to *Talorchestra praxidactyla*, Haswell, so far only recorded from Tasmania, but I have specimens of it from ocean beaches in various parts of Victoria; how far westward it reaches I am unable to say. It has not been found in New South Wales.”

The few earthworms taken prove to be indigenous species, but have not yet been determined. Land Planarians were very scarce, and only three species were taken—viz., *Geoplana hoggi*, *G. munda*, and *G. mediolineata*.

Among the marine invertebrates, apart from the Mollusca, which is being dealt with by Mr. G. B. Pritchard, there was little to be found. A few examples of Echinoderms were noted, such as Starfish, one or two species of Sea-urchins, and some Holothurians, including a very large species, about 6 inches in length, which we frequently found imbedded in the sand at low tide. The few Bristle-worms seen were similar to those taken during the Shoreham excursion in March, 1902.

CONCHOLOGY.—BY G. B. PRITCHARD, F.G.S.

The first opportunity for collecting shells on the Wilson's Promontory trip was at the landing-place at the south-west corner of the Corner Basin, but as our arrival was timed for high tide, in order to get in as close as possible to the shore, the first outlook was rather unpromising. Shells appeared very scarce, and only a few were obtained, such as *Anapella cuneata*, Lamarck, *Chione strigosa*, Lamarck, *Ostrea angasi*, Sowerby, and *Austrocochlea constricta*, Lamarck. Before leaving, the tide began to fall very rapidly, owing to the general shallowness, and there were signs of improved prospects, but there was no time for further investigation, as the party was desirous of pushing on. However, on the return journey this locality was in the condition of extreme low tide, and vast expanses of sandy mud flats were exposed, and a good opportunity was thus obtained of noting the usual species.

Along the shore margin, and for the most part inside the mangroves, numerous small pans occur where brackish water shells may be collected, amongst which may be mentioned—*Salinator fragilis*, Lamarck (*Ampullarina fragilis*); *Salinator quoyana*, Potiez and Michaud; *Assimineea brazieri*, T. Woods; *Assimineea tasmanica*, T. Woods; and *Ophicardelus*, n. sp.

On the sea side of the mangroves, such genera as *Nassa*, *Natica*, *Thalotia*, *Columbella*, *Anapella*, *Modiola*, and *Anatina* may be found in almost any number. The species from this locality may be listed as follows:—

Anatina tasmanica, Reeve	<i>Nassa pauperata</i> , Lamarck
Anapella cuneata, Lamarck	<i>burchardi</i> , Dunker
Chione scalarina, Lamarck	<i>Austrocochlea constricta</i> , Lamarck
<i>strigosa</i> , Lamarck	<i>striolata</i> , Quoy and Gaimard
Modiola inconstans, Dunker	<i>Nerita melanotragus</i> , E. A. Smith
Barnea australasice, Sowerby	<i>Diala lauta</i> , A. Adams
Barbatia trapezia, Deshayes	<i>Bittium insculptum</i> , Sowerby
Pteria papilionacea, Lamarck	<i>Mangelia tasmanica</i> , T. Woods
Chlamys asperrimus, Lamarck	<i>Bulla australis</i> , Gray
Donax deltoides, Lamarck	<i>Haminea brevis</i> , Quoy and Gaimard
Lasæa rubra, Montagu	<i>Bulinella pygmaea</i> , Adams
Thalotia conica, Gray	<i>Tornatina hofmani</i> , Angas
Risella melanostoma, Gmelin	<i>Cerithiopsis crocea</i> , Angas
Natica plumbea, Lamarck	<i>Odostomia angasi</i> , Tryon
Columbella lincolniensis, Reeve	<i>Clanculus undatus</i> , Lamarck
<i>angasi</i> , Brazier	<i>Voluta undulata</i> , Lamarck
Lotorium subdistortum, Lamarck	<i>Fasciolaria coronata</i> , Lamarck
Sistrum adelaidense, Crosse and	<i>Cominella lineolata</i> , Lamarck
Fischer	<i>costata</i> , Quoy and Gaimard
Trophon paivæ, Crosse	<i>Turbo undulatus</i> , Martyn

En route to the Derby River the swamps and soaks showed an abundance of *Bulinus tenuistriatus* and *Bulinus productus*, and the coastal dunes showed quantities of dead shells of *Succinea australis*. Off the mouth of the Derby River the reefs of dune limestone, only exposed at low tide, showed *Purpura succincta*, Martyn, *Turbo undulatus*, Martyn, *Patella tramoserica*, Martyn, and *Mytilus rostratus*, Dunker, very commonly; also, *Haliotis nævosa*, Martyn, *Lotorium spengleri*, Chemnitz, *Patella limbata*, Philippi, and *Austrocochlea striolata*, Quoy and Gaimard, of less frequent occurrence.

The next locality to receive attention was Tongue Point, but the general ruggedness of the coast hereabouts did not render the ground a favourable one. A few of the ordinary rock-loving species were obtainable, such as—

Patella limbata, Philippi	<i>Modiola ater</i> , Zelebor
<i>tramoserica</i> , Martyn	<i>Nerita melanotragus</i> , E. A. Smith
Littorina mauritiana, Lamarck	<i>Austrocochlea striolata</i> , Quoy and
Acmaea septiformis, Quoy and Gai-	Gaimard
mard	<i>Sistrum adelaidense</i> , Crosse and
Mytilus rostratus, Dunker	Fischer
Lasæa rubra, Montagu	<i>Purpura succincta</i> , Martyn

None of these being of special interest except *Patella limbata*, which has only been recorded previously for Victoria from Cape Otway, though this species is common enough along the north coast of Tasmania; it was therefore of considerable interest to find it fairly plentiful along this part of our coast.

Oberon Bay was our next collecting ground, and one which proved highly interesting from many points of view. Hemmed in on both sides by a rugged weather-worn granite coast, with a very heavy shingle and occasional rock-pools, there is opportunity here again of observing the ordinary rock-loving species, but in the pools at low tide there is ample opportunity for gathering a far richer fauna. The latter reminds one strongly of the reef-collecting at Shoreham, Western Port, and one of the most striking features even to casual observation is the enormous number of Chitons on almost every stone overturned, about three dozen to the stone being not infrequent. Then there is also the fine broad stretch of sandy beach at the head of the bay, and as the bay is very shallow for a long distance from the shore, low tide here, with a favourable wind off the land, enables one to see to perfection many of the sand-burrowing species in their natural surroundings. *Meretrix paucilamellata*, Dunker, is especially abundant at this locality, and *Donax deltoides*, Lamarck, *Glycimeris radians*, Lamarck, young shells of *Natica conica*, Lamarck, and *N. incei*, Philippi, Marginellas, and *Bankivia fasciata*, Menke, may also be conveniently studied. The beach at and above high tide was very disappointing, especially when one saw so much living material in the neighbourhood. This may, however, be accounted for by the fact that during the whole of our stay the wind was easterly, and a considerable amount of fine sand was being moved from the land seawards, and a good shelly beach could thus be made to appear very barren. It is not unlikely but that there are favourable times when this beach would be extremely profitable.

From Oberon Bay we went across to Waterloo Bay, and it has been said that there is a striking contrast in the shells from these two localities. I cannot say that this struck me. In Waterloo Bay there is deeper water, and not the gentle shelving out so noticeable in Oberon Bay, and this would no doubt permit of the occurrence of a few species in the former not noticeable in the latter. The rock-loving species are identical in both, but I had no opportunity of examining any rock-pools on the Waterloo Bay side, while the sand-loving species were mainly identical, and no species were obtained which have not previously been abundantly taken at Anderson's Inlet, Western Port, or Port Phillip. In view of the fact that much stress has been laid on Wilson's Promontory forming part of an old Bassian isthmus, a comparative view of all the shells taken from either side will not be devoid of interest.

NAME.	Oberon Bay.	Waterloo Bay.	Other Occurrences.
<i>Purpura succincta</i> , Martyn ...	1	2	
<i>Nerita melanotragus</i> , E. A. Smith ...	1	2	
<i>Patella tramoserica</i> , Martyn ...	1	2	
<i>limbata</i> , Philippi ...	1	—	.. C. Otway
<i>aculeata</i> , Reeve ...	—	2	
<i>Siphonaria diemenensis</i> , Quoy and Gaimard	1	2	
<i>Scutus anatinus</i> , Donovan ...	1	2	
<i>Haliotis nevosa</i> , Martyn ...	1	2	
<i>Austrocochlea striolata</i> , Quoy and Gaimard	1	2	
<i>Australium aureum</i> , Jonas ...	1	2	
<i>Hipponyx australis</i> , Lamarck ...	—	2	... General
<i>Lotorium spengleri</i> , Chemnitz ...	1	2	
<i>Voluta undulata</i> , Lamarck ...	—	2	... Port Phillip, Port Albert
<i>fusiformis</i> , Swainson ...	—	2	... C. Schanck, Bar- won Heads
<i>Natica conica</i> , Lamarck ...	1	2	
<i>incei</i> , Philippi ...	1	—	
<i>didyma</i> , Chemnitz ...	—	2	... Port Phillip, Western Port
<i>Calyptraea calyptraeformis</i> , Lamarck ...	—	2	.. Western Port
<i>Cassis pyrum</i> , Lamarck ...	1	2	... Sorrento
<i>semigranosa</i> , Lamarck ...	—	2	... Port Phillip
<i>Bankivia fasciata</i> , Menke ...	1	2	
<i>Cypræa angustata</i> , Gmelin ...	1	2	
<i>Clanculus undatus</i> , Lamarck ...	—	2	.. Western Port
<i>plebeius</i> , Philippi ...	1	—	... Western Port
<i>Nassa jacksoniana</i> , Quoy and Gaimard ...	—	2	Port Phillip, Western Port
<i>Marginella muscaria</i> , Lamarck ..	1	2	
<i>tasmanica</i> , T. Woods ...	—	2	... San Remo
<i>Scalaria australis</i> , Lamarck ...	1	2	
<i>Turritella gunni</i> , Reeve ...	—	2	... Lorne
<i>Minolia tasmanica</i> , T. Woods ...	—	2	... Port Phillip
<i>Submarginula rugosa</i> , Quoy and Gaimard	1	2	
<i>Acmæa gealei</i> , Angas ...	1	2	
<i>Sistrum adelaidense</i> , Crosse and Fischer ...	1	—	... Port Phillip
<i>Purpura tritoniformis</i> , Blainville ...	1	—	... Western Port
<i>Diloma odontis</i> , Wood ...	1	—	... General
<i>Mitra pica</i> , Reeve ...	1	—	... Western Port
<i>Gena nigra</i> , Quoy and Gaimard ...	1	—	... Western Port
<i>Conus anemone</i> , Lamarck ...	1	—	... General
<i>Siphonalia dilatata</i> , Quoy and Gaimard ...	1	—	... Port Phillip
<i>Columbella nubluculata</i> , Reeve ...	1	—	... Portland, West- ern Port
<i>lineolata</i> Tryon ...	1	—	... Port Phillip
<i>Bittium granarium</i> , Kiener ...	1	—	... General
<i>cerithium</i> , Quoy and Gaimard ...	1	—	... General
<i>Trophon brazieri</i> , T. Woods ...	1	—	... Western Port
<i>Calliostoma hedleyi</i> , Pritchard and Gatliff	1	—	... Western Port
<i>Ichnochiton crispus</i> , Reeve ...	1	—	... General
<i>australis</i> , Sowerby ...	1	2	
<i>nove-hollandiæ</i> , Reeve ...	1	—	
<i>Plaxiphora petholata</i> , Sowerby ...	1	2	
<i>Acanthochites</i> , 2 unidentified species ..	1	—	
<i>Emarginula candida</i> , Adams ..	1	—	... General
<i>Clanculus aloysii</i> , T. Woods ...	—	2	

NAME.	Oberon Bay.	Waterloo Bay.	Other Occurrences.
<i>Cancellaria levigata</i> , Sowerby ...	... 1 ...	— ...	Tidal River Bay
<i>Murex triformis</i> , Reeve ...	... 1 ...	— ...	
<i>Fasciolaria coronata</i> , Lamarck ...	... 1 ...	— ...	
<i>Fusus novæ-hollandiæ</i> , Reeve ...	... — ...	2 ...	Western Port
<i>Clanculus flagellatus</i> , Philippi ...	... — ...	2 ...	Western Port
<i>Mytilus rostratus</i> , Menke ...	... 1 ...	2 ...	
<i>Modiola albicosta</i> , Lamarck ...	... 1 ...	2 ...	Tidal River Bay
<i>ater</i> , Zelebor ...	... 1 ...	2 ...	
<i>Donax deltoides</i> , Lamarck ...	... 1 ..	— ...	C. Bridgewater, Anderson's Inlet
<i>Meretrix paucilamellata</i> , Dunker ...	... 1 ...	2 ...	
<i>kingii</i> , Gray ...	... — ...	2 ...	Port Phillip
<i>planatella</i> , Lamarck ...	... — ...	2 ...	San Remo
<i>Mactra polita</i> , Chemnitz ...	... 1 ...	— ...	Gellibrand Coast
<i>rufescens</i> , Lamarck ...	... 1 ...	2 ...	Tidal River Bay
<i>Mesodesma elongata</i> , Deshayes ...	... 1 ...	2 ...	
<i>Glycimeris radians</i> , Lamarck ...	... 1 ...	2 ...	
<i>flabellatus</i> , T. Woods ...	... — ...	2 ...	Portland
<i>Barbatia fasciata</i> , Reeve ...	... — ...	2 ...	General
<i>Chione disjecta</i> , Perry ...	... — ...	2 ...	Port Phillip
<i>gallinula</i> , Lamarck ...	... — ...	2 ...	Western Port, Otway
<i>placida</i> , Philippi ...	... — ...	2 ...	Western Port
<i>Solen vaginoides</i> , Lamarck ...	... — ...	2 ...	Port Phillip
<i>Corbula scaphoides</i> , Hinds ...	... — ...	2 ...	Western Port
<i>Myodora brevis</i> , Sowerby ...	... — ...	2 ...	Port Phillip
<i>ovata</i> , Reeve ...	... — ...	2 ...	Port Phillip
<i>Myochama anomoides</i> , Stutchbury ...	... — ...	2 ...	
<i>Anatina creccina</i> , Reeve ...	... — ...	2 ...	Port Phillip
<i>Gari zonalis</i> , Lamarck ...	... 1 ...	— ...	Western Port
<i>Dosinia cœrulea</i> , Reeve ...	... 1 ...	2 ...	Tidal River Bay
<i>Cardium pulchellum</i> , Gray ...	... — ...	2 ...	Port Phillip
<i>tenuicostatum</i> , Lamarck ...	... — ...	2 ...	General
<i>Lucina huttoniana</i> , Vanatta ...	... — ...	2 ...	Western Port
<i>Crassatellites kingicola</i> , Lamarck ...	... — ...	2 ...	Anderson's Inlet
<i>Trigonia margaritacea</i> , Lamarck ...	... — ...	2 ...	Western Port
<i>Modiolaria barbata</i> , Reeve ...	... 1 ...	— ...	San Remo
<i>Pecten medius</i> , Lamarck ...	... — ...	2 ...	General
<i>Chlamys asperrimus</i> , Lamarck ...	... — ...	2 ...	General
<i>Ostrea angasi</i> , Sowerby ...	... 1 ...	2 ...	
<i>Tellina albinella</i> , Lamarck ...	... — ...	2 ...	Western Port
<i>deltoidalis</i> , Lamarck ...	... 1 ...	— ...	General
<i>Arca trapezia</i> , Deshayes ...	... 1 ...	— ...	General
Totals ...	57	64	

The above list shows a total of 94 species, 57 being obtained from Oberon Bay and 64 from Waterloo Bay, of which 28 are common to both. A general perusal of the list will show that the whole of the species belong to the Southern Australian region, and as far as the present evidence goes I fail to appreciate any perceptible influence from the Bassian isthmus. A glance at the list of species obtained from the Corner Basin also fails to show any indication of Eastern Australian influence. If the continuation of the land from Wilson's Promontory to Tasmania

ever formed an effective barrier to the blending of eastern and southern molluscan forms, the magnitude of the time which has elapsed since that barrier was broken down must be duly considered. In this respect evidence of the influence of such a barrier might perhaps be better sought for in Marine Pleistocene or Pliocene deposits of Victoria, Tasmania, and New South Wales. Unfortunately we lack the latter, except perhaps in Victoria, but no attention at all has been paid to the former from this point of view.

In the neighbourhood of our Oberon Bay camp a few fresh-water and terrestrial mollusca were collected, including *Unio novæ-hollandiæ* and a species of *Pomatopyrgus*, *Laoma pictilis*, and a small *Endodonta*.

BOTANY.—BY A. D. HARDY, F.L.S.

The vegetation of the National Park, in which for the purpose of this report is included the half-mile strip of temporary reserve along the coast, is not, from a general point of view, of economic importance. The timber, except at Sealers' Cove on the east coast, is not of commercial value, while there is not a sufficient quantity of grazing land within practicable distance of settlement to make the grass of value, except perhaps to an adjacent "run." Nevertheless the Park vegetation should admirably serve the purpose which the Club has in view, provided it is guarded against fire. It will afford shelter and sustenance to such of our animals and birds peculiar to Australia as it may be desirable to protect and allow to increase.

Roughly divided with respect to the flora, several classes of country exist in the Park. The granite ridges are almost nude and barren. A few stunted gums, *Eucalyptus amygdalina* and *E. obliqua*, are dotted here and there, and a few scrubby plants of *Hakea nodosa* and *Acacia myrtifolia* are found growing close up to the precipitous parts; just the kind of places in which one would look for lizards and "Parsley-fern," *Cheilanthes tenuifolia*, of which latter, however, we did not collect a specimen.

Of hilly, timbered country, parts of the Leonard and Latrobe Ranges are types. Here the eucalyptus trees of the species just mentioned, together with some Blue Gums, *E. globulus*, grow plentifully, but to no great height or girth. In such country there is not so much shrubby undergrowth as is found on similar soils of other parts of the State, but herbaceous plants are fairly numerous in some and plentiful in other parts of it.

On granite sand derived from the mountain rocks hard by, and also on dune sand, grow the so-called "honeysuckles," *Banksia marginata*, *B. serrata*, and *B. integrifolia*, and, at somewhat higher elevations, *B. collina*. On the low, sandy undulations fine groves of *Banksia* mingle with the larger Grass-tree, *Xanthor-*

rhœa australis, but in parts, especially on some patches of almost flat ground, the *Banksias* have a monopoly, and in the distance bear a striking resemblance to orchards of old apple trees. The Grass-trees, in turn, grow luxuriantly either among the *Banksias* and small eucalypts, or appear as the giants of a forest in which dwarf plants of a "heathy" nature form the undergrowth. Some specimens of Grass-tree measured gave 14 feet to the top of the flower-spike.

It is not so easy to describe a class of country by means of the "sheoaks," as *Casuarina quadrivalvis*, at least, shows here marked adaptability. It may be found on the low, well-grassed sand ridges, sheltered behind the higher sand hummocks of Oberon Bay, on the steep sides of high hummocks near the Derby River, and on the wind-swept rocky seaward face of the Promontory's western hills. On these steep and exposed hillsides there are groves of this *Casuarina* extending over acres of ground, the trees so close as to give continuous shade to the pedestrian, who may walk with noiseless tread over a brown carpet of the dead and matted filiform branchlets which have fallen and accumulated through many years. The Erect Sheoak, *C. suberosa*, was much scarcer than either *C. quadrivalvis* or *C. distyla*.

The last-mentioned species we found to be typical of another sort of country differing widely from those previously mentioned, and from its associations reminding one of the flora at Sandringham. There are, however, some differences, the principal being the greater elevation of the Promontory heath-lands, and with that elevation a loss of the "tea-trees"—*Leptospermum levigatum*, *L. scoparium*, *L. myrsinoides*, *Ricinocarpus pinifolius*, &c., and the substitution of *Platylobium triangulare* for the commoner *P. obtusangulum*, the former having been thought by Baron von Mueller to have come across from Tasmania. But the association of the *Casuarina* named with stunted *Banksia marginata*, *Isopogon ceratophyllus*, *Epacris impressa* (red and white), *Styphelia virgata*, *Hibbertia*, sp., *Candollea serrulata*, *Correa speciosa*, the "Native Fuchsia," the orchid *Glossodia major*, and, omitting many others, the Bluebell, *Wahlenbergia gracilis*, warrants the application of the term "Sandringham flora" to the heath-loving group here as well as in the Otway Ranges and parts of the Yarra valley, &c., and so enable the student to recall a type of vegetation to be seen close to Melbourne. This Sandringham flora may be found in several parts of the Park, notably between the Derby and Tidal Rivers along the old telegraph route, and on the seaward slopes, where the sand hummocks have piled high over granitic rocks.

There are left the inland tea-tree thickets, marsh lands, grass land, river belts, and shore and gully vegetation. The tea-tree thickets, comprising chiefly *Leptospermum lanigerum*, *L. sco-*

parium, *Melaleuca ericifolia*, *M. squarrosa*, &c., occupy portions of the water spaces, and extend far over the dry land, which, though dry in summer season, is subject to inundation. In places it is dense and continuous, but in others it is broken up into patches, some of which are circular in outline, the spaces between being occupied by lowly semi-aquatic plants. Deeper in the marshes the fringing tea-tree gives way to tall, close-growing plants of grass-like aspect, and some of which have, by the end of the year, become topped with rich brown flowerings or fruits. In this group we most frequently found *Schaenus brevifolius*, *Pectio tetraphyllus*, *Leptocarpus brownii*, *Lepidospermum exaltatum*, *Lepidosperma concavum*, *Gahnia trifida*, with the Swamp-oak, *Viminaria denudata*, &c., while here and there a small swamp eucalyptus broke the monotony of what, as a bird's-eye view, might seem like a plain of waving Prairie-grass. The tea-tree which persists in these marsh lands, while not exceeding the surrounding plants in height, is *Melaleuca squarrosa*. In the case of the Oberon Valley morass the marsh land reaches the foot of the eucalyptus-clad foothills of the higher ridge, where it is fringed with a narrow belt of Grass-tree.

Out of these morasses, in which the courses of the streams are often difficult of definition, the rivers and creeks meander to the sea. Where the streams deepen and get clear of the swamps the usual river vegetation asserts itself, and we find *Limnanthemum exaltatum*, *Typha angustifolia*, *Triglochin procerum*, *Heleocharis sphacelata*, *Aruundo phragmites*, &c., &c.

On the banks of the Derby River *Indigofera australis*, which is common on sandy soil throughout the Park, creeps down from the sand hummocks and mingles with the plants which grow up from the water, accompanied by the pest *Acena sanguisorbae*. A little further from the water's edge, and sheltering among the *Leptospermum* scrub, the Native Cherry, *Exocarpus stricta*, grows plentifully, and at Christmas was laden with its singular so-called fruit.

The coastal vegetation is much the same as in other parts of south-eastern Australia. There are the salsolaceous pioneers of the sand hummocks, seedlings of which were taken from below high tide mark, the grass, *Spinifex hirsuta*, backed up by the scrubby and robust *Correa alba*, *Styphelia richea*, and *Leptospermum laevigatum*. The *Styphelia* was bearing the small, white, sweet, succulent berries, from which it is often called the "Native Currant." Where mud flats take the place of sandy beaches, however, the Spurious Mangrove, *Avicennia officinalis*, grows freely in low, squat bushes fringing the sea, in the water, or left nearly high and dry as the tides rise and fall. This plant fruits at Christmas time, the fruit being yellow, of about the size of almonds. An interesting feature in connection with the Spurious

Mangrove, and one possessed by mud-loving plants of other countries, such as *Sonneratia*, sp., and *Laguncularia racemosa*, &c., is the thrusting up through the mud of what appear to be at first sight, so many small dead stems of seedlings. These are the pneumatophores, or organs by which the plant obtains oxygen for its roots, which would otherwise be asphyxiated in the dense, evil-smelling mud.

Of grass land there is in all about 2,000 acres worthy of the name, distributed in isolated parts. One area is at the Derby River, and another in the valley between the Oberon and Norgate Ranges, and stretching miles inland easterly from Oberon Bay. This division of the vegetation consists principally of *Carex cæspitosa*, *C. pseudocyperus*, and the true grasses *Alopecurus pratensis*, *Festuca hookeriana*, and *Poa cæspitosa*.

The gully vegetation is poor both in quality and quantity, and particularly noticeable is the numerical poverty of ferns. The botanical section made a special effort to find something of the typical Dandenong, Otway, or Black Spur valley shrubberies, but without success. With the exception of Roaring Meg Creek and a few other small streams in the south the ferny and thickly-shrubbed watercourses and valleys appear to be confined to the sheltered east coast. There is a too abrupt transition from the small stream, dashing down amongst granite boulders on the steep hillsides, to the quiet tea-tree swamp and sedgy morass, to allow of the growths we sought, the lack of humus on the higher parts being very evident. Where tree-ferns did appear it seemed that in most cases the Hill Tree-fern, *Alsophila australis*, grew at the creeks, often to the exclusion of *Dicksonia billardieri*, but not on the slopes; though on several of the creeks the King-fern, *Osmunda barbara*, exercised a monopoly as regards large ferns.

In the floral colouring of the landscape at Christmas the innumerable tints of the foliage of tea-tree, banksia, eucalyptus, and casuarina ranged from dark green to golden yellow, but of flowers the predominating colours were blues and yellows, reds, purples, and whites being rarer. On granite-sandy soil of the slopes at the foot of Mt. Vereker, at south corner of Corner Basin, and elsewhere, fine waves of blue are given to the landscape by beds of the purple orchid *Glossodia major*, the Blue-bell, *Wahlenbergia gracilis*, and the blue pin-cushion, *Brunonia australis*, sometimes intermingled, but often each species forming individual patches. Of this latter exclusive habit two species of *Lobelia* were conspicuous—the tall, pale blue *L. rhombifolia*, and the shorter and dark blue *L. simplicicaulis*. *L. anceps* flowered well, but in proportionately small quantity.

Of yellow flowers the genus *Helichrysum* presented most species, several kinds of "everlastings" being common. Two

very conspicuous yellow blooms were those of swamp plants, the shrubby "Golden Spray," *Viminaria denudata*, forming belts along parts of many creeks, and mingling with other marsh plants, while the herbaceous *Limnanthemum exaltatum*, the so-called Yellow Swamp-Lily (N.O. Gentianæ) was seen here at its best, acres of shallow swamp being filled almost exclusively with it, but with here and there a purplish *Pattersonia longiscapa* giving a dash of complementary colour.

It would be hard to find a prettier floral scene than that presented by a dark-green bank of tea-tree, and from it, reaching to our feet, a terraced series formed by, first, the tall, graceful "Golden Spray," next, the shorter white-flowering *Veronica derwentia*, and for a foreground the grass flecked with large golden everlasting and the purple blooms of *Indigofera australis* or *Hovea heterophylla*.

White-rayed blooms of *Helichrysum leucopsilivum* dotted the slopes, and the White Iris, *Diplarrhena moraea*, grew well, not only on the moist lowlands near the southern shores of Corner Basin and in sheltered lower valleys, but also ascended a considerable distance up the drier slopes. These, with the *Veronica* already mentioned, *Epacris impressa*, *E. obtusifolia*, and *Kunzea corifolia*, were the only white or almost white flowers worth mentioning.

In the deeper marshes the prevailing green of other seasons is at Christmas relieved by the rich brown flowers or fruits of various "sedges" and grass-like plants, flecked here and there with the rich yellow of *Viminaria denudata*, the creamy flowers of *Melaleuca squarrosa*, the swamp "bottle-brush," having appeared earlier.

It will be seen on reference to the list which follows that, as might have been expected, the order Compositæ is more strongly represented than any other, twenty species of composite plants being noted; of ferns, fourteen species are recorded; while Leguminosæ has thirteen species, representing twelve genera. Four genera of Myrtaceæ present eleven species in all; and, as the proportion of species to an order diminishes, we reach a group of orders—Orchidæ, Gramineæ, and Cyperaceæ—each with seven species, but with varying numbers of genera. Epacridæ and Liliaceæ give equal results—six species each. There were five species of campanulate plants, while two Buttercups and two Clematis made a total of four species for the Ranunculaceæ. Equal in having only three species noted are the following seven orders:—Casuarineæ, Salsolaceæ, Candelaceæ, Irideæ, Scrophularineæ, Labiatæ, and Fluviales. Twelve orders were represented by only two species each, while twenty-seven orders presented only a single genus each with only one species.

The last-mentioned group embraces a number of widely different plants, which range from timber trees, such as the Native Beech or Myrtle, *Fagus cunninghami*, down through the Native Mulberry, *Hedycarya cunninghami*, to herbs such as the Native Nettle, *Urtica incisa*, the fleshy-leaved "Pig-face," *Mesembrianthemum equilaterale*, the Swamp "Lily," *Limnanthemum exaltatum*, the Pond Weed, *Myriophyllum variifolium*, with the "Liver-wort," *Marchantia polymorpha*—sole representative of the Hepaticæ.

Of the total, 57 orders, embracing 119 genera and 182 species, no species, as far as I am aware, is restricted to this region, but some are becoming more scarce yearly throughout the State, and might well be preserved and increased by the planting, where practicable, of specimens from other parts of the State.

In the search for plants I was given much assistance by Mrs. Hardy, and in the identification of many of the specimens obtained I was glad to consult Mr. Charles Walter, whose acquaintance with the Promontory flora occurred in a way worth relating. In 1873, when the late Mr. Ernest Giles was preparing for one of his exploring expeditions in Central Australia, the late Baron von Mueller was asked to take in hand, for training, the botanical member of the projected party, the trainee being Mr. W. H. Tietkens. With this object in view the Baron, Mr. Walter, and Mr. Tietkens travelled by boat to the Wilson's Promontory Lighthouse, and, landing there, struck northerly, crossing the ranges into the Oberon-Norgate Valley, and penetrated as far as the Tidal River. Thus the expedition, which was primarily intended to train a collector for a more extensive trip, helped considerably the regional distribution records. Those records, however, were for regions of too great extent and of too indefinite boundary to be precise, and the value of this excursion's work lies in marking off a subdivision of definite extent.

SYSTEMATIC LIST OF PLANTS COLLECTED OR SEEN.

(* = bloom, o = fruit, + = many seen, - = few seen.)

Ranunculaceæ—	Polygalæ—
Clematis aristata, R. Brown	* - Comesperma volubile, Lab.
o - C. microphylla, Candolle	* + C. ericinum, Cand.
o - Ranunculus aquatilis, Dodoens	Tremandree—
- R. rivularis, Banks and Solander	* - Tetratheca ciliata, Lindley
Dilleniaceæ—	* + T. ericinum, Smith
* Hibbertia stricta, R. Br.	Rutaceæ—
* + H. acicularis, F. v. Mueller	* Correa speciosa, Andrews
Monimiæ—	Linææ—
Hedycarya cunninghami, Labillardière	Linum marginale, Cunningham
Violaceæ—	Geraniaceæ—
- Viola hederaceæ, Lab.	Erodium cygnorum, Nees
- V. betonicifolia, Smith	* + Pelargonium australe, Willdenow
	Sterculiaceæ—
	Thomasia petalocalyx, F. v. M.

- Euphorbiaceæ—
 * + *Amperea spartioides*, Brongniart
- Urticaceæ—
 - *Urtica incisa*, Poirét
- Cupuliferae—
Fagus cuminghami, Hooker
- Casuarineæ—
 o + *Casuarina quadrivalvis*, Lab.
 o - *C. suberosa*, Otto and Dietrich
- * o + *C. distyla*, Ventenat
- Stackhousiæ—
 * + *Stackhousia linearifolia*, Cunn.
- Salsolaceæ—
Rhagodia billardieri, R. Br.
Sueda maritima, Dumortier
Atriplex (?)
- Ficoideæ—
 * + *Mesembrianthemum æquilaterale*,
 Haworth
- Polygonaceæ—
 * - *Polygonum minus*, Hudson
 * *Muehlenbeckia adpressa*, Meissner
- Leguminosæ—
 * + *Gompholobium minus*, Sm.
 * *G. huegelii*, Bentham
 * + *Viminaria denudata*, Sm.
 - *Pultenæa daphnoides*, Wendland
Dillwynia ericifolia, Sm.
 * + *Platylobium triangulare*, R. Br.
 - *Goodia lotifolia*, Salisbury
Lotus australis, And.
- * o + *Indigofera australis*, Willd.
 * *Swainsonia lessertifolia*, Cand.
 * - *Kennedya prostrata*, R. Br.
Acacia myrtifolia, Willd.
A. verticillata, Willd.
 - *A. melanoxylon*, R. Br.
- Rosaceæ—
 o + *Acæna sanguisorbæ*, Vahl
- Saxifrageæ—
 * + *Bauera rubioides*, And.
- Crassulaceæ—
Tillæa recurva, J. Hooker
- Onagraceæ—
Epilobium tetragonum, Linné.
- Haloragaceæ— [Hook.
 * - *Myriophyllum variifolium*, J.
- Myrtaceæ—
 o + *Leptospermum lanigerum*, Sm.
 o + *L. scoparium*, R. and G. Forster
 o + *L. myrsinoides*, Schlechtendal
 o + *L. levigatum*, F. v. M.
 * *Kunzea penduncularis*, F. v. M.
 * o + *K. corifolia*, Reichenbach
 o + *Melaleuca squarrosa*, Donn
 o + *M. ericifolia*, Sm.
 o + *Eucalyptus amygdalina*, Lab.
 o + *E. obliqua*, l'Héritier
- Myrtaceæ—
 o + *E. globulus*, Lab.
E. gunnii, J. Hook.
- Rhamnaceæ—
 - *Pomaderris apetala*, Lab.
 * + *Cryptandra hookeri*, F. v. M.
- Umbelliferae—
 - *Hydrocotyle*, sp. (?)
 * - *Apium prostratum*, Lab.
- Santalaceæ—
 o *Exocarpus stricta*, R. Br.
- Proteaceæ—
 o - *Hakea nodosa*, R. Br.
 o - *H.* sp. (?)
 o + *Banksia serrata*, Linné *fil.*
 o + *B. collina*, R. Br.
 o + *B. integrifolia*, L. *fil.*
 o + *B. marginata*, Cavanilles
- Compositæ—
 * *Aster huegelii*
 * *A. myrsinoides*, Lab.
 * *A. ramulosus*, Lab.
 * + *A. argophyllus*, Lab.
 * *Gnaphalium japonicum*, Thunberg
 * *Podolepis acuminata*, R. Br.
 * *Leptorrhynchus tenuifolius*, F.
 v. M.
 * + *Helichrysum apiculatum*, Cand.
 * + *H. leucopsidium*, Cand.
 * - *H. lucidum*, Henckel
 * + *H. scorpioides*, Lab.
 * - *H. ferrugineum*, Lessing
 * - *Cassinia aculeata*, R. Br.
 * *Cotula coronopifolia*, Linné
 * - *Senecio velleyoides*, Cunn.
 * - *S. dryadeus*, Sieber.
 * - *S. odoratus*, Hornemann
 * - *S. bedfordii*, F. v. M.
 * - *S. lautus*, Solander
 * *Calocephalus fastigiatus*
- Campanulaceæ—
 * - *Lobelia anceps*, Thunb.
 * + *L. simplicicaulis*, R. Br.
 * + *L. rhombifolia*, De Vriese
 * + *Isotoma fluviatilis*, F. v. M.
 * + *Wahlenbergia gracilis*, Cand.
- Candolleaceæ—
 * + *Brunonia australis*, Sm.
 * - *Dampiera stricta*, R. Br.
Scavæola tenuula, R. Br.
- Goodeniaceæ—
 * *Goodenia ovata*, Sm.
- Gentianeæ— [v. M.
 * + *Limnanthemum exaltatum*, F.
- Plantagineæ—
 * *Plantago varia*, R. Br.
- Primulaceæ—
Samolus repens, Persoon

- Apocynææ—
Alyxia buxifolia, R. Br.
Lyonsia straminea, R. Br.
- Solanaceæ—
Solanum vescum, F. v. M.
 (?) *aviculare*, G. Forster
- Scrophularinææ—
Mimulus repens, R. Br.
 * + *Veronica derwentia*, Littlejohn
 * + *Euphrasia brownii*, F. v. M.
- Lentibularinææ—
 * - *Utricularia dichotoma*, Lab.
- Labiataæ—
 * - *Brunella vulgaris*, Lin.
 * - *Prostanthera lasiantha*, Lab.
 * - *Mentha australis*, R. Br.
- Verbeniaceææ—
o *Avicennia officinalis*, Lin.
- Myoporinææ—
 * - *Myoporum viscosum*, R. Br.
- Epacridææ—
o + *Styphelia humifusa*, Pers.
o + *S. richea*, Lab.
 - *S. virgata*, Lab.
 * + *Epacris impressa*, Lab.
 * + *E. obtusifolia*, Sm.
 * *Sprengelia incarnata*, Sm.
- Orchidææ—
o - *Thelymitra aristata*, Lindley
o - *P. longifolia*, R. and G. F.
 * + *Prasophyllum fuscum*, R. Br.
 * + *P. patens*, R. Br.
 * + *Microtis porrifolia* R. Br.
o - *Dipodium punctatum*, R. Br.
 * + *Glossodia major*, R. Br.
- Iridææ—
 * + *Diplarrhena moræa*, Lab.
Pattersonia glauca, R. Br.
 * + *P. longiscapa*, Sweet
- Liliaceææ—
 * *Dianella revoluta*, R. Br.
 * - *Burchardia umbellata*, R. Br.
o + *Xerotes longifolia*, R. Br.
o + *X. thunbergii*, F. v. M.
o + *Xanthorrhæa australis*, R. Br.
o - *X. minor*, R. Br.
- Typhaceææ—
 - *Typha angustifolius*, Lin.
- Lemnaceææ—
 - *Lemna minor*, Lin.
- Fluvialesææ—
 - *Triglochin procera*, R. Br.
 + *T. striata*, Ruiz and Pavon
 - *Potamogeton natans*, Lin.
- Cyperaceææ—
 - *Cyperus lucidus*, R. Br.
 * - *Heleocharis sphacelata*, R. Br.
 + *Scirpus nodosus*, Rottboell
 + *Schenus brevifolius*, R. Br.
 + *Lepidosperma concavum*, R. Br.
 + *L. exaltatum*, R. Br.
o + *Cladium glomeratum*, R. Br.
o + *Carex pseudo-cyperus*, Lin.
o + *Cæspitosa*
- Juncaceææ—
 + *Juncus communis*, E. Meyer
 + *J. pauciflorus*, K. Br.
- Restiaceææ—
 + *Restio tetraphyllus*, Lab.
 + *Leptocarpus brownii*, J. Hook.
- Graminæææ—
 - *Anthistiria ciliata*, Lin. *fil.*
 - *Spinifex hirsutus*, Lab.
 + *Poa cæspitosa*, G. F.
 - *Ehrharta stipioides*, Lab.
 + *Festuca hookeriana*, F. v. M.
 - *Arundo phragmites*, Dod.
 + *Alopecurus pratensis* (?)
- Lycopodiinæææ—
 - *Selaginella uliginosa*, Sprengel
- Filicesææ—
o - *Gleichenia circinata*, Swartz
 - *G. flabellata*, R. Br.
o + *G. dicarpa*, R. Br.
o + *Osmunda barbara*, Thunb.
o - *Alsophila australis*, R. Br.
o - *Dicksonia billardieri*, F. v. M.
o - *Davallia dubia*, R. Br.
o - *Lindsaya linearis*, Swartz
o - *Adiantum æthiopicum*, Lin.
 + *Pteris aquilina*, Lin.
 - *P. incisa*, Thunb.
 - *Lomaria lanceolata*, Spr.
 + *L. discolor*, Willd.
 - *L. capensis*, Willd.
- Hepaticæææ—
o - *Marchantia polymorpha*

GEOLOGICAL NOTES.—BY G. B. PRITCHARD, F.G.S.

GRANITE.—In dealing with the geology of Wilson's Promontory one cannot do better, in the first place, than make a few remarks on the most extensively developed rock of the district. The granite is in the main composed of the three typical minerals quartz, orthoclase, and mica, but in parts other minerals make

their appearance, and the most striking feature about the rock is the uniformity of its coarseness over such a large area. At the landing place in the south-west corner of the Corner Basin, where the rock could be first examined, one was struck by the large felspar crystals, but afterwards similar rock was met everywhere with much larger crystals, and is reported similar right down to the Lighthouse, so that it soon lost its novelty in its commonness. Fine-grained rock is comparatively scarce, and is consequently usually interesting where it occurs. On the south side of Oberon Bay there is a fairly large outcrop of fine-textured aplitic-looking rock, the relations of which to the coarser-grained granite are by no means clear, but it appears to be a later intrusion. A similar feature at the Lighthouse is also recorded by R. A. F. Murray, in his report on South-Western Gippsland, in the following words:—“The Lighthouse at the end of the Promontory is built of a very fine-grained grey granite, occurring on the spot in the form of a thick band between that of a coarse description.” Along the shore at Oberon Bay this rock on weathering is slightly iron-stained, and shows some remarkably regular rings, which at first sight appeared artificial, but which are really a type of spheroidal weathering. Again, some peculiar holes in the rock appeared quite as if they had been drilled, but further investigation showed that there are occasional large felspar crystal inclusions, the decomposition and disintegration of which leaves the hole in question.

In the coarser rock quartz-veins occur occasionally, and in some cases good specimens of black tourmaline are obtained in the vein quartz, but this mineral is not restricted to the quartz, but is common in the granite in parts, as at the Bad Saddle and Mt. Norgate. The tourmaline is mostly schorlaceous, but some fair prismatic crystallizations were also procured. In some places associated with the tourmaline occurrence Cassiterite makes its appearance, and one prospector's locality was pointed out to us on the way to Waterloo Bay, but no examples of this mineral were obtained by us.

The coarse-grained granite has, of course, suffered very much from weathering, and some splendid tors may be seen on any of the hills and mounts, and at every point where the granite projects into the sea enormous rounded masses may be seen, which look rather like tors let down to sea-level than examples of marine erosion. Some magnificent examples of weathering occur on the hills south of Oberon Bay—great masses of rock, closely studded all over with large felspar crystals in relief. The felspar appears to answer in all respects to orthoclase, and every crystal appears to be twinned on the Carlsbad type, sometimes simply two crystals, but occasionally rosettes of six or eight crystals blended together. The crystals are a combination of the oblique

rhombic prism with orthopinacoid, clinopinacoid, orthodome, and basal planes. and their habit is a broad development parallel to the clinopinacoid, and rather narrow parallel to the orthopinacoid. The largest crystal measured *in situ* was 4 inches in length, but 2½ to 3 inches was more about the average size of the large crystals. Another very remarkable example of rock weathering is shown in this same locality, where the rock appears at first sight like a heavy conglomerate, with large pebbles sticking out of it, owing to the removal of the matrix. The rock is not so coarse as that just mentioned above, but when in its original molten state it included masses of other material of apparently a more basic character, and these are the rounded and irregularly disposed, fine-grained, dark-greyish lumps that appear like pebbles, owing to the faster weathering of the granitic matrix.

Both black and white micas, apparently Biotite and Muscovite, are abundantly distributed through the rock, but none was seen of any size.

To the south of Oberon Bay, the medium-grained granite was also garnetiferous, the species represented being Almandite. Washings from granitic detritus at Yanakie landing are recorded to have yielded zircons, sapphires, and topaz, but we did not procure any along our route. Most of the exposed hills and points jutting into the sea appear pretty bare of vegetation until one tries to climb up; then they are covered with a mass of matted vegetation which it is easier to walk over than to force a passage through, as the various plants are beaten down flat by the strong winds. Where the granite is usually bare of vegetation is only on the steepest and most inaccessible slopes, and on the tors, but even the latter show evidence in places of the inroads caused by plant growth. On other parts the granite carries heavy timber, and in places much undergrowth. In some of the valleys there is good drainage, and splendid water runs down to the sea at frequent intervals; but in some there is no longer fall for the water to get away, and the development of swamps and morasses is a consequence, as up the Tidal River, and on the way to Waterloo Bay, and other places. These deposits can only be regarded as a recent development from the granitic detritus.

SILURIAN.—There is none of this rock on the lower part of the promontory itself, but around Foster it is frequent enough, and extends over to the northern slopes of the Hoddle range. A junction of this rock with the granitic rock of the Promontory is recorded on the Corner Basin coast, near Yanakie, which shows the granite to be of younger age than the Silurian.

At Foster the rocks are mudstones, shales, and sandstones, very similar in lithological character to the rocks round Melbourne, such as at Diamond Creek. From the mullock heap of the mine at Foster a hard, close-grained, yellowish-grey rock con-

taining small cubic crystals of pyrite may be noted as probably a dykestone of some kind, but none of this material was visible *in situ*. Turton's Creek is, I believe, about the nearest locality from which Silurian fossils have been obtained to fix the horizon of these beds.

TERTIARY.—In the neighbourhood of Foster there is a fairly heavy white quartz gravel and conglomerate, as at New Zealand Hill, Kaffir Hill, and Cement Hill, which is characterized by being almost entirely siliceous, even to the finer material holding the coarser together. Towards the base of this deposit there is a considerable amount of drift lignite, but no identifiable plants or fruits were collected. This deposit is also auriferous, and was considerably worked at one time as the Stockyard Creek diggings. Mr. R. A. F. Murray, in his report, refers to the deposit as Older Pliocene, but there is no conclusive evidence as to the correct horizon for these deposits.

Pleistocene.—The older dune limestone forming the base of the present dunes along the coast northwards from the mouth of the Derby River, may best be referred to under this head. On the Admiralty chart, opposite Shellback Island and on the mainland, a note may be read—"Low red cliffs," which evidently refers to the dune-rock, and one can only conclude that this deposit must have been casually examined from the sea, whence in certain lighting this view might hold. Everyone is, however, now pretty familiar with the fawn or yellowish appearance of these rocks, as at the Back Beach, Sorrento, and their cementing with carbonate of lime is also well known. Here also, as is usually the case with this rock, some fine examples of current bedding may be seen, but another feature which is not often present is the very fine platy layers firmly cemented together occurring for some distance along the coast north of the Derby River mouth. Some of these layers were only the thickness of ordinary cardboard, yet they were strong enough to resist hand breakage. The usual rugged character and fantastic weathering is also present.

Recent.—That the upper portions of this deposit are of no great antiquity is clearly shown by an old sandy soil layer, containing recent terrestrial and freshwater shells, including a small *Endodonta*, *Bulinus tenuistriatus*, *Bulinus productus*, *Succinea australis*, and *Vitrina verreauxi*.

There is some dune rock over this layer, which points to the probability that the whole deposit might perhaps be regarded as recent, as well as the present loose shifting dunes. Some very fine examples of sand volcanoes were seen amongst the dunes on the day of our passage across the Corner Basin. Good accumulations of shells, flints, bones, &c., and a few stone axes and grinding stones, were noted as relics from the aborigines, mostly on the dunes.

Another deposit along the shore at about high tide calls for a brief comment. This is a peaty and coal-like deposit to be seen at the foot of the dunes north of the mouth of the Derby River. In some places this carbonaceous accumulation is covered with sand, but a layer from 4 to 6 inches thick is often visible, and this appears to me to be nothing more than a preservation of accumulations of seaweed into a form of peat.

ETHNOLOGY.—BY A. S. KENYON, C.E.

Any expectations of interesting discoveries in the anthropological line were destined to be disappointed. The remains—kitchen middens and stone implements—present the usual features of any part of the Victorian coast line in their kind and occurrence. The only part of the Victorian coast presenting unusual features is at Cape Otway, where the physical conditions favour a certain amount of isolation. No such conditions are present at the Promontory. The tribes making Shallow Inlet, where large middens occur, their rendezvous, worked naturally and easily along the isthmus to the Derby River and the range. Food is plentiful—molluscan, mammalian, or vegetarian—the whole way, while fresh water occurs frequently in swamps and soaks. At each point of shelter adjacent to rocks large shell-mounds occur, containing the usual varieties of shells, a few bones of birds and animals, quartz and flint chips and flakes, and broken stone implements of various sorts—axes (polished and chipped), hammers, grinding stones, &c. No human bones were met with. One bone implement was found. On the Promontory itself, considered apart from the isthmus, the same remarks apply. Progression from bay to bay through the comparatively open timbered country was easy. The middens of Oberon Bay show distinct evidence, by the variety of implements found, of tribal camps—that is, women as well as men penetrated so far. In the bush country itself little evidence was to be found. The granites in disintegrating provide such a plentiful supply of crystalline quartz in all sizes and shapes that there was no need for the aboriginal to carry foreign stones with him to strike flakes off for his knives, &c.

Although much recent formations exist, both as dunes and as dune rocks, and, although they are much denuded and exposed, no trace of any different and inferior race to the one we know was to be found. The remains discovered were all on the surface of such comparatively recent formations as to lead to the suspicion that the natives did not get on to the Promontory until very little before ourselves. Much interesting work in this regard remains to be done, both on the Promontory and in particular in the island chain representing all that is left of the old Tasmanian land-bridge.

FIELD NATURALISTS' CLUB OF VICTORIA.

(Concluded from page 190.)

NATURAL HISTORY NOTES.

WALLABY AT SEA.—Mr. F. Wisewould stated that when coming from San Remo recently he noticed an object in Western Port Bay, about one hundred yards from the beach, which proved to be a wallaby swimming towards Phillip Island. It seemed very exhausted, and fell down upon reaching the shore, taking several minutes to reach the scrub, only a short distance off. It is alleged there are no wallabies on either French or Phillip Island. Should this be correct, the animal must have been caught by the tide on one of the mud banks or sand spits at the head of the bay, and carried by the ebb, which was running very fast, a distance of eight or ten miles.

GROWTH IN LOBELIA.—Mr. J. S. Kitson called attention to some specimens of *Lobelia simplicicaulis*, R. Br., exhibited, which had been picked some six weeks ago, and though neither in water nor earth, had grown from one to two and a half inches since being picked, notwithstanding the weather had been very warm during the whole period. One specimen, placed between the leaves of a book to press, had grown two inches out of the book. He said some of the specimens were still growing, and asked if this had been noticed by other collectors.

EXHIBITS.

By Mr. F. G. A. Barnard.—Growing plants of the Nardoo, *Marsilea quadrifolia*, L., from East Kew.

By Mr. F. Chapman, A.L.S., on behalf of Rev. A. W. Cresswell, M.A.—Abnormal leaf of *Gangamopteris spatulata*, M'Coy, from Bacchus Marsh, in illustration of paper.

By Mr. C. French, jun.—Fine specimen of aboriginal stone wedge, from Hamilton, Victoria.

By Mr. F. G. D'Ombraïn.—Dove-like Prion, *Prion desolatus*, Gm., from Huonville, Tasmania.

By Mr. H. Jeffery.—Six species of South African shells.

By Mr. J. S. Kitson.—Specimens of *Lobelia simplicicaulis*, R. Br., from Red Hill, near Dromana, in illustration of note.

By Mr. F. Pitcher, for the Director.—Blooms of *Grevillea banksii*, var. *forsterii*, from Queensland and North Australia, and *Melalenca lateritia*, from Western Australia, now flowering in Melbourne Botanical Gardens.

By Dr. Sutton.—Growing plant of fern, *Lomaria patersoni*, Sprengel, from Eurobin Falls.

After the usual conversazione the meeting terminated.

THE
Field Naturalists' Club of Victoria.

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9th APRIL, 1906

(With particulars of Branch of Study).

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