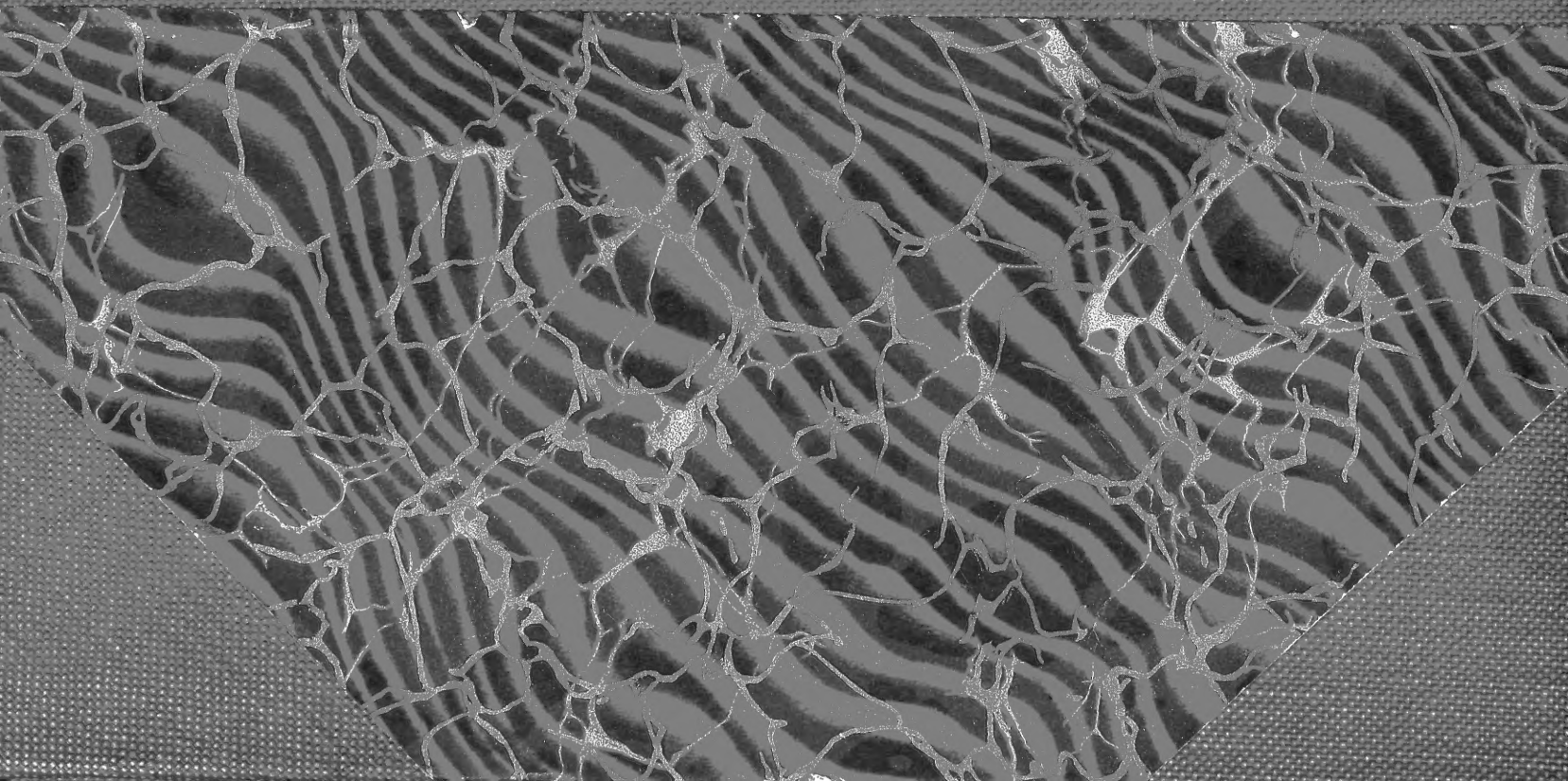

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THE

VICTORIAN NATURALIST:

THE JOURNAL & MAGAZINE

OF THE

Field Naturalists' Club of Victoria.

VOL. III.

MAY 1886, TO APRIL 1887.

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

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1887.

INDEX TO VICTORIAN NATURALIST.

VOL. III.

ERRATA.

Page 51, line 14—for "Gymnophore" read "Gynophore."

Page 115, line 11—for "New Guinea" read "New Caledonia."

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Vol. III. No. 1. May 1886.

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PRICE—SIXPENCE

South Melbourne:
MITCHELL & HENDERSON, PRINTERS, CLARENDON ST.
1886.

Field Naturalists' Club of Victoria.

OFFICE-BEARERS 1885-86.

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Mr. C. A. TOPP, M.A.

This Club was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

No Entrance Fee. Annual Subscription, including copy of proceedings, 15s, dating from May 1st.

The Ordinary Meetings for the reading of papers, and exhibition of specimens, with a short conversazione, are held on the second Monday in each month at the Royal Society's Hall, Victoria Street, Melbourne, at 8 p.m.

The proceedings of the Club are recorded in its journal—the "Victorian Naturalist." Annual Subscription, 6s. 6d., post free (to members free). The first Volume, comprising sixteen numbers, with title page and index, just completed. Price—Seven Shillings and Sixpence (post free).

Copies of the Annual Report and List of Members for 1884-5, with Rules, etc., can be obtained on application to the Hon. Sec.

THE

Victorian Naturalist:

Vol. III. No. 1. MAY 1886. No. 29.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall, on Monday evening, 12th April, 1886.

The president, the Rev. J. J. Halley, occupied the chair, and about sixty members and visitors were present

The hon. librarian acknowledged the receipt of the following donations to the Club's library:—

"Proceedings of the Linnean Society of London," "Zoology," 20 parts, from Mrs. J. Stirling, of Omeo; "Proceedings of Linnean Society of New South Wales", Vol. X., Part 4, from the Society; "Journal of Pharmacy," Vol. I., No. 3, from the Pharmaceutical Society; and "Supplement No. 2, to Australian Oology," by A. J. Campbell, from the author.

The following persons were elected members of the Club:—Mr. E. Tweddell, and Mr. S. H. Wintle, F.L.S.

Messrs. A. J. Campbell and J. E. Prince, were elected to audit the accounts of the Club previous to the annual meeting.

Nominations for office-bearers for 1885-6 were then received, the only excess of candidates being for members of committee, for which eleven nominations were made for seven vacancies.

The hon. secretary announced that the annual conversazione would take place on the 20th inst., when a lecturette, entitled "An Old Rail," would be delivered by Mr. C. A. Topp, M.A.

Papers read:—By the Hon. Dr. Dobson, F.L.S., entitled 'Some Remarks on Fruit." The author gave the definitions of various botanical writers of the word "fruit," and stated that in his opinion the word should be restricted to the product of reproduction of flowering plants, while some other term should be used for the result of reproduction in cryptogamic plants, such as ferns, fungi, etc.

Considerable discussion took place on the opinions offered, in which Messrs. Topp, A. H. S. Lucas, and D. McAlpine were the principal speakers.

Mr. Topp pointed out that the oospores of cryptogams were strictly homologous with the embryoes of flowering plants.

Mr. Lucas defended the use of the term fruit in Systematic Cryptogamic Botany, where no possible confusion of ideas was possible. The term had been used by all great botanists in a conveniently loose sense from Linnæus down to Fries, Berkeley, Hooker, and Mueller. The word was taken from the common language, and it was not possible for the authors of text-books to make their definition compulsory on the great masters. Similar terms were used in a general sense in zoology, where no confusion could arise, and where the multiplication of exact technical terms was cumbersome.

Mr. McAlpine preferred to adhere to a strictly scientific use of the term. He was preparing a work on the life histories of some cryptogamic forms, and hoped to present in that work a simple and satisfactory nomenclature for the products of reproduction.

2. By Mr. McAlpine, F.C.S., entitled "The Dry Preservation of Animal Specimens for Museum and Teaching Purposes." The author gave an interesting account of the experiments he had made with the view of preserving zoological specimens in a perfectly natural way, and, though not the actual inventor of the process, he had succeeded in producing an interesting series of exhibits, such as preparations of parts of animals, frogs, snails, etc. He expressed the hope that some of the members of the Club would take up his method, as it was the only one by which the complete structure of the different specimens could be shown, and stated that it is now in use by several of the universities, etc., on the continent of Europe.

The following were the principal exhibits:—By Mr. A. J. Campbell, eggs of Australian night-jars, viz., spotted night-jar, (*Eurostopodus guttatus*), white-throated night-jar, (*E. albogularis*), and large-tailed night-jar, (*Caprimulgus macrourus*); by the Rev. A. W. Cresswell, original models of the forms of crystals; by Mr. P. Dattari, dried specimens of Victorian ferns, *Cyathea Boylei*, and *Davallia dubia*, (crested); by Mr. J. E. Dixon, portion of fossil whale from older pliocene beds at Cheltenham; by Mr. T. A. Forbes-Leith, British birds, viz., the landrail, (*Crex pratensis*) the water-rail, (*Rallus aquaticus*), the dipper, (*Cinclus aquaticus*), and ring ouzel, (*Turdus torquatus*); by Mr. C. French, F.L.S., group of rare Australian beetles, Buprestidæ, also specimens of the white-eared honey-eater, (*Ptilotis leucotis*), and the yellow-faced honey-eater, (*P. chrysops*), which have this season destroyed large quantities of grapes in the Frankston district; by Master C. French, fossils from New Guinea; by Mr. E. H. Hennell, about 100 species of

Coleoptera, Hymenoptera, and Diptera; by Master H. Hill, a case of moths; by Mr. F. Reader, twenty-six species of hitherto unrecorded Victorian fungi, viz., *Agaricus* (*Armillaria*) *dessigratus*, Pers.; *A.* (*Collybia*) *velutipes*, Fr.; *A.* (*Omphalia*) *dumosus*, Fr.; *A.* (*Tubaria*) *furfuraceus*, Pers. var. *trigonophyllus*, Les.; *A.* (*Pholiota*) *spectabilis*, Fr.; *A.* (*Crepidotus*) *globiferus*, Berk.; *Marasmius impudicus*, Fr.; *M. scorodonius*, Fr.; *Polyporus contiguus*, Fr.; *P. obliquus*, Pers. *Calocera guepinioides*, Berk.; *Rhizopogon luteolus*, Fr., *Tulostomma mammosum*, Fr.; *Geaster Australis*, Berk.; *G. Archeri*, Berk.; *Lycoperdon Gunnii*, Berk.; *Scleroderma verrucosum*, Pers.; *Physarum album*, Fr.; *Cytispora xanthosperma*, Fr.; *Cyathus desipus*, Tul.; *Uredo* (*Puccinia*) *Clematidis*, Berk.; *Ustilago solida*, Berk.; *Peziza stercorea*, *Pers.*; *Hysterographium Rousselii*, De Not.; *Sclerotium Cepæ*, Lib.; and *Poronia punctata*, Lib.; by Mr. S. H. Wintle, F.L.S., mineralogical specimens from Tasmania; and by the Rev. C. M. Yelland, *Newton's Herbal*, also European olives, (*Olea Europea*) and Egyptian wheat, (*Triticum compositum*), grown at Avoca.

After the usual *conversazione* the meeting terminated.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

Annual Conversazione.

The Sixth Annual Conversazione of the Club was held at the Royal Society's Hall, on Tuesday evening, 20th April, 1886, when there was as usual a large attendance of the members and their friends, over 350 ladies and gentlemen being present.

Before assembling to hear the president's address, the visitors rambled through the lower rooms of the building, where a large number of exhibits of a most interesting and attractive character, were displayed for critical examination.

Among the exhibits, which will be found fully detailed further on, may be mentioned as attracting considerable attention, the aquaria with marine fish, shown by Mr. J. E. Sherrard; the butterflies and moths by Dr. Lucas; the botanical specimens by Baron F. von Mueller, K.C.M.G.; the shells by Mr. Worcester; the lichens by Miss Campbell; the birds by Messrs. Leith, Coles, Campbell, and Dixon; the rare beetles by Messrs. French and Best; the sponges by Mr. Lucas; and the growing ferns by Mr. F. G. A. Barnard.

After a pleasant half-hour among the birds, insects, shells, plants, etc., the visitors assembled in the upper hall to hear the Rev. J. J. Halley deliver the presidential address, which was as follows:—

LADIES AND GENTLEMEN, MEMBERS OF THE FIELD NATURALISTS' CLUB OF VICTORIA.

By your kind suffrages the lot falls to me a second time to speak from the presidential chair, an honour undeserved, yet highly appreciated. It is my good fortune also to-night, as at our last annual gathering, to congratulate you on the position in which, as a Club, we find ourselves. Our members have increased to 200, of whom 30 are ladies.

The meetings of the year have been full of interest. Papers, some of great excellence, have been read, and the exhibits at our monthly meetings have evinced the diligence with which some of our members, at any rate, have pursued their work of investigating the wondrous and beautiful mysteries of the world of nature.

Some of our exhibitors have forwarded their collections to enrich the exhibits at the Indian and Colonial Exhibition, now being held in South Kensington. In this connection the names of Messrs. French and Lucas deserve especial attention.

In connection with our monthly exhibitions, it must be noted that we held one of native wild flowers; previous wet weather somewhat interfered with the display, nevertheless, by the diligence of earnest seekers, about 150 different species were shown. It is intended that such should be this year repeated on a larger scale, and in a more definite manner than the one already held.

The year has been made notable by our having been favoured by the visit of one of the luminaries of science, in the person of Dr. J. E. Taylor, editor of "Science Gossip." By the delivery of a series of lectures of a popular, if not profound, character, Dr. Taylor was able to place some of the phenomena of natural science before a large number of people, and he doubtless incited many to seek to understand what perhaps before they had never thought of—the structure of the world on which they live, and how in long ages past, that structure had been slowly prepared to be the bright and pleasant home of man. Some, too, doubtless taught to look with new eyes on common plants and animals, as they learned some of the mystic wonders of the life history of our *flora* and *fauna*.

Dr. Taylor, too, contributed a series of gossipy semi-scientific articles to the pages of our leading newspaper, and which we are quite sure were read with interest and profit both by learned and unlearned, and tended also to popularise natural science. A warning, too, that even those who have attained and justly a right to speak, yet need to continue close observation and be content with something more than mere looking from the windows of a railway train, for surely the strange statement that the You Yangs was the centre of a great volcanic outburst, and that Buningyong with its well-formed crater was no extinct volcano, are mistakes which cannot

be hidden under "*magni nominis umbra*," (the shadow of a great name.)

Nor would the most enthusiastic young Australian, proud alike of the fertility and glorious sunshine of the land of his birth, dare to speak of our camellias as fragrant with scent. Far be it from me to attempt to detract from the well earned fame of Dr. Taylor, but we want more and more to learn to take nothing as fact that we can prove for ourselves, and to be very certain by prolonged and careful examination of all the facts of every case.

With much satisfaction we note that natural science is, at any rate, beginning to be considered an essential part of a liberal education. I do not ask that the study of classics should be relegated to an inferior position in our university curriculum. May the day be long distant when our young men shall cease to read the teachings of the old philosophers, in the language in which those teachings were written or spoken, when the sonorous cadences of old Homer and the rythmic lines of Virgil be forgotten. With all heartiness the members of our Club can congratulate the university on its classical chair being filled by so able and enthusiastic a scholar as Professor Tucker. Yet we note with much thankfulness that arrangements are to be made for a chair of biology, with demonstrator of the same, and that Mr. Lucas at Trinity, and Mr. McAlpine at Ormond, both honoured members of our Club, are teaching the science of biology at the affiliated colleges. Each year as it comes and goes, shows the growing interest that is being taken in those studies that engage the attention of our Club. So, too, in the world of thought. Every year is the truth of the old line being understood and acted on—"*Scire tuum nihil est nisi te scire hoc sciat alter*," or as Dryden has it, "Science is not science till revealed.

If we needed a text this should be the one for to-night. It was in the spirit of this line that I pleaded last year, when I had the honour to address you, and asked that aids to scientific knowledge should be wisely and well arranged for in this new colony of ours. I ventured then, in a modest way, to indicate some of the wants most felt by our seekers after knowledge. Some of these wants have or are being met. Some are still as keenly felt as ever. Our National Museum still requires enlargement, and the needs indicated a year ago have in no case been met. If we are to be beggars, we must be importunate ones.

The Zoological Gardens at the Royal Park, and the Aquarium at the Exhibition Building, have had added to them during the year many interesting forms, and their usefulness has thus been much enhanced.

The *Dichotomous Key to the Plants of the Colony* is not yet published, but some of us have been privileged to see proof sheets of

the same, so that we may fairly hope that before long the much desired aid may be in the hands of our botanical students. The proof sheets indicate that the fame of our government botanist, the Baron von Mueller, will suffer no diminution, but be rather enhanced by so useful a work.* Having made many tours through the country districts during the past year, over and over again I have been asked for popular works dealing with Australian *fauna* and *flora*, and I have had alas to answer that such were not in existence.† With our growing population, with the number of students of natural science continually on the increase, surely this want ought now to be met. The *Victorian Naturalist*, the journal and magazine of our Club, meets to a very limited extent, by publishing our papers, this need, and its usefulness would be greatly increased if its members would from time to time forward notes and observations bearing on natural history.

What we doubtless need is original work. Work, that by its close application and patient research brings to light some fact that shall help to elucidate some one or other of the mysteries of life. To do this, attention must be concentrated. Studies must not be too wide. We are too apt, I think, to want to know a little of everything, rather than a few things well.

Dr. Moloney, in his address to the Medical Society of Victoria, seemed almost to deprecate specialism as far as medical practice is concerned, and indicated that in his opinion specialism has not done very much in the way of medical discovery. I, on the other hand, want, so far as our particular work is concerned, to emphasize the need of specialism, but then, I daresay that the President of the Medical Society and myself would use the term in a somewhat different sense.

The study of nature should broaden our views, extend the range of our mental vision, save us from the narrowing influences of the daily world work by which we are so apt to get all our interests and sympathies dwarfed. We read the story of the rocks, and there comes to our vision a new world in the old. Quaint, strange forms of animal and vegetable life, the like of which nightmare dreams had not before revealed. World after world is evolved to our astonished gaze. Or under the microscope thousands of forms, some of grand beauty, some of strange hideousness, are born, live, grow, change, die beneath our never wearied eyes. Or other worlds are investigated, far off suns are measured, their orbits traced, their constituents analysed by spectroscope. Now all this must help, after the hard day's work is over, to widen thought and enlarge sympathy, to get a man away

*Since this address was written, one part of the ***Dichotomous Key*** has been received from Baron Mueller.

†Perhaps "the native plants of Victoria, succinctly defined by Baron von Mueller," should here have been mentioned, but the first part has as yet only been published.

from the little interest of his shop or counting-house, from the small details of his law cases, the quips and quibbles of the courts, the monotony of ever recurring disease, or the narrow lines of his theological beliefs. But this broadening influence will not be experienced if a man's studies become too specialised. If for example he determines to make only one single form his study, takes as the all absorbing subject of waking thought and nightly dream shall we say a slug, he soon knows more about the brute than any living man, but with no other object in life than slug, his sympathy in subjects of common and wider interest becomes sluggish. This is not a man either to be envied or admired. And such men we meet not unfrequently ; men with one pet subject, to them the most important in the universe, they get a kind of mental short-sightedness and see but in a most limited area. That is a specialism to be deprecated. But the specialism I want to impress on the members of our club is the working out some special and particular department of natural science, and that in relation to the grand whole. Desultory study of natural science is better than no study at all, but the end of scientific study is, as I reminded you last year in the words of Lord Bacon, "to enrich human life with useful arts and inventions," and this can only be attained by earnest and persistent endeavour in some one particular line. If our members will only do this, they will soon create for themselves the much needed literature. Would-be students in the country who now almost despair of learning would find in our transactions the very help they crave for.

I have sometimes thought that our Club might be made still more useful, if sections, as in the Royal Society, were formed. That our botanists, ornithologists, entomologists, and so on might have, not in the place of our monthly meetings, but in addition to them, their own gatherings.

As I have before said, what I want to impress, more particularly on those who are not too old to learn, is the necessity of special definite study, I suppose that it is the want of books that deters so many, especially in the country, from the study of natural history. My life for the last few years has taken me continually away from this marvellous Melbourne of ours, and over and over again I have met intelligent men and women who have plenty of leisure time, and hardly know how sometimes to kill that time, yet never seem to dream of the garden of delight, the doors of which are wide open before them. Gentlemen belonging to the learned professions who are letting all their previous training save in the line of their profession, go for nothing, who spend their spare time little better than the illiterate loafer, men of my own profession included, who have lamented to me that their lot was cast in places where the possibilities of doing anything worth the doing were so few, men who have looked at me with no little

surprise in their faces when I have said to them, why, here right before your eyes are realms of investigation that the scientific world longs to understand. Here on mountain height and in valley lowliness, here on plain, in lake or flowing streamlet are organisms of whose life history nothing is known. Here is a flora in many respects special and peculiar, mostly named indeed by the indefatigable exertions of the Baron von Mueller, but of the properties of which, economic and medicinal, little are known, in some cases entirely unknown. Here is a fauna, much of which is unnamed, untraced, new to science, and so of interest, and a fauna that plays a part in the economy of nature, that has never at all been estimated. Part of which if rightly preserved and used will add to the nation's wealth, without cost of a single penny to any man, fighting our battles for us, destroying our enemies, preserving the results of our toil, and asking in return nothing save protection from the stupid hand of ignorance. Another part, not friends, but foes, reaping where they have not sown, destroying the labour of skilled hands, sometimes so small that the unaided eye fails to detect them, and knows their presence only by the ruins they have made. Others still more hurtful promoters or breeders of disease sure messengers of death. To understand all this, to reveal it to others, to add to scientific knowledge, and so to the sum of human progress and happiness, the intelligent inhabitants of our country districts have opportunities denied to us of city life. Ladies and gentlemen of our Club, I want my plea for the study of natural science to be heard beyond our walls, and it will be no unworthy task for our Club in the future to attempt in some way to incite those not in our own immediate neighbourhood to form societies for the cultivation of scientific studies.

Doubtless the strifes of social and political life have their pleasures, and all are to be honoured who labour to lessen the weary toil of others and promote the common good in the arena of public life. But the pursuit of knowledge has its charms, and you will permit me to close my address in the words of an old enemy, and yet when I learned to master him, a friend of mine, who wrote so beautifully and with such marvellous insight, *de rerum natura* (into the nature of things) near a century before the Christian era. Pardon the Latin* and admire the English.

"How sweet, at distance from the strife to view
Contending hosts, and hear the clash of war!
But sweeter far on wisdom's height serene,
Upheld by truth to fix our firm abode;
To watch the giddy crowd that, deep below
For ever wander in pursuit of bliss;
To mark the strife for honour, and renown,
For wit and wealth, insatiate, ceaseless urged
Day after day, with labour unrestrained"*

Good's translation.

Ladies and gentlemen, may we learn to dwell on wisdom's serenest height.

*"Per campos instructa, tua sine parte pericli
Suave, etiam belli certamina magna tueri;
Sed nil dulcius est, bene quam munita tenere,
Edita doctrina sapientum, templa serena;
Despicere unde queas alios, passimque videre
Errare, atque viam palanteis quærere vitæ
Certare ingenio, contendere nobilitate
Nocteis atque dies niti præstante labore
Al summas emergere opes rerumque potiri."
Lucretius de rerum natura.
Liber II., l. 5 - 13.

Baron von Mueller, K.C.M.G., proposed a hearty vote of thanks to the president for his address, and in the course of his remarks advocated the study of natural history, and the extension of the use of the microscope. The Rev. A. W. Cresswell, M.A., briefly seconded the motion, which was carried by acclamation.

The address was followed by a lecturette after a short interval.

Outline of Lecturette—"An Old Rail," by Mr. C. A. Topp, M.A.

In the course of his remarks he explained the causes of the grey colour which old fences assume, and of the black, green, and red patches and streaks which they almost invariably present. These he showed to be due to the growth of minute algæ and fungi. The remainder of the lecturette was devoted to a popular account of the structure and life history of the lichens so frequently seen on old fences, and of the theory that they are compound plants formed of fungi parasite on algæ. Mr. Topp stated that this theory was still in dispute, and suggested that members of the Club who used the microscope, might perhaps succeed in obtaining new facts bearing on the question.

During the evening, Baron von Mueller, K.C.M.G., Government Botanist, exhibited advanced copies of the second part of "The System of Victorian Plants," which he has been preparing in response to the wish expressed by the Hon. Dr. Dobson, in his presidential address to the Club in 1884. This part enumerates the 1825 species of Victorian vascular plants, under their orders and genera, giving annotations of their regional distribution. It contains 210 wood-cuts, representing 152 species, with explanatory notes referring to the original description of the plant. The size of the publication is such as to allow it to be conveniently carried in the pocket during excursions, nevertheless, all the illustrations are given at the natural size or magnified. Another part, also of about 270 pages, will complete the work, which has been printed at the Government Printing Office.

The following is a list of the principal exhibitors, and their specimens:—

Mr. D. Best, ten cabinet drawers of Australian coleoptera, principally Longicornes, Buprestidæ, and Scarabeidæ.

Mr. F. G. A. Barnard, four cases of insects, chiefly collected around Kew. A number of well-grown ferns, mostly Victorian, including *Pteris umbrosa*, *Lomaria lanceolata*, *Gleichenia flabellata*, *G. circinata*, *Adiantum æthiopicum*, *Schizæa fistulosa*, etc. About twenty autographs of eminent scientists, etc.

Mr. N. J. Caire, some beautiful photographs of the scenery on the Ovens River, near Bright, and the Buffalo Mountains, also views taken at Macedon.

Miss F. M. Campbell, fine specimens of fossil woods from Glenmaggie, Gippsland. A large collection of Australian lichens. Books containing veneers of 350 Australian and 100 Japanese woods.

Mr. A. J. Campbell, specimens of several of the rarer Australian birds, viz., the satin bower-bird, (*Ptilonorhynchus holosericeus*), in bower, the regent-bird, (*Sericulus melinus*), Queen Victoria's Rifle-bird, (*Ptiloris Victoriæ*), the sun-bird, (*Nectarinia Australis*), with nest, pair of Swallow Dicæum, (*Dicæum hirundinaceum*, with nest.

Mr. G. Coghill, several Victorian orchids in bloom, including *Pterostylis reflexa*, *P. aphylla*, *Eriochilus autumnalis*, *E. fimbriatus*, etc.

Mr. A. Coles, a case of European birds, and a case with representatives of dead Scottish game. Specimens of the white goshawk, (Victoria), the plumed hawk, (Queensland), Soemmering's pheasant, (Japan), pinnated grouse, (Canada); and a number of Indian shells.

Mr. P. Dattari, case with exotic insects, etc.

Mr. J. E. Dixon, a collection of Victorian bird-skins, and a unique collection of specimens of insect architecture, (Victoria.)

Mr. C. French, F.L.S., groups of Australian and foreign beetles, of the family Buprestidæ, and Australian Longicornes. Specimens of the recently discovered beetle, *Phalacrognathus Muelleri*, from North Australia. A fine group of Australian and Foreign lepidoptera.

Master C. French, two cases of Victorian fossils.

Master G. French, specimens of the seeds and seed-cases of Australian and New Guinea trees and shrubs.

Mr. C. Frost, a case of British lepidoptera, also fossils and minerals from Devonshire.

Mr. R. Hall, a case of Victorian lepidoptera.

Master W. H. F. Hill, three cases of lepidoptera, and a case of shells.

Master G. E. F. Hill, two cases of lepidoptera, and a case of coleoptera.

Mr. E. H. Hennell, a case of insects, also minerals, etc.

Mr. E. E. Johnson, four live stubble-quail, a fine specimen of the wedge-tailed eagle, pair of powerful owls, from Goulburn River, pair of funereal cockatoos, from Hamilton, and a black-cheeked falcon, from Northcote.

Mr. T. A. Forbes-Leith, a large collection of birds from all parts of the world, including birds of paradise, rifle-birds, the apteryx, etc.

Dr. Lucas, twenty-six cabinet drawers of Australian lepidoptera.

Mr. A. H. S. Lucas, M.A., B.Sc., a large collection of Victorian sponges.

Baron von Mueller. K.C.M.G., a number of the plants collected in New Guinea, by the Geographical Society's Expedition. A series of sections of Foreign woods prepared for examination under the microscope, named and arranged in volumes.

Mr. F. Pitcher, specimens of sixty Victorian ferns, named, and mounted on large cards.

Mr. F. Reader, a collection of micro-fungi; a series of medicinal plants; and a number of parts of Cooke's "British Fungi."

Mr. J. E, Sherrard, two salt-water aquaria, with hermit-crabs and fish.

Mr. A. Thie, a collection of New Caledonian weapons, manufactures, etc.

Mr. S. H. Wintle, F.L.S, specimens of Tasmanian tin-stone; binoxide of tin, Cassiterite, etc. Topazes from tin wash-dirt. Crystals of Phacolite, Phillipsite, Calcite, and Arragonite, from the newer basaltic lava from Clifton Hill.

Mr. T. Worcester, five cases of bivalve Mollusca, containing specimens of the genera *Cardium*, *Venus*, *Cytherœa*, *Arca*, *Pecten*, *Spondylus*, *Chama*, *Pinna*, etc., and three cases of univalve Mollusca, containing specimens of the genera *Cypræa*, *Voluta*, *Murex*, *Triton*, *Ranella*, etc.

About ten o'clock the visitors began to disperse, having spent a very enjoyable evening.

NOTES ON THE HABITS OF NATIVE BIRDS.

By I. Batey, Sunbury.

(Read before the Field Naturalists' Club of Victoria, Jan. 18th, 1886)

Part 2. Cockatoos and Magpies

(*Continued.*)

Our magpie was possessed of extraordinary memory. Her favorite perch was a quince-tree down the garden. One night a native cat attacked her, and my brother and self rushed to the rescue. She never forgot the episode, and ever after would turn up punctually at dusk to be placed on the kitchen cross-beam. It was intensely

amusing to watch the pretty coaxing methods she would resort to, in order to compel you to attend to her wants in this respect. One summer evening when attending to the garden, I pretended to take no notice of her, though she had recourse to all her blandishments in order to induce me to offer her my forefinger. Maggie was not to be put off, so she looked about and caught a beetle, and then jumped on to my knee, uttering a low chirpy noise. Evidently this beetle was meant for me, so stooping down, I opened my mouth, when she coolly dropped it in. Of course, I could not resist this last appeal. When we scolded this bird, she would assume an air of humble contrition so irresistibly comic that we could not help laughing. She was very fond of being praised, and showed her appreciation of flattery by joyfully skipping about.

Magpies in a state of nature, can show unmistakable signs of sorrow for several days after being robbed of their young ones. I recollect a pair, which built in a she-oak: they went about the task of ministering to the wants of their young family with all the elation of confident hope. For days after I invaded their happy home, and ruthlessly deprived them of their youngsters, I noticed the parents moping about in such a state of utter dejection, that it was truly pitiable to look at them. From the manner in which they drooped their wings, and the aimless forlorn way they wandered about in the vicinity of the nest, it was evident they were sorrowing over their loss as keenly as human parents, when death bereaves them of their first-born.

When incubating, the male bird is particularly attentive to his partner, continually supplying her with food as she sits on the nest. Further, they entertain affection for their young for a long time should they miss breeding. Under such circumstances, it is a common occurrence to see the parent birds giving grubs, etc., to a twelve months old son or daughter.

As to warlike proceedings among themselves, I think they have three different kinds of quarrels The first is the pairing fight between cock and hen. This generally commences in pursuit, and culminates in a pitched battle between the amorous parties on the ground. They tumble over and over, and go at it with beak and claw, screaming all the while, a lot of old birds of both sexes pretending to assist. When the fracas is ended, the usual solo and chorus is given, after which the married couple fly off together. The union, I think, is life-long with some of the birds, because one frequently sees an old pair together in one locality, sticking to each other, in or out of season, and for years using the same tree to nest in. Secondly, there is the private quarrel, originating probably from some insult or injury, and lastly there is the chasing off of an interloper, who intrudes upon territory not his own.

(*To be continued.*)

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Vol. III. No. 2. June 1886

THE

Victorian Naturalist:

THE JOURNAL AND MAGAZINE

OF THE

Field Naturalists' Club of Victoria.

The Author of each article is responsible for the facts and opinions he records.

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Field Naturalists' Club of Victoria.

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This Club was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

No Entrance Fee. Annual Subscription, including copy of proceedings, 15s., dating from May 1st.

The Ordinary Meetings for the reading of papers, and exhibition of specimens, with a short conversazione, are held on the second Monday in each month at the Royal Society's Hall, Victoria Street, Melbourne, at 8 p.m.

The proceedings of the Club are recorded in its journal—the "Victorian Naturalist." Annual Subscription, 6s. 6d., post free (to members free). The first Volume, comprising sixteen numbers, with title page and index, just completed. Price—Seven Shillings and Sixpence (post free).

Copies of the Annual Report and List of Members for 1884-5, with Rules, etc., can be obtained on application to the Hon. Sec.

THE

Victorian Naturalist:

Vol. III. No. 2. JUNE 1886. No. 30.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The sixth annual meeting of the Club was held at the Royal Society's Hall, on Monday evening, 10th May, 1886.

The president, the Rev. J. J. Halley, occupied the chair, and about sixty members and visitors were present.

A letter was read from Mr. T. A. Forbes-Leith, resigning his membership of the Club, and explaining his reasons for so doing. On the motion of the Rev. C. M. Yelland and Mr. A. Coles, it was decided to express regret at any misunderstanding which had arisen, and to ask him to reconsider his action in the matter.

The hon. librarian reported the receipt of the following donations to the library:—

"Kent's Manual of the Infusoria" six parts; and "Key to System of Victorian Botany," Part II., from Baron von Mueller, K.C.M.G.; "Treasury of Botany," 2 Vols., from Mr. C. French; "Journal of Pharmacy," Vol. I., No. 4, from the Pharmaceutical Society; and "Annual Report Ballarat School of Mines," 1884, from Mr. F. M. Krausé.

The following were elected members of the Club:—Messrs. D. Campbell, Wm. Garland, W. E. March, and H. S. Wellington.

Professor Ralph Tate, F.G.S., was elected an honorary member of the Club.

Mr. C. A. Topp's addition to Rule 4, defining the qualifications of honorary members, was carried.

Mr. A. H. S. Lucas moved that Baron von Mueller, K.C.M.G., F.R.S., and Professor M'Coy, F.R.S., be requested to accept the position of patrons of the Club; seconded by Rev. C. M. Yelland, and carried.

The hon. secretary read the Annual Report, which stated that the Club is now in a very prosperous condition; 161 persons had

paid their subscriptions for the past year; the papers read had been of an interesting character, and the monthly meetings had been well attended. The exhibition of wild-flowers had been a success, and warranted greater efforts next year. The *Victorian Naturalist* had been regularly issued to the members, and up to the present had been published at a loss of about one pound per month, which was not considered unreasonable. Mention was made of the new Victorian botany, and members were urged to contribute notes on natural history for the meetings, or for publication in the *Naturalist*.

The report was unanimously adopted.

The hon. secretary then read the balance sheet for the past year, 1885-6, showing total receipts £157 14s., and expenditure £140 18s. 6d., the credit balance having increased from £18 18s. 3d., to £35 11s. 8d. This was also adopted.

The following office-bearers for 1886-7, were re-elected without opposition:—President, Rev. J. J. Halley; Vice-Presidents, Mr. T. A. Forbes-Leith, and Mr. A. H. S. Lucas, M.A.; Hon. Treasurer, Mr. E. Bage; Hon. Librarian, Mr. C. French, F.L.S.; Hon. Secretary, Mr. F. G. A. Barnard; and Hon. Assistant Secretary, Mr. G. Coghill.

The ballot for members of committee, resulted in Messrs. D. Best, A. J. Campbell, G. R. Hill, D. Le Souëf, O. A. Sayce, C. A. Topp, M.A., and F. Wisewould being elected.

Votes of thanks to the retiring office-bearers, and to Mr. A. H. S. Lucas as Editor of the *Victorian Naturalist*, were carried unanimously.

The following were the principal exhibits:—By Mr. C. French, group of exotic *Cetonidæ*; by Master C. French, dried specimens of 19 species of orchids, genus *Pterostylis*; by Master G. French, eggs of wild doves from Brighton; by Master G. E. Hill, a case of moths; by Mr. H. Kennon, sea-weeds and cuttle-fish, also an American bear's claws; by Mr. F. Reader, phanerogamous plants from France; by Mr. H. Watts, recently collected micro-fungi; by Rev. C. M. Yelland, a shark's mouth.

After the usual *conversazione* the meeting terminated.

DRY PREPARATION OF ANIMAL SPECIMENS FOR MUSUEM & TEACHING PURPOSES.

By D. McAlpine, F.C.S.

Read before Field Naturalists' Club of Victoria, 12th April, 1886.

It will be evident to every naturalist, that dried preparations of animal specimens, if they could be made conveniently, rapidly, and

inexpensively, would be a boon of no ordinary kind. Dried animals, however, are not to be had like dried plants, and indeed the structural features of the two are so different, that a *zooarium* on the lines of a herbarium would be practically useless. There are, it is true, some animals which may be permanently preserved by hanging up in an airy place and drying, (such as small specimens of Skate, known when so preserved as Mummy Skate), still their number is so small that they need not count for much.

To the working botanist, a herbarium of some sort is regarded as essential, and although the plants may seem disfigured in their flattened condition, they lend themselves so naturally to such a mode of treatment, that there is usually little difficulty in using them thus for reference, or restoring them, if need be, almost to their original condition. The zoologist enjoys no such luxury. He may have the soft parts of animals preserved in spirit, but the hard and dried parts cannot be made to do duty for the whole. As the eminent botanist, M. Alphonse De Candolle has said, "The herbarium is a kind of collection superior to anything which zoologists can possess. The dried plants which compose it are in a perfect state, or nearly so; while shells, skeletons, or stuffed animals, show only certain parts of the beings they represent There are usually several flowers or seeds, so that it is easy to find material for dissectien, if needed. The specimens are so little altered, that it is easy by means of a simple immersion, to see the smallest and the most delicate organs. In certain cases one can see them even better than upon the living plants; for example, in the case of ovules embedded in pulpy matter, or of membranes, which separate very clearly in drying. If collections of dried plants be compared with those of living ones, the advantages are more evenly balanced than is generally believed."

A collection of dried specimens yielding somewhat similar results to the zoologists is not an impossibility, as the few specimens on the table show, and the mode of preparation of such specimens, together with some of the uses to which they may be applied, will form the subject of the present paper. On some future occasion, I may give the results of my own experiments and those of others, in preserving certain plants, and parts of plants such as flowers, in their natural shapes and colours.

While animal specimens may be excellently preserved in spirit [1], glycerine-jelly [2], or other medium [3], it is desirable for many purposes tohave, if possible, the specimens dry, capable of ready handling, and useful for demonstrating to a class. It was the desire to have something

1. Flower, "Nature," January 4th, 1877.
   Miall., "Nature," Vol. XVI., p. 360.
2. Parker, "Nature," February 9th, 1882.
3. Parff., Eng. Mechanic, December 23rd, 1881.

of this kind, in teaching a class of biology, that induced me to turn my attention to the subject.

Methods of dry preservation of the soft parts of animals are known to some museum keepers and others, but they are, as a rule, too complicated and troublesome for ordinary use. Compared with the method I am about to give, they remind one of the system of dosing the living body, in vogue not so long ago, making up in quantity and complexity of ingredients, for any possible lack of quality. As an example, I will just give one such method, received from a medical gentleman in Edinburgh, and used with good effect. The fluid is prepared by dissolving in 3000 grammes boiling water,

100 of Alum.
25 of Common Salt.
12 of Nitrate of Potash.
60 of Carbonate of Potash.
80 of Arsenious Acid.

then cool and filter.

To every 10 litres of solution, add

4 litres of Glycerine, and
1 litre of Methylated Spirit.

Such is the fluid, consisting of 7 different substances, and the preparations to be preserved dry, are immersed in it from 6 to 12 days, and then dried in the open air. Hollow organs to be filled with it before immersion, afterwards inflated with air and dried. It was perfectly plain to me that a complicated process like this could never find general acceptance, and that some simpler fluid, for fluid apparently it must be, was requisite.

In my first attempts, a number of different substances were tried, but without success. Thus glycerine-jelly, a well-known preservative, was used for the first course, then alcohol to remove water and harden.

Soaking in melted paraffin was next tried, expecting it so to permeate the specimen as to dry without shrinking. Steeping in gum was a third process, then hardening the gum by means of alcohol, which removes the water. But all the specimens proved unsuccessful on attempting to dry them.

My most promising attempt was made when I tried a solution of chromic acid, a commonly used hardening agent, with alcohol afterwards to remove the water. Theoretically, this simple process should have been a success, for after fixing and hardening the specimen with the acid, and removing excess, as well as water by means of alcohol, what was there to prevent it drying and becoming permanently preserved? But again my rising hopes were doomed to disappointment, for practically, it turned out that on drying, the specimens shrank and shrivelled up. Everything promised fair till the drying commenced, and how to prevent shrinking was the problem I had now to solve. Fortunately, just at this juncture, I happened to read a short paragraph in the journal of the Royal

Microscopical Society, for August, 1881 [1], which helped me out of my difficulty, and gave "the one thing needful" to make my last experiment successful. It was to the effect that Professor Semper, of Wurzburg, had recently exhibited to the Society there, some zoological and anatomical preparations prepared by a new method for dry preservation. Chromic acid and alcohol were used, and the objects were steeped in oil of turpentine before drying. "The tissues whilst drying are permeated by innumerable small air bubbles, and in consequence the preparations retain their original form without sensible shrinking, whilst in colour they assume a white tint, similar to that of a gypsum-model."

On reading this, I was delighted. *Eureka* rose to my lips and visions of success before my mind. A bath of oil of turpentine solved the mystery, and completed the process before drying.

And here you will observe that the process I have carried out is not original. I have simply adopted a suggestion and achieved a success. I understand that these dry preparations are made and sold upon the Continent of Europe, although I have not as yet seen any myself. The main object of this paper, however, as already stated, is not to discuss the discovery, (for which there are several candidates in the field, claiming the credit of having first made it public), but to describe and explain the process, so that some of you may be led to take it up and possibly improve upon it.

There are just 3 re-agents required, each of which is used separately—chromic acid for hardening, alcohol for withdrawing water and excess of acid, and oil of turpentine to prevent shrinking or drying. Simple as the process appears, it requires care and attention in carrying it out.

Perhaps the most instructive way will be to take a small animal, such as the Frog, and explain the various steps in connection with it—the three stages of the preparation process. The exact time will be given for each stage in this specimen, (Frog), but you are to bear in mind that this will vary according to size of specimen, temperature, &c. It is an easy matter, however, to know when the different re-agents have had their proper effect, and a general principle may be laid down. It can be *felt* when the specimen is properly hardened, always remembering that too long immersion makes it brittle. It can be *seen* when the alcohol has removed all the water and excess of acid, for then the alcohol will remain clear and without discolouration, and the final application of oil of turpentine has had its effect when any part on drying is whitish in colour.

To begin with, the Frog is opened up from the front, so that the hardening agent may have free access to all parts, for otherwise it might not penetrate through the skin. Then it is pinned out on a

1. See also same Journal for October, 1882.

thin layer of loaded cork, or any other contrivance to keep it from floating. The specimen is now ready to be placed in the chromic acid solution, which must be made very weak to start with, as if made strong, it would harden the outer parts too rapidly, and so prevent thorough saturation. I begin with a solution of a pale sherry colour, making it on each successive application a little deeper in colour, and so stronger. This Frog was kept 5 days in the chromic acid solution, and during that time it was only once changed. After removal from this solution the specimen was washed in water, so as to get rid of the excess of acid as much as possible before placing in alcohol. The methylated alcohol is used weak at first, about 50°, and kept at this strength for a time or two, until the specimen ceases to colour it. The acid is but slightly soluble in strong alcohol, hence that is only resorted to latterly, finishing up with absolute alcohol to remove every trace of water. The alcoholic treatment extended over 4 days, with at least as many changes. The specimen was now hardened and dehydrated, and after exposure to the air for a little to allow the spirit to evaporate, it was transferred to pure oil of turpentine. After lying in this for 3 days without any change, (although less time might have served), the Frog was afterwards dried, and proved to be a perfect specimen, thereby showing the efficacy of the treatment. In this case the internal organs are all in their natural position, but if desired, they may be laid out to advantage before hardening, and then the specimen becomes more valuable for purposes of instruction.

I need not give details about other specimens preserved, among which were rabbit, pigeon, chick, mouse, cuttlefish, snail, slug, mussel, whelk and worm, besides brains, hearts, lungs, &c. Small and soft-bodied animals such as worms, snails and mussels may be preserved entire without any previous preparation, by simply placing them in the fluids. When killed with chloroform worms and snails usually stretch themselves out to their full extent before giving up the ghost, which is a decided advantage to the preserver. The acid acts upon calcareous structures such as shells, and so they are removed. Animals may be kept in spirit before being treated to this process, and so a number of specimens may be collected and done together. It is a saving of time and material to do several at once, and in the case of Museums, the oil might be used over again by distilling it, while the alcohol last used might be employed at an earlier stage with other specimens.

It is easiest, of course, to do comparatively small animals, but pigeons, rabbits, cats, &c., only require more changes of fluid and longer immersion. With larger specimens still, the difficulty is to get the hardening fluid to penetrate, but that might be overcome by injection. I think it quite practicable to prepare specimens up to the size of the human body.

I trust the mode of preparation has now been made sufficiently clear, so that any one may follow it out with success, and avoid the pitfalls and disappointments of my own early attempts.

These dry preparations have their advantages and their drawbacks. One drawback is the loss of their natural colour, but fortunately, this can be remedied to a certain extent if desired. By painting with oil-colours, the specimens may have their living tints restored.

On the other hand, they combine the advantages of a spirit-preparation or a model, without their disadvantages. When properly prepared, the parts are of leathery consistency, and overlapping parts can be turned aside to show those lying beneath, and just as in a model, certain parts may be specially coloured to bring them into prominence, so here the same may be done. There is another great advantage which would not strike the ordinary observer, and which gives an additional value to these preparations. By the very mode of preparation, not only the external form, but the *microscopic structure* is preserved. And this suggests a remark. I was struck with the fact that this very method was employed by Mr. Lockhart Clarke, in making his beautiful microscopic preparations of the spinal cord, some thirty years ago.

According to his method, a portion of perfectly fresh spinal cord is hardened by steeping in dilute chromic acid solution, soaked in spirits of wine to remove the water, and then treated with oil of turpentine. So that a process then used for microscopic preparations, is now used for macroscopic preparations, and it occurred to me that here was a hint which might be turned to good and useful account—the application of microscopic methods to larger objects.

A very good further illustration of this principle has just come under my notice within the last few days, and if it had been recognised, what is now reported as a remarkable scientific discovery, might have been anticipated long ere this.

Microscopists are familiar with the fact, that if it is wished to observe the changes undergone by the blood in its active condition, it is necessary to have the preparation enclosed in oil, and they as well as biologists, are likewise familiar with the fact, that the coagulation of the blood soon after its effusion, has been a great hindrance to experiments with micro-organisms, since all the means hitherto tried to prevent coagulation have been more or less unsatisfactory, because they altered the chemical composition of the blood.

A student, (mark you), in the chemical laboratory of Professor Stricker, at Vienna, has discovered that coagulation can be prevented simply by making an oil preparation of it on a large scale. The blood is poured into a clean glass or other vessel, the sides of which have been coated with a thin film of oil, then a layer of oil is poured on the top of it, and the blood is thus preserved fresh for any

experiment, and decomposition arrested. Vaseline, almond oil, and olive oil, have all been tried with equal success, and here in Australia we have just to try it further with eucalyptus oil. Truly, after all science and simplicity are near akin, if not synonymous, as the simplest means may often prove the most effective. I think I am somewhat justified from these two striking examples of microscopic methods being applied on the big scale, in saying to those of a suggestive turn of mind, that latent discoveries exist here—discoveries which might be turned to practical account, like the dry preparation of animal specimens, or the arrest of the decomposition of the blood.

In the title of this paper, I have indicated some of the uses to which such dry preparations may be applied,—for museum and teaching purposes. First, for museums, and here their use is evident The object of a museum being public instruction, whatever helps in the accomplishment of that end is to be commended and encouraged. The soft parts of animals are at least as instructive as the hard parts, but of the visitors to our museums, who cares for the spirit preserved specimens, or gives them more than a passing, curious glance, regarding them as so much flabby material, without seeming order or beauty? The shells of many animals are beautiful and artistic, the skeletons are, at least, wonderful, but the internal parts suggest little or nothing as commonly exhibited. Now, if a number of the commoner animals were displayed after the manner of these dry preparations, in glass covered card-boxes, with the important parts coloured and named, such as the heart, stomach, lungs, kidney, &c., I venture to say that the general public would then take an interest in something they can understand. Beside the skeleton of the animal might be placed, the various organs which it is its function to support and protect; and thus the public would cease to regard the animals as so much skin and bone, from seeing so frequently in museums only stuffed specimens and skeletons. And just to single out one class of animals, I think it would be a unique collection to have the bodies of the mollusca represented in our museums, alongside of their shells—to have the whelk and the limpet, the mussel and the snail, placed beside the houses they construct and inhabit, so that the wonderful architects might have some share of the interest and admiration their works excite. To any one here interested in that class, I would suggest that his interest could take no better shape than preparing such a collection, and perhaps presenting it to one of our public museums.

It is becoming customary in many museums, to have Students' Type Collections, cases where the genuine student can go and study the leading types of animals, with their various parts displayed to advantage. For this purpose I can conceive nothing better adapted than these dry preparations, to show every part, if need be, in its

natural colour, and the name or initial letter written upon each principal organ. It would be as delightful as if the botanist could go out into the fields and find his plants already named, so that he could devote his time and attention to their real study. And if accompanied by drawings possibly enlarged, or photos, such as these now before you, (frog, cat, snail,) so much the better. To note only one possible further use for museums, where the object is not so much to represent parts as the whole, they might be used in the case of birds, at least, for stuffed specimens, since the plumage is not materially affected in the preparation. There is a constant outcry at home against the miserable specimens of stuffing, and no less an authority than Professor Flower, Director of the Natural History Department of the British Museum, has told us of the cases of museums filled "with wretched and repulsive caricatures of mammals and birds, out of all natural proportion, shrunken here and bloated there, and in impossible attitudes." Where good specimens, independent of cost is the object, I would imagine that a bird preserved in this way, with the flaps sewed up, would at least preserve the natural proportions, since the natural contents are there. On the whole, I can safely say that with such specimens judiciously named and coloured in our museums, this department would be a source of attraction, and frequented rather than shunned as it too often is at present.

Second, for teaching purposes there can be no doubt of the value of these preparations. Holding, as I do, that it is unnatural to teach natural history without reference to specimens, nothing could be more effective than the coloured dry preparations for demonstrating to a class, (I speak from experience.) They may be handled and carefully examined by the pupil, and I think it will be granted that no model nor drawing can teach the grand outline of animal structure and the relation of parts better than the object itself. Of course, one may have the fresh animal, but fresh specimens are not always at hand when wanted, and here they are preserved once for all, with the parts standing out in clear contrast where colour is employed. I need not enlarge under this head, but would notice specially how useful these preparations might be made in the teaching of physiology. The sheep's head, heart, lungs brain, eye, &c., can all be beautifully preserved and used to illustrate practically the teaching of human physiology.

There is a third purpose for which these preparations might be used—the purposes of the investigator. And to mention only one such, they might serve for studying the natural relations and positions of the various parts in different animals. Hitherto, this was possible only in frozen specimens, but now in smaller animals, at least, the mutual relations of internal organs may be studied.

I have now shown how specimens may be prepared, with the

precautions necessary for success, and the specific uses to which they may be applied. It only remains for members of this Club to reduce the precepts to practice, and possibly to originate new methods. Thus the different ingredients might be varied, possibly with useful results. A solution of bichromate of potash, and sulphate of soda, hardens like chromic acid, without leaving the specimens brittle, and it would be interesting to note how eucalyptus oil would act in the final stage. Whether success crowns your efforts or not, in seeking to advance the bounds of science, there is always a pleasure which the investigator alone knows, and you may have the satisfaction, among the sweetest of human delights, of having added to the sum of human knowledge.

THE AQUILINÆ OR EAGLES.

By T. A. Forbes-Leith.

The Eagles are a sub-family of birds, and belong to the order *Accipitres*, division A, or *Accipitres Diurni*, and family *Falconidæ*. The bill is strong, compressed, and curved at the top, in the shape of a hook; the margins in some of them being more or less festooned, and the tarsi feathered almost to the toes.

Just as the lion among animals has been called the king of beasts, so among the feathered tribe has the Eagle been named the king of birds ; as from the earliest ages to the present time, it has always been considered amongst birds as first for strength, courage, and boldness, for when roused to anger, it fears neither man nor beast.

Often in boyhood, from the mountain tops of my native land, have I watched that glorious bird, the Golden Eagle, soaring aloft in the sapphire sky, till to the naked eye he appeared no larger, on the cloudless summer canopy of heaven, than the smallest fixed star we can distinguish on a clear night.

The Golden Eagle was the emblem of France in the days of the Great Napoleon, and in Byron's poem on his farewell to the French nation, before being sent to St. Helena, one verse alludes, figuratively, to this national emblem, in the following words :—

"Oh ! for the veteran hearts that were wasted
In strife with the storm, when their battles were won ;
Then the eagle, whose gaze in that moment was blasted,
Had still soared with eyes fixed on victory's sun."

When Prince Louis Napoleon landed in the north of France in 1848, to rouse the enthusiasm of the French people, especially the army, he took with him a Golden Eagle, which an attendant was told to let go when the Prince landed, and it is said that a tempting piece of fat pork was placed on his Imperial Highness's head, with

the hope that the half-starved bird would alight thereon, and so be a good omen for France ; but Eagles have wonderful eyes, and tradition says this sagacious bird saw a butcher's shop in the distance and shaped his course for the carcass of a recently slaughtered lamb, young mutton being this species of eagle's particular weakness when allowed in freedom to cater for himself. I was in France at the time, and know that the Prince had an eagle with him when he landed, but I cannot say with a degree of certainty whether this historical eagle made its first meal in the fair land of France off fat pig or young mutton.

The Golden Eagle, *Aquila chrysaetus*, is found in Great Britain and other parts of Europe, also in the mountainous parts of North America and Asia ; its food consists chiefly of small quadrupeds, lambs, young deer, &c., and carrion when very hard pressed for food. In my young days I recollect hearing of one carrying off a child in the Isle of Skye to its nest high up on a rocky cliff in the mountains, where it was found alive and safe by the son of a neighbouring landed proprietor, who rescued it at great personal risk, and restoring the highland baby to its mother's arms, was ever after almost worshipped by the surrounding peasantry ; and I doubt not some of you have read the tale of a young mother who had her first-born carried off in a like manner by this king of birds, and who, with all the unquenchable fire of a mother's love at its height, followed her babe up the rocky mountain side, springing over cascades and caverns, and traversing the edge of precipices, never once halting or looking back until she once more clasped her offspring in her arms.

This noble bird, the Golden Eagle, will measure at times as much as 7 feet in extent of wings, and $3\frac{1}{2}$ from the beak to the extremity of the tail. I have heard of them doing a little fishing on their own account, and I remember when I was a boy, one being shot near my home with a river trout 4lbs. weight in its inside. The other eagles met with in Britain are the greater Spotted Eagle, (*Aquila clanga*) the White-Tailed Eagle (*Haliætus Albicilla*), and the Osprey or Fishing Eagle, (*Pandion Haliætus.*)

The Eagles of North America are the White-Headed (*Falco Leucocephalus*), the Osprey (*Falco Haliætus*), and the Golden, this latter found most common in Western Canada. On the continent of Europe there are no less than eleven species of Eagles met with viz., the Golden, the Imperial, Bonelli's, the Greater Spotted, the Spotted, the Tawny, the Booted, the White-Tailed, (this is, I believe, the Jean le Blanc of the French), Pallas's Sea Eagle, the Short-Toed, and the Fishing or Osprey. But of all quarters of the world, India is the strongest in Eagles, having 18 well-known found there, viz., the Imperial, Spotted, Tawny, Golden, Long-Legged, Dwarf, Black, Crestless, Changeable, Crested, Spotted-Hawk Eagle, Rufous, Common Serpent, Crested Serpent, Osprey,

White-Tailed Sea Eagle, Ring-Tailed Sea Eagle, and Grey-Backed Sea Eagle, and of Vultures, Hawks, Owls, and Night-Jars there are nearly 70 species known, so it will be seen that rapacious birds muster as strong in that ancient and interesting land, as rapacious beasts do; and some of the birds, beasts, and plants of Southern India are of course met with in Ceylon.

Another fine bird of this sub-family is the Vulturine Eagle of South Africa, (*Pteroœtus Vulturinus*), but the Harpy or Imperial Eagle of Mexico and South America, (*Thrasœtus Harpyia*), is perhaps the largest and most powerful bird of all the Eagles, and when wounded will fight like a Turk in a corner. Some years ago one was shot in South America and considered dead, the natives pulled out the feathers and even the down, (which they use in dressing wounds), and in this state the naked bird was thrown into the canoe; but all at once it sprang at the white man of the party, and wounded him so severely with its talons, that it took three natives to take it off, and the unfortunate man was placed thoroughly *hors de combat.*

Only last year at Furstenwald, province of Brandenburg, an *Aquila Imperialis* attacked and killed a large watch-dog belonging to a farmer, tearing all the flesh from its back; the Eagle was afterwards shot, and measured 7 feet in extent of wings; it had on its left foot a ring with the date 1827 thereon, and the name of a place in Upper Hungary, near the Northern Carpathian Mountains.

This year an American Harpy Eagle was shot by a settler in the Southern States of America, and when he went to secure it, the attack it made on him was so furious, that he had to retire to dress his wounds, and go home for assistance, the bird receiving a charge of small shot before they could capture it, even in its wounded state. It was after all carried home apparently not much the worse for the two shots it received.

In Ohio country, America, last January, an Eagle attacked a lad working in the fields; they fought for some time, until he managed to close with it, and grasping it by the throat, held on till life was extinct. From the bill to the end of the tail this Eagle measured 4 feet, and would therefore be fully 7 feet in extent of wings. After the encounter the lad had to be conveyed to the local hospital.

In May last, a large grey Eagle in Pekin, Illinois, swooped down on a little child, and was rising in the air with it, when a farmer coming along killed the bird and saved the child; this Eagle measured 8 feet from tip to tip of the wings.

Eagles are known to live to a great age, and one recently died in Vienna which had been kept in confinement 114 years: its age was supposed to be 120, but they have been proved to live much longer than this. Another handsome Eagle is the Brazilian one, *Morphnus Urubitinga*, and like the Harpy it is also met with in Guiana.

(*To be Continued,*)

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VOL. III. No. 3. JULY 1886

THE

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THE JOURNAL AND MAGAZINE

OF THE

Field Naturalists' Club of Victoria.

The Author of each article is responsible for the facts and opinions he records.

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This Club was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

No Entrance Fee. Annual Subscription, including copy of proceedings, 15s., dating from May 1st.

The Ordinary Meetings for the reading of papers, and exhibition of specimens, with a short conversazione, are held on the second Monday in each month at the Royal Society's Hall, Victoria Street, Melbourne, at 8 p.m.

The proceedings of the Club are recorded in its journal—the "Victorian Naturalist." Annual Subscription, 6s. 6d., post free (to members free).

With the view of popularising the study of the Natural History of the Colony, correspondence, notes, and queries relating to this subject are invited for insertion, and should be addressed to the Editor at the Wesley College, Prahran.

Any of the numbers from the commencement, January 1884, can be obtained from the Hon. Sec., Mr. F. G. A. Barnard, Kew, at sixpence each; or in sets, Vol. I (1884-5), 16 numbers, 7/6; Vol. II (1885-6), 12 numbers, 6/-; each set with title-page and index for binding.

The numbers forwarded post free to any address on receipt of remittance (postal-notes preferred).

Copies of the Annual Report and List of Members for 1885-6, with Rules, etc., can be obtained on application to the Hon. Sec.

THE

Victorian Naturalist:

Vol. III. No. 3. JULY 1886. No. 31.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall, on Monday evening 14th June, 1886.

The president, the Rev. J. J. Halley, occupied the chair, and about fifty members and visitors were present.

A letter was read from Prof. R. Tate, F.G.S., Adelaide, thanking the Club for his election as an hon. member, offering to name for members specimens of tertiary mollusca, and desiring specimens for examination from southern and south-eastern Victoria.

In reply to the resolution passed at the last meeting, a letter was read and accepted from Mr. T. A. Forbes-Leith, in which he withdrew his resignation, etc.

The hon. librarian reported the receipt of the following donations to the library:—

"Monograph of the Tertiary Bivalves of Australia," Part I., from Prof. Tate, F.G.S., Adelaide; "Proceedings of the Linnean Society of New South Wales," Vol. I., Part 1, new series from the Society; "Proceedings of the Royal Society of South Australia," Vol. VIII., from the Society; "Proceedings of the Field Naturalists' Section of the Royal Society of South Australia," for 1884-5, from the Section; "Journal of the New York Microscopical Society," Vol. I., Nos. 8 and 9, Vol. II., Nos. 1 and 2, from the Society; "Journal of Pharmacy," Vol. I., No. 5, from the Society.

The hon. secretary reported that the excursion to Lilydale on the Queen's Birthday had been fairly attended, and read a short account of the outing. Ferns, lichens, and fungi were the principal objects collected; of the former some twenty species were noted, among the lichens, several specimens of *Peltigera dactyla*, and *Thysanothecium*

hyalinum, were collected, also Cladonias, Parmelias, Usneas, etc. At the limestone quarry, fossils were very scarce, but some good specimens of dendritic markings were obtained.

The following were elected members of the Club:—Messrs. P. H. Anderson, J. H. Dunning, W. Jennings, Jno. MacDowall, and J. N. Sayce.

Baron F. von Mueller, K.C.M.G., Government Botanist, having intimated his willingness to accept the position, was unanimously elected Patron of the Club.

A sub-committee was appointed to undertake the revision of the Rules, and the former sub-committee on the question of increased protection to our native birds was re-appointed.

Papers read:—1. By Mr. P. Dattari, entitled "Notes on the new Australian beetle, *Phalacrognathus Muelleri*." The author briefly reviewed the history of this splendid insect, and stated that in his opinion the specimens exhibited would probably be found to represent more than one species. The paper was illustrated by large coloured drawings of the mandibles, etc., and lithographic plates of the beetle were distributed among the members present.

2. By Mr. S. H. Wintle, F.L.S., entitled "The Fossil Mammalian Remains of Tasmania," Part I. The author in the course of his remarks stated that no fossil remains of the large extinct marsupials, such as the Diprotodon, the Protocoptodon, and the Thylacoles, or of the *Canis dingo* have been discovered in Tasmania, though found in Victoria and New South Wales, his reasons for which would be given in the next part of his paper. He also gave an interesting account of the first exploration of the Mount Fawkner Caves, near Glenorchy, Tasmania.

The following were the principal exhibits:—By Miss F. M. Campbell, fungi, mosses, and lichens, collected during the Club excursion at Lilydale; by Mr. J. P. Chirnside, specimens from the Pink and White Terraces, Lake Rotomahana, New Zealand, also lava from Mt. Tarawera, New Zealand; by Mr. A. Coles, an Australian bittern, (*Botaurus poicilapterus*); by Mr. P. Dattari, coloured plate of the beetle, *Phalacrognathus Muelleri*; by Mr. C. French, F.L.S., rare *Lucanidæ* from North Australia, wedge-tailed eagle, whistling eagle, and chestnut-faced owl from Victorian Alps; by Master C. French, New Guinea curiosities; by Master R. D Hatch, fossil remains of crayfish, and fossil wood from Cambridge Gulf, Western Australia; by Mr. H. W. Hunt, skins of Victorian birds; by Mr. H. Kennon, fossil teeth from Wodonga, native axe from Carrum Swamp; by Mr. J. N. McKibbin, a fine specimen of *Phasma* sp.; by Mr. J. E. Prince, photographs of the mountains and watersheds of North Gippsland; by Mr. F. Reader, Victorian mosses, (first series); by Mr. F. Spry, lepidoptera from New Guinea; by Mr. O. A. Sayce, fossils from the Upper Silurian limestone,

Lilydale, species of *Holopella*, *Euomphalus*, *Flustra*, etc.; and by Mr. S. H. Wintle, F.L.S., polyzoa from South Australia, viz., *Escharas Buskii*, (Woods), *E. porrecta*, (Woods), and *Sphærica Ockleyii*, (Wintle), a large sheet of mica from West Australia, specimens of *Terebratula microles*, (Wintle), a photograph of Hobart taken by exhibitor 30 years ago by the iodized albumen process, also photographs of vertical section of Upper Silurian beds at Victoria Street Bridge cutting, Kew, showing nearly vertical dykes of decomposed felsite, in which occur concretions of limonite.

After the usual *conversazione* the meeting terminated.

THE FOSSIL MAMMALIAN REMAINS OF TASMANIA COMPARED WITH THOSE OF THE AUSTRALIAN MAINLAND.

By S. H. Wintle, F.L.S., &c.

(*Read before the Field Naturalists' Club of Victoria, June 14th, 1886*)

It is a somewhat remarkable fact, that hitherto palæontological researches in Tasmania have failed in bringing to light the fossil bones of animals that had an existence in the pleistocene epoch of this Australian mainland; and it is one that I venture to regard as deserving of more general attention, may I say, than it has hitherto received. Having devoted much attention to the subject by practical researches in Tasmania, extending over many years, I purpose in these remarks to point out the singular breaks—the missing links in the chain of past mammalian life between the mainland and the island, which have presented themselves to my observation during the last quarter of a century.

As far as researches have extended in Tasmania up to the present date, no true bone-breccia of pleistocene age has yet been discovered, such as that of the celebrated Wellington Caves in New South Wales, to wit, nor indeed anything that furnishes evidence of extinct orders of mammalian life differing widely from existing forms.

That repulsive, untameable, and treacherous animal, the Tasmanian Devil (*Sarcophilus ursinus*), whose powerful jaws and massive teeth are a study in themselves, is found fossil only in this continent in the pleistocene deposits. So also with the *Thylacinus cynocephalus*, the Tasmanian tiger, sometimes called the marsupial wolf. These carnivora no longer inhabit the forests of the Australian continent, preying upon inoffensive herbivora. No fossil remains of the huge *Diprotodon*, whose enormous bones have been exhumed in Victoria, South Australia, Western Australia, and New South Wales—and no remains of the *Nototherium*, *Procoptodon*, and *Thylacoleo*—

the gigantic progenitus of existing marsupalia have been found in Tasmania, while no mesozoic, *i.e.*, secondary formations supply evidence of the former existence of *Icthyosauri*, *Plesiosauri*, and *Enaliosauri*, those leviathan marine lizards which swarmed seas of the Oolitic period in Northern Australia, as well as those of Europe. And add to this no fossil remains of *Canis dingo*—the wild-dog—have rewarded the search of palæontologists in that island; notwithstanding that such fossil remains are quite common on this mainland. (In saying this, I am quite aware that the late Gerrard Krefft, F.L.S., C.M.Z.S., in his *Notes on the Fauna of Tasmania*, speaks of the dingo as being "extinct;" but I have yet to learn that any fossil bones of that animal have ever been discovered in the island)—in the post pliocene deposits; as for instance at Mt. Macedon, and beneath the volcanic ashes at Warrnambool, in Victoria. And lastly, no marsupial lion, the *Thylacoleo*, appears to have roamed through the forests of Tasmania as it did on this continent; and no gigantic *Dromornis*—the progenitor of the emu, stalked over the grass-clothed plains when Victorian volcanoes poured forth their fiery floods of lava to form the extensive plains which you now see.

Although Tasmania is only separated by a span, comparatively speaking, from the Australian mainland, and at best can only be regarded as an outlier, there is, as will readily be seen, a very wide gap in the geologic record between the two areas, and also in the history of their respective fauna; and which gap is traceable to the fact of there being no known mesozoic equivalents of the cretaceous and oolitic groups such as obtain in Queensland, nor of the beds of Barrabool Hills, in this colony, nor the representatives of the jurassic limestone system.

From the upper coal measures of Tasmania to the eocene epoch, there is a gulf unbridged as far as the investigations of the geologist have extended. It has yet to be satisfactorily proved that the upper coal measures of Tasmania are of oolitic age, as some staunch advocates of their oolitic origin contend; notwithstanding the striking agreements of much of the fossil flora with well-known European oolitic facies, and which agreement has been considerably strengthened by the fact of the fossil bones of a huge batrachian reptile, allied to the well-known *Labyrinthodon* of secondary deposits of Europe, having been discovered some years ago in a quarry of coal-measure sandstone at Hobart, from which quarry the stone was obtained for building Government House. But, even conceding that Tasmanian coal-measures are of true oolitic origin, there are absent other mesozoic systems and groups, such as the triassic and cretaceous, as already stated. It may, therefore, be said that at a single step we pass over incalculable periods of geologic time, viz., from the mesozoic to the cainozoic epochs, which are wholly unrepresented

by any vestiges of those typical groups of strata seen on the Australian mainland and in Europe, as for instance in the Lias, the Muschelkalk, Wealden, and true Chalk.

Apart from the interesting *Labyrinthodon* remains, the oldest fossil bones as yet discovered in the colony, have no greater antiquity than the close of the miocene epoch. These consist of bones and teeth of *Hypsypromnus*, (Kangaroo Rat), found beneath a solid sheet of basalt at One Tree Point by my friend Mr. R. M. Johnston, F.L.S. &c, while working up the plant remains of the island.

Notwithstanding this comparatively recent character, they have no small interest, as tending to throw some light on the antiquity of existing indigenous mammals, both placental and implacental.

There are not more than three or four caves known to contain fossil bones in Tasmania—the great Chudleigh Cave in Silurian limestone, another smaller one in the same district, distinguished as the habitat of a new and singular cave-inhabiting spider, *Theridon Troglodytes*, (Higgins and Petterd), and the Barradal Cave, Mt. Fawkner, Glenorchy. To this latter my remarks will chiefly apply, and which I was the first to explore immediately upon its discovery being made known to me some years ago.

My attention was drawn to it by a young friend of mine who had just returned, with his companions, from a kangaroo hunting expedition among the ranges of hills in the district of Glenorchy, a few miles from Hobart. He produced some pieces of bone, which he told me he had found in a very "singular cave" on the crown of a steep hill, and into which he had ventnred a short distance; and by the light of a lucifer match, he discovered some fragments of bone partly embedded in the floor of the cave. Thinking that some interest might be attached to them, he had brought them for my examination. From the description which he gave me of the cavern, as well as the character of the fragments of bone, I saw at a glance that the spot was invested with much interest, and accordingly lost no time in visiting it. Accompanied by him as a guide, and a few other friends, we started early one fine winter's morning for a day's exploration, provided with all that was necessary for enjoying a scientific picnic. The day was well advanced before my guide found the entrance to the cave, owing to its very inconspicuous character, and the rough nature of the country making travelling very slow at best.

I had imagined that I would find it to be a cave by disintegration of carboniferous limestone, which is extensively developed at the base of the hills forming the Mt. Wellington Range But, on the contrary, I found it situated in a greenstone capping of Mt. Fawkner, a hill of about 2000 feet in altitude above sea land. It proved to be very difficult of ascent, owing to the side being covered with

loose fragments of fissile greenstone.* Scaling the hill by walking was next to impossible on the Glenorchy side, by which we made the ascent. We had literally to climb by laying hold of the stunted vegetation which grew thereon, so steep is the escarpment.

Upon reaching the entrance to this subterranean bone *depôt*, I found it to consist of a nearly circular opening of about 18 feet in its greatest diameter, situated close to the summit of the hill, and parallel to the surface, and presenting the appearance of the roof of a vault having caved in. It formed a chamber of about 12 feet in depth. the sides and floor of which were composed of angular masses of dense, hornblendic greenstone. In outline, it was very concave, so as to resemble the interior of a dome. The interstices of the floor were filled with humus and fragments of wood, such as sticks, twigs, and decayed leaves. Upon disturbing the soil I could find no bones, but there were fragments of the shells of the land-snail *Bulimus gunni*, which is tolerably abundant in the immediate neighborhood.

On the western side of this chamber is an opening close to the floor, barely large enough to admit the body of a man crawling on his stomach, and which leads into another compartment, narrow, and irregular, with the floor sloping at an angle of about 35 degrees. In some parts of the cavern a person could stand upright, while in other parts progress could only be made on the hands and knees. Here I found a few small fragments of bone, which had the appearance of having been gnawed. It was here that my young friend found the pieces of bone to which he had drawn my attention, and beyond which he had not ventured. There was no deposit of vegetable soil in this compartment, to which, must be added, an almost entire absence of twigs and leaves. The soil, or cave earth, on the floor, was of a chocolate color, and of fine, loamy character. The angular blocks of greenstone forming the sides and roof of the chamber, were coated with a natural enamel, which, reflecting the lights of our candles, had a very pleasing effect. This enamel coating, I am inclined to believe, has been caused by the percolation of moisture carrying silica in solution. It is singular, however, that this deposit should be confined to this particular part of the cave, since no trace of it was visible in other parts. The length of this chamber is about 50 feet, and it leads into two others, one of which is narrow and irregular, running upward toward the surface of the hill at an acute angle, but along which I was unable to proceed more than a few yards, owing to a large mass of rock which had apparently fallen, at some time or another, blocking up the passage—the other, or fourth chamber, is reached by a hole in the floor of this one. The hole, at the widest part, being about five feet across. Failing to see any bottom to this well-like opening by the

*A dense, crystalline variety of igneous rock of Plutonic age.

light of the candle which I held at arm's length down it, as I lay on my stomach, craning over the edge of the opening; and as no splash of water responded to a stone thrown down it, I tied a piece of stout line to my waist that I had brought, and got my companions to lower me down. At a depth of about fourteen feet I stood on the bottom, which is exceedingly rough and broken. This compartment formed an oblong, irregular vault, varying from five feet to fifteen feet in width, and about forty feet in length. The roof is low, seldom permitting an erect position to be assumed. There is a greater depth of earth on the floor here than in the last described compartment. It is of a rusty red color, and uniformly fine, being quite free from gravel. Here I unearthed several bones, more or less mutilated, which chiefly belonged to kangaroos.

At the northern extremity of this chamber, I found a small opening leading into another—so small, indeed, that it was with the greatest difficulty I could squeeze myself through it, after divesting myself of my coat and waistcoat, notwithstandingI am only of medium stature. This compartment is about thirty feet long, and about ten feet wide, and the roof so low and uneven that only a crouching position could be assumed in any part of it. It was here that I found the largest number of bones. They were sticking out of the floor of the cavern in all directions, and it was not long before I exhumed a sufficient number to fill a large carpet bag that I had brought with me. I dug up from a depth of nearly two feet from the floor, bones of the boomer kangaroo (*Macropus major*), together with those of all other marsupial mammals indigenous to the island, save the native tiger.

The deepest deposited, and consequently older bones, had not undergone transmutation by petrifaction to any appreciable extent; for it may be here observed that the term fossil in a strictly scientific sense, does not imply that organic remains must necessarily be litholised or converted by petrifying processes into stone, as is generally assumed by a large majority of persons. The oldest of these bones have been altered so far as to lose trace of their animal oil and albumen to a large extent; consequently, they readily clove to the tongue—a simple test—showing that phosphate of lime, alone, was left by time.

I have been thus prolix in describing the compartment of this subterranean cavity, in order that my hearers may be better able to understand the data on which my deductions—that are to follow—rest; not only for the comparative antiquity of the various animals to which the bones belonged, but also the manner in which they came to be deposited in such an out-of-the-way and certes remarkable mausoleum.

The following is a list of the animals to which the bones belonged, which I exhumed, as determined by the late Mr. Gerrard Krefft,

of the Australian Museum, to whom I sent a large number for identification.

Macropus major - -	Boomer or Forester Kangaroo.
Halmaturus bennetii -	Brush Kangaroo.
H. Billardieri - -	Tasmanian Wallaby.
Hypsiprymnus apicalis -	Kangaroo-Rat.
Perameles Gunnii - -	Bandicoot
Phalangista fuliginosa -	Black Opposum.
P. vulpina - - -	Common Opposum.
P. viverrina - - -	Ringtail Opposum.
Antechinus Swainsonii -	Swainson's Antechinus.
Dasyurus viverrinus -	Native Cat.
D. maculatus - -	Spotted-Tailed Tiger Cat.
Sarcophilus ursinus -	Tasmanian Devil.
Phascolomys Wombatus -	Wombat.
Mus castaneus - -	Bush Rat.

It will be seen from the above list, that all the bones belonged to animals indigenous to and existing in the island at the present time; and, therefore, unlike the osseous relics of the Australian mainland, they do not furnish any extinct forms of mammalian life.

At the extremity of this small chamber, was an opening barely large enough for me to pass my arm through, which indicated the existence of another compartment. Indeed, it would be difficult to say how far these singular ramifying cavities in this greenstone hill may not extend; and it would have been highly dangerous to have attempted making an enlargement, by the displacement of any of the blocks of stone, had I been provided with the means of so doing; inasmuch, as every block appeared to serve the purpose of a key-stone in the arch of a bridge. By some terrene convulsion in the past, the whole rock-mass had been irrupted, and had thus become accidentally wedged and locked together—forming these singular and erratic chambers. If ever a natural crypt or cavern was calculated to impress the explorer with a sense of the uncertainty of life by character of its configuration, this one, most undoubtedly, was. One felt that even the discharging of a pistol would have been courting destruction. There were enormous, angular, masses of rock, hundreds of tons in weight, apparently hanging from the roof, like the fabled sword of Damocles, and without any visible adequate support; and yet they had maintained that position for untold ages.

The bones did not bear traces of having undergone any marked change by petrifying processes. Those on surface of the floor still retained a trace, in some instances, of the animal oil; while those which were the lowest embedded, and consequently the oldest, appeared to contain little more than the phosphate of lime, and accordingly adhered to the tongue. This condition may be due to the

peculiarly dry character of the earth which surrounded them, which, strange to say, was little more than damp, notwithstanding that it was the depth of winter when I first visited the spot; while the lowest chamber cannot be less, as I estimate it, than 50 feet below the surface of the hill.

Although no greater antiquity, geologically speaking, can be assigned to these osseous remains, still, when the time that must have elapsed since the animals to which they belonged, lived, is calculated by that chronology which is measured by human events and action, nothing short of an *æon* has rolled into the ever-swelling past, as I will endeavor to show. The cave-earth covering the bones, is completely foreign to the soil on the surface of the hill, and especially to that immediately surrounding the mouth of the cave. On the floor of the opening forming the first chamber, there was much in common with the soil on the surface—an intermixture of alluvium, gravel, grit, bits of sticks, and other vegetable matter, and the remains of land-snail shells of species found living in abundance in the locality. These had been carried in by wind and weather. In the second chamber, as already stated, these conditions were almost entirely absent; such traces of humus and vegetable substance as were visible, were confined to the immediate vicinty of the narrow opening leading thereto; while, from this point to the extremity of the cavern the soil was fine, pulverulent, rusty red, and homogeneous throughout; such as could only be produced by disintegration of the hard, crystalline greenstone. No evidence, whatever, is to be seen of fluviatile agency in this cave-earth. Now, when it is remembered how well calculated a crystalline, plutonic rock, such as this greenstone is to resist natural decomposing, or disintegrating agency, it will be readily conceded, I feel assured, that a very long period of time must have elapsed to produce a deposit such as I have described, and which I penetrated in one place to a depth of 18 inches. That this cave-earth is the result of slow disintegration of the greenstone, is satisfactorily shown by analysis, which was made of both earth and rock, allowance being made for the presence of traces of the elements of animal excrement in the former.

Of no small interest, it may be said, is the question of how these bones came to be deposited in such an out-of-the-way situation. In the first place, there was not a single perfect skeleton, or anything approaching to one, to be seen *in situ*. The bones were scattered in a most confused manner, while there were very few, indeed, that did not bear the marks of having been subjected to a crushing process. Had the various small animals to whom many of the bones belonged, sought protection from a pursuing foe by rushing into the cave to the farthest extremity, and then, through being unable to get out again had died from starvation, it is only reasonable to suppose that under such circumstances a more or less perfect skeleton would be met

with. On the contrary, I found the bones of the great Forester kangaroo, indicating an animal 5 and 6 feet high, when in an erect posture, mixed indiscriminately with those of the native cat, the opossum, and bandicoot. Although all the smaller animals to whom the bones belonged, could have passed through the contracted apertures leading into the various chambers, it would have been impossible for the great Forester Kangaroo to have done so, and it is very doubtful if the Brush Kangaroo could have squeezed through the contracted openings. We are, consequently, driven to the conclusion that they were killed by some animal of prey, and carried into the remote recesses of the cavern in a dismembered state. This view of the question I purpose considering on a future occasion, when I think that I will be able to propound a satisfactory theory as to the cause of the extinction of the *Thylacinus* and *Sarcophilus* on this continent.

(To be Continued.)

THE AQUILINÆ OR EAGLES.

By T. A. Forbes-Leith.

(Continued.)

Here in Australia, 5 species of Eagles are well-known to us besides the White-Headed Osprey or Fishing Eagle, viz., the Little Eagle, the Large Sea Eagle, the White-Breasted Eagle, the Whistling Eagle, and the Wedge-Tailed. This latter bird I had alive and tame. He had become quite an epicure, and would not if he could possibly help it eat anything but first-class beef, consuming per diem enough for two ordinary mortals. The *Aquila Audax* has been called by ornithologists the Golden Eagle of the Southern Hemisphere. Now, although I admit he is a fine bird, still I say he cannot hold a candle to the Golden Eagle of the heather-clad hills of Scotland.

The Wedge-tailed Eagle is also found in Tasmania and some of the islands of Bass's Straits. Other fine birds of this sub-family are the Royal Eagle (*Aquila Regalis*), found on the banks of the mighty Amazon; the Superb Eagle (*Aquila Superbus*,) whose native habitat is Guiana; the Martial Eagle of Africa; the Oronoka Eagle, found in South America, with a top-knot; and two Indian ones I forgot to mention, the Cheela and the Pondicherry Eagles, also the Crowned Eagle of Guinea, Western coast of Africa. There are I know several Eagles in New Guinea, but the only one I have seen and handled is the one known as the Swallow Eagle.

The Golden Eagle was the emblem of ancient Rome as well as modern France, and in Grecian and Roman mythology he was the associate of Jupiter, and proudly termed the bird of Jove, being

the true emblem of dignity and might, The White-headed, Bald-headed, or American Sea Eagle is the national emblem of the United States, and is a bird of a wide geographical range, being met with from the ice-bound northern coast to the palm-covered headlands of Brazil, and this bird at times makes inland journeys to large lakes and up great rivers ; he is fierce and daring, but not easily roused, and will watch the Osprey and coolly rob him when he catches a fish. It is a bird of rapid flight, soaring at times into the highest heavens, at others sitting low on a dead tree near the sea shore watching for fish, flesh, or fowl, all of which are equally relished by him. When first chosen as the national emblem of America, Dr. Benjamin Franklyn objected, as he said the bird was of bad moral character, thieving from and preying on other birds ; but other Americans, less sensitive, did not view the laws of nature instinctively carried out by this bird, in the same light, and every true citizen points to the American Eagle with republican pride.

In the northern parts of Norway where the coast is rocky, sea Eagles rendezvous, and carry off lambs and small animals, attacking and often overpowering the Norwegian oxen, and his mode of attacking them is singular and unique First darting down into the waves, he then rolls about on the sandy beach in his wet plumage, until he has his wings well charged with sand, then rising in the air, he hovers over his intended victim, then swooping down in front of its face, he flaps his wings with vigour, which sends the sand into the eyes of the poor brute, and quite scares it by the blows of its pinions, the ox thus blinded rushes away to avoid the Eagle and soon becomes exhausted, or breaks his neck over a cliff, when the enemy arrives and a banquet ensues. In Iceland, also, these Eagles are the terror of the inhabitants, eating their eider ducks, &c., so that when they manage to shoot one there is much rejoicing; and even up much farther north they are met with, ever on the look-out for some bird or beast to feast upon.

One remarkable characteristic of both Eagles and Vultures is their wonderful power of sight; great as it undoubtedly is, it has been over estimated by most ornithologists, as they contend that both species of birds can see incredible distances, and by their vision can always find the carcase of any dead animal, no matter how far off. Now, I believe it is their still more wonderful sense of smell that guides them to dead animals, for in the countries where Vultures and Eagles abound, a few hours suffice to cause decomposition to set in, and as the scent from decomposing animal matter ascends, it reaches those birds, far, far away in their elevated atmospheric soarings. It matters not what part of an African plain, or a dense Indian jungle an animal is slain or dies, Eagles and Vultures, although nowhere in sight, soon put in an appearance to refresh exhausted nature,

and this will happen where the dead animal could not be seen from any point twenty yards off, which to my mind is a proof that they are guided by scent, and not by sight.

In the north of Scotland, we have known the Golden Eagle to live considerably over 100 years. In olden times the chieftains in the highlands of that country wore three Eagles' feathers in their highland bonnets, (which said head-pieces did not the least resemble the "Tam O'Shanter's" now so common in Victoria), those beneath the rank of chieftan one, while others wore the Heron's plume, or sprigs of white heather, &c., according to the class they belonged to. This Eagle when seen soaring over the tops of the rocky crags on the highland mountains, seems to be the bird that alone could add to their romantic beauty, and caused that true poet of nature, Andrew Park, to say in his lines thereon,

"I have trod merry England, and dwelt on its charms;
I have wandered through Erin, the gem of the sea;
But the Highlands alone, the true Scottish heart warms,
For her heather is blooming, her eagles are free."

NOTES ON THE HABITS OF NATIVE BIRDS.

By I. Batey, Sunbury.

(Read before the Field Naturalists' Club of Victoria, Jan. 18th, 1886)

Part 2. Cockatoos and Magpies.

(Concluded.)

Some people, with apparently good grounds, would question how it could be possible for birds to recognise one of their own species as a stranger. I freely assert that magpies at least can do so, but, as we are comparatively speaking just entering on the vista of animated nature, I cannot explain "the how." This much, I know, that the smallest of our parrakeets will miss their mates in a few short seconds of time. If fifty or more of these diminutive creatures are in a tree, and one or more falls to your fire, the remainder, unlike the large parrakeet, take instant flight. Very often, before they have flown a hundred yards, according to the number slain there is a proportionate return of survivors to the fatal tree. These birds wheel out of the main flock, as it is in full flight. This, I regard as simply marvellous, that birds under the impulse of fear, caused by the loud discharge of the gun, should not lose their gift of identification, which their almost instant return to the scene of the disaster, proves they possess in a very high degree. The returned birds will remain in the tree for hours, uttering their plaintive "cree crees."

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OF THE

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The Author of each article is responsible for the facts and opinions he records.

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This Club was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

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The Ordinary Meetings for the reading of papers, and exhibition of specimens, with a short conversazione, are held on the second Monday in each month at the Royal Society's Hall, Victoria Street, Melbourne, at 8 p.m.

The proceedings of the Club are recorded in its journal—the "Victorian Naturalist." Annual Subscription, 6s. 6d., post free (to members free)

With the view of popularising the study of the Natural History of the Colony, correspondence, notes, and queries relating to this subject are invited for insertion, and should be addressed to the Editor at the Wesley College, Prahran.

Any of the numbers from the commencement, January 1884, can be obtained from the Hon. Sec., Mr. F. G. A. Barnard, Kew, at sixpence each; or in sets, Vol. I (1884-5), 16 numbers, 7/6; Vol. II (1885-6), 12 numbers, 6/-; each set with title-page and index for binding.

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Copies of the Annual Report and List of Members for 1885-6, with Rules, etc., can be obtained on application to the Hon. Sec.

THE

Victorian Naturalist:

Vol. III. No. 4. AUGUST 1886. No. 32.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall, on Monday evening, 12th June, 1886.

The president, the Rev. J. J. Halley, occupied the chair, and about sixty members and visitors were present.

Baron von Mueller, K.C.M.G., M. and Ph.D., F.R.S., wrote thanking the Club for his election as Patron.

The hon. librarian reported the receipt of the following donations to the library:—

"Remarks on the new Australian beetle, *Phalacrognathus Muelleri*," with coloured plate, by Mr. P. Dattari, from the author; "Select Extra-tropical Plants" Mueller, from the premier; "The President's Address to the Royal Society of New South Wales," May 1886, from the author; "Journal of Pharmacy," Vol. I., No. 6, from the Society; and "Journal of the New York Microscopical Society," Vol. II., No. 3, from the Society.

The hon. secretary reported that the monthly excursion on Saturday, June 19th, was well attended considering the threatening weather, and time of year. The members journeyed to Cheltenham, where they divided into two sections, one under the leadership of Mr. C. French, F.L.S., proceeding across the heath towards the Black Rock in search of botanical specimens, the other, under Mr. S. H. Wintle, F.L.S., proceeding to the cliffs bent on palæontological research. Mr. French reported that the very dry season had materially affected the growth of the various native plants, parts known as swamps for thirty years were found perfectly dry. *Acacia suaveolens* was found in flower. Small specimens not yet in flower of *Hovea heterophylla*, *Gompholobium Huegelii*,

were obtained, and further on plants of *Schizæa dichotoma*, and *Ophioglossum vulgatum*, etc., were noted. A few of the commoner fungi of the genera *Agaricus*, *Geaster*, *Polyporus*, and several lichens (*Cladonias*, and *Parmelias*), were collected. A few beetles belonging to the *Carabidæ*, and *Curculionidæ* were taken. Mr. Wintle read an interesting account of the doings of the geological section. He stated that his principal object in visiting the locality was to obtain a photograph of the fossil cliff which would show its structure and height. For the latter purpose a couple of the party helped him by by taking up suitable positions against the cliff, so that in the view a comparison could be drawn between the different heights. After carrying out his desire, some little time was spent in search along the beach for specimens, and among the results may be mentioned pieces of the fossil bone of the sperm whale *(Physeter)*, fossil echinoderms (*Lovenia Forbesii*), sponges (*Halichondria resillis*), and Algæ (*Hormosirus Billardieri*, *Cystophora*, etc.) The united party reached town about six o'clock.

The following were elected members of the Club:—Mrs. Flatow, Master H. Grover, Mr. Jno. T. Haden, Mr. J. O. Moody, Miss Moody, Miss H. Moody, Master C. Moody, and Mr. G. Sweet.

Papers read:—1. By Mr. S. H. Wintle, F.L.S., entitled "The Fossil Mammalian Remains of Tasmania," Part II. The author pointed out the unaccountable absence not only of remains of many extinct Marsupialia common to the Australian mainland, but also of several recent forms of life, which abound in Victoria, among which may be specified the native bear, the flying fox, the tortoise, and members of the Python family. Regarding the extinction of the *Thylacinus* (Tasmanian Tiger), and *Sarcophilus* (Tasmanian Devil) on the mainland, he gave it as his opinion that this was due to the existence of the wild-dog, *Canis dingo*, which had exterminated them, and had never as far as known existed in Tasmania. This break in the chain of animal life, he contended was all the more singular, on account of the island of Tasmania having so recently formed a part of this continent.

The paper was very attentively listened to, and gave rise to some little discussion.

2. By Mr. T. A. Forbes-Leith, entitled "Notes on the Salmonidæ or Salmon Family." The writer gave a general view of the different members of this great family of fishes, and related his experiences when endeavouring to obtain a glimpse of a so-called Tasmanian salmon, when on view in Melbourne; and stated that he coincided in opinion with Mr. W. Saville Kent, Inspector of Tasmanian fisheries, that the true salmon had not yet been introduced into Tasmanian waters.

The following were the principal exhibits:—By Mr, F. G. A. Barnard, a fine specimen of the spectre insect (*Phasmidæ*),

Cyphocrania species from Albury, also a *Cicada*, apparently unrecorded, from Marysville; by Mr. G. Coghill, leaves of a eucalypt, perfectly skeletonised by attacks of caterpillars; by Master H. B. Coles, seventeen species of honey-eaters; by Rev. A. W Cresswell, M.A., siliceous tufa from Rotorua, New Zealand, also a sponge, *Suberites Wilsoni*, dredged off Queenscliff by Mr. J. Bracebridge Wilson, M.A.; by Mr. P. Dattari, 250 species of *Cetonidæ*, and other exotic coleoptera, including the rare elater, *Pectocera Fortunei*, from South America; by Mr. T. A. Forbes-Leith, a pair of parrots, *Electus polychlorus*, from New Guinea, also the smallest species of parrot known, *Nasciterna pusilla*, syn. *Psittacula pigmæa*, from New Guinea; by Mr, C. French, F.L.S., Jardine's harrier, and Whistling Owl from Omeo; by Master C. French, fossils from Waurn ponds; by Mr. T. Hyland, seeds of a species of wild-apple, and of a species of water-gum, which grows on the sea-beach, also a flying squirrel, all from Bulladelah, New South Wales; by Mr. D. McAlpine, F.C.S., egg within egg from Clunes, also *Globigerina*, obtained in Atlantic Ocean at 1990 fathoms by the "Challenger" Expedition; Baron von Mueller sent for exhibition dried specimens of three Vacciniaceous plants from New Guinea. All three are epiphytes; one, the *Dimorphanthera Moorhousiana*, was published in February last *(Wings' S. Science Record)* from collections of the Rev. James Chalmers; the two others are from Mr. H. O. Forbes's collections; one represents a new species of *Agapetes*, allied to *A meliphagidum*, described some years ago by Dr. Beccari from Mt. Arfak; the third of these new plants forms a remarkable new genus, to which Baron von Mueller has given the name *Catanthera*, on account of the anthers remaining permanently turned upside down. In reference to its distinct four petals it is allied to *Oxycoccus*, the genus which comprises the Cranberry plant of Britain; the main characteristic of *Catanthera* consists in the anthers being unmovingly refracted inwards; for although in *Clethra* and *Pyrola* an inversion of the anthers also occurs, it is at first outward, the introflection taking place inward during anthesis, and becomes not an infraction of the stamen so complete as in the new genus now indicated; moreover *Catanthera* belongs to *Vaccineæ*, although the *choripetalous* corolla is universal in *Clethreæ* and *Pyroleæ*, whereas it is only of exceptional occurrence in *Vaccinieæ*. All these three new plants are of charming beauty, their flowers being copiously produced along the branches and of a bright red; but as the growth of these *Vaccinieæ* is epiphytal, their culture will probably be found to be surrounded with difficulties. The Baron also exhibited a new *Sterculia*, named after Mr. Edelfeldt, from South-eastern New Guinea, and to be described with some other new species of that genus in the next number of the *Victorian Naturalist*, and a new species of Eucalyptus, *E. Naudiniana* was also shown, this being so far as is known, the only Eucalyptus

hitherto recorded from Polynesia, but the fruit of this interesting tree has not yet been obtained. By Mr. F. Reader, European fungi, *Sporifera*; and by Mr. S. H. Wintle, F.L.S., ¼ plate photograph of the cliff at Cheltenham, fossil tooth of cetacean, fragments of fossil bone of sperm-whale (*Physeter*), and an undetermined fossil, either a palatial tooth of a fish, or a fossil coral allied to *Placotrochus deltoides*, all from Cheltenham, some fine zeolites from basalt quarry near Melbourne, and kaolin from decomposed felspar dyke, Victoria Bridge Cutting, Kew.

After the usual *conversazione* the meeting terminated.

THE FOSSIL MAMMALIAN REMAINS OF TASMANIA COMPARED WITH THOSE OF THE AUSTRALIAN MAINLAND.

By S. H. Wintle, F.L.S.

Part II.

Read before the Field Naturalists' Club of Victoria. July 12, 1886.

Upon my first visit to the cavern, my suspicions fell upon the *Thylacinus*, or native tiger, as the animal most likely to have carried these bones into it. Subsequent examination has induced me to dispel that impression, for I now consider it very doubtful if an animal of its size and peculiar form could have managed to pass through the narrow opening to the remotest chamber. In this opinion I am supported by old Tasmanian bushmen who have had even better opportunities of observing the habits of this creature than myself. There is only one other carnivorous marsupial in the island that can be suspected, and that is the Native Devil, which has been well-named *Sarcophilus*; and, therefore, I am inclined to believe that he has been the real bone-depositor in these subterranean recesses. This opinion, I may observe, is strengthened by the fact of the bones of this animal occurring with those of herbivorous marsupials, while the contracted apertures of the chambers would offer easy access to him. But then, at a first glance, we are confronted with the fact that he could not carry a Forester Kangaroo into such a place, even if he succeeded in killing it, which is very improbable, notwithstanding his bloodthirsty, voracious, and treacherous character. The charge of destroying sheep is laid at his door, as well as it is to that of the Native Tiger, which is so many times larger and swifter of foot; but the timid sheep is a very different animal to the "old-man" kangaroo, who can prove a

dangerous foe to either man or dog when attacked in close quarters; and, notwithstanding the powerful jaws and teeth of the Tasmanian Devil, the Macropus would make small work of him if he once got him in his embrace. Viewing the question in this light, there is very little doubt, in my mind, at least, that the giant of existing kangaroos, whose bones I found here, was killed by the Native Tiger, who would be a fair match for him, and that portions of the carcase were dragged into the cavern by the Sarcophilus.

There is one apparent difficulty offered to ingress and egress of the latter animal, and that is presented by the pit-shaped depression by which access is gained from the third chamber to the fourth, owing, not only to its depth, but also to the few facilities presented for climbing by the conformation of its sides, which are more concave than convex. The Sarcophilus is not an animal possessed of much agility. On the contrary, it is sluggish in its movements, lying in wait, and, cat-like, seizing its prey. Therefore, leaping down a hole 14 feet deep, with the hind leg of a Forester Kangaroo in its mouth would be a feat of strength and agility not to be expected from an animal of its size and habits.

In discussing the question with a geological friend, of how these bones came to be deposited in this labyrinthine vault, some time after my second visit to the place, he ingeniously suggested that probably, at the time the bones were placed there the cavern presented a somewhat different form to what it does at the present time, and that at some subsequent period a shock of earthquake had so displaced the masses of rock as to give to it its present configuration. I merely mention this for what it is worth. Be it as it may, there are the bones, whatever may have been the origin of their deposit.

It would appear, as I afterwards learned, that the existence of this cavern was known to some of the kangaroo hunters of the district years before I explored it, but it had not been penetrated beyond the second entrance. It would also seem that a rusty clasp knife, and a tinder box and flint had been found in it, and it is asserted by more than one of the oldest settlers in the district, that it was the secret haunt of some of the bushrangers in the early days of the colony, long before the advent of lucifer matches. This is quite probable, for its very inconspicuous entrance, and out-of-the-way situation, would render it eminently calculated as a place of secret retreat—a very bushranger's sanctuary.

Notwithstanding that the carboniferous, or mountain limestone, abounds throughout a considerable part of Tasmania, caves of disintegration, as might naturally be expected to exist in such a formation, like those known to obtain in other parts of the globe, are few; and those few have shed very little light on the ancient Fauna of the island. Referring to this marked absence of osseous

remains in Tasmania, Mr. J. Bonwick observes, in his *Daily Life of the Tasmanians*, p. 291 :—

"Notwithstanding Mr. Gould did good service while Government Geologist, Mr. Wintle has labored freely and nobly in the cause of science, yet the fossil discoveries have not been extensive or satisfactory. There are still wanting in the little island many forms of life revealed on the Continent of Australia."

The most notable cave is that of Chudleigh, in the Mersey district, on the north-east coast. It consists of a series of extensive chambers excavated by the action of water in fossiliferous limestone, and of Silurian age, and is distinguished for its coral remains and its magnificent stalactites and stalagmites—the rock being known as the Chudleigh marble. Although this cavern extends for a distance of three or four miles, it is said, underground, it has furnished nothing in the way of extinct osseous palæontology up to the present time. The water that carved out this extensive subterreanean vault, ages on ages ago, is still running out at the entrance in a clear, cold stream. Beyond being an eloquent exponent of old-world marine conditions and the result of terrestrial aqueous agency, it is valueless when viewed in connection with palæontology. The deposits which have yielded, perhaps, the most interesting fossil bones in the island are the Tertiary fresh water limestone formations, which are regarded as the equivalents of the travertine of Limeburner's Point, near Geelong, and the Pliocene gold drifts of Dunolly, as well as the clays of Back Creek, in Victoria. These deposits have furnished numerous valuable remains of extinct mammals, as well as evidence of the comparatively great antiquity of the Dingo. Their Tasmanian equivalents contain but few fossil bones, and they belong to existing genera and species associated with the remains of plants, frequently in abundance, and land and freshwater snail shells; while in some few instances, insects and their larvæ, chiefly coleopterous, are met with, among which, as occupying a foremost place may be mentioned the water-beetle *Dyticus*.

One of the richest in organic remains of these pliocene tertiary travertin deposits is of great historical interest, inasmuch as it is associated with the name of one, which all who now hear me, I am sure, hold in the highest veneration, viz., the late Charles Darwin. It is situated on the eastern bank of the river Derwent, at Geilston Bay, in the district of Richmond. A quarry was opened in it as far back as 1835, by the late Hon. T. G. Gregson, of Tasmanian political renown, for lime burning purposes. It was visited by the undying author of the Origin of Species and Natural Development, when quite a young man he visited these colonies in H.M.S. Beagle, in the capacity of naturalist to that expedition; and it is briefly described by him as being of much interest on account of the perfect state of preservation of its fossils. The excavation in

This formation reveals three distinct beds of hard, compact limestone, containing numerous impressions of leaves and stems and seed-vessels of plants, for which the minutest detail of structure is most frequently seen. These beds are intercalated by bands of calcareous tufa, gravel, and coarse sandy loam, more or less colored by ferruginous matter. On one occasion, during one of my many visits to this quarry, I found some bones in a stratum of incoherent tufa beneath the three beds of compact rock, at a depth from the surface of about 40 feet. They were chiefly the bones of birds, much broken, together with those of, it is supposed, the *Antechinus* and rat-kangaroo, still living. Notwithstanding the great lapse of time since the creatures lived to which the bones belonged, the bones were, to all appearance, as fresh as if the animals had been living only four or five years ago; a condition which may possibly be due to the phosphate of lime of the bones not undergoing any transmutation, owing to their being embedded in a matrix of carbonate of lime. In this deposit the late Morton Allport, F.L.S., brought to light a fossil water beetle *(Dyticus)*, and several larvæ of other supposed *coleoptera*. Although the faunal remains are identified as belonging to existing families, the floral relics, for the most part, it is agreed, are extinct. One of the most numerous leaf impressions, and which is, at the same time, the most beautiful in form, is allied to the existing *Cinnamomum*. At the time when this travertine was deposited, the contour of the surrounding country presented a widely different aspect to what it does at the present day. There was no river Derwent flowing then between countless hills; for, as the same formation, with its characteristic fossils, exists on the opposite side of the river—a distance of two miles away—it points to a freshwater basin, or lake having existed during the Pliocene epoch, and fed by numerous streams which carried into it the animal and vegetable remains, which we find so beautifully preserved. The beds of travertine have been dislocated and tilted at various angles by the subsequent irruption of basalt, a dyke of which intervenes between the Geilstown Bay beds and the river, and it is, doubtless, to the irruptive forces accompanying this outburst of volcanic rock-matter that the present physical features of the locality are due.

Notwithstanding that this Tertiary deposit is, in point of age, an analogue of the bone-bearing travertines near Geelong, and elsewhere in Victoria, it, unlike them, does not furnish any vestiges of extinct forms of mammalian life. This fact invites much earnest enquiry as to the probable cause, when it is considered that at this period Tasmania and the Australian mainland, New Guinea, and as many with good reason contend, New Zealand, were one continuous stretch of land. Victoria has its living *Phascolarctos*, or native bear, and its Dingo; but no traces of these animals having existed in Tasmania have been discovered.

The existence of the Dingo in the Australian Continent exclusively, during the Pliocene Tertiary period, is invested with much that is paradoxical when there is such strong evidence to show that at that time the island of Tasmania and the mainland were one. The remains of this animal are among the most ancient of indigenous mammals, being found in company with those of Thylacoleo, Nototherium, Diprotodon, and Procoptodon in the Pliocene drifts at Colac, in Victoria. Tasmania has its living Wombat, in considerable numbers, so also has South Australia, but of a different species—the hairy-nosed Wombat—where its fossil remains are found in Pliocene Tertiary deposits. Not so in the former colony, for no remains of the Tasmanian Wombat have been found, as far as I know, in deposits older than the Post Tertiary, which are accumulating at the present time. Accordingly, it is only reasonable to infer from this data, that the South Australian Wombat claims a greater antiquity than that of Tasmania.

The marked absence of these links in the chain of distribution of Australian animal life in such a comparatively circumscribed area, may, to a great extent, be ascribed to the difference of climatic condition in the past ; but even regarding such assumed condition by the most favorable light, we are still in the dark as to the why and wherefore of the Sarcophilus being an inhabitant of the island and extinct on the mainland—why the Thylacinus should be found living in Tasmania while it is only found fossil on the Continent ; and why no traces of the extinct Diprotodon, Thylacoleo, Nototherium, and other gigantic marsupials that roamed the Australian forests during the Pliocene epoch, never had, like the Dingo, an existence in the island across the Straits. These are problems which may yet be solved in the future when Australian geology and Australian palæontology can boast more practical working disciples than they can at the present day.

One of the most interesting examples of fossil osseous relics furnished by Tasmania is to be seen in the Royal Society's museum at Hobart. This consists of the almost entire skeleton of a wallaby in a block of shelly limestone of marine origin. It was discovered many years ago in a cliff of later Pliocene age at Table Cape, on the North West Coast of the island. This cliff is celebrated on account of its fossil shells, which are very abundant and in a beautiful state of preservation. This formation may be best described as a Tertiary raised beach, and is the equivalent of the well-known fossil shell beds of Victoria, of which those at Schnapper Point and Cape Schanck may be taken as type. The bones of the wallaby (which species appears to be identical with the common Halmaturus Billardieri) are seen in a natural position, just as the creature died. This skeleton is embedded in a matrix

almost exclusively composed of the well-known existing spiral univalve shell, Cerithium. What forms a striking feature in these fossil remains is that the creature must have been entombed by this shell-drift almost simultaneously with its death. This fact serves to show the great abundance of these testacea at that time. Had it been buried in mud, or sand, it would not have appeared so remarkable, still, even in that case, its complete entombment must have been accomplished before decomposition had taken place to any great extent, else the bones would have been more or less dispersed and disarranged by tidal action on what was, most probably, the Laminarian zone of a Pliocene Tertiary sea shore.

Along the shores of Tasmania, as along those of the Australian mainland, are Raised Beaches occupying an altitude above the sea level of from 50 feet to, in not a few instances, 150 feet. These uplifted sea-margins are invested with much interest, as showing an elevation of the land, or recession of the sea, during a late geological period; and which may, without doubt, be assigned to the Post Tertiary epoch. They consist of an accumulation of shells which occur in beds conformable to the underlying deposits, consisting chiefly of loam and clay. They vary in thickness from one foot to three and four feet, and in very many instances are composed almost entirely of fragments of shells. Those which are found entire are chiefly univalves of stouter structure, such as Turbo, Trochus, and Triton; and of the bivalves, Ostrea, Pecten, and Cardium. The shells belong to families and genera existing at the present time in Australian waters; thus showing the recent origin of these shell-beds. These raised beaches have, to a small extent, contributed to the osseous palæontology of Tasmania, by furnishing bones of marine mammals. In a shell bed in the Sorell district, which has a mean thickness of three feet, and is so rich in shells that it has been worked for years for lime-burning purposes, I found the ear bone of a whale, *(Cetotolite,)* and a part of the upper jaw of a seal, which has been assigned to *Arctocephalus lobatus*, now met with on the coast.

(*To be continued.*)

OBSERVATIONS ON SOME PAPUAN AND POLYNESIAN STERCULIACEÆ.

By Baron von Mueller, K.C.M.G., M. & Ph.D., F.R.S.

In bringing some new specific forms of *Sterculia* and of allied genera under notice, from collections recently received, the writer

seizes on this apt opportunity of promulgating simultaneously various notes, which were gradually made on material often imperfect accumulating during a series of years in his establishment. The connected investigations now instituted have led to altering some of the generic limits of the plants here under review; and this small essay may induce local observers beyond Australia, to follow up this particular line of observations elsewhere. The notes, now to be offered, have in an unconstrained fashion been variously appended to the descriptions of the new species just elaborated. For an exhaustive monographic treatise on the tribe of *Sterculieæ* as yet the time has not arrived, as doubtless numerous species and perhaps some genera, pertaining to this group of plants, remain still to be discovered within the tropics both of the eastern and western hemisphere, not to speak of the scanty material, from which many of the known specific forms could hitherto only be elucidated.

Pterygota Forbesii.

Leaves almost ovate-cordate, at the base nearly truncate; fruitlets obliquely ellipsoid-ovate, terminated by a narrow blunt ascending apex, containing about 20 seeds.

Near the base of the Owen Stanley's Ranges; H. O. Forbes (441.)

The above diagnosis comprises all the characteristics, which from a solitary specimen with immature fruit can be offered for separating this *Pterygota* from *P. Roxburghii* and *P. Thwaitesii*; yet the Papuan plant cannot be considered as identical with the former, and is still more distinct from the latter; moreover the flowers and ripe fruit, when obtained, are likely to exhibit additional specific differences. The leaves, so far as the material hitherto extant allows to judge, have not a distinctly cordate base, the fruitlets are nearly twice as long as they are broad, therefore not almost globular (as those described by Roxburgh, Schott, Beddome, Masters and Kurz from the original congener), and further they are produced into a conspicuous apex, not indicated in any of the descriptions, nor shown in Beddome's illustration of *P. Roxburghii*. The only fruitlet seen, which commenced to burst and therefore was approaching ripeness, is $3\frac{1}{2}$ inches long and 2 inches broad, irrespective of the stipes, which measures about one inch in length; thus it is evidently smaller than the ordinary fruitlets of *P. Roxburghii*, and more approaching in size and form those of *P. Thwaitesii*, though not blunt; the seeds are also much less numerous than in the Continental-Indian species. As yet no record is extant of any *Pterygota* occurring in the Sunda-Islands, a fact which renders the occurrence of an isolated and vicarious species in New Guinea all the more significant, and points also to permanent specific diversity. In adopting for Roxburgh's plant the original specific name, given in Vienne, the repetition of the leading characteristic both in the generic and specific appellation is avoided.

STERCULIA EDELFELTII.

Leaves on long stalks, chartaceous, ovate or verging into a lanceolar form, blunt at the base, suddenly short-acuminate at the summit, almost equally green, quite glabrous and shining on both sides; panicle narrow, sometimes almost racemous, not very elongated; flowers small; stalklets shorter than the calyx, as well as the flower-stalks glabrous; calyces urceolar-ovate, five-lobed, outside glabrous, the lobes hardly half as long as the tube or sometimes nearly as long, semi-lanceolar, for a long while cohering at the summit, inside papillular-rough and towards the margin bearded by straight simple whitish hair; staminal column very short; anthers crowded into a globular mass; fruitlets large, mostly ripening solitarely on the elongated peduncle, not stipitate, very much compressed, nearly dimidiate-orbicular, few-seeded; valves comparatively thin, outside brown-velvety, inside except the margin glabrous; seeds ellipsoid-ovate; testa black, glabrous; cotyledons plan-convex, nearly as thick as the albumen; radicle remote from the hilum.

Towards Port Moresby, Rev. James Chalmers; near the Astrolabe-Range, E. G. Edelfelt; at the base of the Owen Stanley's Range, H. O. Forbes (752.)

A tree, flowering already in a shrubby state. Branchlets robust. Leaf-stalkes 1-2 inches long. Leaves attaining a length of 10 inches and a breadth of 5, though often only about half that size, strongly and ascendingly but distantly costate-nerved, prominently net-veined, and besides traversed by close reticulations of subtle veinlets, the base of the leaves often slightly bilobed. Panicles a few inches long, with most of the leaves emanating from the summits of branchlets. Calyces $\frac{1}{3}$ to nearly $\frac{1}{2}$ an inch long, in a dry state brownish-yellow, the tube also inside glabrous. Head of anthers not reaching the lobes of the calyx. Stigmas of the male flowers concealed. Fruitlets 2-2$\frac{1}{2}$ inches long, about 1$\frac{1}{2}$ inches broad, almost obliquely ovate, rounded-blunt, amply almost bivalvularly dehiscent, inside pale when dry. Seeds nearly half an inch long; outer integument very thin and brittle; middle one thicker, dark-coloured, somewhat elastic when fresh, slightly separated from the outer by a pasty or powdered substance; innermost very thin, pale-brownish, closely adnate to the albumen; cotyledons detractible from the latter, more or less conspicuously veined on the free commissural side.

Specimens from three collections have enabled me, to give an almost complete description of this species; but the flowers on the specimens, obtained by Mr. Forbes, are of a somewhat thicker texture, less turgid, also less bearded, while the lobes are longer and do not remain cohering at the summit. Whether therefore possibly two species are comprehended under what I described here, similar in

leaves and flower, but different in fruit, requires yet to be cleared up. Only Mr. Chalmers specimens are in fruit, but devoid of flowers.

Our plant is evidently allied to *S. guttata*, but the foliage and panicles are not hairy, the lobes of the calyces are not so long, and the fruitlets are not turgid. More distant it is yet from *P. Roxburghii* on account of the shorter stalklets, color of flowers and form of fruitlets. The plant shows also some affinity to *S. Blumei*, *S. cuspidata* and a few others as yet imperfectly described.

The collections, formed during the Australian Geographical Society's Expedition, contains from the Strickland-River a *Sterculia*, which may be referable to *S. rubiginosa*; but in absence of fruit the identification remains doubtful.

In seeds of a *Sterculia*, sent from India as belonging to *S. fœtida*, nearly the same proportion of the cotyledons to the albumen is observable, as in those of *Edelfeltii*, but the cotyledons being not readily separable from the albumen; these Indian seeds have a very small yellowish carnulent strophiole of oblique ovate-renate shape; there is no substance between the brittle thinly coriaceous testa and the cartilaginous inner tegument. The carpologic characteristics are evidently among the best for the demarkation of the species of *Sterculia* also.

In all probabillty the bast of these Papuan congeners, like that of some other species, could be used for textile fabrics, and the seeds may prove edible as those of several other kinds. The macerated flowers exude much gelatinous mucilage, thus these trees are sure to yield a Bassorin-Gum.

In using also here plainly the English term fruitlets (instead of carpels from Latin or better carpids from Greek), for the disjoined portions of Sterculia-fruits, developed each from a distinct ovary, no objection can be taken to this expression merely on account of size, in as much as also the leaflets of so very many kinds of plants are very large indeed, and as in the same manner stalklets may very often be thick and elongated, and therefore of large dimensions.

It seems to me, that we would obtain a very acceptable generic group, if in restoring *Firmiana* we added to it *Hildegardia*, *Scaphium* and *Pterocymbium*, the fruitlets of all being membranous and the radicle inferior,—*Tarrietia* being very closely cognate, and *Courtenia* having by Bentham and Masters already been joined to Cola, a genus, which received so far back as 1623 its name from Caspar Banhin, as shown by Pfeiffer.—*Carpophyllium* is likely also referable to *Firmiana*, in as much as Miquel does not positively speak of the direction of the embryo. *Pterocymbium* would form a separate section in the genus *Firmiana*, on account of the disposition of the anthers, uniseriate as in *Cola* and *Heritiera*. The fruitlets of *H. literalis* occasionally ripen two seeds. *Sterculia pallens* is referable to *Firmiana*, and nearest allied to *F. diversifolia*.

The series of hitherto well known genera of the tribe *Sterculieæ* would consequently be: *Sterculia*, *Octolobus*, *Brachychiton*, *Pterygota*, *Firmiana*, *Tarrietia*, *Cola*, *Heritiera*.

STERCULIA ONCINOCARPA.

F. v. M. AND FORBES.

Branchlets thick and rough; leafstalks elongated, slightly brownish-tomentose; leaves crowded on the summit of the branchlets, large, ovate-or roundish-cordate thick-chartaceous, glabrous above, somewhat paler and not shining beneath, but there conspersed with subtle star-hair; primary nerves 5-8 from each side of the midrib, prominent on the lower page of the leaf, spreading at a very acute angle, not much curved, the two lowest on each half arising from the base of the leaf and emitting outward strong patent rather distant secondary nerves; primary veins almost transverse; veinlets prominulous, reticulating; the enclosed small areoles subtle punctular-rough; fruitlets woody, on elongated stalklets but without stipes, about four times longer than broad, cylindrically convex, obliquely crescent-shaped curved, outside invested with a very short brownish tomentum, inside along the placental suture densely bearded by pale fascicular hair; seeds several, obovate-ellipsoid, glabrous.

Near the base of the Owen Stanley's Ranges; H. O. Forbes (680.)

Leaves 4-9 inches long, 3-6 inches broad, somewhat acute, dark-green above, the leafstalkes varying in length from $1\frac{1}{2}$ to 4 inches. Flowers not yet available. Semi-mature fruitlets very hard, uncinate-ascending, gradually attenuated to the base and to the pointed apex, probably not very dehiscent; the pericarp about $\frac{1}{3}$ inch thick. Seeds about $\frac{1}{2}$ inch long; testa black.

The form of the leaves is that of *Pterygota Roxburghii*, but the nervature rnd venation is much stronger;—the particular curvature of the fruitlets seem to be quite specific.

STERCULIA OLIGANTHERA.

Leaves on long stalks, rigidly chartaceous, orbicular-cordate, entire, paler green and not shining beneath, as well as the branchlets glabrous, the basal sinus closed by the overlapping roundish lobes, the five primary nerves radiating from the base of the leaves, the secondary nerves spreading, the veins closely reticulated; panicles quite short, almost racemous, terminal; stalklets short, as well as the stalks velvet-downy; flowers small; calyces bellshaped, cleft to the middle or somewhat deeper, inside scantily soft-hairy or glabrescent, outside thinly velvet-downy, lobes semilanceolar, spreading; column of stamens not quite so long as the tube of the calyx, slender, glabrous; anthers 6-7, erect, forming a single circular almost regular row; pistils of the fertile flowers 3-5, velvet-downy; stigmas clavate-spatular, somewhat recurved, glabrous; ovules several.

In New Caledonia; Pancher (157.)

Branchlets rather robust. Leaf-stalkes 3-4 inches long, slender but firm. Leaves scattered towards the summit of the branchlets, measuring from 3½ to 7 inches, the closed sinus giving to the basal part a peltate appearance. Bracts at the base of the inflorescence glabrous, almost semiorbicular, imbricate, deciduous. Calyces about ½ inch long, inside dark-colored when in a dry state; lobes valvate before expansion. Anthers dorsifixed, sessile. Stigmas of the strictly staminate flowers concealed or obliterated. Ovaries of the strictly pistillate flowers depressed globularly cohering, as well as the styles soon receding, surrounded at the base by 5-6 erect sessile anthers. Fruit unknown.

The reduction of the number of stamens and pistils separates this species from all other genuine *Sterculias*, if indeed it belongs to that genus, which in the absence of fruit cannot be positively affirmed. This plant further seems to prove, that a simple cyclic arrangement of anthers, such as is normal for *Heritiera*, *Cola* and *Tetradia*, is not of absolute generic value, our plant showing a slight irregularity in the uniseriate disposition. Possibly this New Caledonian plant may turn out, to belong to the last-mentioned genus, as in one genuine *Sterculia* also a four-cleft calyx normally occurs, and as Wallich seems to have found in his *Herietera dubia* also a four-lobed calyx and 4 anthers. The pluriovulate pistils of our plant however forbid its being placed into *Heritiera*, not to speak of the difference of the indument, though Beddome noticed also the ovaries of *H. Papilio* to be biovulate.

Pancher's New Caledonian collection under 282 contains a plant, which to all appearances represents a variety of *S. oliganthera*; it has still larger leaves distinctly shining underneath and cleft to the middle into five lobes, the basal sinus being shallow and open, while the panicle consists of some spreading branches.

Brachychiton Carruthersii.

Branchlets robust; leaves on long stalkes, orbicular-cordate, at their upper portion three-lobed, radiatingly 5-7-nerved from the base, above glabrescent, beneath sparsely star-hairy; panicles short, spreading, crowded towards the summit of the branchlets, brownish-tomentose from close starry hair; stalklets somewhat shorter than the flowers or some much abbreviated; calyx almost bellshaped, five-lobed to near the middle, outside starry tomentose, inside dark-coloured and throughout beset with soft crisp pale fascicled hair; the lobes amply induplicated before expansion, staminal column reaching hardly beyond the tube of the calyx, slender, surrounded above the base by a beard of white soft fascicular hair, otherwise glabrous; anthers capitular-crowded, not numerous, each of the five coherent sets terminated by a subulate appendage; stigmas five, thick, roundish; ovary white-velvety.

Near the base of the Owen Stanley's Range; H. O. Forbes (476,904.) Young branchlets thinly brownish-tomentose. Leaf-stalkes 7-5 inches long. Leaves, so far as seen, measuring about 8 inches; their margin somewhat wavy; the lobes comparatively short, deltoid-semiorbicular and but slightly acuminate; primary nerves very valid, secondary much spreading and on the under side of the leaves prominent; veins much transverse and reticulated with the copious veinlets. Panicles a few inches long. Flower-buds nearly ovate. Calyces when well developed measuring nearly an inch in length; the lobes induplicate-valvate, the exterior portion thicker, semilanceolar, the inner bent portion rather membranous, nearly half as broad as the other, subtle-velvety ouside, through expansion rendering the lobes almost semi-elliptical and therefore blunt, the edge tomentose-bearded. Gymnophore very short at flowering time, sulcated, glabrous. Appendages terminating the staminal column about $\frac{1}{8}$ inch long, glabrous. No distinct scales inside around thebase of the calyx. Fruit not seen.

This plant is not unlike *B. paradoxum* as regards the form of the leaves, but the flowers are very much smaller and in many respects of a different structure, their disposition being also quite dissimilar. The leaves remind also of those of *Sterculia macrophylla*, but there is no resemblance of the flowers.

I have ventured, to place this evidently new plant into the genus *Brachychiton*, although the fruits were not available to the discoverer; but the broad induplication of the calyx-lobes indicates this generic position;—for although R. Brown referred already to an induplicate-valvate calyx as occurring exceptionally in genuine species of *Sterculia*, he instancing *S. villosa*,—yet in these cases the unexpanded calyx-lobes are only infracted narrowly, and never to that remarkable extent, which characterizes the primary section of the genus *Brachychiton*; but *Octolobus* has an induplicate destivation also. In connecting the name of the distinguished Chief Administrator of the Phytologic Department of the British Museum with this new plant, Mr. Carruthers will recognise my wish, to allude thereby also to the researches of his illustrious predecessor, R. Brown, both in the great national establishment and in the Linnean Society, it now falling to his share to preside over the forthcoming centenary jubilee of that renowned and vene ble union. An opportunity is also afforded me simultaneously of acknowledging concessions, disinterestedly made by him, through which the elucidation of a large number of the Papuan plants, brought together already by the courageous and accomplished Mr. H. O. Forbes, will—if divine providence grants me life and strength—fall to my lot, he and his adjutors engaging also on some portion of this task.

Brachychiton paradoxum was traced by the writer already in 1855 and 1856 during Gregory's Expedition from the Victoria-River to

the Gilbert-River, it occurring preferentially on sandstone-tablelands. R. Brown discovered it 1802 on the Gulf of Carpentaria; J. Macdonald Stuart obtained it near Mount Hall, and several collectors brought it from the Glenelg-River. Bracts numerous, lanceolar or linear, half an inch or less long, hairy. Calyces to 2 inches long, also inside star-hairy; the basal scales quite tomentose. Staminal column star-hairy, downward gradually turgid. Anthers not rarely extended along the upper third of the column, although sometimes also crowded into a globular mass. Fruitlets outside densely tomentose, more particularly so in a young state.

Brachychiton Bidwillii extends to Cleveland-Bay (Fitzalan), the Comet-River (Miss Lamont) and the Bremer-River. Upper lobe of the leaves somewhat sinuated. Calyces occasionally quite as wide as those of *B. paradoxum*. Staminal column slender, above the base as well as the basal scales almost glabrous. Fruitlets outside thinly starry-tomentose.

Brachychiton discolor attains a height of 80 feet. Bark smooth. It extends southward to the Manning-River.

Brachychiton diversifolium I observed on the Victoria-River and in its vicinity. Mr. Schultz and Mr Holtze found it near Port Darwin, Mr. Armit on the Etheridge-River.

Brachychiton populneum ranges to the Macquarie-River (Dr. Lauterer) the Warrego and Ovens-River. Trees with stems over eleven feet in circumference at four feet from the ground were noticed by Mr. Rudder.

Brachychiton Gregorii is now known from Hampton-Plains (Hon. J. Forest), from Fraser's Range (Dempster), from Mount Everard (Giles) and from the Finke-River (Rev. H. Kempe.) The autochthones on the last mentioned River use the roots for food and the wood for shields.

Brachychiton Delabechei extends to the Warrego and Paroo (Mrs. F. Spencer), to Nercool-Creek (Bowman) and towards Edgecombe-Bay (Fitzalen.) Seeds 2-5.

Brachychiton accrifolium reaches southward to Shoalhaven (Baeuerlen.)

NOTE.

FIRST EGG OF THE SEASON.

On the 24th July, Mr. A. J. Campbell took a Lyre-Bird's egg from a nest in one of the dark recesses of the Dandenong Ranges. A significant answer to a query that appeared in *The Australian* lately, "whether any bird incubates in this country during the winter months?"

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The Author of each article is responsible for the facts and opinions he records.

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This Club was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

No Entrance Fee. Annual Subscription, including copy of proceedings, 15s., dating from May 1st.

The Ordinary Meetings for the reading of papers, and exhibition of specimens, with a short conversazione, are held on the second Monday in each month at the Royal Society's Hall, Victoria Street, Melbourne, at 8 p.m.

The proceedings of the Club are recorded in its journal—the "Victorian Naturalist." Annual Subscription, 6s. 6d., post free (to members free)

With the view of popularising the study of the Natural History of the Colony, correspondence, notes, and queries relating to this subject are invited for insertion, and should be addressed to the Editor at the Wesley College, Prahran.

Any of the numbers from the commencement, January 1884, can be obtained from the Hon. Sec., Mr. F. G. A. Barnard, Kew, at sixpence each; or in sets, Vol. I (1884-5), 16 numbers, 7/6; Vol. II (1885-6), 12 numbers, 6/-; each set with title-page and index for binding.

The numbers forwarded post free to any address on receipt of remittance (postal-notes preferred).

Copies of the Annual Report and List of Members for 1885-6, with Rules, etc., can be obtained on application to the Hon. Sec.

THE

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THE FIELD NATURALISTS' CLUB OF VICTORIA

The monthly meeting of the Club was held at the Royal Society's Hall, on Monday evening, 9th August, 1886.

The president, the Rev. J. J. Halley, occupied the chair, and about forty-five members and visitors were present.

A letter was read from the Commissioner of Trade and Customs, asking for an expression of opinion from the Club as to the desirability or otherwise, of protecting under the Game Act, the magpie, magpie-lark, curlew, and laughing jackass. It was decided to support their protection.

The hon. librarian reported the receipt of the following donations to the library:—

"Report of the Mining Department," for first quarter of 1886, from the Department; "Report of the School of Mines, Sandhurst," for 1885, from the School; "Journal of Pharmacy," July 1886, from the Society; "Journal of the New York Microscopical Society," Vol. II., No. 4, from the Society.

The hon. secretary read an interesting account of the Club excursion to Riddell's Creek, on Saturday, July 24th. The party left town by the midday train, and on arrival at Riddell's Creek, struck towards the ranges overlooking the township on the north-west side. They followed up a branch of the main creek, which led them between two steep ranges mainly consisting of coarse conglomerate. At several places on the creek the conglomerate had weathered into large tubular masses, plainly showing the details of their formation. Along the creek, some seven or eight species of ferns were noted, none of them being particularly rare. *Grevillea alpina*,

Acacia verticillata, *Kennedya monophylla*, etc., were noted in flower along the banks of the creek. Ascending to the top of one of the ranges, a different series of plants were met with, such as *Epacris impressa*, the larger grass tree, *Xanthorrhœa Australis*, etc. Specimens of several birds were obtained during the afternoon, such as the ground thrush, robin, spine-billed honey-eater, tree-creeper, etc. At a more favorable time in the season, the locality, it was thought, would be well worthy of another visit by the Club. The party reached town after their seventy mile trip about half-past seven in the evening.

Messrs. W. F. Clark, and L. Ellson were elected members of the Club.

It was resolved to form a section for the closer study of Cryptogamic botany. Baron von Mueller, K.C.M.G., in supporting the resolution, alluded to the comparatively wide field open for investigation by students of this department of botany.

The consideration of the proposed alterations in the rules was postponed for a month.

Paper read:—1. By Rev. A. W. Cresswell, M.A., entitled "Notes on Fossil Crabs from the Miocene Rocks of Corío Bay." The author prefaced his remarks with a general account of the class Crustacea, referring more particularly to the classification and anatomy of the crabs. He exhibited specimens of the fossil species, which he had found in nodules of rock at Point Henry, near Geelong, belonging to the genus *Gonoplax*, and described its leading features.

Some little discussion ensued as to habits of the land crabs of this colony, but definite information was wanting.

Mr. H. Watts introduced a discussion as the production of "manna" and the lerp insect, and cited several authorities as giving different opinions. Several members spoke on the subject, the general opinion being that the ordinary manna is an exudation from certain eucalypts, resulting from injuries caused to the branches by insects, the precise species not being agreed upon.

The following were the principal exhibits:—By Mr. F. G. A. Barnard, growing fern (*Grammitis rutifolia*), from Riddell's Creek; by Miss F. M. Campbell, specimens of an injurious grass (*Sporobolus indicus*), from the Domain, South Yarra; by Rev. A. W. Cresswell, fossil crabs from Corio Bay, also hermit crabs; by Mr. E. M. Cornwall, two cases of lepidoptera, recently collected by exhibitor at Townsville, Queensland; by Mr. J. E. Dixon, several species of fossil *Echinidæ*, including *Pericosmus compressus*, etc., also *Trigonia undulata*, *Pecten* sp., *Terebratula grandis*, from Corio Bay; by Mr. T. A. Forbes-Leith, parrakeet (*Eos fuscata*), from New Guinea, lorikeet from New Ireland, photograph of the ourang-outang (*Simia satyrus*), of Borneo, also of parrots, and New Guinea birds; by Mr. C. French, F.L.S., two New Australian longicorn beetles, *Batocera*

Frenchii, from N. Queensland, and *Rosenbergia megalocephala*, from Port Darwin; by Mr. R. Hall, fossil woods from Port Darwin; by Master G. F. Hill, humming birds; by Mr. G. Keartland, harmonious thrush, and tree-creeper from Riddell's Creek; by Mr. H. Kennon, fossils from central South Australia, by Baron von Mueller, new and recently described plants from New Guinea and Polynesia, of the genera *Bignonia*, *Tecoma*, and *Fragacea*; by Mr. F. Reader, Victorian mosses, (second series); by Mr. W. Sangwell, a new orchid (in flower), *Dendrobium Fœlscheri*, from Port Darwin; by Mr. S. H Wintle, F.L.S., zeolites, etc., from Clifton Hill quarries.

After the usual *conversazione* the meeting terminated.

ORCHIDEÆ OF VICTORIA.

By C. French, F.L.S., Department of Government Botanist.

Part 9.

(*Read before the Field Naturalists' Club of Victoria, June 10th, 1885*)

(*Continued.*)

P. concinna, (R. Brown.)

This curious and well marked *sp.* is perhaps the most common of our orchids, being found in great numbers in the Ti-tree scrubs on the coast of Port Phillip, also in the inland parts of the colony. This *sp.* may be easily distinguished from others of the genus, the "hood" being short, wide for its size, and has a reddish tint. The leaves are in a radical rosette, and the plant is nearly always to be found in patches, growing in great numbers. The plant generally bears but one flower, but two is not a very uncommon occurrence in fine specimens. This is one of the easiest to cultivate of our native *sp.*, and tubers removed even while in flower, will reappear the next season as if nothing had happened. For cultivation, use good sandy soil, with plenty of drainage. The tubers should be grown in a shallow pot or pan, say 50 tubers in an 8 inch pot. This common little plant is well worth growing, as it remains a long time in flower, and dries well for the herbarium. Flowers from October to January. A *sp.* was found some time since at or near the Red Bluff, which at first Baron von Mueller thought to be *P. obtusa*, but on further examination he concluded that it is but a distinct form of *P. concinna*, although the singular filament which is a peculiarity of this plant, is not observable in the normal specimens of *P. concinna*. Found in New South Wales, South Australia, and in Queensland.

P. CURTA, (R. Brown.)

A very common *sp.*, with green flowers, singly on a large stalk, the flower being large, but not acuminate as in *cucullata*, *reflexa*, and some of the other larger flowering kinds. The leaves are formed in a radical rosette, large, and in shady places flabby and soft. The tubers of this *sp.* are readily removed, and with a little attention will make good strong plants, the flowers in this, as in many other cases, improving on cultivation. To grow it well, use leaf mould tightly pressed down into a shallow pot or pan, being careful not to use too much or too little water while in bloom. This is, as I said before, a very common *sp.*, and should be looked for in shady moist places, where it will be found growing in large patches, the leaves having a somewhat yellow appearance. At Brighton, Cheltenham, Berwick, and elsewhere. It may be found growing often to a height of 12 or 14 inches, but more commonly about 6 inches, which size is the best for removal. Flowers from October to January. Found also in New South Wales, South Australia, Queensland, and Tasmania. Bentham also describes a variety named *grandiflora*, which I have not seen.

P. NUTANS, (R. Brown.)

This singular and beautiful *sp.* is like the above, very common throughout Victoria, growing in leaf mould, often in sandy soil about Brighton, Mordialloc, Dandenong, &c. It may be easily recognised from the other *sp.*, by its curious hooded flowers, which has led to the not altogether inappropriate name of the nodding orchid, and by the wrinkled appearance of its radical leaves. This is one of the best *sp.* for cultural purposes, and if, say 50 tubers are placed in a pan, you will find 100 tubers added by the next season. The labellum of this *sp.* is very irritable when touched, but this peculiarity is more noticeable in *P. longifolia* than in any other *sp.* of the genus; and in this respect, it is quite as sensitive as *Stylidium graminifolium*, or Native Jack in the box. As this *sp.* is so well known to collectors generally, I need not tire you with any further description, excepting to state that it grows to nearly 15 inches high. Flowers in Spring. And is also found in South Australia, Tasmania, Queensland, and New South Wales.

P. PEDUNCULATA, (R. Brown.)

This very elegant plant, which seems to be identical with *P. semirubra*, is to be found always in shady and moist situations, generally amongst Melaleuca scrubs near creeks, or on grassy slopes in mountain districts. The flower when growing in its natural state, assumes a curious reddish appearance, which becomes much less intense when cultivated, although the plant becomes stronger.

In a gully near Berwick, and owned by Mr. R. Bain, this plant may be found growing in perpetual moisture, when the whole plant becomes so brittle, that it falls to pieces when exposed to light and air. It may be recognised chiefly by its color, also by its slender appearance and semi-glabrous leaves. To grow it well, use leaf mould, with plenty of shade, and water, and if possible, try to obtain the specimens from the driest parts of the places where it grows. In a place called the Pound Bend, near Warrandyte, this plant used to be growing by the hundreds, even although the ground near the river was covered with silt to a depth of 4 inches. Flowers about December, and grows to a height of from 4 to 12 inches, the latter, only when "drawn" up by undergrowth Found also in South Australia, New South Wales, and Tasmania.

P. NANA, (R. Brown.)

This pretty little orchid, although well marked, seems to have caused some confusion as to which really is *nana*, which *sp.* sometimes approaches very near to pale and small flowered forms of *P. concinna*, more especially as they are often found in company. Mr. Bentham places this *sp.* near *pedunculata*, and, although I have here adopted his method of sequence in *sp.*, I cannot find out in what respect they are allied, because the general appearance, habit, color, &c., are totally different, and the true *nana* seems to be much nearer to *P. pyramidalis* than to *pedunculata*, but this must be left to specialists to work out, as any reduction of *sp.*, if made on scientific grounds, will, I am sure, be always acceptable to those interested. To return to *P. nana*, I may say that it is to be found near the coast, often in the Ti-tree, and sometimes inland, when the forms seem by exposure to become more robust. The color of flower is a pale green, the leaves small, and in a radical rosette. The hood, (or galea) is narrower than that of *P. concinna*, and I have not noticed the peculiar reddish tint, which in the former *sp.* is so marked. This little plant is barely worthy of cultivation excepting as an addition to a collection of native orchids, as it does not remain long in flower, and is not nearly so hardy as its frequent companion, *P. concinna*. Height from 3 to 6 inches. Found also in New South Wales, Tasmania, and South Australia.

P. PRAECOX, (Lindley.)

A very beautiful orchid, rather more common than the former species, the habit and appearance being somewhat similar, the principal point of difference being according to Bentham, the narrower leaves, smaller flowers, and on internal examination, broader sinus between the lobes of the lower lip of the perianth. This *sp.* is to be found generally on grassland, although I have collected specimens

growing in the ti-tree scrub at Elsternwick and Brighton. I should perhaps mention that I have found the flowers to have a somewhat reddish tinge of colour, which is not so in *P. reflexa*. Height from 4 to 6 inches. Flowers in Spring. *P. alata*, and *Disperis alata* of Labillardiere, are identical with this *sp.* Found also in Tasmania, South Australia, and New South Wales.

Series 2. Parvifloræ.

Stems leafless at time of flowering, except empty sheathing bracts. Basal appendage of labellum short, entire or with 2 or 3 teeth or setæ.

P. parviflora, (R. Brown.)

This is the smallest of our native *sp.* of *Pterostylis*, and one which is most easily recognised from any other which we are likely to find during our rambles, principally on account of its very small flowers, slender habit, and by an absence in most cases of the radical rosette leaves at time of flowering, although these make their appearance later on. In the Brighton district this *sp.* in some places is not uncommon, although it had grown there unobserved for many years, and was first brought under notice by myself, the Baron thinking it to be *P. aphylla*, but upon closer examination, he considers it to be identical with *P. parviflora*. This plant generally bears but 2 flowers in the raceme, but sometimes 5 have been found, when the plant was comparatively robust. It is hardly worth cultivating excepting for to complete a collection, in which case it should be grown in sandy soil, with good drainage. Flowers from April to August. I may remark that there seems to be some doubt attached to a *sp.* found by Mr. McKibbin, near Maryborough, as a flowering tuber kindly given to me by that gentleman seemed to be quite a distinct form, it being much more robust, and a decided red color pervaded the whole flower, but possibly this change may be partly attributable to cultivation. Height from 3 to 12 inches. Found also in New South Wales, Queensland, and in Tasmania.

Section 2. Catochilus.

Lower lip reflexed from the base. Labellum appendage entire and obtuse, sometimes almost obsolete.

P. barbata, (Lindley.)

One of the most singular and beautiful of our native orchids, easily distinguished from any of the other *sp.*, by the beautiful yellow beard-like hairs on the labellum, which, by the way, seem to be always on the move. To find this *sp.*, search well on the heath ground near Brighton, as it is better to remove the tubers from the

sandy soil, than to run the risk of damaging them, which often happens when lifting them out of hard loam. In the months of April and May, the radical rosette-like leaves of this *sp.* may be easily seen if carefully looked far, as its bright green color contrasts distinctly with the dark color of the Epacris scrubs where it grows, and thus renders it easy of detection. To grow it well, use sandy soil mixed with decayed vegetable mould; put say 24 tubers in a shallow pot or pan, water well, and be careful as to drainage. This orchid is well worth cultivating, and will seed freely if taken care of. It is widely distributed throughout the colony, although by no means to be considered a common plant. Flowers from October to December. Height from 4 to 10 inches. *P. squamata* is synomous with this *sp.* Found also in S. and W. Australia, Tasmania, and in New Zealand.

P. MUTICA, (R. Brown.)

A small flowered and singular *sp.*, often found growing in dry districts. The general appearance of this plant is quite distinct from that of any of the Victorian *sp*, the whole plant having an erect habit, and a very faded look, the little green flowers often partaking of the same feature. When Mr. Best and myself were on our Murray trip, we found a large number of specimens of this orchid, growing in the yellow sand of the dreary Frenella, or pine scrubs, a country, which, by the way, must be a cheerful place to be "bushed" in. I again remark the large tubers attached to this little plant, and as in the case of *P. rufa*, I suppose it is the same here. This *sp.* is barely worthy of cultivation, excepting for the completion of a collection, it being very inconspicuous, and not at all uncommon, being found also near Melbourne, and in many other parts of the colony. To grow it, use sandy loam well pressed down, and water sparingly. The spike has from 5 to 9 flowers, borne in a sort of an erect raceme, if such a term be allowable. Height from 3 to 8 inches. Flowers from September to November. Found also in New South Wales, Queensland, Tasmania, and South Australia.

P. RUFA, (R. Brown.)

This is another gem amongst the *Pterostylis*, and although not quite so distinct and handsome as the preceding *sp.*, it is of much rarer occurrence. It is a strange fact that this plant is found nearly always in the hardest and driest soil, so hard and dry, indeed, that the wonder is how it can exist at all during a scorching summer, and generally, its habitat is in the hottest parts of the colony. It seems to be a wise provision of nature, that this little plant is furnished with (for its size), very large tubers, which, no doubt, enables it better to withstand the great heat and long droughts of the Murray

country. I was fortunate enough to find my first plant of this *sp.* many years since, whilst on a collecting trip to the district around Lake Cooper, although it had often been found before, and since by many collectors. When in company with my old friend, G. W. Robinson, of Berwick, a short time since, he found one in the ranges near his house, and together we found several others, in what I believe is quite a new locality for this plant. The whole specimen when growing has somewhat of a withered look, and the galea or hood is of a transparent nature, somewhat difficult for me to describe. The stem bears from 2 to 4 flowers, which have a peculiar reddish appearance. This *sp.* is well worthy of cultivation, strong loam being necessary to grow it successfully, with a limited supply of water. Height from 3 to 6 inches. Found in Queensland, New South Wales, Tasmania, also in S. and W. Australia. This *sp.* is very variable, and *Pterostylis Mitchelli*, is now considered but a form of the above *sp.*

P. LONGIFOLIA, (R. Brown.)

A very fine and distinct *sp.*, found in most moist parts of the colony. It may be easily recognised by its long stem, linear leaves, and, for its size, very small flowers. In the Ti-tree near Brighton Beach, this plant may be met with in patches, mostly in the most secluded and out of the way places, and thus it is easily overlooked by any but the enthusiastic collector, who is not afraid of a little hard work in scrambling through the almost impenetrable scrub, which in many places line the coast between Brighton and Frankston. This *sp.* is very easy of removal, and it will thrive well with very little care, blooming as a rule much earlier than when in its native state. The irritability of the labellum of this orchid is more marked than in any of the other Victorian *sp.*, and it is less irritable when wet, than when the flower is quite dry. To grow it well, use sandy soil and leaf mould mixed, plenty of water and use an ordinary flower pot, because the plant being tall, the tubers have a better hold than when grown in the usual shallow pan. This *sp.* is also found growing inland, where it is invariably found in sheltered places, often amongst the branches of fallen trees, and in such positions it often attains a height of nearly 2 feet. The number of flowers on the stem is usually from 3 to 5, or even 6. Flowers from October to end of December. Found also in New South Wales, Tasmania and South Australia.

P. VITTATA, (Lindley.)

This handsome orchid was found in Victoria, (for the first time I believe), by Mr. C. Walter, a former member of the Club, and a well known professional plant collector, who has also made known

many fine plants from different parts of Australia. It has completely puzzled me to account for such a showy and comparatively common plant, having so long escaped the observation of others as well as myself, as I thought I had thoroughly exhausted the Brighton district, where Mr. Walters found it in numbers. Baron von Mueller thinks that its early time of flowering may account for it, but I cannot share in his opinion, because it remains in bloom as long, if not longer than any other of our Victorian orchids. I, of course, agree with the Baron so far as the case of *Eriochilus fimbriatus* is concerned, because this, although very common, is a much less showy *sp* than the former. *P. vittata* may be easily distinguished by its very curved hood, dark red color, shining leaves, and rigid stem, almost as stiff and erect as in *P. longifolia*. It should be looked for on the slopes of Brighton Beach, amongst the Ti-tree, (this information is supplied with the hope that only a few specimens may be taken as required, and not to exhaust the supply, which is already becoming limited.) Culture, same as that of *P. longifolia*. Flowers from May to October. Height from 6 to 18 inches. Found also in New South Wales, Tasmania, and South Australia.

(*To be continued.*)

DESCRIPTION OF A SPECIES OF PYCNARRHENA FROM NORTH-EASTERN AUSTRALIA,

By Baron von Mueller, K.C.M.G., M. & Ph.D., F.R.S.

Pycnarrhena Australiana.

High-climbing; leaves large, on short stalkes, ovate or elliptical, protracted into a short and blunt apex, quite glabrous; peduncles few or several or many together, rather elongated, very thin, almost cymosely branched at and near the summit, minutely appressed-hairy; sepals almost orbicular, in three rows, the outer three considerably shorter, the other six nearly equal in length and these much surpassing the almost rhomboid petals; stamens very short; filaments nearly cuneate, at the base united; fruitlets obliquely ovate-globular, on an extremely short stipes.

Near the Endeavour-River; W. Persich Near Trinity-Bay; Karsten.

Leaves (as far as seen) attaining a length of 11 and a width of 5 inches, thick-chartaceous, shining on both sides, hardly paler

beneath, distantly and adscendingly penninerved, finely and closely net-veined. Inflorescurœ axillary or lateral. Flowers (according to the collector's note) fragrant. Primary peduncles often from 1 to 1½ inch long, sometimes numerous, forming then a dense tuft; cymous ramification spreading to about one inch. Pedicels ⅙ inch or less long, some obliterated. Inner sepals measuring nearly $\frac{1}{12}$ inch. Anthers generically quite normal. Pistillate flowers unknown Fruitlets about ½ an inch long, glabrous, very turgid; exocarp somewhat carnulent; endocarp thinly cartilagineous, not intruding. Seed obliquely ovate, rather more than ⅓ inch long. Cotyledons very convex outward.

The Australian species differs from *Pycnarrhena pleniflora* in shorter petioles, larger leaves, long peduncles, more distinctly pedicellate flowers, different proportionate size of sepals and rather larger fruitlets; from *P. tumefacta* in leaves also dark-green underneath, not distinctly dilated petioles, six inner sepals and perhaps also in fruit, but the disposition of the flowers is similar; from *P. lucida* and *P. Manillensis* the Australian congener is far more removed;—*P. Novo-Guineensis* is as yet only imperfectly known and in some respects allied to our plant.

Tinospora smilacina has been observed near Springsure by Miss E. Lamont, who sent branchlets with simple filiform aerial roots of several feet length, and remarked also, that this plant will emit numerous fine roots from various parts of its branches, down towards the ground from any height, and that a detached piece of the plant, when placed against a wall, will push forth roots in search of nourishment.

Adeliopsis decumbens occurs also on the Endeavour-River (W. Persieh). It becomes a climber. The leaves attain a length of three and a breadth of two inches. The flowers are fragrant, and petals as well as filaments are, even when fresh, remarkably dark-colored. The fruitlets are almost globular, measuring hardly ¼ inch, not stipitate, the stigma being near the base; the exocarp is rather thin and not succulent, outside yellow; the endocarp smooth, very hard and comparatively thick, its intruding portion occupying the centre of the fruitlet and being two-celled. The seed is much compressed and considerably dilated; the albumen is equable, much broader than the embryo; the latter semi-annular, the radicle not quite so long as the cotyledons.

Thus the genus *Adeliopsis* now obtains a fixed systematic position, in the tribe *Cocculeæ* near Hypserpa, to which genus indeed it might be reduced, notwithstanding the biovulate fruitlets, the latter characteristic not being any longer as a solitary one on record, two ovules in the fruitlets having been noted by Dr. Beccari also in the genus *Arcangelisia* in the tribe *Tinosporeæ*. This characteristic

may therefore not be quite so exceptional in *Menispermeæ*, as hitherto supposed.

ADDITIONAL NOTE ON STERCULIACEÆ.

BY BARON VON MUELLER.

SINCE my remarks on some sterculiaceous plants appeared in the July-issue of the *Victorian Naturalist*, I obtained all at once fifteen "Hefte der Berichte der Deutschen botanischen Gesellschaft," among them that, edited on the 21st May of this year in Berlin. At 82-85, Tafel III. of this publication a new Brazilian sterculiaceous genus is ably described and delineated under the name *Basiloxylon* by Dr. K. Schumann, and thus a most interesting access is gained, as it adduces a generic type from the western hemisphere closely cognate to *Pterygota*, the extension of which genus to New Guinea had just been shown by me here. The distinguished author alluded already in the description to affinity with those species of *Sterculia*, which have seeds, each terminated by a large membrane; indeed *Basiloxylon* differs from *Pterygota* only in uniseriate anthers, the number of pistils being reduced in *P. Thwaitesii* also to three, while these organs of the Papuan congener remained yet unknown. Moreover the arrangement of the anthers, from what is seen in *Sterculia oliganthera*, appears to be of doubtful generic value, so that perhaps the new coordinal Brazilian plant could be transferred to *Pterygota* subgenerically, especially so, as in its outer appearance it is quite similar to the three known genuine species of *Pterygota*. At all events the fact, that Dr. Schumann founded on his plant a new genus, confirms the view, enunciated in these pages, that the genus *Sterculia*, as defined by recent writers, needs disintegration again.

RECORD OF A NEW PAPUAN HELICIA

BY BARON FERD. VON MUELLER, K.C.M.G., M. & Ph.D. F.R.S. &c.

HELICIA FORBESIANA.

ALMOST glabrous; leaves lanceolar-ovate or nearly lanceolar, protracted at the summit, decurrent into the usually very short petiole, generally quite entire at the margin, their nerves ascendant and beneath prominent; racemes elongated; pedicels rather long, free to

near the base; bracts minute, narrowed upwards; flowers comparatively large; petals very narrow towards the middle; anthers linear; stigma elongated, very thin; hypogynous scales annular-connate; fruit almost oblique-ovate.

Near Soyere; H. O. Forbes (343, 387, 678, 723, 799.)

A slight appressed brown or greyish indument only on the youngest branches and scantily on the inflorescene. Leaves scattered, attaining a length of nine and a breadth of three inches, seldom remotely denticulated. Petioles sometimes almost obliterated, but occasionally over half an inch long, neither page shining in a dried state, the lower less green; the apex oftener blunt than acute; veins reticulated, rather conspicuous; veinlets subtle. Racemes on short peduncles, measuring in length from four to six inches. Pedicels $\frac{1}{4}$-$\frac{1}{3}$ inch long. Petals $\frac{3}{4}$-1 inch long; the terminal portion much broader than the lower one; the color not recognisable in the dried state of the flowers. Apex of the connective blunt, considerably extending beyond the anther-cells. Stigma very slender, of about $\frac{1}{4}$ the length of the style, somewhat streaked Hypogynous disk almost patellar, more or less crenulated. Fruit only seen in an immature state, then hardly half an inch long, and covered by a light-brown pellicle.

This species comes nearest to *H oblongifolia*, the differences of the latter plant consisting in the rather blunt leaf-base, somewhat shorter pedicels, more denticulated hypogynous disk and perhaps also color of flowers as well as shape and size of ripe fruit, because from the latter characteristic important specific distinctions can be derived in this genus also, as elicited from Australian experiences particularly. All other known species show lesser affinity.

The indefatigable phytologic explorer, Rev. B. Scortechini, has sent me two species of *Helicia* from Perak; both are undescribed; but as they likely will come under review for the fifth volume of Sir Joseph Hooker's Flora of British India, they are left here unattended to;—one has long petioles, and lanceolar rigid entire leaves shining above, soon glaucous underneath, the flowers being small, brown-velvety outside and forming short spicate racemes;—the other species has large thin lanceolar-ovate almost sessile leaves without denticulations, the racemes being remarkably short in proportion to the leaves and glabrous, the pedicels almost free, the style very many times longer than the stigma and the hypogynous scales connate. Of neither species the ripe fruit could be obtained, both probably form trees of some size in that damp and hot region. The characteristics of the bark of these plants are worthy of study. The presence or absence of denticulations of the leaves should no longer be used as a primary mark of distinction for the species in this genus.

THE FOSSIL MAMMALIAN REMAINS OF TASMANIA COMPARED WITH THOSE OF THE AUSTRALIAN MAINLAND.

By S. H. Wintle, F.L.S.

(Continued.)

Read before the Field Naturalists' Club of Victoria, July 12, 1886.

This shell deposit is overlain by a stratum of arenaceous vegetable soil, supporting a forest of *Eucalyptus*, *Casuarina*, and *Banksia*, the former frequently attaining a height of 70 and 80 feet, with boles proportionately thick. The impression likely to be conveyed to the mind of the beholder by this mantle of arborean vegetation flourishing over the shell bed, is that of comparative antiquity of these marine remains. But such an influence will be greatly modified when it is remembered how rapid is the growth of the Eucalyptus in Tasmania, especially *E. globulus*, and *E. viminalis*. The bones in question had lost all traces of animal oil, otherwise they had undergone no petrifaction. The late J. E. Calder, Esq., formerly Surveyor General of Tasmania for very many years, had in his possession a portion of the humerus of a whale. This fossil was about 3 feet in length, and almost completely silicified, so much so, that it was capable of taking a good polish. He obtained it in a pliocene tertiary deposit at Swan Island, near Cape Portland, in Bank's Straits, many years ago,

In point of age this fossil bone corresponds to the fossil bones of a whale found on the shores of Hobson's Bay at Cheltenham, and is, consequently, much older than the cetacean remains which I have just alluded to. The only other instance of discovering an osseous relic in Tasmania is that of the *patella* of a cetaceon which I unearthed in a shell bed at Sandy Bay, twenty years ago. That Raised Beach occupies an altitude of about fifty feet above high water mark, and like that at Sorell, is of recent, or Post Tertiary age.

From the foregoing it will be seen that owing to some unexplained cause, the osseous palæontology of Tasmania not only throws very little light upon the antiquity of its Fauna, but is insignificant in comparison with that of the mainland. Her caverns have yielded nothing that gives a clue, as far as I know, to the antiquity of the now extinct human race. Such human bones and native implements as have been brought to light have been found in the latest superficial deposits of humus; and in this respect the Australian mainland is no better off. The few human remains exhumed are principally skulls, and this may be accounted for by the fact that it was the custom of the aborigines to burn their dead. The late Rowland

H. Davies, who has paid much attention to their customs, in writing of them in the year 1845, says :—

"When death occurs they place the body upright in a hollow tree. When a year or upwards has passed away, they return to the place and burn the body with the exception of the skull ; this they carry with them until they chance to fall in with a cemetery in which a number of skulls are heaped together, when they add this one."

This custom of cremation may have been the cause of so few bones of the natives having been discovered other than skulls, and yet no instance has come to my knowledge of these skull-burrows having been found containing their grim records.

It is the opinion of many Ethnologists that the extinct Tasmanian race is of high antiquity. Bonwick, who is one of the best authorities on the "lost race," observes in his DAILY LIFE OF THE TASMANIANS : " That Tasmanians, whether as a distinct creation, an affiliated people, or a transmuted race, are of high antiquity can admit of little doubt. A strong argument for their remote age may be gathered from their ignorance of navigation, which is equally apparent in their neighbours across the Straits."

In point of human advancement everything tends to show that they were in the Palœolithic division of the Stone Age; viz., that of rough, unground stone implements ; and accordingly they, like the Australians, had not advanced sufficiently far as to drill holes into their axe-heads for the reception of the handles. On the contrary, they employed withes bent into a loop to receive the stone hatchets, and which was secured in its place by string made of twisted fibre and the gum of the Xanthorrea. They had not advanced far enough to fashion canoes out of the hollow trees, but constructed them with sheets of bark tied up at the ends, while the only means they possessed of propelling these frail primitive craft were spears, and paddling with their hands.

" Seeing how low these primitive people were in the scale of civilizition, it is most probable," observes Mr. Bonwick, " that they were isolated from the rest of the world of progress for many thousands of years. They were in their hunting grounds when their land was joined to New Zealand on the east, and to Victoria on the north, whatever lay to the southward and westward. They are, therefore, an older race than the Australians." Accepting this view of the question, it is, I repeat, strange that nothing has been brought to light in caves and post pliocene deposits to prove the correctness of the deduction. As a set-off to this it may be observed that the population of the island is small in comparison to that of the neighbouring colonies, and also that there are few persons who have the taste for prosecuting geological and palœontological researches. It is, therefore, impossible to say what facts may not be brought to light in the future from the tomb of the distant part,

when these sciences can boast more disciples than they now possess in this part of the globe.

From what I have advanced in these remarks, it will be seen that Tasmania is singularly poor in fossil mammalian remains, and what few have been brought to light are of very recent date compared with those which the Australian mainland has furnished. The cause of the extinction of the Sarcophilus and Thylacinus on the "continent," and the non-existence of the Dingo in the island at any time, is a subject which has exercised the minds of leading Australian palæontologists for many years; but up to the present time no light has burst through the clouds which envelope the mystery.

I may here observe that Mr. Bonwick, in his *Daily Life of the Tasmanians*, has given me credit, in connection with the late Dr. Milligan, F.L.S., for the discovery of the fossil bones of the labyrinthodon reptile in the sandstone of the Queen's Park, Hobart. This is incorrect, inasmuch as they were brought to light by workmen employed in quarrying the stone used in the construction of Government House. In p. 292, Mr. Bonwick says :—"That which especially distinguishes the labors of Mr. Wintle and Dr. Milligan was the discovery of a species of huge batracian reptile, the Labyrinthoden, in the Hobart Town sandstone."

Our author seems to think this conclusive evidence of the sandstone in question (which undoubtedly is a member of the coal measures of southern Tasmania), being of mesozoic age ; but he had evidently forgotten that remains of the labyrinthodon have been found in true carboniferous strata in Europe, from whence they range up through the Permian to the Triassic system, and in which latter system this singular reptile appears to have become extinct. It is, therefore, as much palæozoic as it is mesozoic, and consequently is not in itself sufficient data on which to assign the formation in which its remains are found, to the secondary epoch.

I have pointed out in the foregoing remarks the marked difference that exists in much of the living and fossil Fauna of Tasmania and the Australian mainland. The cause of the extinction of the Thylacinus and Sarcophilus here I believe is due to the existence of the dingo, who has preyed upon them. Had that animal been a denizen of the forests of Tasmania, there is little doubt that the Thylacinus and Sarcophilus would not be met with now committing nocturnal raids upon the settlers' sheep. One other singular fact is the complete absence of the Koala (native bear) *Pharcolarctos*, and the great bat, *Pteropus poliocephalus*, or flying fox ; and add to this no tortoise inhabits the streams, and no non-venomous snakes, such as tree-snakes or pythons of any kind ; and no flying phalangers, such as the flying squirrel exist there. The absence of these creatures, so common to this mainland, is indeed unaccountable, considering how recently, in a geological sense, the island was part and parcel of this

continent. The difference in climate is not sufficient to account for their absence, and the very slight dissimilarity in the *Flora*, which almost amounts to nothing, certainly fails to supply a solution of the problem. The late Gerrard Krefft, in his NOTES ON THE FAUNA OF TASMANIA, says : "Owing to the absence of indigenous fruits, no flying foxes occur." This is scarcely true. The indigenous fruits are not more rare or insignificant than here, if we except the Moreton Bay fig, *Ficus*. He further adds, in speaking of flying foxes : "If these marauders once found out the richness of Tasmanian plantations, they would soon wing their way across the Straits." In conclusion, let me say that it is to be fervently hoped that no naturalist or acclimatiser will allow their enthusiasm to so far override their judgment as to introduce them to the "tight little island," as they have foxes here, and the wrong sparrows everywhere.

NOTE.

IGUANA *Versus* COCKATOOS.

I WAS one day last summer staying near the Kangderaar Creek, between Inglewood and Tarnagulla. My attention was called to a lofty tree by the unusually loud screaming of cockatoos in its neighbourhood. I went toward the tree, and saw a pair of cockatoos, whose nest was high up in the trunk, flying round and round, and uttering loud discordant cries. On going nearer, I found that the cause of the disturbance was a large iguana, which had evidently made up its mind to get at their nest. The birds tried to prevent the reptile from climbing higher by flying down close to it, and as, I believe, by pecking it with their bills as they swept by. Presently the iguana came to a place where the tree forked. It stopped here, and endeavoured in a futile manner by darting out its long forked tongue, to ward off its adversaries, whenever they approached near to it. The cockatoos, however, did not slacken their assaults; whilst one attacked in front, the other flew at its back, until the iguana had had so much buffeting, that he seemed as anxious to come down as he had before been to go up. He presently, in fact, turned tail and made his way down in a precipitate and undignified retreat. So pleased was I with the devotion and valour of the birds, that I ran up and killed the reptile, though this was perhaps not the best course, as iguanas are useful to man in destroying rabbits and other vermin.—D. T. HAMILTON.

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THE

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THE JOURNAL AND MAGAZINE

OF THE

Field Naturalists' Club of Victoria.

The Author of each article is responsible for the facts and opinions he records.

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With the view of popularising the study of the Natural History of the Colony, correspondence, notes, and queries relating to this subject are invited for insertion, and should be addressed to the Editor at the Wesley College, Prahran.

Any of the numbers from the commencement, January 1884, can be obtained from the Hon. Sec., Mr. F. G. A. Barnard, Kew, at sixpence each; or in sets, Vol. I (1884-5), 16 numbers, 7/6; Vol. II (1885-6), 12 numbers, 6/-; each set with title-page and index for binding.

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THE

Victorian Naturalist:

Vol. III. No. 6. OCTOBER 1886. No. 34.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall, on Monday evening, 13th September, 1886.

The president, the Rev. J. J. Halley, occupied the chair, and about fifty-five members and visitors were present.

A letter was read from the Commissioner of Trade and Customs, stating that a close season extending over the whole of the year, had been proclaimed under the Game Act for the following birds:—curlew, laughing-jackass, magpie (two species), magpie lark, and mopoke (two species.)

A circular letter was read from Professor Liversidge, Sydney, respecting the formation of an Australasian Association for the Advancement of Science. It was decided to take part in the preliminary meetings.

The hon. librarian reported the receipt of the following donations to the library:—

"Proceedings of the Linnean Society of New South Wales," (new series), Vol. I, part 2: also "Catalogue of Library," from the Society; "Journal of the New York Microscopical Society," May 1886, from the Society; "Transactions of the Geological Society of Australasia," Vol. I., Part 1, from the Society; "Notes on Native Plants of South Australia Suitable for Cultivation," by J. O. Tepper, F.L.S., Adelaide from the author; "Annual Report of Zoological Society of Victoria," 1885, from the Society.

The hon. secretary read short accounts of the excursions to Clayton's Road, Brighton, and Box Hill, held since the last meeting. He reported that they had been fairly attended, but that no important find had been made on any of the trips.

The proposed alterations in the rules were submitted to the meeting, and with a few amendments were duly passed.

Paper read:—By Mr. C. French, F.L S., entitled "The Orchideæ of Victoria," Part X. In this part of this interesting series of papers, the author described and exhibited specimens of nine species of Victorian orchids, belonging to the genera *Caleya*, *Acianthus Cyrtostylis*, *Lyperanthus*, and *Eriochilus*.

Baron F. von Mueller, K.C.M.G., contributed a note on a fern, *Adiantum diaphanum*, new to Victoria, recently discovered by Mr. C. French, F.L.S., near Drouin.

Mr. S. H. Wintle, F.L.S., read a note on, and exhibited specimens of some fossil crabs found in an old bed of the River Yarra cut through by the Coode Canal at Fisherman's Bend, and also on some mammalian remains found in the excavations for the new Princes Bridge.

The following were the principal exhibits:—By Mr. F. G. A. Barnard, specimens of the lerp insect, *Psylla* sp., in various stages, also flowering branches of the handsome leguminaceous shrub, *Goodia lotifolia*, grown at Kew; by Mr. A. Coles, two young Southern stone plovers, or curlews, *Œdicnemus grallarius*; by Mr. G. Coghill, orchids in bloom, *Caladenia carnea*, and *Diuris maculata*; by Mr. E. M. Cornwall, sixteen species of Queensland birds, eggs of cassowary, and yellow honey-eater, (*Ptilotis flava*), from North Queensland, also eggs of the rock warbler, *Origma rubricata*, from North Head, Port Jackson; by Mr P. Dattari, collection of Australian buprestid beetles; by Mrs. Flatow, some fine ammonites, and fossils from the Morley Main coal-pits; by Mr. C. French, F.L.S., dried specimens of new Victorian fern, *Adiantum diaphanum*, and nine species of orchids in illustration of his paper, also two male specimens of the square-tailed kite, *Lophoictinia isura*, from Omeo; by Mr. T. A. Forbes-Leith, exotic birds, a New Guinea pitta, a New Ireland myna, and a Fijian lorikeet; by Master H. C. Grover, an owl, and a sooty crow-shrike; by Mr. R. Hall, pipe-fish and star-fish, also a clutch of crow's eggs from Laverton; by Mr. J. T. Haden, geological specimens; by Mr. H. Kennon, a brown snake, 3 feet long, killed at Glenrowan on September 11th, specimen of cotton from New Guinea; by Baron von Mueller, K.C.M.G., a new plant, *Helicia Forbesiana*, from New Guinea, a copy of Part I. of "The Myoporineæ of Australia," by Baron von Mueller, Government Botanist, "Monograph of the Erythreæ," by Wittrock, Sweden; by Mr. F. Reader, rare unrecorded Victorian mosses, *Glyphomitrium acutifolium*, Hook. and Wils., *Enthosthodon gracilis*, Hook. and Wils., and *Tortula muralis*, Hedw., also *T. torquata*, Tayl., (Vict.) and *Phascum cylindricum*, Tayl., (Vict.); by Mr. H. Watts, a new marine hydrozoon, *Plumularia Wattsii*, from Queenscliff; by Rev. W. T. Whan, M.A., coral from Diego Garcia, fossils from Glenelg

River; by Mr. S. H. Wintle, F.L.S., cancerolites, fossil brachiopoda, from near Melbourne, recent spider crab, fossil bones, (Pleistocene) from Princes Bridge; by Mr. T. Worcester, fossil ear-bones of whales (cetotolites), and fish palates from near Hamilton; by Rev C. M. Yelland, pumice from Sumbawa, found floating in the Indian Ocean.

After the usual *conversazione* the meeting terminated.

DESCRIPTION OF A NEW PAPUAN TERNSTRŒMIACEOUS PLANT,

BY BARON VON MUELLER, K.C.M.G., M. & Ph.D., F.R.S. &c.

TREMATANTHERA.

CALYX deeply five-lobed, persistent. Corolla five-cleft almost to the base, the segments twisted-imbricate before expansion. Stamens numerous, connate into an only slightly filamentous membrane; anthers narrow-oblong, base-fixed, blunt, glabrous, opening by two terminal pores; pollen-grains almost ovate, smooth, bursting by longitudinal fissures. Style filiform, formed by concrescence of five into one, entire; stigma minute, undivided. Ovary nearly free, five-celled, with very numerous ovules in each cell on axillary placentas. Capsule indehiscent, depressed-globular, adnate to the calyx slightly beyond the base. Seeds minute, multitudinous, mostly truncate-ovate; albumen comparatively large; embryo straight, cylindric-ellipsoid; cotyledons half as long as the radicle.

A shrub with scattered almost lanceolar crenulate-serrulated leaves, with axillary solitary paired or ternate rather long-stalked flowers without hypocalycine bracteoles and with comparatively small fruits.

The genus, thus now defined, differs from all others of the order, except *Saraiia* and *Pentaphylax*, in the dehiscene of the anthers; but is widely separated from these two in various other respects, coming nearest to *Cleyera*, *Adinanara* and *Eurya*, receding from these three in not extensively free filaments, in not longitudinally opening anthers and not curved embryo.

TREMATANTHERA DUFAURII.

At Dedouri on the Jala-River, W. Armit (Argus-Expedition); near the Owen Stanley's Ranges, H. O. Forbes (356,785.)

Plant in general appearance not unlike *Cleyera Japonica*, resembling also some *Euryas*, quite glabrous except minute scaly glands occurring on the young branchlets and on the underside of the leaves. Petioles $\frac{1}{3}$–$\frac{2}{3}$ inch long, slender. Leaves firm-chartaceous, oblong-or ovate-lanceolar, flat, attaining a length of 4 and a breadth of $1\frac{1}{2}$ inches, but often of less size, dark-green above, pale-green

beneath, slightly or hardly acuminated, callous-glandularly denticulated, ascendingly costate, subtle-veined. Peduncles usually absent, seldom elongated. Pedicels ½-1 inch long, very thin, bearing one or two minute almost lanceolar bracts near or below the middle. Hypocalycine bracteoles none. Lobes of the calyx from a broad base oblong semiovate, usually about three times longer than the undivided basal portion, rarely reduced to four in number, the two outer somewhat smaller. Corolla deciduous, about ⅓ inch long, rather membranous; its color not recognisable in a dried state; the segments broadly sessile, nearly cuneate-ovate. Stamens inserted along the base of the corolla, but free from it; the membranous connate portion of the stamens about as long as the anthers and only partially divided into very short filaments; anthers forming a few irregular rows, about $\frac{1}{12}$ inch long, yellowish. Style about ⅛ inch long. Ovary adnate in its lower portion, rarely 4-celled. Fruit from hardly ¼ to rather more than ⅓ inch broad, almost completely superior; septa thin; placentas very prominent. Seeds from $\frac{1}{24}$ to $\frac{1}{30}$ inch long, sometimes verging into an almost globular form, outside brown, reticulated by copious close impressions; moistened testa mucilaginous; embryo white, somewhat shorter than the albumen.

This notable and pretty plant is dedicated to E. Du Faur Esq., F.R.G.S., one of the first originators of the Australian Geographical Society, who not only devoted as a member of its administrative Council much attention to the Society's Expeditions into New Guinea, but who also upheld perseveringly in later years the cause of the long-lost Dr. Leichardt and the unfortunate companions of that renowned and lamented explorer.

Australian Paradoxes.

"But this is New Holland, where it is summer with us when it is winter in Europe, and *vice versa*; where the barometer rises before bad weather, and falls before good; where the north is the hot wind and the south the cold; where the humblest house is fitted up with cedar; where the fields are fenced with mahogany; and myrtle-trees are burnt for firewood; where the swans are black and the eagles white; where the kangaroo, an animal between the squirrel and the deer, has five claws on its fore-paws, and three talons on its hind legs like a bird, and yet hops on its tail; where the mole lays eggs, and has a duck's bill; where there is a bird with a broom in its mouth instead of a tongue; where there is a fish one half belonging to the genus *Raja* and the other to that of *Squalus;* where the pears are made of wood, with the stalk at the broader end; and where the cherry grows with the stone on the outside." From "Field's New South Wales," p. 461.

NOTE ON A NEW VICTORIAN FERN, ADIANTUM DIAPHANUM,

BY BARON F. VON MUELLER.

(Read at Field Naturalists' Club of Victoria, Sept. 13th, 1886.)

MR. FRENCH exhibited specimens of an *Adiantum*, determined as *A. diaphanum* of Blume by Baron von Mueller, and discovered near the Leng Leng, a tributary of the Latrobe-River in ranges about 10 miles south-west of Drouin by Mr. French. This fern is new for Victoria, and the locality, in which it was found, is the most southern known for this species.

Since the 7th vol. of the "Flora Australiensis" was published eight years ago, this fern has been found at the following additional places, Mt. Dromedary (Miss Bate), Milton (Bauerlen), Connors River (Scortechini), Norfolk Island (Robinson), Bloomfield River (Miss Bauer), Mossman's River (Barnard), Trinity-Bay (Sayer.)

Fronds occur with single and with as many as 9 pinnæ, in the latter case two diminutive, the pinnules not rarely bear a few dark bristly hairs. *A. diaphanum* may easily be mistaken for *A. affine* but the pinnæ are fewer and more crowded, the pinnules of thinner texture and still more finely veined, while usually the whole plant is smaller. In all probability *A. affine* will also still be found in Gippsland, but it might be easily taken for a form of *A. formosum*, known through Baron von Mueller since 1854 from the forests on the lower Snowy River.

The shape and position of the indusiæ offer the best marks of discrimination between the two, almost enclosed and orbicular-renate in *A. affine* exserted and ellipsoid-renate in *A. formosum*. The latter species is the taller of the two, and its pinnæ are also more numerous.

Mr. French, F.L.S., exhibited on behalf of Baron von Mueller a specimen of a new Papuan *Helicia*, pointing out that it was belonging to that genus, by which the *Proteaceæ* were solely represented in India, China, Japan and the Phillipine Islands, its extension also to Australia having first been demonstrated by the Baron.

It would be of great interest to watch in what direction the order of *Proteaceæ* was developed in New Guinea, from whence hitherto a litorial *Banksia*, and an equally maritime *Grevillea* of Australia had been obtained, besides this *Helicia* and an endemic *Grevillea* belonging to the mountain regions. The latter however indicated already that we might look for other forms of *Proteaceæ* in the Papuan Ranges, than merely *Helicia*, more particularly so as in Continental Australia, Tasmania, New Zealand and South America, some *Proteaceæ* were alpine.

NOTE ON UTRICULARIA DICHOTOMA.

By C. A. Topp, M.A.

(Read before Field Naturalists' Club, 8th February, 1886.

In August, 1884, I read a paper on "Some Observations on the Genus Utricularia," a small group of flowering plants remarkable for their carnivorous habits. My remarks were chiefly limited to the species *U. lateriflora*, the only one whose utricles I had seen in a fresh state. This spring I obtained specimens of the larger species, *U. dichotoma*, and I propose to give a short account of my observations of this plant. *U. dichotoma*, (Labill.,) when in flower forms a pretty plant, bearing two or three bright lilac flowers on a slender stalk from 6 to 12 inches long. The radical leaves are in general not above $\frac{1}{4}$ inch in length, and are hardly noticeable; the plants usually grow in considerable numbers together in swampy patches, and flower in October and November. Those which I have examined were found by Mr. F. G. A. Barnard, at Ringwood. I have also found them at Caulfield and Oakleigh.

The utricles, which are the organs for entrapping the larvæ of insects and small crustaceans, are attached by slender footstalks to the petioles of the leaves, the petioles and utricles being underground. Each utricle is nearly globular, and is from 1-12 to 1-10 inch in diameter. One surface is somewhat flattened, this may be called the ventral aspect, at the base of this is the footstalk, and at the top a projection, called by Darwin from its resemblance to that organ in insects, an antenna; this is a slender process, about half the diameter in length, ending in a forked hair. In its natural position it appears to be curved over the ventral surface of the bladder, probably to prevent the entrance to the bladder from being choked with sand. Underneath this process is an orifice or mouth leading into the interior of the utricle, and between the footstalk and this opening, the surface of the utricle is covered with slender multicellular hairs. The outer surface of the whole bladder is formed of polygonal transparent cells, studded over at intervals with small globular projecting glandular cells. A spiral vessel continuous with that of the footstalk, runs round the dorsal surface of the utricle to the commencement of the antenna. The opening into the utricle is protected by a deep collar, which is readily seen through the transparent cell wall; this collar is formed of closely set oblong cells filled with dark granular matter.

The interior of the utricles is closely beset with quadrifid glands formed of four elongated conical cells on a short footstalk, similar to those shown in figure 28, "Darwin's Insectivorous Plants," as found in *U. montana*. The conical cells are only about 1-500 inch long, and it is singular that they are actually smaller than those

with which *U. laterifolia* is provided, though the utricles of this plant are only 1-4 or 1-5th as large as those of *U. dichotoma*.

The bladder when fresh in nearly every case contained a large bubble of air, or some gas, and many of them contained the larvæ of insects or small crustaceans. One shown to me by Mr. F. Barnard, contained seven larvæ or crustaceans, very little decomposed. The utricle on a slide I show to-night, shows one larva almost perfect, and several others in various stages of decay. The quadrifid glands and the cells of the collar of utricles, contained remains of animal life, give evidence of the absorption of nitrogenous matter since they contain a quantity of granular protoplasm, some of a brown colour, which is absent from the empty bladder.

There can therefore, be no doubt, that the Australian *Utricularias* like those examined by Darwin, are carnivorous, and present an equally complex and wonderful structure.

Though the utricles of the two species I have examined present a general resemblance, and no doubt fulfil the same function, they differ in the following particulars.

1. The bladder of the *U. dichotoma* are 4 or 5 times as large as those of *U. lateriflora*.

2. The antenna of the former species is more slender, and divides into two hairs.

3. The ventral surface of *U. dichotoma* is furnished with slender multicellular hairs, while the corresponding part of the smaller species has singular conical papillæ.

4. The quadrifid processes of *U. dichotoma* are smaller, but more numerous than those of *U. lateriflora*.

These differences may indicate a difference in the form of leaf, of which the bladders are probably modifications.

It is possible that the difference in shape of the antennæ and ventral hairs, may be due to the necessity for the larger orifice in the larger bladders to be protected from the access of animals which would be too large for absorption, and which might prove destructive to the organ, a protection which the smaller and less noticeable might not need.

The bladders of *U. dichotoma* have not, so far as I know, been figured or described. This species is not mentioned in Darwin's monograph.

Fecundity of Snakes.

Mr. Morton, the Curator of the Hobart Museum, in opening up a female *Hoplocephalus curtus* last season, found no less than 109 living young ones. This seems to be "the record" so far, though litters of 70-80 had been met with before.

ORCHIDEÆ OF VICTORIA.

By C. French, F.L.S., Department of Government Botanist.

Part 10.

CALEYA, (Endlicher.)

SEPALS and petals all linear, the dorsal sepal erect, the lateral sepals and petals spreading or reflexed. Labellum articulate at the base of the column or at the end of its basal projection, and movable, with a linear incurved claw. Column elongated. Anther erect, not mucronate. Pollen masses granular. Tubers large for size of the plant, Leaf linear-lanceolate or oblong. Flowers 1 to 3, or rarely 4. The genus is, as Mr. Bentham remarks, limited to Australia, and is readily known by the large petal-like wings of the column, forming a kind of pouch, open or closed by the elastic motions of the lid-like labellum.

C. MAJOR, (R. Brown.)

Leaf radical linear or narrow-lanceolate, 2 to 4 inches long, stem often 1 foot or more high, with a closely appressed empty sheathing bract below the middle. Dorsal sepal narrow-linear, rather thick and channelled. Labellum long. Stigma obscurely 2-pointed. This interesting and curious orchid is one which cannot fail to attract the attention of plant collectors, as its singular shape and appearance render it of easy detection.. In the beautiful and flower-covered flats bordering on Mt. William, at the Grampians, I had the good fortune to see my first specimen of this charming little plant, which was growing in company with that superb plant, *Calectasia cyanea*, in nearly pure white sand, its dark flower, and darker green leaf standing out in striking relief. Mr. D. Sullivan, F.L.S., of Moyston, to whom I am indebted for a friendly and most enjoyable drive to this place, informs me that it is common on the sandy flats near these mountains, and I have since found it at Oakleigh, and further on the railway line towards Mulgrave, in both of these places the plants grew in the most out of the way places, and it was quite by accident, while looking for an insect, that I came across them. It will be quite unnecessary to give any further description of this plant, as the very excellent one given above, and taken from the "Flora Australiensis" of Bentham and Mueller, will enable anyone to recognise it at a glance. I have observed that the leaves of this species are covered with black dots, and this seems to be very constant in all the specimens which I have collected. To grow it well, use almost pure sand, with a little bog soil chopped up, and added. Water well, and place several tubers in a pot or pan, the latter being the most suitable. This *sp.* flowers about November, and sometimes even later on. *Caleana major* of R. Brown, is

synonomous with this *sp.* Found also in New South Wales, Queensland, and Tasmania.

C. Sullivani, (F. v. Mueller.)

Stem very slender, comparatively short, its lowest portion enclosed in a membranous, narrow, slightly downy cylinder; leaf narrow-linear, inserted some distance from base of stem, no bract between the leaf and the floral bracts; flowers two to three, very small; labellum lanceolar-ovate, passing from a gradually attenuated base into curved stipes of hardly half the length, pointed at the summit, very bulging above; membrane of the column terminated on each side by a small deltoid lobe, fruit oblique, egg-shaped.

This pretty little orchid was first brought to light by my old friend, Mr. D. Sullivan, F.L.S., of Moyston, and was found near Mt. Zero, one of the Grampian chain of mountains. I can scarcely venture on any recommendations as to its culture, it being almost unique at present, and I am indebted to my respected chief, Baron von Mueller, for the loan of the specimen here exhibited. I have taken the (abbreviated) description from the "Victorian Chemist and Druggist," in which publication the more detailed and scientific description can be found. Flowers, I believe, later in the season than *C. major*. Height, 4 to 6 inches. I may mention that this genus was founded in honor of a Mr. Caley, and thus the Baron has adopted the generic name of *Caleya*, instead of *Caleana*, a change which I think most of us will appreciate. I had hoped to be able to announce the existence of *C. minor* in Victoria, a small form of *C. major* having been found by our member, Miss Campbell, and at first the Baron supposed it to be a form of *C. minor*, but has since placed it as a small form of the common *sp.*

Acianthus, (R. Brown.)

Dorsal sepal erect or incurved over the column, concave, not very broad, and often produced into a fine point, lateral sepals narrow, erect or spreading; petal much shorter. Labellum about as long as the petals, sessile, or nearly so. Column erect or incurved, 2-winged. Anther broad, erect, 2-celled. Pollen granular. Leaf solitary. Flowers solitary, or several in a terminal raceme, on a scape or stem, without scales above the leaf.

A. caudatus, (R. Brown.)

Stems slender, sometimes filiform, 3 to 6 inches high. Leaf at or near the base, deeply cordate, ovate, rarely above 1 inch long. Flowers 1 to 3, of a dark color, on short pedicels within small bracts. Dorsal sepal tapering into a filiform point. Labellum almost or quite sessile. Column not winged. Pollen more granular than in the following *sp.*

A very singular, and in Victoria, a rare *sp.*, which, I believe, I had the honor of being the first to find in Victoria, whilst on a botanical trip to Gembrook. This little plant may be at once

recognised from the other *sp.* of the genus, principally by the tail-like extension of the dorsal sepal, which is very curious and distinct. In the specimens which I have seen, the flowers are of a light transparent purplish red, and not dark as stated above, although possibly the specimens from which the originals were described, may have been so. In looking for it, the search must be made in a very careful manner, as it grows in the most sheltered and obscure places near the fern gullies, and seems to shrink from the light. The leaves are somewhat different from *A. exsertus*, being not so cordate as in that *sp.*, and without the purplish tint which is so constant a character in the latter plant. To grow it, place in a shallow pan, well drained, and amongst leaf mould, moss, and sand, place your tubers to the depth of one inch. Water sparingly, and keep from direct exposure to either the sun or wind. It is worth growing simply as a botanical plant, or to complete a collection. Flowers in November and December. Found in New South Wales, and said to be common in Tasmania.

A. EXSERTUS, (R. Brown.)

A slender, delicate plant, much resembling *A. fornicatus*, but smaller. Leaf deeply cordate. Flowers rather smaller, 3 to 6 in a raceme, the pedicels very short. Dorsal sepal slightly incurved, concave but narrow and much contracted at the base. Labellum nearly as long as the sepals. Column slender, not winged, about half as long as the sepals, incurved, and protruding forwards from the dorsal sepal.

This very common little plant may be found in large numbers, growing amongst the Ti-tree which lines the coast nearly throughout the colony. It is an early *sp.*, flowering sometimes in August. It is very easily distinguished from any of the little orchids which grow near it, principally by its dark, heart-shaped leaf, the under part purple. This *sp.* was long known to most of us as *A fornicatus*, but of late years the error has been pointed out by the Baron, the former *sp.* not having as yet, I believe, been found in Victoria, although it is quite possible that some of our energetic members may yet add it to the list of our Victorian orchids. To grow it, procure a large number of tubers, and a pan of leaf mould and sand, place the tubers about an inch, or even less, below the surface, water well, and keep shaded until it makes its appearance above ground, where it can be then gradually used to more exposure, although, as a rule, it is a shade-loving plant. In the fern gullies, I have noticed that the leaves are quite green, the purple tinge so common on the under part of the leaves of plants, growing in more exposed and less moist situations, being entirely absent, so that this character cannot always be relied upon. Found also in New South Wales, South Australia, and Tasmania.

Before closing my remarks on this genus, I may make mention of *A. viridis*, a very elegant and delicate *sp.* found in Tasmania, where Dr. Dobson tells me he found it growing on dripping rocks, and on damp logs in fern gullies. I have one specimen in my collection, for the possession of which I am indebted to our late president, the Hon. F. S. Dobson, M.L.C. This *sp.* will, in all probability, yet be found in this colony.

ERIOCHILUS, (R. Brown.)

Dorsal sepal erect, slightly incurved and concave; petals nearly as long, usually narrower, erect or spreading. Labellum much shorter, with a narrow, concave erect claw. Column erect, the front angles sometimes ciliate, or very narrowly winged. Anther erect, not mucronate, 2-celled. Leaf solitary at the base of, or higher up the stem. Flowers 1 or more, nearly sessile on a scape or peduncle.

E. AUTUMNALIS, (R. Brown.)

A slender plant, rarely exceeding 6 inches, more or less glandular pubescent. Leaf radical, ovate, acute, usually dying away before time of flowering. Flowers solitary, or 2 or 3 rather distant. Dorsal sepal erect. Labellum about half as long as the lateral sepals, with an erect, conclave, narrow claw. Column shorter than the dorsal sepal.

This pretty little harbinger of the orchid season, makes its appearance, say from March to June, and I have often found it still later on. It may be easily recognised, even without referring to the abbreviated description taken from the "Flora," and given above, as its pinky white flowers are sure to attract the attention of collectors, and it cannot be well mistaken for any other orchid. In the grassy country in and about the ranges, it may be found in large numbers, being much more common there than it is at Brighton and elsewhere near the coast, although very fine and isolated specimens are met with in the Ti-tree at Brighton, &c. To grow it well, place a number of tubers in a shallow pot or pan, with a mixture of loam and sand, and when growing, water freely. Although this little plant flowers in many instances without the leaves, still you will often find it otherwise, the leaves often remaining above ground till later in the summer. I have noticed a great difference in the leaves of this orchid, as sometimes they have quite a glabrous appearance, and at others the surface is thickly covered with little white hairs. This is a general favourite, and should be in every collection of native orchids. *Epipactis cucullata*, Labill., and *Eriochilus cucullata*, Reichenbach, are synonomous with this *sp.* Found also in New South Wales, Queensland, South Australia, and Tasmania. Mr. T. Sloane, of Mulwala, has sent me a very sturdy form of this *sp.*, found in the pine scrubs on the Murray.

(*To be Continued.*)

New Victorian Fungs.

We have to record the following 15 new Victorian Fungi, named by Dr. M. C. Cooke, forwarded by Baron von Mueller: *Agaricus mastoideus*, *A. semiglobatus*, *Hygrophorus puniceus*, *Polyporus Gunnii*, *P. lilacinogilvus*, *Hydnum ochraceum*, *Irpex zonatus*, *Thelephora atra*, *Stereum Sowerbei*, *Clavaria aurea*, *C. muscoides*, *C. rufa*, *Cynophallus Caleyi*, *Ileodictyon cibarium*, *Cyathus vermicosus*.

Pond Life about Oakleigh.

Mr. H. Watts forwards the list of objects found by him in a visit to Oakleigh and the immediate neighbourhood in August. Diatom—*Gomphonema geminatum*: Desmids—*Closterium lunula*, *C. venus*, *Penium digitus*, *Docidium verrucosum*, *D. undulatum*, *Cosmarium margaritiferum*, and *Staurastrum* sp.: other freshwater Algs—*Oscillaria tenuis*, *Vaucheria clavata*, *Spirogyra* sp. (sterile), *Bulbochæte pygmæa*, *Œdogonium* sp., *Merismopedia punctata*: Infusoria—several sp., Entomostraca—3 sp.: Hydrachnida—1 sp.

Frogs *v.* Mice.

"Mr. W. August Carter, of South Norwood, states that he observed, a short time since, several mice pursuing some frogs in a shed which was overrun by these reptiles ' (sic.)" The alacrity of the latter, however, rendered the attacks of the mice futile for a considerable period. Again and again the frogs escaped from the clutches of their foes, but only to be recaptured, severely shaken and bitten. The energy put forth by these reptiles was so great that they actually swayed their captors to and fro in their efforts to wrest themselves from their grasp. At length the wounds inflicted upon them rendered the frogs incapable of further resistence, and they were easily overpowed by the mice, which devoured a certain part of them." "Nature," June 3rd, 1886.

BOTANICAL NOTE.

At the last meeting of the F.N.C., Mr. G. Coghill exhibited a pot of the orchid, *Caladenia carnea*, grown by himself. Among the flowers was one in which there was an extra petal, and a double labellum.

ERRATUM.

In the second last page, line 21, of "Observations on Sterculiaceæ," read *gynophore* instead of gymnophore.

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THE

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THE FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 11th October, 1886.

Mr. T. A. Forbes-Leith, vice-president, occupied the chair, and about 175 members and visitors were present.

A letter was read from the Commissioner of Trade and Customs, asking for the Club's opinion as to altering the dates of the beginning and ending of the close season for birds throughout the colony. It was decided to support the present season.

The following persons were elected members of the Club :—

Miss E. S. Poynter, Messrs. J. Harris, M.L.A., H. Jacobs, H. J. McCovey, R. E. McDougal, B.Sc., and Master T. Long.

A few notes on a method of preserving flowers in nearly their natural colours and shapes were given by Mr. D. McAlpine, F.C.S., who exhibited specimens of flowers preserved by the process.

The exhibits of the evening consisted principally of wild flowers, a more detailed description of which is appended.

After the usual *conversazione* the meeting terminated.

Would any reader kindly inform me whether such plants as water lilies bearing blue and crimson flowers are known, and of what parts of the world are they natives ?—F.

EXHIBITION OF WILD FLOWERS AND LIVING AUSTRALIAN BIRDS.

The success of the first exhibition of fresh native flowers having been so pronounced, it was determined to repeat the experiment this year, and accordingly the last (October) meeting of the Club was specially devoted to an exhibition of these interesting signs of a returning spring or summer. In order to somewhat vary the exhibits it was also decided to admit live specimens of Australian birds, which proved an additional attraction.

Of native flowers there were about 180 species shown. These were exhibited in different ways, according to the several tastes of the exhibitors, but principally in the ordinary show stands. The flowers presented a very creditable appearance, considering that many of them had been gathered on the previous Saturday, and had come from such distances as Echuca, Leigh-road, Croydon, Avoca, etc. About 20 species were also shown from Sydney.

Among the principal exhibitors were Mr. G. Coghill, who exhibited about 100 species from Echuca, Eltham, Dandenong Ranges, Leigh-road, etc., among which were grevilleas, swainsonias, etc., and several orchids. He also had sixteen species of wild flowers from Sydney. Mr. O. A. Sayce had about 80 species from the Gembrook Ranges and Beaconsfield, among which were several acacias, *Utricularia dichotoma*, etc. Mr. C. French, F.L.S., had about 60 species from Dandenong Ranges, Mulgrave, Oakleigh, and Cheltenham. Mr. C. A. Topp, M.A., exhibited about 60 species from Croydon, Diamond Creek, and Studley Park, including *Grevillea rosmarinifolia*, *Myoporum viscosum*, etc. Mr. F. G. A. Barnard exhibited about 60 species from Croydon, Cheltenham, and Doncaster, those from the latter place having been collected by Mr. Thiele. In this exhibit were several handsome leguminaceous flowers, the orchids, *Lyperanthus nigricans*, and *Caladenia Menziesii*, etc. Rev. C. M. Yelland exhibited a nice collection of about 35 species made at Avoca by Miss Sproston; among these *Eriostemon obovalis*, *Grevillea alpina*, and several species of orchids were much admired. Mr. W. R. Guilfoyle, F.L.S., showed a fine stand of 24 species of the rarer Victorian plants grown at the Botanical Gardens, among which were *Lhotzkya genetylloides*, *Velleya paradoxa*, *Grevillea oleoides*, *G. confertifolia*, *Calycothrix tetragona*, *Eriostemon myoporoides*. Among Mr. J. E. Prince's specimens was the quondong (*Santalum persicarum*) in fruit, also Boronias, etc., from Sydney. Baron von Mueller, K.C.M.G., who also very kindly assisted in naming many of the specimens, exhibited dried specimens of the curious "sheep

plant" of New Zealand (*Haastia pulvinaris*), which, growing on the hill-sides of the Alps, is often mistaken for sheep. Miss Moody and the Misses Halley exhibited tastefully-arranged flowers from Warragul and Camberwell. Mr. E. Dombrain had an interesting exhibit of native orchid flowers. Miss Campbell, Messrs. A. J. Campbell, G. R. Hill, and others also contributed to the general display.

It is needless to mention that the same species was, in many cases, shown by several exhibitors, so that where in the short summary above a plant is mentioned with an exhibitor's name he was not necessarily the only exhibitor of that flower.

The following list of the principal flowers exhibited is arranged according to Baron von Mueller's "Key to the Victorian Plants":—

Natural Order.	Genus and Species.
Ranunculaceæ ...	*Clematis aristata; C. microphylla* (in fruit).
	Ranunculus lappaceus; R. rivularis.
Dilleniaceæ ...	*Hibbertia densiflora; H. stricta; H. fasciculata; H. virgata.*
Violaceæ ...	*Viola betonicifolia; V. hederacea.*
Pittosporeæ ...	*Billardiera scandens.*
Droseraceæ ...	*Drosera peltata.*
Polygaleæ ...	*Comesperma volubile; C. ericinum.*
Tremandreæ ...	*Tetratheca ciliata.*
Rutaceæ ...	*Boronia pinnata.*
	Eriostemon myoporoides; E. obovalis.
	Correa speciosa var. *virens.*
Lineæ ...	*Linum marginale.*
Malvaceæ ...	*Plagianthus pulchellus.*
Sterculiaceæ ...	*Lasiopetalum Baueri.*
Euphorbiaceæ ...	*Ricinocarpus pinifolius.*
	Amperea spartioides.
Casuarineæ ...	*Casuarina distyla.*
Stackhousieæ ...	*Stackhousia linarifolia.*
Ficoideæ ...	*Mesembrianthemum æquilaterale.*
Leguminosæ ...	*Sphaerolobium vimineum.*
	Daviesia latifolia; D. corymbosa; D. ulicina.
	Aotus villosa.
	Pultenaea Gunnii; P. scabra; P. humilis.
	Dillwynia ericifolia; D. floribunda; D. cinerascens.
	Platylobium obtusangulum.

Natural Order.		Genus and Species.
Leguminosæ	...	*Bossiaea cinerea*; *B. prostrata.*
		Goodia lotifolia.
		Indigofera Australis.
		Swainsonia procumbens; *S. lessertiifolia.*
		Kennedya prostrata; *K. monophylla.*
		Acacia juniperina; *A. diffusa*; *A. acinacea*; *A. suaveolens*; *A. myrtifolia*; *A. oxycedrus*; *A. verticillata*; *A. decurrens.*
Saxifrageæ	...	*Bauera rubioides.*
Myrtaceæ	...	*Calycothrix tetragona.*
		Lhotzkya genetylloides.
		Leptospermum lævigatum; *L. lanigerum*; *L. scoparium*; *L. myrsinoides.*
		Kunzea corifolia.
		Melaleuca ericifolia.
		Eucalyptus Sp.
Rhamnaceæ	...	*Cryptandra Hookeri.*
Santalaceæ	...	*Santalum persicarium* (in fruit).
		Exocarpos stricta (in fruit).
Loranthaceæ	...	*Loranthus pendulus.*
Proteaceæ	...	*Isopogon ceratophyllus.*
		Grevillea alpina; *G. rosmarinifolia*; *G. oleoides*; *G. confertifolia.*
		Hakea nodosa; *H. microcarpa*; *H. ulicina*, var. *carinata*; *H. microcarpa.*
		Banksia marginata; *B. integrifolia.*
Thymeleæ	...	*Pimelea humilis*; *P. axiflora*; *P. serpillifolia*; *P. flava*; *P. octophylla.*
Rubiaceæ	...	*Asperula oligantha.*
		Galium Australe.
Compositæ	...	*Brachycome cardiocarpa.*
		Aster myrsinoides; *A. stellulatus*; *A. asteroichus*; *A. ramulosus.*
		Podolepis acuminata.
		Leptorrhynchus squamatus.
		Helipterum incanum.
		Helichrysum scorpioides.
		Craspedia Richea.
		Cotula coronopifolia.
		Senecio vagus.
		Microseris Fosteri.
Campanulaceæ	...	*Wahlenbergia gracilis.*
Candollaceæ	...	*Candollea serrulata.*

Natural Order.	Genus and Species.
Goodeniaceæ ...	*Goodenia ovata; G. geniculata; G. humilis.*
	Velleya paradoxa.
Gentianeæ ...	*Limnanthemum exaltatum.*
Convolvulaceæ ...	*Convolvulus erubescens.*
Scrophularinæ ...	*Veronica perfoliata.*
	Euphrasia Brownii.
Lentibularinæ ...	*Utricularia dichotoma.*
Asperifoliæ ...	*Cynoglossum suaveoleus.*
Labiatæ ...	*Prostranthera rotundifolia.*
	Ajuga Australis.
Myoporinæ ...	*Myoporum viscosum.*
Epacridæ ...	*Styphelia Richei; S. virgata.*
	Epacris impressa; E. obtusifolia; E. microphylla.
	Sprengelia incarnata.
Orchideæ ...	*Thelymitra ixioides; T. aristata; T. carnea; T. flexusa; T. antennifera; T. epipactoides.*
	Diuris maculata; D. pedunculata; D. longifolia.
	Calochilus campestris.
	Prasophyllum elatum.
	Pterostylis curta; P. nutans; P. cucullata; P. mutica.
	Lyperanthus nigricans.
	Caladenia Menziesii; C. Patersoni; C. suaveoleus; C. carnea; C. deformis.
	Chiloglottis Gunnii.
	Glossodia major.
Amaryllideæ ...	*Hypoxis glabella.*
Liliaceæ ...	*Wurmbea dioica.*
	Burchardia umbellata.
	Bulbine bulbosa.
	Chamæscilla corymbosa.
	Stypandra glauca; S. caespitosa.
	Arthropodium strictum.
	Xerotes longifolia; X. Thunbergii.
Fluviales ...	*Triglochin procera.*

The following flowers from New South Wales were also exhibited :—

Polygaleæ ...	*Comesperma taxifolium.*
Tremandreæ ...	*Tetratheca ericifolia.*

Natural Order.	Genus and Species.
Rutaceæ ...	*Boronia pinnata ; B. serrulata.*
	Philotheca Australis.
	Eriostemon lanceolatus.
Leguminosæ	*Dillwynia ericifolia.*
Myrtaceæ ...	*Darwinia fascicularis.*
Umbelliferæ	*Actinotus Helianthi.*
Proteaceæ ...	*Isopogon anethifolius.*
	Lambertia formosa.
	Telopea speciosissima.
Labiatæ ...	*Hemigenia purpurea.*
Epacridæ ...	*Lysinema pungens.*
	Styphelia daphnoides ; S. microphylla.
Amaryllideæ ...	*Doryanthes excelsa.*
Liliaceæ	*Sowerbæa juncea.*

Among the principal exhibitors of birds were Mr. D. Le Souëf, who exhibited specimens of the white-eyed crow, *Corvus Australis ;* the allied kite, *Milvus affinus ;* Leach's kingfisher, *Dacelo Leachii*, from N.W. Australia; and the tawny-shouldered podargus, *Podargus strigoides*. Mr. T. A. Forbes-Leith showed a pair of grey-headed parrakeets, *Agapornis cana*, from Madagascar, and a pair of the little sulphur-crested cockatoos, *Plissolophus citrino-cristatus*, from Timor or adjacent islands. Mr. C. French exhibited a fine pair of the Fiji masked parrot, *Platycercus personatus*, also Pennant's parrakeet, *Platycercus Pennantii*, the rose cockatoo, *Cacatua roseicapilla*, and the Rosehill parrakeet, *Platycercus eximius*. Several other birds were shown, but particulars were not handed in.

After a most interesting *conversazione* the meeting closed.

NOTES ON SOME FOSSIL CRABS FROM THE MIOCENE ROCKS OF CORIO BAY.

By Rev. A. W. Cresswell, M.A.

(Read before Field Naturalists' Club of Victoria, 9th August, 1886.)

Before speaking about the particular fossil crab found in the miocene rocks of Corio Bay, let me say a few words about crabs in general. Crabs, somehow or other, seem to have got a bad name, but why I know not ; whether it is because they have the faculty of giving a nasty nip to anyone who may handle them incautiously, or because of their crooked-looking limbs, or because of their queer habit of walking sideways instead of straightforward, I am ignorant, but somehow or other the word "crab" has come to be a

synonyme in our language for anything that is cross-grained, crooked, and disagreeable—*e.g.*, we hear of "*crab-apples*," which are anything but agreeable to the taste, and of "*crab-sticks*," as people with an unpleasant infirmity of temper are called. Again, we are all aware of that humiliating *faux pas* in rowing, technically called "catching a crab," and what disgust it occasions to the oarsman; whilst the Latin word "Cancer"—a crab—has given the name to a very agonising and fatal disease which, unhappily, is far too prevalent in this colony. Talking, however, about "Cancer" reminds me that that is also the name of an astronomical constellation, and one of the signs of the Zodiac, so that it would seem that the ancients had a much higher opinion of our crustacean hero than we have, in that they have exalted him to the stars; but even in this there is an element of disagreeableness, for to a large proportion of the human race when the sun is in "Cancer" it is fiery hot, whilst to those who, like ourselves, live in this southern latitude it is "biting" cold. To descend, however, to sublunary matters, to speak of him from a gastronomic point of view, the importance of Mr. Crab as an article of diet has been fully recognised by both ancients and moderns, and though on our own immediate sea coast they do not attain to such a size as to be in much demand for the table, a very *much larger* species than we have here is caught at Portland, and often finds its way to the Melbourne market, and is esteemed a delicacy that is unmixed with anything that is disagreeable, unless it be the thickness of the shell and the difficulty of getting at the inside.

But, to proceed with the natural history of crabs, I have often been impressed with the desire for more simplicity in zoological descriptions, and for the avoidance, as much as possible, of hard technical terms, and my feeling in the matter was very much strengthened by a lecture that I had the pleasure of listening to some time ago at Ormond College, and which was given by a prominent member of the Field Naturalists' Club. So, in speaking of crabs to-night, I shall use as popular language as I can, and, where it is absolutely necessary to use a few long words, will explain them as I go on for the benefit of the junior members of the Club.

Crabs, then, belong to that great sub-kingdom of the animal world called "articulata," or jointed animals, and to that particular class of it called the crustacea. The crustacea, the name of which is derived from the Latin word "crusta," a crust or hard covering, are so called because their outer skin is hardened by the deposition in it of a substance which is partly calcareous like the shells of ordinary shell-fish, and partly chitinous like the hard covering of beetles. This covering, popularly called the shell, envelopes the

whole body and limbs like a suit of armour, and so it is called, in scientific parlance, an exo, or outside skeleton, although it is true also that it is found to send certain processes of its substance into the interior of the body for the support of the soft parts within. The crustacea nearly all inhabit either the sea or fresh water, and breathe by gills, or else in the lower forms and in the embryonic stages of the higher ones by the thin membraneous sides of the body.

The special order of crustacea under which crabs are ranged is the "Decapoda," so called from the Greek δεκα=10, and πους, ποδος =a foot, because the ambulatory or walking feet are in 5 pairs, and crabs belong to that section of the order called the "Brachyura," or short-tailed crustaceans, because they have the abdomen, or what is popularly termed the "tail," short and rudimentary, a mere hard, thin, flat-jointed appendage, which is kept folded tight under the body so that you can scarcely see it, very much in the same way as our humorous Professor used to say that a frightened poodle carries his tail when under chase by a larger dog; whereas the "*Macrura*," or long-tailed crustaceans, such as lobsters, crayfish, prawns, and shrimps have the tail large and extended, and with terminal flaps for use in swimming, and the "*Anomura*," or irregular-tailed crustaceans, such as hermit or soldier crabs, have the abdomen soft and furnished with a sucker or a forceps at the end, by which to adhere to the interior of cast-off whelk or spindle shells in which they live. Although crabs carry their tails in a somewhat undignified way, they are by far the most highly-organised and thoroughbred group of the crustacea—in fact, they are the aristocrats of their class, who are getting advanced beyond such vulgar things as tails, hence, no doubt, they hide them out of sight as though they were ashamed of them. The body of crabs, like those of lobsters and crayfish, consists of 21 joints, or somites, as they are called—7 for the head, 7 for the thorax, and 7 for the post-abdomen or tail. Huxley adopts a somewhat different arrangement, viz., 6 for the head, 8 for the thorax, and 6 for the tail—20 in all, probably a more accurate view as far as the segments of the head and thorax are concerned, but I follow the opinion of older naturalists in counting 7 segments in the tail, *i.e.*, including the telson or end piece as a distinct segment, for the simple reason that it is pierced as the others by the intestinal canal. The joints of the head and thorax, however, are united more or less into a single mass, called the "cephalo-thorax," by a dorsal shield or covering, called the "carapace," which in crabs is very large and depressed, the line of division between the head and thorax being only slightly marked on the carapace by the neck suture, but all the joints being perfectly distinct on the under

surface of the body. The 1st segment bears the compound eyes (with quadrangular facets, not hexagonal as in insects), which in all Decapoda, and some others, are surmounted on movable two-jointed footstalks, then follow 2 pairs of antennæ, horns, or feelers, and then comes the mouth, which is a most complicated apparatus, consisting not only of a pair of hard-biting jaws, called "mandibles," which work horizontally instead of vertically, but also of 2 pairs of jaws of slenderer make called "maxillæ," and 3 pairs of what are called "foot-jaws," all being concerned in the office of mastication. Then follow, under the cephalo-thorax, the 5 pairs of large limbs, the first pair of which in the crab consist of the "chelœ" or pincers, and the remaining 4 pairs are "ambulatory" or walking-legs, the hinder pair in some crabs, however, being modified into terminal fins for swimming. All these 5 pairs of limbs have 7 joints. (Here the viscera were briefly described, also the "Zoæa," and "Megalopa" stages of the immature crab; also difference between ♂ and ♀ tail, &c., &c.)

There are a great many kinds of crabs that differ in size, shape, and habits, as well as in habitats. There are *Shore Crabs*, with which we are all familiar; and *Swimming Crabs*, with their hinder limbs, as I have just said, modified into paddles; and *Spider Crabs*, so called because of their long, thin, spider-like legs; and *Sponge Crabs*, that live in sponges, or else carry one about with them on their backs; and *Racer Crabs*, that run so fast that a man on horseback can hardly catch them; and *Beckoning or Calling Crabs*, so named because of the peculiar beckoning manner in which they hold their claws; and there are *Cocoanut Crabs*, that crack cocoanuts and feed on the contents, and that have a very sweet, nutty flavour in consequence; and *Land Crabs*, that burrow in the ground far inland and are said to migrate annually to the sea; and Mr. Wilson, of the Geelong Grammar School, tells us he has found a peculiar kind of crab that adorns itself with bits of seaweed that it plants on its own back—so I suppose it ought to be called the "*Jackdaw Crab*"—but the particular family of crabs whose fossil remains I have got to speak of to-night, from the miocene rocks of Corio Bay, don't *boast* of a *popular* name that I am aware of, not being generally known to the public, as they, for the most part, hide their light under the mud at the bottom of the deep sea, and are only known to the curious and the scientific under the rather alarming name of "*Gonoplacidæ*." I think, however, we will call them "Deep-sea Mud Crabs." It is just possible there are some recent representatives of the family down in the bottom of the "vasty deep" of our own seas if anyone were to take the trouble to dredge for them, but—as far, at least, as I know—they may at present be

regarded as an extinct family in this quarter of the globe, their only living representatives being found in other waters.

The following are the salient points of the *Gonoplacidæ*, as given by Milne-Edwards, the great authority on the crustacea:—The carapace is either square or rhomboidal and much wider than long, the posterior border measured between the base of the fifth pair of legs equals nearly the half of its transverse diameter, internal antennæ always horizontal, the peduncles of the eyes are long, the gronto-orbital border occupies nearly the whole transverse diameter of the carapace, abdomen of the male more than usually narrow, and instead of extending to the basilary joint of the posterior feet, it leaves exposed a considerable portion of the sternal plastron between its outer edge and the base of those feet; the length of the anterior feet varies—it is sometimes very considerable—and those of third or fourth pair are always the longest. The genus "Gonoplax," in addition to the general characters of the family, is distinguished by the fact that the fourth joint of the external "jaw-feet" is inserted at the internal angle of the third joint.

And now to come at last to the particular *species* of "Gonoplax" found at Corio Bay. As I have given specimens of it to Prof. M'Coy, and understand that he intends publishing a proper scientific description of the crab in a future number of the Decades—it being altogether a new species—I shall not attempt to do anything more to-night than to give such a rough and ready description of it as will enable any young member of the F.N.C., with a turn for paleontological research to identify it. Briefly, then, the carapace is about 2 inches wide by 1 inch long, and the anterior corners of it are produced into a spinous termination on each side; the upper surface is rather convex, showing a slightly prominent ridge right across it, and parallel with the general outline of the front border, and about a third of the length of the whole carapace from it, and *another* parallel ridge half-way between the last ridge and the *hinder* border of the carapace, but prominent only in the middle or just in front of the cardaic region. The front (or rostrum) is squared or truncated and lamellar or plate-like. The eye-stalks are comparatively short. The chelæ or claw-limbs are very large, and very strong, and the hands and fingers themselves are also very large, strong, and much compressed, and, of the four pairs of walking-legs, which are of considerable size, the second pair, or the next but one to the chelæ, are the largest, the two front pairs of these walking-legs being rather rounded like the legs of the genus "Phlyxia," and the two hinder pairs are more compressed; all the four pairs of walking-legs are terminated by a pointed toe. I should mention that the front and the side borders of the carapace are marked by minute granulations, and so are the upper sides of the chelæ and walking-legs.

Let this rough, popular description of the fossil crab do for the present, in which hard words have been eschewed as much as possible, and I will leave the more scientific description of it for more competent hands. I may mention that I obtained my first specimens of it about two years ago, in company with Mr. Curlewis, in some smooth calcareous nodules that occur in great abundance in the miocene rocks on the south side of Corio Bay, a few miles beyond Point Henry, and that I have since found them in the rocks on the other side of the bay at North Geelong, but though similar nodules are also be found at Cheltenham, and I have often broken them open there, I have not as yet succeeded in finding any specimens there, nor indeed anywhere else than in Corio Bay. As, therefore, the fossils are so thoroughly "Geelongese," I would suggest "Corioensis" as the specific name for them, although that has already done duty in the same way for several other fossils.

Hugh Miller, in his well-known book called the "Story of My Education," when speaking of his geological researches amongst the lias rocks of Cromarty Bay, tells us how his heart leaped up with joy as he laid open a nodule with the blow of his hammer, and saw that it contained the glittering scales and spines of his first discovered ganoid fish—and although crabs are not so high in the scale of animal life as fish, and though we were not such celebrated individuals as Hugh Miller, I think my friend Mr. C. will bear me out in saying that the sudden disclosure of the relics of our first fossil crab in the rocks of Corio Bay gave us a joy that was not one whit less than his, and when we took the fragments home, and putting them together, puzzled them out as belonging to the genus "Gonoplax," I think I may add that we learnt to enter somewhat into the experience of another saying, as I think it is of Hugh Miller's, that he who *reconstructs* enjoys a bliss second only to that of *creating*.

I have just to draw your attention to the fact that some of the specimens exhibited have been crushed, showing, as I take it, that the animals themselves met their death in a violent manner, perhaps by a sudden volcanic ejection of mud or other matter from below the sea.

(N.B.—Since reading this paper I have been told that the same crab has been found fossil at Cheltenham, but I have never seen it myself.)

EXCHANGES.

Mr. E. Cornwall, 55 Chapel-street, South Yarra, will be glad to exchange Queensland Lepidoptera for Australian birds' eggs.

F. R. offers back numbers of "Science Gossip" for Australian plants (Phanerogams or Cryptogams) *not* occurring in Victoria.

DESCRIPTIONS OF NEW AUSTRALIAN PLANTS;

By Baron von Mueller, K.C.M.G., M. & Ph.D., F.R.S.

Kochia spongiocarpa.

Erect; branchlets whitish-velvetdowny; leaves semicylindric-linear, rather long, somewhat pointed, glabrous; style enclosed; stigmas generally two; fruit-bearing calyx quite spongy, almost semiglobular, slightly wrinkled, glabrous, the flat summit expanding into a narrow undivided membrane, the transverse veins of it very subtle.

Near Caiwarro; Mrs. J. Cotter. Also near the Darling-River.

Leaves scattered, $\frac{1}{3}$-$\frac{1}{2}$ inch long, comparatively narrow. Stigmas short, sometimes bifid. Fruiting calyces attaining a breadth of nearly half an inch, pale-brownish, soft and tumid, blunt at the base, without decurrent angles, but somewhat distorted by exsiccation or even folded; cavity rather ample, not reaching to the base of the calyx; fruit more or less depressed; embryo normal.

This species differs from K. triptera in the spongy texture of the fruit-calyces and in the absence of prominent lateral angles of the calyx; the only other congener with spongy fruit-calyces, namely K. decaptera, has its horizontal expanding membrane lobed, and its calyx-tube lined by 5 longitudinal thin plates.

Kochia lobostoma.

Erect; leaves very short, crowded or tufty-disposed, rather flat, mostly ovate-lanceolar, as well as the branchlets velvet-downy; stigmas generally two, shorter than the style; fruit-bearing calyx black-brown, slightly hairy, expanding around the depressed base into a broad undivided membrane, the five lobes of the orifice large, semiorbicular or semiovate, nearly as long as the surrounding membrane.

Between the Lachlan-and Darling-River; J. Bruckner.

Leaves mostly $\frac{1}{8}$-$\frac{1}{6}$ inch long, hardly acute. Fruiting calyces nearly half an inch broad, when well developed; the lobes of the orifice not quite membranous. Fruit much depressed.

The flattened not hardening fruit-calyx with ample orificial lobes distinguishes this plant from all forms of K. villosa.

The two Australian species, published in 1810 by R. Brown, became inclusive of the present two augmented gradually particularly in later years to 23, and the saltbush-country of the far interior may furnish still other additions also to this genus, which evidently attains in Australia its greatest numerical development. They are among the most important of our pasture-plants, and should even be methodically redisseminated at the places of their native growth.

Helicia Sayeriana.

Almost glabrous; leaves large, on very short stalks, roundish-ovate, firmly chartaceous, much paler and not shining beneath, remotely denticulated, costate-nerved, subtle-veined; racemes elongated; bracts minute, narrow, acute; pedicels very short, semiconnate in pairs; petals very narrow, except at the dilated summit; anthers oblong-linear, conspicuously apiculated; style capillary; stigma short, clavate-ellipsoid; hypogynous scales roundish, somewhat connate; ovary glabrous.

On the Russell-River; W. Sayer.

Leaves scattered, so far as known attaining a length of 9 and a breadth of 6 inches, dark-green above, somewhat acute at the base; the lateral nerves rather distant, anastomosing towards the margin of the leaf; meshes of primary veins ample. Racemes spike-like, sometimes fully a foot long, lateral, short-stalked. Rachis glabrous. Pedicels slightly silky, $\frac{1}{10}$-$\frac{1}{8}$ inch long during flowering time. Petals measuring about $\frac{3}{4}$ inch in length. Anthers almost sessile; connective broad. Style hardly longer than the petals. Ovary rather slender. Fruit unknown.

This species differs from the North-Western H. Australasica in larger and proportionately much broader leaves with more dissimilarity of colour of the two pages, in longer racemes with considerably larger flowers, in longer pedicels and in the not silky ovary; the fruits of the two may prove also different.

(To be continued.)

A VERY YOUNG PLATYPUS.

The extraordinary interest excited by the discovery of the eggs of the platypus by Mr. Caldwell, in Queensland, some time ago, will be remembered; how the news was cabled to England and back again, and how leaders and paragraphs appeared in nearly every newspaper in the colonies, commenting upon the extraordinary discovery. But the question whether the platypus was oviparous having been settled, another arose. How did the young platypus manage, as it had long been discovered that the female was so constructed as to suckle its young, and this seemed most singular in the case of an animal provided with a bill or beak of a fowl. However, the matter has been set at rest by a discovery made by the Rev. F. A. Hagenauer a couple of days ago at Ramahyuck. Mr. Hagenauer was anxious to secure a pair of platypi for the Royal Park Gardens, and set a couple of his blackfellows to work to

look for them. In their search they came upon a nest containing a male and female, and, more valuable than all else, a very young member of the family, which seemed as if it had been just hatched. None of the aboriginals had seen such a specimen before, nor is there an account of a white man having made a similar discovery. On examination it was seen at once that there was no difficulty in the way of the youngster. It was an inch to an inch and a half in length, and while, of course, bearing the shape of its tribe, it had precisely the appearance of a "joey," being of the same colour, and the bill-shaped beak perfectly soft as to allow it to attach itself closely to the maternal teat. Mr. Hagenauer had it preserved in a small phial of spirits of wine, placed it in Professor M'Coy's hands, and the scientific world of Melbourne will have an opportunity of examining it. This discovery will, we suppose, supply all the knowledge that has been hitherto wanting in reference to the platypus.

Mr. Hagenauer tells us that some years ago he sent the celebrated Professor Owen, of London, a large number of female platypi preserved in spirits, the specimens filling a five gallon keg, and although he has captured large numbers during the course of years he never saw, nor heard of anyone who had seen, a new-hatched specimen, although, of course, very young members of the tribe were common enough. Their method of making their nest is a very excellent one. The animals commence on the river bank below water mark and drive several feet inland, in an upward direction, so that the nest, which is made of grass, fern, etc., is quite dry and above water level, while it is, at the same time, pretty secure, and in this comfortable location the young one is kept until it can accompany its parents into the water. We understand that there has always been a difficulty in keeping these animals in confinement, arising from the fact that they are always kept in water, the fact that they live as much on land as in water being apparently overlooked.—*Gippsland Mercury.*

NOTES AND QUERIES.

At the last meeting of the club Mr. H. J. M'Cooey, of Dubbo, New South Wales, an amateur naturalist of repute, and a member of the Linnean Society of New South Wales, was elected a member.

In these times, when so much is written and talked about the platypus and the echidna, it may be interesting to know that Mr. M'Cooey has proved, to his own satisfaction, that the echidna, or spiny ant-eater, carries her eggs about in her pouch till hatched by

the warmth of her body, and gives her young milk which is secreted from the milk glands in the pouch.

The following are extracts from an article by Mr. M'Cooey, "Interesting Truths of Australian Natural History," which appeared in a recent issue of the *Town and Country Journal* :—

"The presence of the native dog among the marsupials of Australia is quite an anomaly. Apparently it is a variety of the domestic dog (*Canis domesticus*), and though the evidence on this point is not quite complete, it is highly probable that the dingo made its advent in Australia at, geologically speaking, a comparatively recent date. All who have argued that the dingo is indigenous have been stopped by the logic of Professor Owen. The lesson of geology is irresistible. No branch of natural science is, perhaps, more interesting than that which embraces fossils and extinct remains, and no branch is more instructive. It is through the aid of the irresistible logic that geology lends to science that we are enabled to say that the dingo is not indigenous. The bones of the dingo have been found on or near the earth's surface, but never in cement along with those of such giants of the past as the *Thylacoleo*, the *Diprotodon*, or *Macropus titan*, therefore it is safe to affirm that it is not indigenous."

"It is a singular fact, and one deserving of much attention, that this admixture of the bird faunas of this and other countries is not only observable among extant birds, but also among those that are extinct. That gigantic bird, the moa, formerly an inhabitant of New Zealand, finds fossil representatives in South America, in South Africa, and in Australia. The emu of to-day is but a dwarf compared with the emu of the past. The remains found in South Australia by the Rev. J. E. Tenison-Woods in 1865 proves this. Since 1865 similar remains have been found in other places in Australia, proving, beyond doubt, the former existence of a gigantic emu, to which Professor Owen has given the name of *Dromornis Australis*. The presence of extinct and extant wingless birds in New Zealand and Australia corresponding with, and closely allied to, the African ostrich and South American *Rhea*, differing from all other birds in the structure of the skeleton, while agreeing with each other, and all making near approach to reptiles in anatomy, is a fact so scientifically important and remarkable as to incline many eminent naturalists to the belief that all these countries were at one time connected by land, and formed a vast southern continent. Wingless birds in New Zealand seem to have been far more plentiful and far larger than on the continent of Australia. In 1839 a Mr. Rule took to England a part of the thigh-bone of a moa, from which Mr. (now Professor)

Owen drew up a wonderful notice of the bird. So extraordinary, so improbable, did the conclusions he arrived at seem that his friends tried all they could to suppress the publication of the paper, from a belief that it would shipwreck his scientific reputation. Yet that paper is alone sufficient to immortalise him. Since then not only has Professor Owen satisfied the world of the former existence of the moa, but he has established, on the evidence of fossil remains sent to him by various settlers, the former existence of no less than fourteen species of wingless birds in New Zealand."

"I must observe to my readers that, although I have in this article merely skimmed the surface, yet all the subjects I have touched upon are of almost unfathomable depth, and each and all —such as the presence of the dingo among our marsupials, the admixture of our bird fauna with that of other countries, the anatomy of marsupials, the platypus and echidna, and the important fossil discoveries made in Jenolan and Wellington (New South Wales) caves—furnish inexhaustible material for profound and interesting essays. When we consider that Professor Owen has devoted 40 years to a study of the fossil remains of the monster lizard found in the Darling Downs, and has only just recently completed his great treatise on that most horrible and extraordinary reptile, it is not too much to say that human life is too brief for a thorough study of even one branch of natural science. I may mention that the fossilised reptile to which Professor Owen has devoted so much study is a monster ally of our curious little horned lizard, *Moloch horridus*."

Mr. Broadbent, the energetic collector attached to the Queensland Museum, is at Niagara, in the Herbert District, Northern Queensland, where he has succeeded in "bagging" a lot of new specimens. . . . .

FLIES AS SANITARY INSPECTORS.

The *Sanitarian* records an instance of flies acting as sanitary inspectors. In one of the rooms of a residence in an American city offensive odours were detected, but their exact source could not be located. The carpets were raised, and a carpenter was engaged to take up the entire floor. At this moment a visitor suggested that an appeal be made to the instincts of the fly. Two "blue bottles" were accordingly brought from a neighbouring stable, and the doors and windows of the room closed. The flies soon settled upon one of the cracks in the floor, and when the boards were raised at this point a decomposed rat was found.

Field Naturalists' Club of Victoria.

President :

REV. J. J. HALLEY.

THIS Club was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

No Entrance Fee. Annual Subscription, including copy of proceedings, 15s., dating from 1st May.

The Ordinary Meetings for the reading of papers, and exhibition of specimens, with a short conversazione, are held on the second Monday in each month at the Royal Society's Hall, Victoria-street, Melbourne, at 8 p.m.

The proceedings of the Club are recorded in its journal—the "Victorian Naturalist." Annual subscription, 6s. 6d., post free. (To members free.)

With the view of popularising the study of the Natural History of the Colony, correspondence, notes, and queries relating to this subject are invited for insertion, and should be addressed to the Editor at the Wesley College, Prahran.

Any of the numbers from the commencement, January, 1884, can be obtained from the Hon. Sec., Mr. F. G. A. Barnard, Kew, at sixpence each; or in sets, Vol. I. (1884-85), 16 numbers, 7s. 6d.; Vol. II. (1885-86), 12 numbers, 6s.; each set with title-page and index for binding.

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THE FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 8th November, 1886.

The president (the Rev. J. J. Halley) occupied the chair, and about forty-five members and visitors were present.

The hon. secretary announced the receipt from the Kew and Hawthorn Microscopical Society of several tickets for distribution for their *conversazione* on Friday evening, 12th November.

The hon. librarian reported the receipt of the following donations to the library:—"Life Histories of Plants," by Mr. D, M'Alpine, F.C.S., from the author; "Prodromus of Zoology of Victoria," Decade XII., from the Government; "Report on a Diatomaceous Deposit near Lilicur, Vict.," by Professor Krausé, F.G.S., from the School of Mines, Ballarat; *The Australian Bee-keepers' Journal*, Nos. 1 to 9, from the Editors; *Australasian Journal of Pharmacy*, October, 1886, from the Pharmaceutical Society; *Journal of the New York Microscopical Society*, June, 1886, from the Society.

The hon. secretary reported that the excursion to Box Hill on Saturday, 16th October, had been well attended, and the members fairly successful in their collecting work. Among other flowers noted may be mentioned the pretty orchids *Calochilus campestris* and *Caladenia Menziesii*, the latter being found in considerable quantity.

The following persons were elected members of the Club:—Mrs. Friederich, Miss Le Febre, and Master H. F. Soward.

PAPERS READ.

1. By Mr. D. M'Alpine, F.C.S., on "The Dry Preservation of Flowers, Fungi, etc., in their natural shapes and colours." The author gave an interesting review of the various methods which had been recommended or adopted for the purpose of

preserving botanical specimens in as nearly as possible their original shapes and colours. After a long series of trials, he had adopted a modification of the dry sand process, with the addition of a subsequent coat of thin transparent varnish, as giving the most satisfactory results. He exhibited a number of specimens prepared in different ways, and in different stages of preparation. The paper gave rise to some little discussion among those present.

2. By Mr. P. H. Anderson—"Notes on the Culicidæ, or Mosquito Family." The author gave a brief account of the various stages through which these well-known insects pass before they arrive at their fullest development, and illustrated his remarks by references to a series of well-executed drawings, on a large scale, of the various parts, &c. He referred to the principal species of the family found in different parts of the world, and stated that he had taken several specimens about Melbourne, which were probably undescribed species, as they differed in several particulars from the species described by several authorities he had consulted.

Owing to the length of the papers, several interesting natural history notes had to be postponed.

The following were the principal exhibits:—By Mr. P. H. Anderson, several parts of Brown's "Forest Flora of South Australia," also drawings in illustration of his paper on the mosquito; by Mr. F. G. A. Barnard, native orchid in bloom, *Caladenia suaveolens;* by Mr. G. Coghill, bird's nest and egg (species unknown) from Cheltenham, also orchid in bloom, *Diuris punctata*, grown by exhibitor; by Mr. P. Dattari, a frond of the fern, *Pteris tremula*, five feet nine inches in length, from Lang Lang, near Drouin; by Mrs. Flatow, seaweeds, polyzoa, and hydrozoa from Queenscliff; by Mrs. Friederich, portion of a skull found in the catacombs at Rome; by Mr. W. Jennings, fossil shells from Fisherman's Bend, fossil shark's teeth, &c., from Cheltenham, obsidian from Limeburner's Creek, near Hamilton; by Mr. G. A. Keartland, eggs of rufous-capped sandpiper; by Mr. H. Kennon, specimen of carving on an emu egg by an aboriginal; by Mr. H. Watts, a fine collection of marine algae, mounted in an album and on cards, also specimens of marine algae mounted for the microscope; by Rev. W. T. Whan, M.A., pumice stone from Diego Garcia, drifted 2000 miles westward; by Mr. J. Wing, lichens, fossils, gold-bearing quartz, &c., from Rushworth; by Rev. C. M. Yelland, 126 specimens of wild flowers collected at Oakleigh, Brighton, and Cheltenham on three excursions.

After the usual *conversazione* the meeting terminated.

EXCURSION TO THE YOU YANGS.

For some years past the Prince of Wales' Birthday (9th November) has been almost the only public holiday on which the members of the Field Naturalists' Club of Victoria have organised a Club excursion.

For many parts of the country this date is perhaps rather unfortunate, as it appears to be somewhat "between the seasons" —too late for botanists, as the majority of our flowering plants are then past their prime, and too early for the entomologists, whose efforts in the collecting line are generally better rewarded a month or two later.

Last year, it will be remembered, a visit to the well known Lal Lal Falls, near Ballarat, was suggested, and the members of the Ballarat Field Club were asked to join our members there. This they at once agreed to do, also undertaking to act the part of hosts during the day, which they did to everybody's satisfaction, a most enjoyable outing resulting.

This year it became the duty of the metropolitan society to entertain their country fellow-scientists. The choice of locality was somewhat limited, owing to the few promising collecting grounds conveniently situated to the Melbourne and Ballarat line of railway. After some thoughts of trying the Moorabool Valley, near Geelong, it was decided to visit the You Yangs, a well-known granite range rising out of the Werribee plains, about thirty miles south-west of Melbourne An invitation to the Ballarat Field Club having been duly forwarded and accepted, it only remained for fine weather, a good attendance, and plenty of collecting work to make the outing a success.

Soon after six o'clock on Tuesday morning (9th November, 1886) the advance agents of the party might have been seen at Spencer-street station hard at work packing away the indispensable accompaniments of such an expedition.

A carriage had been set apart for the Club, and on mustering, it was found that our party numbered twenty-four, of whom six were ladies. Among those present were the president and several other office-bearers of the Club. Taking our seats in the Geelong train, we were soon off on our way to the rendezvous at Little River. The day promised to turn out everything that could be wished, a cool breeze from the south-west blowing over the plains, and rendering the absence of clouds quite endurable.

After an hour's run, the train drew up at Little River, where the ladies of the party found that the committee of the Club had studied their comfort by engaging a vehicle to carry them over the four miles between the station and the mountains. One of

the gentlemen, a well-known F.L.S., undertook to handle the ribbons, and pilot them to the camping spot, and a second vehicle having been loaded up with the commissariat stores, they were despatched on their journey. The president, hon secretary, and about half a dozen others remained behind to await the arrival of the Ballarat train, and welcome the contingent expected from that city, the remainder of the party walking across the plains to the ranges, naturalising as they went, but with little success.

The You Yangs have been visited by the Club on two previous occasions, about the same time of year, in 1881 and 1882, so that it was pretty well known what objects were likely to be met with As there are several plants and insects almost peculiar to the district, it is one that should not be neglected by our collectors, and would probably prove still better, from a botanist's point of view, if visited during the month of September, as the district, being naturally very dry, it is probable the wild flower season would be rather early.

Those who were waiting for the Ballarat train, in order to pass away the time profitably, directed their attention to the Little River, which flows not far away. It is a rather picturesque stream, only about 25 feet wide, but apparently deep. There was not much current, and the water was brackish. Search along its banks revealed several interesting water plants, such as *Triglochin procera*, and *Myriophyllum variifolium*, which were in flower, *Chara*, &c. ; and among the stems of these were found many larvæ of dragon-flies, the little flat snail, &c Turning towards the station again, several plants of that curious Amaranth, *Ptilotus macroeephalus*, were met with, other frequent flowers being *Convolvulus erubescens, Helichrysum semipapposum*, the little purple daisy, *Calotis sp.*, &c.

On the arrival of the train it was found that only two visitors had come from the "Golden City," instead of at least half a dozen who had promised to take part in the excursion. A final start was now made for the ranges, which were reached after a pleasant walk of about an hour.

The rugged nature of these miniature mountains became more apparent as we approached, the immense granite boulders being very conspicuous. The plains, which are principally of upper volcanic formation, are almost treeless, but became partially wooded with sheoaks, honeysuckles, and stringy-barks on the newer pliocene which surrounds the granite formation On the latter several plants in flower were noted, among which may be mentioned the brilliant little *Pelargonium Rodneyanum*. Making for the southernmost gorge in the range, some very fine specimens of the black wattle, *Acacia decurrens*, were met with,

and being in full flower, not only presented a handsome appearance, but scented the air for many yards round with their delightful perfume. On these a couple of species of beetles of the genus *Liparetrus* (Scarabeidæ) were obtained, in one of which the elytra were light brown, edged with a darker band of brown. Keeping along the side of the spur, thickets of *Prostanthera nivea*, a labiate shrub, possessing pretty white and lilac flowers, were passed through, and, as it was in full bloom, it excited universal admiration. On these plants a rather local buprestid beetle of the genus *Stigmodera* had been obtained on our previous trip, but now only a couple of specimens were taken. Presently the vanguard of the party was discovered down in the valley below making ready to satisfy the wants of the hungry excursionists. Scrambling down the hillside, the rendezvous was soon reached.

Here were to be seen several prominent members of the Club hard at work laying the table (on the grass), carving, making tea, &c., having for the present deserted natural history. Presently, all being ready, ample justice was done to the good things provided, the only drawback being, perhaps, that water was very scarce, and what there was was not particularly inviting. We would, therefore, advise future picnic parties at this season to bring a sufficient supply from the township. On our previous visits sufficient water had been obtained in a little creek higher up the valley, but now it was quite dry, another evidence of the very dry winter and spring we have just passed through.

After luncheon the members separated in various directions, some botanising, others shaking the bushes into their umbrellas with the hope of capturing a few beetles, whilst another tried the metal of his geological hammer, and another the hammer of his gun.

Working our way up the side of Station Peak, as the highest point of the range is named, splendid patches of the pretty "rock or parsley fern," *Cheilanthes tenuifolia*, were met with, and in the crevices between the boulders the little creeping fern, *Asplenium flabellifol'um*, trailed its slender fronds. Little success attended the entomologists, a *Zoedia* and a few other small beetles being the only captures. On previous trips several larvæ of a handsome longicorn beetle of the genus *Uracanthus* were obtained in the branches of a composite shrub, *Aster glandulosus*, which is very common here, but on careful search, however, only one was obtained.

To reach the top of Station Peak was now the object in view, and, after a rough climb over the stones and through scrub, the wooden trigonometrical survey mark, perched on the top of the

highest boulder, was reached It is singular that a stunted form the blue gum, *Eucalyptus globulus*, grows on the tops of these ranges, and, among other shrubs, was the kangaroo acacia, *A. armata*. A little daisy-like plant, *Brachycome exilis*, was rather plentiful on the top of the mount, and fluttering about out of reach were several of the white butterflies, probably *Pieris aganippe*.

Here presently more of the party arrived, and spent some little time in enjoying the extensive view from the peak. Geelong, some fifteen miles due south, was plainly visible, and across Corio Bay the hills of Port Arlington. Further round westward were the outlines of the Cape Otway Ranges, and away to the north-west Mounts Buninyong and Warrenheip, distant some forty miles as the crow flies Following round, the Blackwood Mountains, Mount Macedon and the Dandenongs helped to complete the circle. Melbourne was scarcely visible, owing to the haze.

On the whole, this mount is well worthy of a visit by tourists, as there are no intervening trees or hills to intercept the view from the summit. The height is given on the maps as 1154 feet, and it is just about a thousand feet above the plains on which it stands. Having feasted sufficiently upon the extensive panorama presented to the eye, tracks were made for the valley, taking a different route to that of the ascent This proved much easier, and led to the head of a small valley, which was followed down to the main valley In these were noted *Polypodium punctatum*, *Clematis microphylla*, a splendid sight, with its beautiful feathery festoons, *Myoporum viscosum*, *Nicotiana suaveolens*, *Pultenaea obcordata*, &c.

On reaching the camping ground refreshments were indulged in, and an hour whiled away talking on various topics. By half-past four all the members had returned and reported their luck, when it was found that fewer specimens had been obtained than on either of the former excursions, which was, doubtless, owing to the extreme dryness of the district.

Several members having volunteered as water carriers, on their return tea was prepared and duly disposed of, after which our President, the Rev. J. J. Halley, proposed success to the Ballarat Field Club, and thanked the members who represented it for their attendance, which was responded to by Messrs. Chalmers and Phillips. Votes of thanks were afterwards carried to the ladies for their efforts to promote the comfort of the party, and to Messrs. Best and Coghill for the refreshments kindly provided by them.

Camp was then struck, and we were soon on the road to the station, which was reached in ample time for the 7.15 p.m. train,

in which, through the efforts of the stationmaster at Little River, the authorities had kindly provided a special carriage, which unfortunately owing to a misunderstanding was not made use of. After several delays, owing to the great holiday traffic, Melbourne was reached about 9 o'clock, and, before breaking up, everybody expressed themselves pleased with the outing.

Before leaving the mount, bunches of prostanthera were gathered as trophies to show our town friends, and on the way to the station several other plants were noticed, such as *Ptilotus spathulatus*, like a feathery bottle-brush, *Diuris sulphurea*, *Pimelia curviflora*, and *Selaginella Preissiana*. Birds were not numerous; parrakeets, tree-creepers, and wattle-birds being the principal kinds seen. The mountains were, years ago, the residence of thousands of rabbits, but they seem now to have been got rid of, and a worse pest, foxes, are taking their places.

MOSQUITOES.

By P. H. Anderson.

(Read before the Field Naturalists' Club of Victoria, 8th November, 1886.)

The family *Culicidæ*, universally known as mosquitoes or gnats, contains many distinct species. The most common are *Culex Pipiens*, the common gnat; *Culex Mosquito*, the common mosquito; *Culex Zancudo*, a larger species with dark blue wings, inhabiting Africa generally; *Culex Tempraneo; Culex Zejeu*, a small quite diurnal species; *Culex Simulium*, and many more rare species.

These insects are to be met with in almost every country of the globe; difference in climate or food appears to have no influence over them, for whilst they swarm in myriads in all tropical countries, yet the poor Laplander condemns himself to be smoked all day, and only frees himself from the onslaughts of this insect by smearing his whole body with a filthy coating of grease and tar.

"They are our declared enemy," says Reaumur*, "and a very troublesome enemy it is; however, it is well to make their acquaintance, for if we pay a little attention, we shall be forced to admire, and even to admire the instrument with which it wounds us. Besides which, throughout the whole course of its life, it affords most interesting matter of investigation to those who are curious to know the wonders of Nature."

During a period of its life, the observer, forgetting that it will at some time annoy him, feels the greatest interest in its history. To watch the mother mosquito laying her eggs is most interesting, and is a wonderful illustration of a mother's care

* Memoires pour Servir a l'Histoire des Insectes.

and forethought for her offspring. The object of this small insect in constructing a boat-shaped raft, which easily floats upon the water's surface, is to prevent her eggs from sinking, which they most certainly would do were they dropped singly into the water. The eggs, which form this raft, themselves are much in the shape of flasks, rather pointed at the upper end and rounded at the under, brownish in colour, and coated with a glutinous fluid.

The first care of the mother mosquito is to fix herself by the four forelegs to the side of a floating twig or leaf, or the first thing that may come to her reach, with her body level with, and resting on the water, excepting the last segment which is slightly curved upwards. She now crosses the two hind legs like a pair of scissors when open, the inner opening slightly bent, thus forming a frame to receive the eggs into. Now she brings this inner opening to the raised portion of her body, and deposits one egg in it; on each side of this she places another egg, which adheres by means of the gluey substance they are coated with. Thus the stern of her boat is now made.

She proceeds in this way to add eggs one by one in a vertical position, and pushes the whole mass gradually from her as the boat increases in size. When half finished she uncrosses the two hind legs, and places them parallel, and so continues until she wishes to form the bow of the boat, when she draws the hind legs gradually together, placing eggs between them, until the bow is formed like the stern.

Kirby describes this little raft, which is now finished, as "resembling a London wherry, being sharp and high (as sailors would say) fore and aft, convex below and concave above, and always floating on its keel. So well are they constructed that, do what you may, you cannot possibly make them sink. I have held them under water for several minutes, but they invariably rose to the surface, again floating on their keel, apparently quite dry. Probably the glutinous fluid they are coated with prevents the water staying on them."

Kirby tried several experiments on these boats. He says:—"The most violent agitation of the water cannot sink them, and—what is still a desideratum in our life boats—though hollow, they never become filled with water, even though exposed. To further test this, he placed half a dozen of these boats upon the surface of a tumbler half full of water, and then poured upon them a stream of that element from the mouth of a quart bottle held a foot above them. Yet, after this treatment, which was so rough as to actually project one out of the glass, he found them floating, as before, upon their keels, and not a drop of water within the cavity. Such marvellous instinct cannot but impress even the most careless observer with the wonderful

providence which is imparted to this small and feeble creature for the maintenance of her young. After a period of three, and sometimes two days, according to the time of year, the larva eats its way through the shell, so to speak, of the egg at the lower part, and drops into the water, coming at once to the surface for air, and grows with great rapidity.

"Some naturalists say that they make themselves little lodgements of glue, which they attach to some floating body at the bottom of the water. Others have noticed them hollow out a dwelling-place in chalk, and sometimes decayed wood, but I have always seen them in constant activity, constantly ascending and descending, rushing about with great rapidity in search of food, always head downwards. They are commonly called rat-tailed maggots, and in parts of England I have heard the rustics call them scurrs. They are always very plentiful in summer in rivers, ditches, pools, and even in water tubs, resembling minute semi-transparent fish somewhat like a fresh-water shrimp.

"The fact that they are always seen head downwards, and with their tail straight upwards, is owing to this tail—from which they get the name of rat-tail maggot—being the respiratory organ, and is most interesting and remarkable, for the larva of the mosquito, unlike most other insect larvæ, breathes through the tail, or rather through a tube of respiration which shoots off from the last but one segment of its body.

"The tube contains two vessels, which disseminate the air throughout its whole body. These two channels are enveloped in tubes which fix one into the other, and are covered with an oily substance to defend this chamber against the invasion of water, which would disturb the organisation. At the entrance of this tube is a door with five leaves of the most ingenious mechanism, which it is able to open or close at will. These, again, are completely anointed with a greasy substance to resist water. Some observers have remarked that, should this oily substance be removed by handling the grub too roughly, it can no longer suspend itself in the water; but I have often removed this oil by means of a camel-hair brush, or with great care by hand so as not to injure the grub, and have noticed it on each occasion bring this tube round to its head and draw it through its mouth, as a bird would a feather through its beak, and thus re-cover the respirative tube with oil.

"The air which enters through several openings in these tubes passes onwards to two lateral windpipes. When the grub wishes to descend it folds up the hair with which the exterior of the funnel is covered, and by means of its oil retains a globule of air at the end, and when it wishes to ascend it has only to open its hair funnel again. By this ingenious

arrangement it possesses a means of always being able to open the orifice of its respirator at the surface of the water whatever may be the level. For example, if you place one of these larvæ in a bucket half full of water, and then gradually add to the water, you will observe all the tubes I mentioned will be projected outwards, being thrust out as far as possible, so that they reach the surface of the water; but, should you by means of a syphon take some of the water from the bucket, all the tubes immediately enter one another like a telescope."

(To be continued.)

THE KIMBERLEY COUNTRY: A PAGE FROM AN EXPLORER'S DIARY.

"MONDAY, 3rd May, 1886.—Lat. 15deg. 31min. 38sec., long. 126deg. 45min. 20sec. Left camp on M'Kee River at 8 a.m.; course, S.W. by W., 240deg. Followed course of river up. At one mile river tending to W. by N., 325deg. Then steered due W., 270deg. Struck river flowing from S.S.E., 155deg., and traversed river up this course to a point three miles up, stream then S.W., 225deg. Tried to cross here, but found the sands too soft. Slight ford of about two feet in river here. Country traversed all well grassed and timbered. At three and a half miles up river came upon a black's grave. The aboriginals have a peculiar way of burying their dead—placing the body about six feet in the air on strong props in a lot of leaves and small boughs. I had this pulled down to see the body, and found it doubled up. I would have taken the skull, but it was far from choice. At four and a half miles had to head a small gully flowing into the Lorimer. Steered W.S.W. for half a mile and came back on the opposite side at four and a half miles. Crossed river (Lorimer) here at a very good crossing, and travelled due west through fine, undulating, timbered country, gradually rising from the time we left the river. At nine miles came upon a fine line of lagoons, where we camped at 12 noon for lunch. Started again at 2 p.m. Travelled due west through beautiful well-grassed and fine large-timbered country. Iron-bark ranges, and still gradual rise. At 11 miles came on a fine chain of waterholes flowing north. At 13½ miles came upon a beautiful blue and Mitchell's grass flat (gradual rise). At 16 miles came upon a little timbered country, still rising, and at 18 miles came upon the top of a table-land, and beheld, I think, the finest view I ever saw in my life. Cliffs on all sides, with a range of mountains in the distance. Below is a magnificent valley, in extent, as far as I see here, about 100 square miles. Succeeded in getting down with some difficulty, and at 18½ miles got to bottom. Struck bed of river at foot, which I named the Carson, after Mr. David Carson, of Melbourne, and

also the valley, which I named the Valley of the Carson. This river, I should say, was the head of a river flowing into the sea about due north from this point. Followed river down two miles, where we camped on the right bank in the best and thickest grasses I ever beheld—blue, Mitchell, and kangaroo grasses. Every indication of gold. Here quartz abounds, and I think eventually this valley will be a massive goldfield. Timber splendid: large gums. Soil very dark chocolate, the darkest I have ever seen. The horses having had a long stage to-day, it is my intention to stop here all to-morrow on such bountiful feed. One of my party saw four blackfellows to-day, and we also passed an old camp. I have named the ridge we have just crossed, in the above latitude and longitude, the Ashton Range, after a friend of mine in Melbourne. Although a very heavy range; owing to the table-land on the east side, it is only visible on the west, or I might say from the S.W. to north, and then from the Valley of the Carson in all its splendour.

"Grasses—Blue, Mitchell's, kangaroo, and a new variety. Timber—Iron-bark, Blood-wood, Stringy-bark and other gums, and pine. Distance—20 miles."

A New Plumularia.—In a paper on the Hydroida, recently laid before the Royal Society of Victoria by Mr. W. M. Bale, there appears a description of the new species of Plumularia exhibited at a late meeting of the club by Mr. H. Watts, and named after him Plumularia Wattsii. The specimens were dredged in the South Channel of Port Phillip, and may be readily distinguished from all the Victorian species already known by the habit. The shoots attain a height of about ten inches, and consist of a main stem, which is slender and monosiphonic, divided into regular internodes, and scarcely varying in thickness from base to summit. The branches are borne one on each internode of the stem, and are arranged in an irregular spiral. They are about an inch long, and often bear one or two secondary branchlets as well as the pinnae. The calycles are cup-shaped, and adnate to the pinnae, and are surrounded, as in most Plumularia, by three nematophores, which are all moveable. Between every two hydrothecæ is a short internode, bearing a nematophore only. *P. Wattsii* is considerably larger than any other known Victorian species.

Town Gathering of Micro-Objects.—Mr. H. Watts hands in the following record of his collection (October) from the Fitzroy and Treasury Gardens:—Algæ, *Œdogonium capillare, Spirogyra decimina, Sp. majuscula, Conferva tenerrima, C. affinis, Vaucheria sessilis, Stigeoclonium elongatum, St. tenue Bulbochæte setigera;* Desmids, *Fragillaria capucina, Didymoprium sp., Closterium acerosum, C. lunula, Micrasterias crenata, Ankistrodesmus sp., Staurastrum sp.*

DESCRIPTIONS OF NEW AUSTRALIAN PLANTS:

By Baron von Mueller, K.C.M.G., M. & Ph.D., F.R.S.

(Continued.)

Elachanthera.

Sepals and petals nearly equal, narrow-oblong, almost nerveless, persistent. Stamens six, equal, free; filaments linear, membranous; anthers minute, roundish-ovate, two-celled, bursting longitudinally. Pollen-grains oblique-ovate, smooth. Style lax, thin, undivided. Stigma very minute. Ovary three-celled. Berry succulent. Seeds usually solitary in each cell, mostly globular; strophiole none; testa crustaceous, black; albumen almost horny; embryo situated in the lower half of the albumen, ellipsoid-cylindrical, straight.—A climber of Western subtropical Australia; glabrous in all its parts; leaves alternate, chartaceous, oblong-or ovate-lanceolar, nearly sessile, subtle-many-nerved; flower-stalklets short, bracteate at the base, articulate near the turgescent summit; flowers small, pale; berries somewhat red.

This new genus differs from Enargea in really twining habit, persistent sepals and petals, form of anthers, not pale nor membranous testa and perhaps inflorescence;—from Calcoa in the disposition of the flowers, not several-nerved sepals and petals, broader and longer filaments, very short anthers and small not clavate embryo.

Elachanthera Sewelliae.

In the vicinity of Nickol-Bay; sent by Miss Julia Sewell. A climber, called by the local aborigines, "Gnarboola" or "Narba." Branchlets very thin, prominently angular, somewhat flexuose. Leaves (on the only fragmentary specimen obtained) 1—1½ inches long, ⅓—⅔ inch broad, shining and equally green on both sides, roundish-blunt at the base, acute at the summit. Stalklets capillary, about ¼ inch long, beset at the base with broadish short membranous bracts. Sepals and petals hardly ⅓ inch long, quite glabrous pale at least in age, tender-membranous, thickened at the median line. Filaments flaccid, pointed upwards. Anthers smooth, fixed near the base dorsally, pale-yellowish, widely bursting. Style only about ⅓ inch long, upwards somewhat thickened. Berry of about ⅓ inch length and breadth. Seeds globular, or when paired in their cell almost trigonous, of about $\frac{1}{10}$ inch length; testa shining, slightly wrinkled. Albumen of rather darkish coloration. Embryo less than half as long as the albumen, whitish.

In setting forth the main-distinctions of this plant, I alluded to two allied genera, the appellations of which seem restorable.

Enargea of Banks was 1788 already with fair correctness defined from Solander's notes by Gaertner (de fructib. I., 283), the etymology being also faultless. though Gaertner, who usually was so accurate, described and figured the embryo as minutely dicotyledoneous,—the whole analytic drawing having passed soon subsequently into Lamarck's Encyclopédie méthodique, planche 248. But errors in characteristics may be subject to various opinions as regards their extent, while the right of priority will always be absolute. The identical genus, taken in the limitation by Bentham and J. Hooker, was promulgated 1789 as Callixene of Commercon by Jussieu (gen. pl. 41), but only 1801 as Luzuriaga by Ruiz and Pavon (flor. Peruv. and Chil. III., 65, t. 298); and this explanation of chronology of the genus agrees also with the annotations of De Candolle, Pfeiffer and Jackson. Indeed Schreber already in 1789 (gener. plant. I., 232), J. F. Gmelin in 1791 (system. natur., edit. XIII., 547), and Willdenow in 1799 (spec. plantar. II., 230) acknowledged fully the claim of the genus Enargea. Only three species are admitted by Bentham and J. Hooker, which would stand thus as regards their names :

ENARGEA MARGINATA, Banks and Solander.

(Callixene marginata, Commercon; Callixene magellanica, Raeuschel; Luzuriaga marginata, Bentham; Callixene parviflora, J. Hooker; Luzuriaga parviflora, Kunth)

ENARGEA RADICANS.

(Luzuriaga radicans, Ruiz and Pavon).

ENARGEA POLYPHYLLA,

(Callixene polyphylla, Hooker; Luzuriaga erecta, Kunth).

The other genus, above mentioned as having claims perhaps for restoration is Calcoa of Salisbury (gen. plant. fragm. 67) quoted as a synonym of Geitonoplesium by Bentham and J. Hooker (gen. pl. III., 768); Salisbury's treatise under that particular title is not mentioned in any bibliography, to which I have access, and seems to have sunk hitherto into oblivion.

(To be continued.)

AN OOLOGICAL CURIOSITY.—On the 30th October, in the neighbourhood of Oakleigh, Mr. J. T. Gillespie took from a prickly acacia a tiny round nest with side entrance, containing three different species of eggs. The nest was that of the little brown acanthiza (*A. pusilla*) with one of its own eggs together with the brown egg of the bronze cuckoo (*Chalcites plagosus*) and the red speckled egg of the narrow-billed bronze cuckoo (*C. basalis*).

FOSSIL CRABS FROM PLEISTOCENE ESTUARINE DEPOSIT, MOUTH OF THE YARRA YARRA RIVER.

By S. H. Wintle, F.L.S.

(Read before Field Naturalists' Club of Victoria, 13th September, 1886.)

No. 1.—Phlyxia Lœvis.

Carapace rhomboidal, very convex, trilobed, slightly puckered, naked, smooth, with longitudinal dorsal ridge. Anterior margin of carapace straight, with two conical teeth; antero-lateral margin with two prominent conical teeth about the centre of carapace. Postero-lateral margin with one very prominent conical tooth. Posterior extremity with three prominent, subequal conical teeth—largest one at posterior extremity of dorsal mesial ridge, and situated above the other two. Abdomen with a very deep mesial longitudinal gastric furrow—wide at posterior extremity at point of insertion of the abdomen, and terminating in a blunt point with sloping sides, and with four subsegmental divisions, which coalesce at base of furrow. Ambulatory appendages absent.

This fossil agrees with *P. lævis*, according to Mr. Haswell to whom I forwarded some specimens. Living examples are met with at Williamstown and other parts of the shores of Port Phillip.

No. 2.—Utica. (Agreeing with *U. crassima*, Haswell)

Carapace subquadrate, smooth, naked, somewhat convoluted, with numerous fine punctures. Anterior margin wide, and nearly straight. Antero-lateral margin recurved. Broader than long, moderately convex. Eye stalks rather long. Third joint of jaw-feet very long and attenuated in proportion to other parts. Pincers slender, not widely gaping. Ambulatory appendages compressed into sharp angular edges, which, in living examples, are tomentose. Abdomen with narrow well-defined transverse plates. Gastric furrow faint. Recent along the shores of Port Phillip Bay.

These fossil crustacea are found in nodules of a highly calcareous cement, containing fragments of recent marine testacea, and occasionally whole shells The nodules occur in great abundance in the old estuarine bed of the river Yarra Yarra, which has been exposed in excavating for docks, and also in the cutting for the Coode Canal at Fisherman's Bend. Associated with these crab remains are freshwater crayfish, *Astacopsis Franklinii* (M'Coy); freshwater mussels, *Unio sp.*; bones of recent animals; terrestrial vegetable remains, &c., which have been brought down by river

action from inland. There are also in the nodules Foraminifera and numerous marine testacea.

From the condition in which these fossil crustacea are found, it would seem that there had been great and sudden mortality among them, probably due to the water having been poisoned by the evolution of gases attending volcanic disturbance. The deposit in which these crustacea are found is of no small interest when viewed in connection with Australian Tertiary geology and demands a close systematic examination from practical field workers.

NOTES.

During the past few weeks the director and assistant director of the Zoological and Acclimatisation Society have been very busy distributing young English trout in various rivers and creeks in the Upper Yarra and Gippsland districts, and also several creeks in the Dandenong Ranges. Altogether about 15,000 young fish have been turned out. About 3000 of these were hatched at the Royal Park, having been purchased as ova from the Salmon Commissioners of Tasmania. The remainder were hatched at Sir Samuel Wilson's estate, Ercildoune, near Ballarat, and presented by him to the Society for distribution. It is also intended to stock the Wimmera with a large number of different varieties of carp.

At the November meeting of the Club, Mr. F. G. A. Barnard exhibited a pot of the orchid, *Caladenia suaveolens*, a plant which was considered rare, until several members of the Club have noted its occurrence in different localities. One of its peculiarities seem to be the long time for which its flowers last. The plants in question were in full bloom just before the September meeting, and, when exhibited, were apparently as fresh as ever. It was grown in an ordinary lath fernery.

ANSWERS TO CORRESPONDENTS.

Blue and Crimson Water-Lilies.—The order of water-lilies, Nymphæaceæ, although not numerous in species, has a world-wide distribution in tropical and temperate still waters. There are four Australian species according to Mueller, three according to Bentham. One, a cosmopolitan form, *Cabomba* (or *Brasenia*) *peltata*, with rather small dull-purple flowers, is found in the waters of North America and of East India, and has a similarly wide range in Australia, reaching from Queensland down to E. Victoria (Census). Another species, *Nelumbo*

nucifera (= Nelumbium speciosum, Willd.), occurs in Queensland and North Australia; this bears pink flowers, 4-8 in. across. It is found in Asia, from the Caspian to Japan. To the genus, which includes the British white water-lily of the poets, belong the most glorious of Australian forms, with flowers sometimes a foot in diameter, and blue, purple, pink, or rarely white in colour. Baron von Mueller refers these to two different species, *N. stellata*, which grows luxuriantly in the tropical waters of Africa and Asia, and *N. gigantea*, which is apparently confined to this continent. To enlarge on the colours of exotic forms would exact too much space, but "F." will find particulars in Bentham and Hooker's "Genera Plantarum," or De Candolle's "Prodromus," in the Public Library.

"Townsville" communicates the following notes from personal observation:—There are three varieties, blue, crimson or pink, and white. Although the three varieties sometimes grow in close proximity to each other, as a rule the blue grows near the coast and the crimson in the interior, and both appear to favour quiet lagoons and "billabongs," while the white prefers streams. Some of the flowers, when fully expanded, measure eight inches across. The large orbicular leaves are about eighteen inches in diameter, with tough roots ten to twelve feet long. An interesting question here suggests itself. In the matter of adaptation of colour, which of these three lilies is the original?

"F. Reader" writes:—Of more than seventy known species of Nymphæa but few bear flowers other than white. For example—*N. scutifolia*, D.C., Cape Good Hope (blue); *N. cærulea*, Sav., Egypt (blue); *N. stellata*, W, East Indies (blue); *N. cyanea*, Rox., East Indies (blue); *N. rubra*, Rox., East Indies (red).

Laughing Jackass.—Belongs to Alcedinidæ or kingfishers, and is in no even remote degree allied to the hawks. Scientific name *Dacelo gigas*, or great brown kingfisher. Professor Huxley considers the kingfishers as being most nearly connected structurally with the cuckoos and trogons.

EXCHANGES.

Conchology.—Wish to exchange specimens of land, fresh water, and marine shells with collectors in Victoria. D. J. Adcock (F. N. Section, Royal Society of S.A.), 27 Currie-street, Adelaide, South Australia.

Insects, with parasites, wanted. H. Watts, 20 Wellington-street, Collingwood.

Field Naturalists' Club of Victoria.

President:
REV. J. J. HALLEY.

THIS Club was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

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With the view of popularising the study of the Natural History of the Colony, correspondence, notes, and queries relating to this subject are invited for insertion, and should be addressed to the Editor at the Wesley College, Prahran.

Any of the numbers from the commencement, January, 1884, can be obtained from the Hon. Sec., Mr. F. G. A. Barnard, Kew, at sixpence each; or in sets, Vol. I. (1884-85), 16 numbers, 7s. 6d.; Vol. II. (1885-86), 12 numbers, 6s.; each set with title-page and index for binding.

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THE

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THE FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 13th December, 1886.

The president, the Rev. J. J. Halley, occupied the chair, and about fifty members and visitors were present.

A circular from Prof. Liversidge, Sydney, was read, reporting the result of the recent Conference for the formation of the Australasian Association for the Advancement of Science.

Baron F. von Mueller, K C M.G., forwarded a communication bringing under the notice of the members the desirability of organising excursions to the Cann River district, East Gippsland, and King's Island, the fauna and flora of which are at present almost unknown.

The hon. librarian reported the receipt of the following donations to the library:—"List of Algae from Port Phillip Heads and Western Port," by Mr. J. Bracebridge Wilson, M.A., from the author; "The Genera of the Plumulariidæ, and Notes on Australian Hydroids," by Mr. W. M. Bale, F.R.M.S., from the author; "A Floral Chart for the Examination of Flowering Plants," by Rev. T. V. Atkin, Campbelltown, N.S.W., from the author; "Prodromus of Zoology of Victoria," Decade XIII., from the Government; "Proceedings of the Linnean Society of New South Wales," second series, Vol. I., part 3, from the society; "Proceedings of the Royal Society of New South Wales," Vol. XIX., 1885, from the society; "Journal of the New York Microscopical Society," July, 1886, from the society; "Journal of Pharmacy," November, 1886, from the society.

The hon. secretary reported the results of the excursions recently made to Cheltenham and Wandong, when, unfortunately, no specimens of particular interest were found.

The following were elected members of the Club:—Miss Smith. Messrs. J. H. Davies, M A., S. Morres, T. Tidy, jun., and H Wrixon.

PAPERS READ.

1. Baron F. von Mueller, K.C.M.G., contributed "Notes on Rare Victorian Fungi," in which he mentioned the discovery for the first time in Victoria of two singular fungi, viz.—*Cyttaria Gunnii* (Berk) on the beeches in the Cape Otway Forest, and *Cordyceps Taylori* (Berk) parasitical on a grub, at Gerangamete, and exhibited the specimens.

2. Mr. H. Watts read a paper entitled "Some Recent Additions to our Knowledge of Microscopic Natural History," in which he mentioned the finding by him of *Sertularia bispinosa* and *S. trispinosa* at Warrnambool about twenty-five years ago, but only lately recorded, while recently he had found a new Plumularia at Queenscliff, which had been named *P. Wattsii*, by Mr. W. M. Bale, F.R.M.S. A neuropterous insect, belonging to the Collembola, and a wood-mite, belonging to the family Oribatidæ, had also proved to be new to science He concluded by giving some particulars of his work with the fresh-water algae and desmids of Victoria, and handed in lists for publication of forty two species of the former, and thirty-five of the latter. He exhibited some carefully prepared specimens and drawings in illustration of his remarks.

3. Messrs. C. French, F.L.S., and F. G. A. Barnard contributed a paper entitled "Notes of a Holiday Tour in Riverina and Western Victoria," in which they described the plants, &c., found in the neighbourhood of Mulwala, New South Wales; the Wannon, near Hamilton; and Mount Sturgeon, near Dunkeld. They exhibited the various botanical and geological specimens referred to in their remarks.

The Rev W. T. Whan, M.A., of Belfast, forwarded an interesting note on some specimens of pumice-stone he had found some time since on the island of Diego Garcia, in the Indian Ocean, having been just washed ashore. These had apparently drifted from the great eruption at Sunda, and taken about thirteen months to traverse the intervening 2000 miles.

The following were the principal exhibits :—By Mr. F. G. A. Barnard, photographs of the Wannon and Nigretta Falls near Hamilton, fossils from Muddy Creek, and sandstone from Mounts Abrupt and Sturgeon, in illustration of paper, also specimens of the locust plague, *Epacromia terminifera*, from St. Arnaud; by Mr. T. A. Forbes-Leith, a pair of swallow dicœums, *Dicœum hirundinaceum*, with their purse-like nest, also nearly sixty species of birds' tongues, and tongues of platypus and iguana; by Mr. C. French, F.L.S., dried plants from Mulwala and Western Victoria, in illustration of paper; by Madame Friederich, specimen of sponge, also a branch of an apple

bearing both flowers and fair-sized fruit; by Mr. J T. Gillespie, eggs of the orange-fronted, white-fronted, and tricoloured ephthianuras, and of the little chthonicola, *C. sagittata*, also nest and eggs of the rufous-headed grass warbler, *Cisticola ruficeps;* by Master H. C. Grover, a mopoke, *Podargus strigoides;* by Master G. Hill, case of coleoptera; by Mr. G. A. Keartland, eggs of thirteen species of Victorian birds, including those of the rosella, *Platycercus eximius*, the red-capped dottrel, *Ægialitis ruficapillus*, white-backed crow shrike, *Gymnorhina lenconota*, and reed warbler, *Calamoherpe Australis;* by Baron F. von Mueller, K.C.M.G., rare plants from New Guinea, collected by Mr. J. F. Roberts, F.R.H.S.; by Mr. H. Watts, three species of hydrozoa, and seventy species of Victorian fresh-water algae and desmids, in illustration of paper; by Rev. C. M. Yelland, sixteen species of wild flowers from Box Hill, also abnormal growth of rose

After a most interesting *conversazione* the meeting terminated.

THE "CAMP OUT."

TWELVE members and friends of the Field Naturalists' Club took part in the "camp out" excursion to Phillip Island, Westernport. Melbourne was left on the evening of the 20th November. On arriving at Frankston the party transhipped into a commodious waggon, drawn by five horses. Hastings was reached in time for supper, which was enjoyed at Peddle's Hotel. Next morning, after an early breakfast, the jetty was left about 6 o'clock in the fishing smack *Antelope*, bound for Cape Wollomai. The weather was delightful, but owing to light breezes and adverse tides the cape was not reached until half-past 5 in the evening, or in time to pitch camp and render all snug before nightfall. Three tents (6 x 8) were erected about 100 yards above high water mark and in a well-sheltered nook. In clearing the space of ferns, &c., two blue-tongued lizards *(Cyclodus gigas)* were captured. Tracks of other reptilia were visible on the sand, causing the nervous individuals of the expedition to see imaginary visions of bedfellows in the shape of black snakes, but fortunately these visions were not realised. All were astir the following morning at half-past 4, and after discussing a good breakfast a start was made an hour later for a ramble round the cliffs. Very few mutton-birds, or properly speaking short-tailed petrels *(Puffinus brevicaudus)* were found in the burrows, and mostly males. A nursery of silver gulls *(Larus Novæ-Hollandiæ)* was seen. Two or three of the more adventuresome spirits descended the bold cliff and secured

about a score and a half of eggs, but, unfortunately, the majority were in an advanced state of incubation. A pair of splendid sea eagles *(Haliaetus leucogaster)* were soaring round. Their eyrie was on an awkward headland. It was occupied by a pair of fully-fledged young. Before the prizes could be secured they took fright, and, scuttling out of the nest, disappeared over the cliff. The huge nest contained remains of wallabies, mutton and other birds, fish, &c. In an adjoining cliff two young red-bills or sooty oystercatchers *(Hæmatopus unicolor)* were then taken. They were downy, and very pretty, like black puff balls. Brush-tailed wallaby *(Halmaturus ualabatus)* were fairly numerous, and seemed chiefly to keep about the cliffs. It was surprising how they managed to keep their foothold when bounding along the steep declivities. One only was "bagged." On returning to camp a very fine specimen of black snake *(Pseudechys porphyriacus)* was captured unhurt. It measured 4 feet 7 inches. Having nothing to place the reptile in, the "snake charmer" carried it to camp and securely fastened it up in a box with the lizards. Lunch over, a rocky point was visited for fish. *En route*, a member took a pair of little penguins *(Eudyptula minor)*. The fish caught were chiefly parrot or butter fish, and a few leather-jackets *(Monacanthus hippocrepis)*. They were a welcome addition to the larder. After tea the campists again sallied out and caught a copper-headed snake *(Hoplocephalus superbus)*, but were again without a receptacle for its retention, so it was allowed its liberty till a more convenient season. After a hot walk over the sand the Cape proper was reached. Several birds were noted—namely, Pacific gull *(Larus Pacificus)*, a tern, gannet *(Sula Australis)*, blue reef heron *(Demiegretta jugularis)*, dottrels and black-cheeked falcon *(F. melanogenys)*, &c. The Pacific gulls had their nests on an inaccessible rock, and seemed to enjoy the futile efforts of the campists to scale it. At dusk the mutton-birds commenced to arrive in numbers—a curious sight. They were flying in all directions, flapping along the ground, and croaking and quarrelling in the holes. After tumbling into their network of burrows in the dark, all the party were glad to reach camp again. The following morning breakfast as usual very early. The day was spent principally on the mutton-bird nurseries, gathering eggs, which members of the party took from the burrows by the aid of long hooked sticks. Two members visited a swamp at some distance. They managed to shoot only one rabbit, besides other "small deer." Others obtained more sea gulls' eggs and young, while another section went botanising and snake hunting, but only secured a few blue-tongued lizards. The day's outing was again terminated by

witnessing the hundreds of mutton-birds wheeling in from seaward to claim their respective holes for laying purposes. On the third and final day the earliest possible start was made for the nurseries, and more mutton-bird eggs were gathered till nine o'clock. All traps were then packed, and the happy campists were once more afloat, drifting homewards. In sailing over the shallows beautiful marine objects were easily observed, varieties of fish, seaweeds of most striking colours, &c. The first portion of the home voyage was slow, but after passing Griffiths' Point, by the aid of a strong E.N.E. breeze, a splendid run was made to Hastings, where they landed about seven o'clock. Melbourne was reached in due course, and shortly after ten o'clock that night most of the members were at their respective homes, and all expressed themselves thoroughly delighted with the "camp outing." An ornithologist, during the excursion, identified between forty and fifty varieties of birds.

THE DRY PRESERVATION OF FLOWERS, FUNGI, &c., IN THEIR NATURAL SHAPES AND COLOURS.

By D. M'Alpine, F.C.S.

(Read before the Field Naturalists' Club of Victoria, 8th November, 1886.)

A previous paper on the dry preservation of animal specimens for museum and teaching purposes has suggested the present one, and it will be remembered that the principle of the method consisted in applying to entire animals a process which had long before been used for microscopic preparations only.

In considering the dry preservation of plant specimens in their natural shapes and colours, the idea naturally suggests itself, might microscopic methods be of service here as well, and will a fluid of some sort serve the purpose? It is well-known that mounting in Canada balsam or dammar does not destroy the colour of petals, and this fact may be turned to useful account.

It will be convenient to consider flowers and fungi separately, since they require to be treated differently for preservation.

1. Dry Preservation of Flowers.

The dry preservation of flowers in the ordinary flattened condition has long been known and practised, and for certain purposes it serves all requirements. Indeed, it seems the only practicable method when extensive collections have to be preserved, gathered over wide areas and in a limited period of time; but

when the flora of a district is being *gradually* wrought out, and it is found desirable to preserve specimens for museum or teaching purposes, then there can be no doubt that the preservation of the natural shape and colour ought to be aimed at. The mere systematist is apt to despise shape as a whole, and ignore colour, but in the modern study of botany both play an important part, and it is well, if possible, and practicable, to retain them.

There is an obvious objection to this method of preservation, which I have heard repeated more than once, that it would be inconvenient on account of the room such specimens would require; and no doubt that is an objection which has weight. But it is beside the question on the present occasion, for I am now speaking of the preservation of the plants of a district, which there would be no difficulty in exhibiting in a public museum. Thus, to take the flowering plants of Victoria, as recorded in Baron von Mueller's recent "Key," there are 1760 species, and of these, after deducting grasses and sedges, not to speak of the various Apetalous orders, there remain about 1520 species—not by any means requiring an excessive amount of space according to their importance. And I could conceive no more attractive, interesting, and instructive department in a museum, and withal a more necessary one, than that which displays the native flowers of the district of which it is the centre in all their glory of colour, and in all their beauty of form.

Altogether the preservation of Natural History objects is now receiving increased attention, commensurate with its importance, especially for teaching purposes, and Mr. Beck, of the Royal Microscopical Society, London, recently described a visit to the Zoological Station at Naples, where he was particularly struck with the special attention given to the preservation of specimens, so as to exhibit them as far as possible in their natural condition. If simple, inexpensive, and effective methods can be devised for the preservation of specimens naturally, the mechanical difficulty of disposing of them afterwards will soon be solved. And I need hardly point out the beneficial effect this would have on the study of Natural Science, not only in making it more practical, but also in making it more general. I have reason to know that even the study of Botany in its practical aspect is somewhat hindered by the expense attendant upon the procuring of specimens, which, if permanently preserved in the manner to be indicated, would remove that cause of offence.

But it is time now to approach the main subject itself; and of the various methods which have been proposed for the dry

preservation of flowers, other than the orthodox one, you will find a short summary in the "Penny Handbook of Flowering Plants," by James Britten, F.L.S., Botanical Department, British Museum.

It will there be seen that the subject has by no means been overlooked, although I am not aware that any particular method has as yet come into general use. A process has lately been patented for "Improvements in preparing and preserving natural flowers, plants, and leaves for ornamental and decorative purposes," but, for scientific purposes, there is still room for experiment and improvement.

In this paper I propose giving (with illustrative examples) the results of various experiments, framed with a view to test the relative efficiency of methods already proposed, as well as, if possible, to hit upon others serving the purpose better. It will then be possible to recommend some definite method as worthy of adoption, so that practical results may be expected to follow.

The various methods may be conveniently arranged and discussed under two heads :—

1. Methods for retaining colour alone.
2. Methods for retaining colour and shape.

First—The preservation of colour in flowering specimens dried in the ordinary (flattened) way has been variously attempted. The methods depend either upon the application of some re-agent which fixes the colour and renders it fast; or upon the application of heat in some form. With regard to the latter, Mr. Britten remarks—"We have seen very pretty groups of flowers in which the colour has been fairly well preserved, and have found upon inquiry, that the specimens have been ironed with a heated flat-iron, the larger and thicker flowers having been picked to pieces, the parts treated separately, and put together again. This treatment suits blue flowers especially well, but quite spoils red ones; these latter it is recommended to wash with muriatic acid diluted in spirits of wine (one part of the former to three of the latter) to fix their colour. Care must always be taken not to bruise the petals, especially in white flowers, as, if this happens, discoloration is certain to result."

As it is well known that rapidity of drying tends to preserve colour, pressing flowers with a heated iron between brown paper, in some cases, produces the desired effect.

Of the re-agents which have been tried with some degree of success, the following may be mentioned :—

(*a.*) Weak solution of alum brushed over the petals.

(*b.*) Petroleum or kerosene used in the above manner, or the

flowers may be immersed in it for some little time. In this connection I tried kerosene, benzol, and turpentine; the two former preserved colour, while the latter completely removed it.

(*c.*) Paraffin paper used for mounting. The paper is prepared by soaking in solid paraffin which has been melted. The specimen to be preserved is laid out upon the paper in the usual way, then after covering with brown paper, pressed with a hot flat-iron. Just apply sufficient heat to melt the paraffin and sufficient pressure to flatten the specimen, and thus at one stroke as it were, the flower is dried and pressed, and colour preserved. I have seen specimens in the Edinburgh Herbarium treated in this way, with their colours quite fresh years after. In this case both heat (ironing) and a re-agent (paraffin) are used in combination.

Second—To preserve natural shape and colour, the well-known sand process is a type of the method, but before describing this or any other, let me call your attention to a very striking fact commented on by Mr. Carruthers, of the British Museum, and president of the Linnæan Society, in his presidential address before the Biological section of the British Association at its recent meeting.

It has reference to the dry preservation of flowers in their natural colours within the mummy wrappings of the ancient Egyptians, and it is so pertinent to our present subject that I make no apology for quoting it somewhat fully. He says:—"The recent exploration of unopened tombs belonging to an early period in the history of the Egyptian people has permitted the examination of the plants in a condition which could not have been anticipated. . . . The plant remains were included in the mummy wrappings, and, being thus hermetically sealed, have been preserved with scarcely any change. By placing the plants in warm water Dr. Schweinfurth has succeeded in preparing a series of specimens gathered 4000 years ago, which are as satisfactory for the purposes of science as any collected at the present day. . . . The colours of the flowers are still present, even the most evanescent, such as the violet of the larkspur and knapweed, and the scarlet of the poppy. The chlorophyll remains in the leaves, and the sugar in the pulp of the raisins. . . . It is difficult without the actual inspection of the specimens of plants employed as garlands, which have been prepared by Dr. Schweinfurth, to realise the wonderful condition of preservation in which they are. The colour of the petals of Papaver rhœas, L. and the occasional presence of the dark patch at their base, present the same peculiarities as are still found in the species growing in

the Egyptian fields. The petals of the larkspur (Delphinium orientale, Gay) not only retain their reddish-violet colour, but present the peculiar markings which are still found in the living plants. A garland composed of wild celery (Apium graveolens, L.) and small flowers of the blue lotus (Nymphæa cærulea, Sav.), fastened together by fibres of papyrus, was found in a mummy of the 20th dynasty about 3000 years old," &c. &c.

In the Egyptian room of the British Museum is a wig as brilliant and fresh as when it came from the hands of its maker some 3000 years ago. There is nothing very surprising in this, for hair, by the ordinary agencies of nature, is imperishable. But flowers—the apt emblems of decay, of fading beauty, and of fleeting pleasure—to be preserved "with scarcely any change," almost as fresh in appearance as their living descendants, is surely contrary to anticipation. Not to moralise, however, but to read a practical lesson in flower-preservation, we have here the specimens hermetically sealed, kept thoroughly dry, and in the dark.

To preserve flowers in their natural shape and colour the hot sand process is a type of all the methods, and may be generally glanced at. The shape is preserved by embedding in the sand, for there is just sufficient pressure to prevent collapse, and any material would serve as well as, or even better than, sand which is a good absorbent of moisture without being injurious to the colour. Next, the colour is preserved by the heating, for it would appear that the rapid evaporation of the moisture fixes the colour on the surface; and, finally, having preserved shape and colour, it is still necessary to exclude the moisture and give rigidity to the parts. The natural stiffness depends to a large extent on the dilatation of the cells by water, and, having removed that, the cells collapse and become flaccid unless artificial stiffness be imparted. This may be done by a gum such as dammar, which stiffens and hermetically seals without affecting colour. Light no doubt affects the colour in certain cases, and so the mummy specimens had a certain advantage there, but we must sacrifice that advantage in order to have the pleasure and use of our specimens.

To meet all these requirements then, I consider it necessary:—

To *dry* the flower by heat.

To preserve *shape* by imbedding it in an absorbent of moisture.

To render it *impervious to damp* by coating it with dammar or some such varnish, and stiffening at the same time.

Various proposed methods may now be passed under review beginning with the hot sand process. The heat required is

"blood heat" (100° F.), like that of mammals, and may be applied artificially if the ordinary temperature is not sufficient, but in this sunny climate of ours the natural heat is sufficient, taking the precaution, however, to guard against rain.

(*a.*) Hot Sand Process.—The specimen is imbedded in the sand, which has to be heated to the temperature of the human body. The hot dry sand (silver sand being preferred) absorbs the moisture, and thus dries the specimen, while at the same time there is sufficient pressure to prevent collapse and preserve the shape. After the moisture has been driven out by the heat and absorbed by the sand, the specimen is afterwards rendered impervious to moisture by a coating of dammar varnish. This may be prepared by dissolving gum dammar in kerosene, benzol, turpentine, or chloroform alone. Since turpentine affects the colour of flowers, I prefer the solution in kerosene or benzol.

(*b*) Patented Process.—In the patented process already referred to, pigments are applied in the form of fine powder or dust, corresponding to the natural colour, and flowers so treated are afterwards dried in a bath of hot sand, when the colour is fixed on their surface. This is hardly preserving the natural colour, since an artificial colour is applied.

(*c.*) Mr. English's Method.—It is evident that other imbedding material than sand may be tried—something which is at the same time a good absorbent. Mr. English has used, with excellent results, plaster of Paris, and he found that plaster of Paris mixed with an equal quantity of lime did better still. But there is this drawback to the latter method, that the lime acts upon the colours, rendering reds rather purplish, which, however, can be remedied by fuming with hydrochloric acid. He says:—"I took ordinary plaster of Paris, warmed to about 90° or 100° F., and imbedded the fresh flowers in it, shaking the plaster carefully down in the plants. This plan answered admirably. Small plants were preserved in less than 12 hours; large species took longer in proportion to the amount of moisture in their tissues. When taken out of the plaster these plants presented a very dirty appearance, and if left in it too long they became somewhat brittle, but on being laid aside in the air for a time they soon relaxed. They were then brushed with a camel's hair pencil, and petroleum carefully applied with a brush. Reds and purplish-reds, however, come out too purple. I overcame this difficulty at last by immersing the dried plants in the vapour of hydrochloric acid. About a teaspoonful of acid is put into a wide-mouthed bottle or glass cylinder, and the plants suspended by the stalks, so as not actually to touch the liquid acid; when the proper shade of colour appears, they must be quickly removed."

(*d.*) A leading horticulturist of Melbourne mentioned to me some time ago a process he had tried with some degree of success, but it was, as he described it, precarious and tedious. He used gum—preferably gum dammar—dissolved in water until it "ran" freely, and then dipped the flower to be preserved in it. He dipped the flower, stalk end first of course, wabbling it about to drive out air, and then hung it up to dry. This dipping and drying was repeated for at least three times. Dahlias, for instance, treated in this manner, kept for five years, but such a tedious process, not to speak of its precariousness, could never be recommended for general adoption.

(*e.*) I have tried various imbedding materials. A mixture of sand and melted paraffin has been favourably mentioned, but I found the mixture cake so that it would not work.

Only two of the absorbents tried need be specially mentioned here.

1st. "Pounce," which is just the so-called bone of the cuttle-fish pounded, is a well-known absorbent, having been used in the early days for drying ink before blotting-paper was made. The specimen shown—Cape weed—was dried in it for about three days, then treated with gum dammar dissolved in kerosene. Both colour and shape are well preserved, and I mean to use this material extensively.

2nd. Fine sawdust was also tried—the ordinary sawdust, passed through fine wire gauze. It serves the purpose fairly well, but has no special advantages that I should recommend it.

For after-treatment I tried Canada balsam dissolved in chloroform, as well as dammar, but the former is so difficult to work with that I gave it up, and confined myself to the latter.

As the result of these various experiments, I recommend for practical use plaster of Paris as an absorbent, since it can be easily procured, and for after-treatment gum dummar dissolved in petroleum, kerosene, or benzol. Mr. English recommends gum dammar dissolved in turpentine, then benzol added, in the proportion of 5oz. of the gum to one pint each of turpentine and benzol.

In the case of white flowers the petals need not be varnished since it darkens the colour.

It is in the hope that the process will be tried and improved upon by members of the club that I have brought it forward. And there is one order of plants to which this mode of preservation is specially applicable. I mean the orchids. With them form is so varied and withal so important, combined with the accompanying colours, that their very identity is bound up, as it were, therein. Hence attempts have been made and instructions given to preserve, if possible, *their* colour. It is

recommended to put them into warm paper and change frequently, in order to preserve the colour by rapidity of drying. And by this method shape and colour may be beautifully preserved, even surpassing my expectations. There are seventy-four species of Victorian orchids (exactly double the number of the British), and since this group of plants is so much prized and sought after, their preservation ought, indeed, to be a "labour of love." Other plants, which have resisted the ordinary methods of drying, such as the magnolias, I mean to attempt as soon as specimens are obtainable.

II. Dry Preservation of Fungi.

It will not be necessary to say much under this head, since I have simply to recommend a process devised by Mr. English, and published in a little book entitled "A Manual on the Preservation of the Larger Fungi and Wild Flowers," a work which ought to be in the hands of all interested in the subject.

The preservation of the larger Fungi in *any* shape or colour has always been considered a most difficult task; nay, to preserve their colour has been pronounced an impossibility. But the impossible in this case has been rendered possible, and, after noticing a few of the methods tried, the final solution of the difficulty will be given

Mr. Holmes, in the article "Herbarium," in the *Encyclopædia Britannica*, thus describes the usual method:—

"The larger species of Fungi, such as Agaricini, Polyporei, &c., are prepared for the herbarium by cutting a slice out of the centre of the plant, so as to show the outline of the pileus, the attachment of the gills, and the character of the interior of the stem. The remaining two halves of the pileus are then lightly pressed, as well as the central slice, between bibulous paper until dry, and the whole is then poisoned and gummed to a sheet of paper in such a manner as to show the under surface of the one, and the upper surface of the other half of the pileus on the same sheet. As it is impossible to preserve the natural colours of Fungi, the specimens should, whenever possible, be accompanied by a coloured drawing of the plant. Fungi, under any circumstances, form the least satisfactory portion of an herbarium."

It will be seen from the above brief description that the ordinary method of Fungi preservation is not by any means satisfactory, so that there is scope here for experimenting.

I have myself tried two methods which have given good results as far as the natural shape is concerned:—

1st. Soaking in melted paraffin for some time, so as to permeate the entire structure, and thus preserve, and render the

whole firm on cooling. I have a specimen of a cluster of ordinary mushrooms treated in this manner many years ago, which still maintains its perfect form, although the colour has not been retained, as I anticipated, from using paraffin.

2nd. Soaking in glycerine-gelatine for some time, and then treating with absolute alcohol for about thirty minutes, in order to impart firmness to the specimen. This method involves more expensive re-agents, and might only be recommended for the gelatinous fungi, which it seems to preserve well, judging from the specimens shown. But, as far as shape is concerned, the larger fungi are most easily and inexpensively preserved by steeping in melted paraffin.

However, all must yield to the final method I have to mention —that devised by Mr. English, who is a working naturalist, and has published details of the method in the manual already referred to. The process consists essentially in the use of a preservative compound, of which he gives the formula, and ample instructions are added to guide any one in following it out. To show its permanency there are specimens now unchanged in the Bethnal Green Museum, London, prepared in 1869, and I can testify to the naturalness of the specimens in the Edinburgh Museum. Speaking of the mode of mounting, Mr. English remarks :—"There are some collectors who complain of the vast space a collection of fungi would occupy. I have recently adopted a plan that would reduce the space complained of by splitting the specimens in halves and mounting them on cardboard. By this means we have a representation of the entire plant, and also in sections, with the spores, thus making the plant complete. They are easily arranged in cabinet drawers, where they have a very neat appearance."

In concluding my remarks on the preservation of natural history objects, I have to point out that it has been my endeavour to show that even here there is still room for originality and improvement, and that we should aim at nothing short of perfection, *i.e*, preserving specimens to correspond as near as may be with the living reality. The mode of animal preservation already brought under your notice still holds out inducements for discovery, as far as colour is concerned, and we have yet much to learn about plant preservation, especially as regards colour also. Further, the practice of preservation need not become a "mere mechanical exercise," for it throws light on *colour*, and colour leads to the consideration of its *uses*, whether for the protection or the attraction of insects ; and this brings us again to the still deeper problem of the evolution of the *shapes* and colours of flowers adapted with such precision to suit certain insects, and so on.

The principal works that may be consulted by those desiring further information are now given as a fitting close:—

"Notes on Collecting and Preserving Natural History Objects," edited by Dr. Taylor; Young Collectors' Penny Handbooks, by Staff of the British Museum; article "Herbarium," Encyclopædia Britannica, by E. M. Holmes; "A Manual on the Preservation of the Larger Fungi and Wild Flowers," by James Lake English."

DESCRIPTIONS OF NEW AUSTRALIAN PLANTS;

By Baron von Mueller, K.C.M.G., M. & Ph.D., F.R.S.

(Continued.)

Kayea Larnachiana.

Leaves on very short stalks, elliptic-lanceolar; flowers small, in terminal short panicules or fascicles without any common peduncle; bracts obliterated or very fugitive; sepals finally much enlarged, the two outer roundish, the two inner more oval; petals roundish; fruit rather large, globular, somewhat pointed, one-seeded.

On the Mossman-River; W. Sayer.

A tree, noticed to be about 20 feet high. Epidermis of branchlets somewhat fissurated. Petioles $\frac{1}{6}$—$\frac{1}{3}$ inch long. Leaves in rather distant pairs, firmly chartaceous, so far as seen 5—7 inches long, $1\frac{1}{3}$—2 inches broad, almost smooth and scarcely shining above, slightly pointed at summit, rounded at the base, very thinly penninerved, the subtle reticulated veins immersed. Inflorescence 1—$1\frac{1}{2}$ inches long; pedicels racemosely arranged, about as long as the calyx, bearing very minute deltoid bracteoles below the middle. Unexpanded calyx globular, glabrous, measuring hardly $\frac{1}{4}$ inch, thinly coriaceous, pellucid and imbricating at the edge. Petals membranous, glabrous. Stamens numerous, slightly connate at the base. Filaments very thin, at the summit pointed. Anthers almost orbicular, fixed above the base; the cells surrounding the short and broad connective, dehiscent along the margin. Style glabrous, subulate-filiform, short; stigmata minute, pointed. Sepals finally about an inch long, hardly shorter than the fruit, of thick texture, outside rather rough and developing a brownish-film. Fruit indehiscent; pericarp coriaceous. Seed filling the cavity, basifixed, sessile. Arillus none. Testa chartaceous, smooth. Embryo almost globular, carnulent.

The descriptive notes are elaborated from specimens with young flower-buds and with over-ripe fruit.

This Australian species is evidently nearest allied to K. racemosa; but it has only faint nerves of the leaves, shorter petioles, pluriseriate stamens, and perhaps the fruit of K. racemosa, when discovered, may show differences also.

This new and remarkable plant is named in honour of James McD. Larnach, Esqr., in phytologic appreciation of his sharing as member of the council of our local Geographic Society in the work of promoting the cause of geography in Australia as in New Guinea also, from which exertions botanic science has also benefited.

Of the Order of Guttiferae,—so little represented in Australia—another plant occurs in Mr. Sayer's collection, from the Russell-River. The leaves are very similar to those of Kayea Larnachiana, but traversed by rather prominent nerves conspicuously confluent into an intramarginal vein; the inflorescence is axillary, the four sepals are equal, semilanceolar and not enlarging, thus not growing to beyond $\frac{1}{8}$ inch length; the fruit is ovate-globular, indehiscent, apiculated, about $\frac{3}{4}$ inch long and one-seeded; the seed turgid-ovate, nearly $\frac{1}{2}$ inch long, exarillate, erect; the testa membranous and brown; the cotyledones are carnulent and partially connate, while the radicle is inconspicuous. It is intended to establish on this plant, when fuller material is obtained, a distinct genus under the discover's name. Beccari has recently indicated a species of Kayea from Borneo.

Hydrocotyle Comocarpa.

Perennial, dwarf, creeping; leaves small, renate—or cordate—roundish in outline, to the middle or less divided into 3—5 crenated lobes, as well as the petioles almost glabrous; umbels capitate, few-flowered, on very short peduncles; styles conspicuous, soon erect or not much spreading; fruits turgid, roundish, but somewhat dilated upwards, the summit surrounded by a series of flattened bristly hair, elsewhere wrinkled-rough; the fruitlets seceding, dorsally blunt, one-nerved on each side; carpophore permanently adnate.

In Kangaroo-Island; Otto Tepper.

Well developed leaves only $\frac{1}{4}$—$\frac{1}{2}$ inch broad, so far as shown by the only specimen of the plant obtained, which is a fruiting one. Leafstalks slender, one inch or less long, occasionally somewhat hairy. Fruitlets obliquely cuneate-ovate, not conspicuously compressed except at the commissural line, about $\frac{1}{12}$ inch long, dark-brown, sometimes beset laterally with a few

short hairs, thinly one-nerved dorsally, the terminating bristles forming a pale pappus-like fringe, almost as long as the fruitlets, not hooked.

Among Australian species only H. glochidiata and H. blepharocarpa have also fringed fruits; but the first-mentioned belongs to a different section of the genus, while H. blepharocarpa differs in annual root, compressed fruitlets fringed longitudinally and with the lateral nerve almost straight.

Mr. Tepper found also H. diantha in Kangaroo-Island, it previously being known only from West Australia. The variety acutiloba of H. hirta is, as pointed out by Mr. C. B. Clarke, the H. Javanica (Thunberg dissert. II., 415, t. 3), which name would rank as the oldest, if H. hirta should be specifically inseparable. H. geranifolia has been traced to the Hawkesbury-River by the Rev. Dr. Woolls; H. scutellifera was found by me on mossy granite-rocks of the Porongerup-Ranges; H. trachycarpa occurs also on the Lachlan-River (H. Andrae) and on the Finke-River (Rev. H. Kempe); H. diantha at the base of Stirling's-Range, so also H. homolocarpa (F. v. M.).

NOTES AND QUERIES.

I SHALL be glad of any information as to species of Amphibia to be found in Victoria —SUBSCRIBER.

Can members supply instances in which they have been eye-witnesses of the destruction of snakes by the great brown kingfisher or others of our birds?—HOPLOCEPHALUS.

Dr. Lucas has recently discovered a new and handsome Lycænid (blue) butterfly in Gippsland.

A CORRESPONDENT of the *Herald* writes:—Mr. Dunn, of Alexandra, caught a large cod in the Goulburn last week, and on opening it found a large black snake in the stomach.

MR. J. BRACEBRIDGE WILSON, F.L.S., of Geelong, has recently published a systematic list of the marine Algæ collected by him, chiefly by dredging, at Port Phillip Heads and in Western Port. The number of species amounts to about 300. Several were new to science, and appropriately indicate Mr. Wilson's sponsorship.

Field Naturalists' Club of Victoria.

President:

REV. J. J. HALLEY.

THIS Club was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

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The proceedings of the Club are recorded in its journal—the "Victorian Naturalist." Annual subscription, 6s. 6d., post free. (To members free.)

With the view of popularising the study of the Natural History of the Colony, correspondence, notes, and queries relating to this subject are invited for insertion, and should be addressed to the Editor at the Wesley College, Prahran.

Any of the numbers from the commencement, January, 1884, can be obtained from the Hon. Sec., Mr. F. G. A. Barnard, Kew, at sixpence each; or in sets, Vol. I. (1884-85), 16 numbers, 7s. 6d.; Vol. II. (1885-86), 12 numbers, 6s.; each set with title-page and index for binding.

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The Author of each article is responsible for the facts and opinions he records.

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THE

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THE FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 17th January, 1887.

The president, the Rev. J. J. Halley, occupied the chair, and about sixty members and visitors were present.

A memo. was read from Mr. A. J. Campbell, stating that he was making inquiries as to an expedition to King's Island, as suggested at last meeting, and expected it would take place about November next.

The hon. librarian reported the receipt of the following donations to the library:—"The Midland Naturalist" for 1884 (12 Nos.), from Mr. A. J. Pickering, Great Western; the "Journal of Pharmacy," December, 1886.

The following were elected members of the Club:—Miss A. Simmons, Messrs. Purves and H. Watson.

On the suggestion of the president, it was decided to ask the Government to appoint a representative of the Club on the Commission for the Centennial Exhibition; the opinion being expressed that Natural History had hitherto been greatly overlooked in connection with such matters.

PAPERS READ.

1. Mr. D. Le Souef read a paper entitled "Notes of a Trip to the Lake Albacutya District." The author gave an interesting account of the different birds he met with in that district, and entered more fully into the habits of the lowans or mallee-hens. He mentioned that great destruction had been caused among the birds of the district by the use of poisoned water, set principally for dingoes and rabbits, and in the discussion which followed there was a general expression of opinion that, in view of the rapid extermination of many kinds of birds, greater caution should be exercised in the use of poisoned water.

2. Mr. H. W. Hunt read a paper entitled "Notes on Australian Birds' Nests," in which he briefly glanced at the principal distinctive features of the nests of many of our Australian birds,

and exhibited a large number of specimens of the various types.

Some interesting notes on the recent locust plague from country correspondents were read by Mr. F. G. A. Barnard, who exhibited specimens of the female locusts and their eggs, together with young locusts recently hatched, which were only about an eighth of an inch long.

Mr. Lucas commented on the season as one remarkably favourable to insect life, as, in addition to the locust plague, the common sorts of moths and beetles had appeared in much larger numbers than usual, while the larvæ of some of the moths (the silver Y and carpet moths, according to Mr. Spry) had been a great nuisance in the gardens, attacking even the flowers of pelargoniums, dahlias, etc.

The following were the principal exhibits of the evening:—By Mr. F. G. A. Barnard, Victorian coleoptera recently collected; by Mr. D. Best, coleoptera recently collected at Yarragon; by Mr. A. J. Campbell, egg of Queen Victoria's rifle-bird (*Ptiloris Victoriæ*)—the first authenticated specimen yet discovered—a pair of the white-faced storm petrel's (*Procellaria frigata*) eggs from the north-west coast of Tasmania—the first recorded instance of that bird having been found in Tasmania—and a pair of diving petrel's (*Pelecanoides urenatrix*) eggs from Bass' Straits, new to science; by Mr. G. Coghill, thirty-two specimens of dried plants, grasses, etc., collected during the Phillip Island excursion; by Mr. A. Coles, a pair of silvery-backed butcher-birds; by Mr. E. M. Cornwall, a pair of red-tailed tropic-birds (*Phæton rubricunda*); by Mr. E. A. Dombrain, twelve species of Australian birds, also specimens of dried quandong fruits and seeds; by Mr. T. A. Forbes-Leith, a female satin bower-bird (*Ptilonorhynchus holosericeus*) with singular plumage—viz., green crown, and red patch on back of neck—tongues of the New Zealand parson-bird and of the porcupine ant-eater; by Mr. C. French, F.L.S., a copper-headed snake (*Hoplocephalus superbus*) from Phillip Island; by Master H. C. Grover, a New Zealand rail; by Mr. E. H. Hennell, small green caterpillars at present very destructive in gardens, with pupa and imago of same; by Masters G. and H. Hill, beetles, butterflies, and birds' eggs; by Mr. H. W. Hunt, nests in illustration of paper; by Mr. H. Kennon, thirty mineralogical specimens; by Mr. S. Lamble, sandstone, with impressions of fossils, from Heathcote; by Mr. D. Le Souef, three lowan's eggs, and a live stump-tailed lizard; by Baron von Mueller, K.C.M G., a rare Victorian orchid (*Diuris alba*) from Upper Murray District; by Master H. F. Soward, a whip-snake and centipede; by Mr. F. Wisewould, agate cornelian, from Lake Sorrell, Tasmania.

After the usual *conversazione* the meeting terminated.

THE LOCUST PLAGUE.

A CORRESPONDENT at Murtoa, in the Wimmera district, forwards the following notes on this subject:—

"They appear to fly in swarms, in size varying from a few yards wide to over a mile, and of great length, as sometimes the flight continues from half an hour to an hour without the slightest break. They fly about 20 to 25 feet above the ground, and seem to be able to sustain themselves on the wing for a long distance, and I fancy those which rest, except for feeding purposes, are younger and weaker than the company they are in. They evidently camp at night. I went out about half-past eight for the purpose of catching some; they were all on the move as soon as they heard me, but only used their legs, and did not attempt to fly. They did not do much damage to the wheat crops in this district; but the grass paddocks were cleared right off in a day or two, so that the farmers will be obliged to sell their sheep at once for what they will fetch, as they have no feed left. They appear to be a bit dainty in their tastes, as they ate all the leaves off the 'Scotch thistles,' but would not touch the so-called 'sow thistles,' which is somewhat fortunate, as stock are very fond of the latter. In passing through the crops they took the flag off the wheat, and all the wild oats and wheat, so that in several places there is nothing left but the ears of wheat on the tops of bare stems. They cut off a few ears of wheat, but they were in all cases those of shorter and later straws; the others appear to have been too hard for them. The consequence is that the loss is small, and, possibly, what are left have a better chance of maturing. They do not appear to eat the ears cut off as they drop down on to the ground and wither away. At a distance the swarms of locusts looked just like the dust raised by a flock of sheep, and more than one farmer was deceived in this way, and could not make out how sheep had got into his paddocks. Any gardens which happened to be in their line of flight suffered very severely. The fowls chased and ate great quantities of them, and for a time this new diet rendered the yolks of their eggs quite red."

Mr. J. W. Pickering, of St. George's Vineyard, Great Western, a member of the F.N.C. of Victoria, writes as follows:—"Some days ago the main army of the locusts visited this neighbourhood and did a vast amount of damage, especially favouring mangolds, rape, peas, beans, green cereals, and cherries; the stalks of the latter they bit through, causing the fruit to fall. The vines, fortunately, did not suit their taste, and so escaped, except a few of the youngest and tenderest shoots.

For two days the atmosphere presented all the appearance of a heavy snowstorm, lasting about eight hours each day. Immense numbers, of course, settled, and during one of the days I noticed hundreds of thousands were very actively pairing. Some days afterwards I heard that millions were depositing their eggs in a very large paddock, some few miles away from here, so I went over, and the sight was to me a very strange one. The whole surface of the ground—many acres—was as closely riddled with holes as if every foot of it had been shot down at with a choke-bore gun. It seems the female, as soon as she settles, and decides upon her ground, curves her abdomen, and begins to drill with the end of it by making half turns, and reversing the movement pretty rapidly, continuing the work till she reaches a depth of about 2½ or 3 inches, her abdomen extending like the drawing out of a telescope. The eggs, which are contained in a kind of bag, are then extruded, the abdomen in most cases withdrawn, and the female soon after dies. Often, however, the insect is unable to withdraw her abdomen, and dies in the act of depositing her eggs There are several points I should like to have cleared up, such as how long the eggs take to hatch, the exact structure of the drilling instrument, and what becomes of the excavated earth, for it is a curious fact that the holes are *clean cut*, as with a punch, without a vestige of excavated soil on the surface. The main body seemed to be migrating in a south-westerly direction, but the wind, on one or two days, prevented them making much progress. A good many of the insects are still left behind, but I notice they are all males. How is this to be accounted for?"

[Specimens of the perfect insect, which was described by Professor M'Coy, F.R.S., some years ago, for the Department of Agriculture, as *Epacromia terminifera*, were exhibited by Mr. F. G. A. Barnard at the December meeting of the Club. It belongs to to the family Locustidæ, section Saltatoria, of the order Orthoptera. Mr. Pickering forwarded specimens of the females with the abdomen extended, and also of the eggs which hatched out under three weeks. We shall be glad to receive other notes on their habits, etc., from our country friends.—Ed. *Victorian Naturalist.*]

Mr. Francis Longmore, chemist, 138 Bourke-street east, thoughtfully mentions that members may have, without compliment, numbers of small empty cardboard boxes, which may be useful for retaining stock or duplicate specimens.

"Catalogue of the Birds in the British Museum," vol. XI.—Fringilliformes—has been added to the shelves of the Melbourne Public Library.

SOME RECENT ADDITIONS TO OUR KNOWLEDGE OF MICROSCOPIC NATURAL HISTORY.

By H. Watts.

(Read before the Field Naturalists' Club of Victoria, 13th December, 1886.)

It is not often that our club has placed before it a paper on microscopy. I only recollect two—one by our esteemed member Mr. O. A. Sayce, who gave us a paper on the Coccidæ, or scale insect. It was an excellent beginning on the subject, and it is matter of regret that Mr. Sayce has been unable to find the time to continue the investigation, because these insects are supposed to be destructive to our trees, shrubs, and other plants, and any information on this branch of economic entomology, however scanty, is valuable in this colony, where we have so much to learn and so few to teach. Another paper has been given us by a comparatively new member, Mr. P. H. Anderson, and, if I am not very much deceived, that gentleman ought to be a valuable member, especially in a department of the club that sadly wants more workers. His first paper was an instance of great patience and industry.

It is now nearly seven years since this club was formed. At our various meetings we have sometimes really magnificent displays of butterflies, moths, beetles, and other insects of the larger and most showy kinds. Our collecting members work most assiduously and bestow great care on their collections, but, after all, how many use their eyes to any effect on the smaller insects. These smaller insects are so numerous that ten or a dozen might be collected in about the same time that it takes to catch a single moth. And some of these small species, when properly set up, excite our wonder and admiration as much as any of the larger species. To give an instance: at our recent excursion to Little River I found a small ant, less than a quarter of an inch in length, that showed better under the microscope as an iridescent object than the elytra of our so called diamond beetle.

But I must not dwell on our shortcomings, but hasten to tell you of some of my experiences in my endeavours to gain some knowledge of our Microscopic Natural History. It is not given to all of us to be able to detect an insect crossing our path whose length is probably not more than the one-fiftieth of an inch, and I suppose we all follow the bent of our own instincts in collecting objects that most please our fancy. I will endeavour to show you a few of the difficulties that beset my path. As for the joy and pleasure when I was successful, I am afraid I could not find words to express them. In every instance

where a specimen is described, the specimen itself will be exhibited to you.

It will be necessary to go back a few years and notice my first collection of marine life. When I was living at Warrnambool, and during my collecting tours on the beach, I found two species of Hydrozoa—viz., *Sertularia bispinosa* and *S. trispinosa*. At the time I did not know that these species were rare, and was quite ignorant of the interest attaching to them. Although the coasts of Australia have been well searched by Messrs. W. M. Bale, C. Maplestone, and several others, as also by the collectors employed by the Australian Museum at Sydney, and later still by the renowned Dr. Lendenfeld, not one of them ever collected these species. Mr. Bale, in a paper read before the Royal Society of Victoria in August last, and recently printed, remarked :—"A specimen of this species was collected by Mr. H. Watts at Warrnambool many years since. It has not been recorded from any other Australian locality." The occurrence of finding these species happened just 25 years ago—rather long to wait for an acknowledgment of services performed a quarter of a century since. I have here the two specimens—one set on paper, and another set mounted on glass in balsam. With regard to recent collections of Hydrozoa, it has already been announced to the club, and published in this month's *Naturalist*, that I have been successful in finding a new species, and Mr. Bale has been kind enough to name it after me as *Plumularia Wattsii*. I will not detain you over my collections of Bryozoa. Professor M'Coy, in his "Prodromus of the Natural History of Victoria," tells you, much better than I can tell you, of my services in the past, of many species as yet only collected by me.

With regard to insect life, I have added the knowledge of two species quite new to Australia. One species is referred to the *Collembola*, and the other to the *Oribatidæ*. The Collembola are an obscure order of insect life, very minute, and of the same order as the *Lepisma* or spring tail. They are covered with minute club-shaped hairs, and some are covered with scales of extreme beauty.

The other specimen belongs to the *Oribatidæ*. These insects form a portion of the sub-family of Acarina—a very numerous family, and of very varied appearance. This insect was found in damp moss, in the fern gully near Berwick, when I was in company with a few members of our club.

Not succeeding in obtaining sufficient information in the colony, I resolved to send them to England to competent authorities on the subject. The former was sent to Sir John Lubbock, who has written specially on these insects. In a very

short time I received his answer, as follows:—"I have duly received your letter, and the specimen. It is a *Degeera*, and closely resembles some of our European forms, but I cannot say that it entirely agrees with any of our species."

The species of *Oribatidæ* was sent to Mr. Michael, sometime president of the Royal Microscopical Society, and wrote on these insects for the Ray Society. Mr. Michael replies as follows:—"On my return from the Tyrol I found your letter, and the microscopical preparation which accompanied it, waiting me. The very beautiful creature which it contains is certainly one of the Oribatidæ, and belongs to the genus *Notapsis*. I am not aware that your species has ever been figured or described." It will be thus seen that, to the credit of our club, a member has not only added two new insects to our knowledge, but has added them to the knowledge of the world. Duplicate specimens of both these are here.

I must now draw your attention to the larger sphere of my work in microscopic botany. The gathering and preparing of my collection of fresh water Algæ has occupied a large proportion of my leisure for many years. But, no doubt, the time was considerably lengthened by the difficulty of naming them. It is impossible as yet to name them out of Europe. The literature of the subject is scattered about in periodicals, pamphlets, and articles in scientific journals in almost every country in Europe, and it is only at intervals that a man may be found who will devote his time sufficiently to the acquirement of the necessary knowledge to be able to name Algæ. It is only a very few years since that the knowledge of these organisms has been somewhat concentrated into a certain compass, but that is only in the German language. Of course, I do not intend to take all the credit of the collection now before you. Every one of them was collected, prepared, and mounted by myself in the state they now appear. Without the assistance of Baron Von Mueller, the fresh water Algæ of Victoria would not be in the state that is now presented to you. Some of the earliest collections were sent to Professor Kützing, but he is now so advanced in years that he is unable to name any more. Another specialist has, however, been found in Dr. Nordstett, of the University of Lund, in Sweden, who has one or two coadjutors with him. We have lately made more progress with the Algæ, thanks to the assistance of our friend, Baron Von Mueller. Dr. M. C. Cooke has written a work on the British fresh water Algæ, in which he describes over 120 genera, one of which has 50 species, and many others have from 12 to 20 species described.

There is also a work in the English language by H. C. Wood,

and published by the Smithsonian Institute, a copy of which was kindly presented to me by the Institute. I have, of course, many species identical with those described as British and North American, and some species are now in Europe awaiting final examination and determination. These plants are found in all parts of the world, and in all sorts of places. They have been found in an icicle and in the heated waters of a boiling spring, in stagnant and brackish waters, in the eternal snow of the highest mountains, in the beautiful streams of our valleys, in the marshes, little pools and ponds, and almost anywhere, where the places are in a constant state of moisture. In the gutters of our streets, whether it is the Yan Yean going to waste or the drainage from the factories or breweries, there is evidence in some form or other of Algic growth. Mr. H. C. Wood, in "The Freshwater Algæ of North America," says :— "In their investigation the physiologist comes nearer almost than in any other study to life in its simplest forms, watching its processes, measuring its forces, and approximating its mysteries. Sometimes, when my microscope has revealed a new world of restless activity and beauty, and some scene of especial interest, such as the impregnation of an Œdogonium, has presented itself to me, I confess the enthusiastic pleasure produced has been tempered with a feeling of awe."

But some species will grow in confinement in small aquaria if the water is changed frequently. I have a species which was collected at Oakleigh in July last, but at the time it was too young for identification. However, by attention it grew, and now is in a perfect st te of fructification. It is a species of Œdogonium, a drawing of which is now before you. Of course if a person has been collecting for many years, he oftentimes obtains species *once* that he never gets again. There are three or four in this collection which I have never seen but once, and then only enough for a single mount. The most notable species I can now name is the one named *Sphærozyga flexuosa*. Some of you will recollect that some years ago the Yan Yean water became discoloured, and for a time was unpalatable, although too much was said at the time in the daily papers as to its probable unhealthy condition. The facts of the case were known to some who were familiar with the normal condition of this Alg, and knew of its very early disappearance. I have here a specimen of the plant, mounted at the time of its occurrence.

I have also prepared a list of the Desmids and freshwater Algæ that have been collected by me in Victoria. A list was published in 1864 in our "Royal Society's Transactions," but the nomenclature of Algæ has changed so much since that this previous list is now obsolete.

List of freshwater Algæ and Desmidieæ found in Victoria :—

ALGÆ.

Batrachospermum moniliforme
Bulbochæte pygmea
,, *setigera*
Cladophora debilis
,, *fracta*
,, *gracilis*
Conferva affinis
,, *tenerrima*
Coleochæte (species)
Characium tenue
Draparnaldia (species)
Hydrianum heteromorphum
Merismopedia punctata
Nostoc commune
Œdogonium capillare
,, *tenellum*
,, *vestitatum*
Oscillaria tenuis
Pediastrum Boryanum
,, *Ehrenbergii*
Rhaphidium aciculare
Rhizoclonium pamiosum
,, *salinum*
Rivularia (two species)
Scenedesmus acutus
,, *quadricauda*
Stigeoclonium elongatum
,, *tenue*
Sphœroplea annulina
Sphœrozyga flexuosa
Spirogyra condensata
,, *decimina*
,, *flavicans*
,, *majuscula*
,, *pellucida*
Tetraspora bullosa
Ulothrix equalis
,, *zonota*
Vaucheria clavata
,, *velutina*
Volvox globator
Zygnema insignis

DESMIDIEÆ.

Arthrodesmus acutus
Closterium acerosum
,, *Dianæ*
,, *Ehrenbergii*
,, *juncidium*
,, *lineatum*
,, *lunula*
,, *rostratum*
,, *striolatum*
,, *turgidum*
,, *venus*
Cosmarium cucumis
,, *margaritaceum*
,, *tetraopthalmum*
,, *bioculatum*
,, *Ralfsii*
,, *pyramidatum*
,, *connatum*
,, *elegantissimum*
,, *tumidum*
,, *anceps*
Docidium baculosum
,, *clavatum*
Docidium crenulatum
,, *minutum*
,, *nodulosum*
,, *nodosum*
,, *truncatum*
,, *verticillatum*
Euastrum affine
,, *ansatum*
,, *Didelta*
,, *pingue*
,, *verrucosum*
Hyalotheca dissiliens
Micrasterias Americana
,, *crenata*
,, *denticulata*
,, *margaritacea*
,, *truncata*
Penium closterioides
,, *Jenneri*
,, *truncatum*
Staurastrum paradoxum
,, *tricorne*
,, *vestitum*

DESCRIPTIONS OF NEW AUSTRALIAN PLANTS,

By Baron von Mueller, K.C.M.G., M. & Ph.D., F.R.S.

(Continued.)

Sida Kingii.

Shrubby or nearly so, erect, densely covered with a yellowish-brown vestiture; leaves on rather short stalks, roundish-or lanceolar-oval, crenulated, wavy from distant beneath prominent spreading nerves; stipules almost setaceous; flowers at and towards the summit of the branchlets from the axils of diminutive leaves; their stalks solitary, somewhat longer than the calyx or twice as long, very thin, jointed close to the upper end; calyces cleft hardly beyond the middle into ovate-semilanceolar lobes, rather membranous, much veined, glabrous inside, somewhat enlarging in age; corolla very small, scarcely exceeding the calyx, hairy towards the base; stamens not numerous, their columnar portion very short; fruitlets about 10, coherent into a roundish very depressed mass, much shorter than the calyx, densely beset with minute star-hairy bristles at the back, deeply wrinkled-foveolate at the sides, not higher than broad nor pointed; seeds silky-downy.

Near Lake Austin; H. S. King, Esq.

From the only other Australian congener with spinulous fruits, namely Sida echinocarpa, this one is readily distinguished by its less close and not pale indument, by rather smaller leaves on shorter petioles and with stronger nervature, by pedicels not jointed towards the middle, by the dense vestiture of the fruit, giving it some resemblance to that of various species of Triumfetta and Commerconia; the fruitlets moreover being deeper reticulated at the sides and not conspicuously hollowed at the summit.

Sida platycalyx has been collected near the Bulloo by Mrs. Spencer; the fruit-calyx is flat at the bottom, on which about 6 blunt and wrinkled fruitlets are ripening. Sida inclusa was found on the Finke-River by the Rev. H. Kempe.

Goodenia Stephensoni.

Erect or ascending, minutely and densely glandular-hairy; leaves of chartaceous texture, from narrow-lanceolar to nearly linear, almost sessile, remotely and irregularly denticulated, flat, equally green on both sides; peduncles generally one-flowered, solitary, axillary, from somewhat longer than the calyx to twice as long, with small bracteoles below the middle; pedicel very short; tube of the calyx longer than the narrow lobes; corolla yellow, narrowly protruding on the lower side of the calyx, subtly gland-hairy outside, its lower lobes rather short, all expanding into broad at the summit truncate membranes;

anthers elliptic-linear, blunt; style purplish-hairy towards the summit; indusium scantily bearded towards the base, short-ciliate at the orifice; fruit ovate-ellipsoid, septate to near the summit; seeds livid, flat, oval, subtle-punctulated, not expanding into a membranous margin.

In the upper regions of the Hunter's River-area; L. Stephenson.

Upper branches transmitted; branchlets not angular; their leaves attaining a length of 2 inches and a breadth of $\frac{1}{3}$ inch, the margin sometimes slightly recurved; peduncles and pedicels constituting jointed flowerstalks. Corolla about half an inch long, the subtle downs on its inner side purplish. Style somewhat shorter than the corolla. Fruit hardly above $\frac{1}{3}$ inch long, terminated by the calyx-lobes. Seeds many, measuring about $\frac{1}{12}$ inch in length.

This plant fairly claims specific recognition; it is easily distinguished from G. ovata by the glandular indument, by the narrowness of the leaves and the paucity of their denticulations, by the generally one-flowered, though occasionally also two-flowered peduncles, by shorter calyx-lobes and also the less elongation of the lower corolla-lobes, by the very distinct hairiness of the undivided portion of the corolla inside, by the also constantly more hairy style and proportionately broader fruit. From G. varia it differs likewise in some of the above indicated characteristics, besides in leaves of thinner consistence, ampler-membranous corolla-lobes, longer septum and broader seeds. G. racemosa stands in its affinity rather more remote. The following localities of species of Goodenia remained hitherto unrecorded:—G. phylicoides, between Esperance-Bay and Bremer-River; S. Carey.—G. bellidifolia, Clyde; Baeuerlen.—G. varia, Eucla; J. Oliver.—G. barbata, New England, at 3500ft.; Fr. Campbell.—G. heterophylla, Shoalhaven; Baeuerlen.—G. scaevolina, Cambridge-Gulf; Johnston. King's Sound; Poulton.—G. albiflora, Flinders-Ranges; F. v. M.—G. calcarata, Mueller-River; W. Birch.—G. paniculata, Mitchell-River; Howitt.—G. heteromora, Wimmera; Dr. Curdie. Lachlan-River; F. v. M.—G. humilis, Tattiara-Country; Prof. Tate.—G. lamprosperma; Fortescue-River; S. Carey.—G. grandiflora, Mount Elliott; Fitzalan. Lake Austin; H. S. King and Th. Beasley.

The collection of the last-mentioned gentlemen from the vicinity of Lake Austin contain also the following noteworthy plants:—Sida cryphiopetala, S. calychymenia, Keraudrenia integrifolia, Dodonæa petiolaris, Codocarpus cotinifolius with narrow-lanceolar leaves, Kochia triptera, Melaleuca glomerata, Haloragis trigonocarpa with small linear leaves, Pimelea For-

restiana with very long spikes, Santalum cygnorum, Pomax umbellata, Helipterum Humboldtianum, Isotoma petræa, Solanum lasiophyllum, Eremophila platycalyx, Myoporum Dampierii, Andropogon exaltatus, Grammitis rutifolia.

NOTES ON RARE VICTORIAN FUNGI.

By Baron von Mueller, K.C.M.G., M. & Ph.D., F.R.S.

(*Read before the Field Naturalists' Club of Victoria, 13th December,* 1886.)

Cyttaria Gunnii (Berkeley).

This fungus formerly only known from Tasmania, and confined in its growth to our evergreen beech, *Fagus Cunninghami*, has just been discovered in the beech forests towards Cape Otway by Mr. R. Lucas, whose attention was directed to the likelihood of its occurring there. It resembles somewhat a raspberry, but is of yellowish colour. Cyttarias distinct from ours occur on the beeches of South America, and are eaten there by the aboriginal tribes; but probably they should be prepared in some way to render them more palatable, and absolutely harmless. It was first rendered known here through Mr. Dall that a Cyttaria also occurs on the beeches of New Zealand, but the species there was late last year described by Mr. W. Buchanan.

Cordyceps Taylori (Berkeley).

This species grows from the head of a large grub. It was discovered first on the Murrumbidgee, and latterly specimens were also obtained from the vicinity of Gerangamete by Mr. John Price, and Mr. H. Carr. This Cordyceps branches out almost in a hart's-horn fashion, and is thus very different to the far more common *C. Gunnii*, which is simply club-shaped. Indeed if it were not for anatomic similarity the two would not be considered congeneric.

NOTES ON SOME PUMICE STONE FOUND AT DEIGO GARCIA, INDIAN OCEAN.

By Rev. W. T. Whan, M.A.

(*Read before Field Naturalists' Club of Victoria, 13th December,* 1886.)

In October, 1884, I was returning from England in the Orient s s. *Lusitania*, and on the 30th of that month we reached Diego Garcia, situated in 7 deg. S lat., and 72 deg. E. long., or almost the centre of the Indian Ocean. This island is a

good specimen of what Mr. Darwin calls an "atoll" or lagoon island. It is coralline in formation, rising about six feet above the sea level, and densely covered with cocoanut palms. The island itself consists of a chaplet, or ring of coral about a quarter of a mile broad, and bent into the form of a horseshoe, enclosing a lagoon five miles by thirteen. In this lagoon the Orient s.s. Co. have a coaling station. While our ship was supplying her bunkers I made my way on shore. I had never seen live coral, and the wonders of this tropical island were to me entrancing. Having spent a short time amid the coral, and picked up a number of specimens of coral, nautilus, hermit crabs, and cowries, I pushed my way across the island to the east side in order to solve a problem that had been warmly discussed on board for some time. About 200 miles before we reached Diego Garcia, the surface of the ocean was covered with long bands of some brown substance, which some of the officers assured me was seaweed with which the sailors stuffed their beds. I believed it was volcanic ashes ejected at Sunda on the 29th August, 1883, and carried westward by the equatorial current; of course, I was laughed at. But on the eastern beach, I found, as I expected, immense heaps of pumice stone, cast up by the sea, while as far as I could see the surface of the water was covered by masses of the same material. The lumps of pumice stone were rounded by friction in the waves, and had depending from them bunches of barnacles. Here then was proof that I was right. In thirteen months it had been carried westward from Sunda, and landed at Diego Garcia, while some was carried much farther towards the coast of Africa. I saw none of it south of this island.

I sent some specimens to the Geological Museum in London, and now submit one to the members of the Field Naturalists' Club, to whom, I feel sure, it will be interesting.

NOTES AND QUERIES.

Ornithological.

Large Collections of Birds' Eggs.—What is probably the largest private collection of eggs in the world is in possession of Mr. William Stoate, of Wembdon, Bridgwater, England. The catalogue of this famous collection, issued in 1884, contains 2154 species, and embraces eggs from all parts of the world. In turning over its pages one cannot but wonder how so many species could be acquired by one person; and the patience, skill, and perseverance requisite must have been astonishing.—*Ornithologist and Oologist.*

Perhaps the most valuable collection of birds' eggs in this country is the property of Professor Thos. G. Gentry, of Philadelphia, who is the author of "The Nests and Eggs of Birds of North America." He spent four years collecting the specimens, some of which are worth to collectors £20 apiece.—*New York Mail and Express.*

Undoubtedly the largest oological collection in the world is in possession of Herr Adolph Nehrkorn, of Germany. At present that indomitable oologist has amassed no less than 3015 different species of eggs.

Nesting of the Fairy Martin.—Gould, in his grand work *The Birds of Australia*, has the following:—"The Fairy Martin, unlike the favourite swallow of the Australians, although enjoying a most extensive range, appears to have an antipathy to the country near the sea; for neither in New South Wales nor at Swan River have I ever known of it approaching the coast-line nearer than 20 miles." This is not strictly correct, if Tasmania may be included in Australasia. At Bridport, on the N.E. coast of Tasmania, there is a hotel where I have had occasion to put up during several years in my peregrinations through that part of the island. The hotel, which has a verandah facing the sea, is barely fifty yards from the wash of Bass' Straits. Under this verandah the Fairy Martins built their nests. The nests were frequently broken by boys throwing missiles at them. Still, the swallows, upon their return from their migrations, invariably repaired them, and reared their brood. I have also seen the bottle-shaped clay nests of the Fairy Martin under bridges and culverts in Sydney 35 years ago, within a few hundred yards of Port Jackson.—*S. H. Wintle, F.L.S., &c.*

An Old Bird.—A cockatoo which had been in the Wentworth family, Sydney, during the last ninety years, died lately. Mr. W. C. Wentworth, when a schoolboy, owned the bird, and taught it to speak. It therefore was anything but a chick, and died in all probability fully a century old.

Geological.

Australian Lion.—Several very complete jaw-bones, containing teeth in an exceedingly good state of preservation, of the extinct *Thylacoleo* have been found in the famous Wellington Caves, and forwarded to Sir Richard Owen. Professor Owen had described the animal previously from imperfect specimens, and in his paper read in November last before the Royal Society (England) repeated his view that *Thylacoleo* was a carnivorous marsupial of about the size of the lion, which had preyed upon the larger forms of the extinct kangaroos, &c. Professor Flower criticised this opinion, inasmuch as the denti-

tion of *Thylacoleo* is unique, and not on the pattern of any existing predaceous carnivores. Even in the Tasmanian devil and tiger, as in the Carnivora proper, there are large canines set well apart, with the incisors so small as not to interfere with their tearing action. But in *Thylacoleo* the canines are rudimentary, and the central incisors greatly developed. He concluded that it was "not safe to speculate on the habits or food of an animal the dentition of which was so highly specialised, and without any analogy in the existing state of things." Professor Huxley said that he agreed with the conclusions of Professor Flower.

THE manager of the Adams Freehold Goldmining Company, near Talbot, has furnished the department of Mines with a fossil corresponding with Baron Von Mueller's description of the *Celyphina M'Coyi*. It is about the size of a walnut, and is the fossilised remains of a fruit. It was taken at a depth of 145 feet from the surface in the gravel wash on the bed-rock, and overlaid by a drift of black clay and layers of basalt.—*Daily Telegraph*.

SHARKS IN CORIO BAY.—The chief inspector of fisheries (Captain Mandeville) having returned from Geelong, is engaged preparing a report containing information relating to the netting of fish in Corio Bay. When at Geelong and elsewhere on the Bay, Captain Mandeville was extremely busy ascertaining all he could on this important question, and it is expected that his report will be a most valuable one. In reference to the extraordinary yarns about the immense quantities of sharks caught in Corio Bay during the captain's visit, he states that he went out one day fully equipped and prepared to catch some, and the result of the very first haul was almost miraculous. When the first net was hauled in it was found to contain 3540 sharks. Altogether, five boats which were out that day captured 8310 sharks, 2050 soldiers, and 100 leather-jackets. Captain Price formally superintended the counting, which was done by three men, and occupied three hours. The sharks were only about a foot long, and quite young. It would be imagined that such little things would not be able to do any damage, but Captain Mandeville states that they are able to bite their more peaceful finny friends most unmercifully. He has in his possession the head of a mullet bearing a mark, which is evidently the bite of one of these young sharks. Captain Mandeville's report will contain a recommendation that netting be allowed in Corio Bay in consequence of the enormous number of sharks there. He says there is no doubt that the bay is a huge spawning ground for sharks.—*Daily Telegraph*, 29th January, 1887.

CORRESPONDENCE.

The Geology of the You Yangs.

To the Editor of the Victorian Naturalist.

Sir,—In the account of the excursion of some of the members of the Field Naturalists' Club to the You Yangs in the December number of the journal I read the following:—

1. "The rugged nature of these miniature mountains became more apparent as we approached, the immense granite boulders being very conspicuous."

2. "The plains, which are principally of upper volcanic formation, are almost treeless, but became partially wooded with she-oaks, honeysuckles, and stringybarks on the newer pliocene which surrounds the granite mountains."

Here it is plain to my mind that the writer has strangely enough confounded detached weathered masses of the coarse porphyritic granite composing the so-called mountains and the weathered masses or bosses of the same rock appearing *in situ*, with transported, erratic, and rounded blocks, which constitute the true boulders of the geologist. As one of the party, and as a geological observer, I failed to detect the slightest evidence of either glaciation or the transportation of rock-masses by aqueous agency, while the progress reports and sketch maps of the Government survey fail to indicate their occurrence. I need scarcely observe that the existence of such boulders would, at the present time, when so many practical geologic observers and theorists contend so strenuously for the existence of evidence of past glaciation in Australia, be of immense interest and importance.

Equally untenable with the foregoing statement is that of newer pliocene deposits immediately surrounding the granite hills. There was no evidence that I could detect of any deposit older than the Quaternary, consisting of humus and its usually associated æolian sand-stratum, occurring with a thin deposit of arenaceous brownish-yellow clay, which, apparently, superimposes the basaltic lava of the Werribee Plain. If any paleontological evidence of newer pliocene age was obtained, that evidence was not laid before the members of the Club. It would seem, from all the accumulated data at my command, that there are no newer pliocene deposits nearer to these granite hills than a short distance inland from Corio Bay, in the direction of Geelong, some miles distant. With all due respect—based upon such brief observation as circumstances would permit, I should describe the geology of the country in the immediate vicinity of the granite hills in question as consisting of Quaternary deposits, interrupted at intervals by protrusions of basaltic lava.—I am, &c., S. H. Wintle.

Field Naturalists' Club of Victoria.

President:
REV. J. J. HALLEY.

This Club was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

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With the view of popularising the study of the Natural History of the Colony, correspondence, notes, and queries relating to this subject are invited for insertion, and should be addressed to the Editor at the Wesley College, Prahran.

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&c., &c.

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THE FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall, on Monday evening, 14th February, 1887.

Mr. A. H. S. Lucas, M.A., B.Sc., vice-president, occupied the chair, and about sixty-five members and visitors were present.

Mr. Coutts Trotter, F.R.G.S., was present as a visitor.

A letter was read from the Chief Secretary, stating that the Club's request for representation on the Exhibition Commission would receive due consideration.

The hon. librarian reported the receipt of the following donations to the library :—"Report of the Department of Agriculture, Victoria," for 1873, from the department; "Quarterly Reports of the Mining Department, Victoria," June and September, 1886, from the department; "Journal of Pharmacy," January, 1887; and a pamphlet from Madame A. Friederich; and that Cooke's "Microscopic Fungi," Taylor's "Notes on Collecting, etc., Natural History Objects," and the "Report of the Department of Agriculture," 1874, had been purchased.

The following were elected members of the Club :—Messrs. Edward Dombrain, W. E. Matthews, and R. L. Pudney.

Papers were promised for future meetings by Messrs. C. French, F.L.S., H. Watts, and S. H. Wintle, F.L.S.

PAPERS READ.

1. By Mr. H. T. Tisdall, F.L.S., "A Botanical Ramble in a Gippsland Gully." The writer gave a most interesting account of the principal objects which would attract the eye of a botanist in a ramble through a thick fern gully. After calling attention to the various species of ferns which border the stream, he referred to some of the larger trees, and mentioned several uses to which their various parts were put by the aboriginals in their everyday life or ceremonies.

Some little discussion followed the reading of the paper.

2. Mr. A. H. S. Lucas, M.A., B.Sc., gave, by request, a short *resumé* of "Sir Wm. Dawson's recent address to the British Association." He briefly glanced at the various topics touched on, and then followed up more closely Dr. Dawson's theories respecting the Atlantic Ocean, pointing out by means of maps and specimens the grounds for the various conclusions arrived at.

3. Mr. A. J. Campbell, "Oology of Australian Birds."—This paper described the eggs of eleven species of Australian birds, recorded for the first time in 1886, and including among others that of Queen Victoria's rifle-bird of Paradise. Specimens of each of the eggs were exhibited.

Madame A. Friederich contributed a short note on the podura and allied forms.

Mr. S. H. Wintle, F.L.S., related some unsuccessful attempts to rear tadpoles in the dark.

Before the meeting adjourned to the *conversazione*, Mr. T. A. Forbes-Leith, one of the vice-presidents, intimated that he was about to leave the colony for Europe, and that, this being the last meeting of the club at which he would be present, he wished to say farewell to his fellow-members, and to thank them for the kind confidence they had placed in him. Great regret was expressed at the loss of Mr. Leith, who was one of the founders of the Field Naturalists' Club, has served on the committee throughout and as vice-president for the last three years, and has contributed much, by his papers, by his exhibits, and in many other ways, to the success of the Club.

The following were the principal exhibits of the evening:—By Mr. F. G. A. Barnard, specimens of *Danais archippus*, and other lepidoptera recently collected at Kew. By Mr. A. J. Campbell—in illustration of his paper—nest and eggs, with pair of birds, of the leaden-coloured flycatcher, *Myiagra plumbea;* egg and pair of birds of Queen Victoria's rifle-bird of paradise, *Ptilorhis Victoriæ;* eggs of northern fantail, *Rhipidura setosa;* the modest coloured honey-eater, *Glyciphila modesta;* the ground parrakeet, *Pezoporus formosus;* the rust-coloured bronzewing, *Lophophaps ferruginea;* the straw-necked ibis, *Carphibis spinicollis*; and the diving petrel, *Pelecanoides serinatrix*. By Mr. A. Coles, a pair of purple-headed fruit-pigeons, from Richmond River, New South Wales. By Master H. B. Coles, a pair of painted snipe, a pair of noisy pitta, and a kingfisher from New Guinea. By Mr. T. A. Forbes-Leith, rifle-birds, *Ptilorhis paradisea;* regent birds, *Sericulus melinus;* noisy pittas, *Pitta strepitans;* lorikeets, *Trichoglossus cyanogrammus*, from Solomon Islands; the chestnut-shouldered parrakeet, *Euphema pulchella*, and a silver mullet, *Mugil waigensis*. By Mrs. Flatow, star-fish from Queenscliff; by Mme. A. Friederich,

dried flowers from France, Switzerland, Italy, and Palestine; by Mr. C. French, F.L.S., Australian and exotic coleoptera (Buprestidæ); by Master H. C. Grover, a falcon; by Mr. R. Hall, Victorian birds and eggs; by Mr. W. Hatton, a large field spider; by Mr. E. H. Hennell, lepidoptera of the season; by Mr. H. Kennon, 27 ammonites from English and Colonial formations; by Mr. A. H. S. Lucas, M.A., 24 specimens of Archean rocks from the Malvern Hills, England, and from Guernsey; by Mr. J. Searle, fish from Alphington (alive); by Mrs. R. Simson, a worm snake from New South Wales, land snails, and *Sagus* fruit from Seychelles Islands; by Mr. H. T. Tisdall, F.L.S., dried plants in illustration of his paper; by Mr. H. Watts, 37 specimens of neuropterous insects, mounted as microscopic objects; by Mr. S. H. Wintle, F.L.S., ribbon shale containing twenty distinct strata in one inch of thickness, from Moonee Ponds, Victoria, sample of coal from Moe, Gippsland, and geological specimens; by Master C. Yelland, skins of black and carpet snakes, egg of moorhen, &c.; by Master A. Yelland, a carpet snake from Newport.

After the usual *conversazione*, the meeting terminated.

NOTES OF A HOLIDAY TOUR IN RIVERINA AND WESTERN VICTORIA.

By Messrs. C. French, F.L.S., and F. G. A. Barnard.

(Read before the Field Naturalists' Club of Victoria, 13th December, 1886.)

When a holiday is obtained there is pretty sure to be some difficulty experienced in deciding where to go, and this was precisely our case, as we discussed the various chances of success in collecting work coupled with real enjoyment. We had invitations to the Upper Murray (Hume district) and to Mulwala, and also wanted to visit Hamilton and the Grampians at Dunkeld, places at almost the extreme points of Victoria. After some consideration, we decided to go to Mulwala, thinking that from there we could strike across country to the western railway; but we were mistaken, and had to journey back to Melbourne and make a fresh start from there to the Western district.

The Mulwala part of the trip was undertaken by Messrs. French and Best. A start was made by the early train on Thursday, 14th October; the morning was fine and clear, but before we had got far on our journey dark clouds were gathering, and down came the rain. Benalla was reached about midday, and after a short stoppage we were off by the Yarra-

wonga train. Reaching Tungamah we ascertained that an agricultural show was to take place the following day, and we had as fellow passengers "ladies and gentlemen" who were "running" some sort of entertainment for the edification of the villagers. Upon reaching Yarrawonga, now quite an important township, we found the buggy of the Messrs. Sloane awaiting us, and, after a pleasant drive to Mulwala, were glad to partake of the hospitality for which the proprietor of Mulwala station is proverbial. Having rested awhile, we went out to look for plants, insects, &c., but beyond a few Carenums and Eutomas, few insects were to be seen. A few very singular fungi and lichens and a few small annuals were collected. The country around the homestead looked charming, the recent rains having been most welcome. Shearing was nearly over, as we were only just in time to witness the finish.

After spending a pleasant evening, we were up betimes and out collecting, but heavy rain prevented us from doing much all day, the plants noticed being the same as obtained on our previous trip, recorded in the *Victorian Naturalist* for February, 1885. The following morning an early start was made, Mr. W. Sloane driving us to Savernake, an out-station on the run distant about 20 miles. On the way we made a short detour to see a nest of the Lowan or Mallee Hen. Threading through the pine scrub with the perception of a black tracker, our guide was not long in finding the nest, which reminded us of about a couple of loads of sand deposited in a heap. We had brought a thermometer for the purpose of testing the temperature of the nest or mound, but our efforts were of no avail, the dry loose sand filling up the hole as we scooped it out, and however these birds manage their affairs still remains a puzzle to us. Leaving the nest we struck off to the left, and camped for a while to refresh both man and beast. The quandong tree, which we saw on our last visit, seemed to be more prolific this season, a number of fine ripe fruit being secured. Crossing a flat a very finely marked iguana was seen. On reaching Savernake we went for a walk; plants were scarce, but we found the beautiful *Cassia eremophila*, *Eutaxia empetrifolia*, and others in fine flower. A fine specimen of the sand iguana was here captured, and secured by a string. This singular animal is said to subsist solely on insects, and lives in holes in the sand, and not in hollow trees as the larger kind, though we fancy the sand iguana is but a variety, and requires further investigation. At night the solitude here was almost painful; not a sound was to be heard—no cry of a night-bird, no frogs, no crickets, nothing at all to break the perfect stillness such as we never remember to have experienced before. The evening was spent in arrang-

ing our collections, and looking over a small local collection. Next morning we breakfasted early, and once more bade adieu to Savernake. We were anxious to visit the Boat rocks (wrongly called boot rocks in our former paper) to see what they produced in the way of mosses and lichens, but, with the exception of one or two species, they were all of the common kinds, a species of Parmelia being the most common; about twenty-five species were collected here. In the water which had collected on the summit of the rock grew a very fine plant of Ottelia, also some Lemiosella and a few other small plants. Leaving the rocks, we took the same route as two years before, but game was much scarcer, only a few kangaroos and a pair of native companions being seen. On the way to the home station we saw three more sand iguanas, one male and two females, which, after a hard chase, were captured and secured, as we wished to present them to the Zoological Gardens. We reached the home station about seven p.m.

Next morning was devoted to shooting, a few fine skins of the bee-eater, *Merops ornatus*, green leek parrot, and other birds being obtained. Taking leave of our hospitable friends, we left for Yarrawonga, crossing the Murray by the new punt, a wonderful improvement on the former apology for a crossing. This again is shortly to be replaced by a fine bridge, which will doubtless be a great boon to the residents on both sides of the river. Leaving Yarrawonga about half-past two on Monday afternoon, we reached Melbourne (161 miles) about a quarter past ten at night, when, having made arrangements for the safe keeping of our iguanas at the railway station till sent for by the Zoological Society, we were just going to Finlay's Hotel to spend the night when our friend, Mr. Barnard, turned up with his baggage, prepared to share in our adventures in the Western district.

We accordingly adjourned to the hotel, and, having determined on our plans, retired for a well-earned night's rest.

Having decided on Hamilton as the limit of our travels westward, we left Melbourne by the first train on Tuesday morning, 19th October, and arrived at Ballarat in due course. The country passed through during this part of the journey is doubtless so familiar to most of us that it needs no description, and, except to one of the party, the trip so far was without incident. On arrival at Ballarat we were told to change for Ararat, and accordingly carried our luggage over the stairs to the other side of the station, when, judge of our surprise, the train we had just come from Melbourne in was shunted to the other side also, and we took our seats in the same compartment as we had occupied before. So much for the careful consideration for travellers displayed by our Railway Department.

Leaving Ballarat about 11 a.m. on our way to Ararat, we were soon in new country, as two of us had not been farther than Ballarat before, and, as probably this part may be new to some of our hearers also, a few remarks as we journey onwards may not be out of place. Though close to Ballarat, the Dividing Range, as marked on the map of the colony, does not assume any great size; in fact, for some miles the country is rather flat and uninteresting, being upper volcanic formation of pliocene age. Farming, however, is extensively carried on, and as we approach Windermere several large farms are passed. It was now raining fast, which made the country look more desolate still. Mount Blowhard and its companions could only just be made out, though only about seven or eight miles away to the north. Altogether, the prospect was not very encouraging to tourists. Soon Lake Burrumbeet came in sight, a large, dreary-looking sheet of water covering about eight square miles. The country appeared to be principally devoted to grazing and sheep farming, till getting near Beaufort the silurian again crops up, and signs of gold mining make their appearance. Beaufort, from the railway, seemed a thriving township, and about ten miles away to the north are the Pyrenees Ranges, of which Mount Cole is a prominent feature. Had the day been fine, we should have had several good views of the Dividing Range as we travelled on, but, being so dull, where the mountains were any distance from the railway they were lost to view. Leaving Beaufort the country became more wooded, and hills and valleys combined to make up some pretty bits of scenery. A few miles beyond Buangor the railway runs quite close to the ranges, and then strikes across the plains to Ararat. Here the rain came down in earnest, and it was still raining when we reached that town, at about a quarter past one.

Here we left the main line, and travelled by the Portland line to our destination. But before proceeding farther we must give due credit to Ararat for having the best refreshment station in Victoria, as in all our journeys we have not yet seen its equal; in fact, it is almost worth the journey from Melbourne to see and experience the excellent treatment there of tired and hungry passengers. We left Ararat about two o'clock, and were soon bowling along over the plains which lie at the foot of the Grampians. On our right was a rather picturesque series of hills, extending for some distance south-west of Ararat, exhibiting many signs of cultivation. Presently we crossed a small stream which is the head of the Hopkins, a river well known in its lower reaches near Warrnambool. After a short stoppage at Wickliffe-road, so as to allow the morning train from Portland to pass, we were once more on our way across the

extensive volcanic plains, almost treeless, but intersected at intervals with wire fences—a pretty certain sign of sheep-farming. Away in the distance to the north-west the large mass of Mount William, 3827 feet—the highest peak of the Grampians, and of Western Victoria—was plainly seen; and stretching away from this to the south-west is the singular range of mountains known as the Sierra Range, a very appropriate name, as it appears like an immense saw with irregularly sized teeth. The country on the other side of the line consisted of slightly undulating plains as far as the eye could see. Glen Thompson passed, we soon approach close to the termination of the Sierra Range, near Dunkeld, where Mounts Abrupt and Sturgeon, two huge masses of sandstone, form a splendid background to the little township as seen from the railway. The exploration of these mounts was one of the chief objects of our visit to this part of the colony, but it was to be undertaken on our return. Our destination was now not far off, and about a quarter to five we reached Hamilton, 224 miles from town, having been about ten hours on the road.

As we approached Hamilton the magnificent character of the country became more apparent, rich black or chocolate soil being exposed wherever there was any cultivation, and the well-grassed, undulating paddocks were greatly admired.

Making the Victoria Hotel our head-quarters, we started off for a short stroll before dinner, in order to get some idea of the town. We visited the public gardens, which were fairly full of flowers, the splendid soil in which they were growing making the plants vigorous and strong, and giving great depth of colour to the blooms.

After tea we considered our plans for the morrow, and, with the help of a friend, decided that a visit to the Wannon Falls would be the most profitable way of spending our first day. Accordingly we hired a pair-horse waggonette, as the Falls are situated some twelve miles from the town.

Next morning broke fine, and though heavy clouds were passing over from the north-west, we hoped for good weather. Starting out on the Coleraine Road, after a few miles through fairly-wooded pastoral country, we took a road leading northwards towards the Wannon, in order to first visit the Nigretta Falls, which some people consider finer than the falls at Redruth, about three miles lower down the river. After driving a mile or so across the paddocks, we came in sight of the river, winding its way between rather steep banks, and presently pulled up close to the falls. Here the Wannon is crossed by a porphyritic dyke, which, during the lapse of ages, has been worn and cut into numerous channels, making miniature islands of the masses

of rock. The river then tumbles some sixty feet down an incline of rocks, splitting up into several streams, but uniting again at the bottom and flowing on as if nothing had happened. The fall was a very picturesque sight as we witnessed it, but we were told if seen when the river is in flood it is very grand. We first of all made our way down the steep bank of the river below the fall, and scrambling about among the boulders along the edge of the stream felt somewhat easy in our minds that the snake season had hardly commenced, as the locality seemed suited in every way to the wants of these dreaded creatures. The numerous bushes of *Hymenanthera Banksii* being partially covered with a bright orange-coloured lichen, looked extremely pretty. Several Leptospermums, native indigo, bursaria, and other shrubs, among which climbed *Clematis aristata*, edged the stream, while the little rock ferns, *Cheilanthes tenuifolia*, and *Asplenium flabellifolium*, were common everywhere. Making our way up stream our attention was soon attracted by *Pultenæa subumbellata*, a very showy species of this genus, bearing fair-sized flowers of a deep orange-red colour. This proved to be a new district for this plant. The banks were gay with various species of everlastings, and a little pink convolvulus. Just above the falls, on the grassy slopes of the river, the orchid, *Pterostylis mutica*, was rather common, and one or two other orchids, such as *Microtis atrata* and *Diuris sulphurea*, were noted. While two of the party vainly endeavoured to place a log across one of the numerous channels so as to get across the river, the other directed his search up stream, and was rewarded with the find of the day—viz., *Leeuwenhoekia Sonderi*, a small plant belonging to the Candollaceae, which Baron von Mueller says has been found but once previously, and then only one specimen.

(To be concluded in our next.)

NOTES AND QUERIES.

Visit of Northern Butterflies to Melbourne.—This year has been a most exceptional one for an abundance of butterfly life. Owing to the long-continued and accumulated heat a number of species rarely seen in Melbourne, and more or less subtropical in habitat, have visited the gardens of our suburbs. It reminded one of the tropics to see the large *Danais Erippus* lazily sporting in our streets. Half a dozen specimens or more have been reported. This *Danais* has been introduced from America. It is believed that about 20 years ago the eggs were imported with some seeds into Queensland. It has gradually extended itself in Queensland and New South

Wales along the East coast, and is also generally distributed over the isles of the S.W. Pacific. It is a strong flier—a flight of 300 or 400 miles is not without record—and in this way we can readily explain its presence in Melbourne this year. Albert Park has been a very garden of butterflies. The pretty *Danais Petelia* simply took possession. This is a not uncommon species in Queensland and New South Wales. Two specimens, at least, of *Papilio Macleanianus* have been seen this year. *Pieris ega*, a beautiful white butterfly, occasionally found near Marysville, but having its home in the northern colonies, has this summer been hailed as a prize by many a young collector, and *Pieris Teutonia* has simply swarmed. We are most glad to hear that several of these great rarities have been seen and captured by young collectors. We wish them continued energy and success, but ask them to note their captures in the *Naturalist*.—T. P. Lucas, Balaclava, 1st March.

Platypus in the Yarra.—Two old pupils of mine, Messrs. Grove and Nye, while boating recently on the Yarra, just above the Johnston-street Bridge, observed a platypus swimming about. They gave chase, and succeeded in effecting a capture, and kindly brought me the specimen alive. It was a young male, about fifteen inches in length. I fed him, and placed him in a warm nest, after watching him swim and dive a while. But he seemed to have been injured by the oar during capture, and he died twenty-four hours after I received him. It is, I think, some time since one of these animals has been met with so near Melbourne.—A. H. S. Lucas.

Experiments with a Tadpole.—In the late Mr. Denton's little book, "Is Darwin Right?" there occurs the following statement:—"If tadpoles be kept in the dark they will never turn into frogs." Being sceptical as to the truth of the statement, I resolved upon putting it to the test, and accordingly captured two tadpoles of the beautiful golden-green frog (*Ranoidea aurea*) in the Fitzroy Gardens. I placed them in a wide-mouth glass jar and put them in a dark cupboard, where not the faintest gleam of light could penetrate. This was on the 20th January last. I replenished the water each night. On the second day one of the tadpoles died. I removed the dead tadpole and well washed the jar, re-filled it, and returned the living tadpole; but it also died on the seventh day, I believe owing to absence of light. Hence, I conclude, whatever truth the statement mentioned may contain, it is based on the fact that under such conditions they never live to pass through the metamorphosis from the tadpole state into the mature batrachian. —S. H. Wintle.

MOSQUITOES.

By P. H. Anderson.

(Read before the Field Naturalists' Club of Victoria, 8th November, 1886.)

(Continued.)

The first segment of the abdomen is large and broad; the others gradually diminish towards the tail, each having on both sides a tuft of hair. The head is flatter than the remainder of the body. The eyes are simple and brownish in colour. Round the mouth are wattles furnished with hair. These move with great rapidity, causing its food, which consists of microscopical animal, vegetable, and earthy matter, to be conveyed to the mouth.

The transparency of the tissues, the delicacy of the hairs, and the extreme mobility of the segments of the body cause the larva of the mosquito to be a most interesting and general subject for the microscope. The anus is fringed with long hairs, and at the end are four thin, scaly blades, oval and transparent, similar to fins. These are placed in pairs, one projecting from the right and one from the left, and have the power of separating.

After changing its skin three times in a fortnight the larva then throws off a fourth skin, and is then no longer in the larva state. It is now in the pupa or second stage. On close examination it will be seen it is considerably changed. Its body is shorter and rounder, and the tail is generally bent under the head. This is owing to it being nearly always in repose, for in the pupa state it needs no food—its digestive organs are all gone, also the wonderful breathing apparatus of the larva. Two spoon-shaped appendages take the place of the respiratory tube, which it is able to expand and close at the surface of the water, and by this means it breathes. Its motions in the water are slow, and are caused by the bending and straightening of its body. It does not now appear head downwards. Its body is oblong and covered with a transparent skin, and as it gradually developes, the perfect insect is plainly discernible.

When the time has arrived for the perfect insect to emerge from this stage of metamorphosis the pupa comes to the water's surface, and floats there perfectly at rest, raising the hind part of the body above the water. Before many moments the skin between the breathing trumpets which is now exposed to the sun dries and splits. The opening increases both in length and breadth. As soon as it is sufficiently large, the imago begins to force its way out of the shell-like case of the pupa. It protrudes its head, then its thorax, raising them above the edge of

the opening. This moment, and those that follow until the perfect mosquito is set free, are attended with great danger, for every care has to be taken to prevent the case, now acting like a boat, which separates it from the water, from capsizing. For now this little insect that so lately lived in water is suddenly in a position in which one drop of water would be fatal. Raising its head as high as possible in the air, and by means of contracting and lengthening the body it works it out of the case, which, by means of its rough construction, aids it to extricate itself. The wings, now long and laid across the abdomen, are not yet free, nor are the legs. While in this position it resembles a boat, for the case, from which it is emerging, is almost hollow. The insect is the mast of the boat, and in this position drifts on the surface of the water. It is difficult to imagine how it is able to put itself in this dangerous, yet necessary attitude.

Yet it is more difficult to imagine how it is able to keep itself in this perpendicular position. These moments, which, fortunately, do not last long, are attended with so many dangers that the observer is in a constant state of anxiety and excitement for the welfare of the insect. Should a slight breath of wind strike it while thus in a perpendicular position, it would at once fall over and be drowned. It is whilst in this position that many thousands of mosquitoes lose their lives, the surface of ponds often being covered with the bodies of poor unfortunates who have never reached perfection, and whose day of happiness has been cut short by a watery grave. Whilst in this state they are carried from side to side of the stream as it floats along, all the while continuing the exit from the case. The insect now draws out one long leg, shortly followed by another, and rests them upon the water's surface, which is buoyant enough to allow them to stand upon; and now, with a last and great effort, which takes all its strength, it pulls out its captive wings and the end of the body. Now all danger is past, and the perfect insect is free. After waiting for some moments on the water, during which it dries and unfolds its wings, which when first set free are damp and limp, but soon become hard and movable, the mosquito gives a preliminary flutter, and then flies off in safety.

The imago, or perfect mosquito, is a most beautiful and delicately-formed insect. Its body is long and graceful, a characteristic of all diptera; its wings are semi-transparent, and are crossed when at rest. These appear very beautiful under the microscope, the scales being very regularly constructed. The legs are long and hairy; the thorax of a dark brown. The eyes, which are exceedingly large when compared with the head, are of a beautiful greenish iridescent colour, and covered

with a delicate net-work membrane. But perhaps the most striking feature of the whole insect is to be found in the antennæ. In the male they resemble very fine feathers or plumes, and when examined under the microscope appear like the branch of a fir-tree. The female is armed with a formidable instrument—namely, a trunk—with which it punctures the skin of man and beast, for it is only the female that stings, the male being quite a harmless insect.

This trunk, which appears to the naked eye to be nothing but a simple spike, when examined, proves to be a sheath for a number of lancets, which pierce the skin, and a tube to suck the blood. Under the microscope it presents a rather complicated appearance.

"1st.—There is a long, exceedingly finely-pointed hollow lancet, with a flattened head. Réaumur, in speaking of this, says, 'The point of the finest needle, when compared to the sting of the gnat, is the same as the point of a sword compared to that of a needle.'

"2nd.—Two sharp, sword-like blades, which cut the hole made in the skin.

"3rd.—Two small saws, with long sharp teeth on one side projecting the reverse way, with a notch and point on the other side.

"4th.—An exceedingly fine tube; so small is this that I have searched for this for hours without finding it, and Réaumur, who only saw five parts in the sheath instead of six, no doubt failed to find this last-named fine tube.

"To watch a mosquito under a strong glass while she stings you is most interesting, if not pleasant. She first pierces the skin with the finely-pointed lancet, then widens this hole with the sword and saw-shaped blades for a short distance, and places in this hole the tip of the sheath, which bends as the lancet blades and tube descend, the sheath being quite flexible. When the lancet has entered the skin about one-sixth of an inch, the hole is made wider by means of the sword and saw, which all the while are digging at the skin, and thus cut the sides of the hole, causing the blood to flow slightly, whilst from the tube of the lancet a highly irritating fluid is squirted into the wound, which dilutes the blood, thus made thin enough to be drawn up through the minute tube in the gullet. In this way they suck the blood until quite satisfied.

"The liquid with which the mosquito dilutes the blood of the animal it is sucking is colourless, and highly irritant. Réaumur saw the liquid in the trunk, and it is sometimes to be noticed oozing out of the end of the tube. It is of an acid nature, and therefore ammonia is a good antidote, but perhaps a drop of cold water is most effective in stopping the irritation.

"Whether the mosquito prefers new blood, or whether it is that after a time the liquid ceases to have the irritating effect on the blood, I don't know, but it is a peculiar fact that a stranger coming into a district infested with mosquitoes is always severely attacked by these bloodthirsty demons."

Next to the torture which it inflicts, its most annoying peculiarities are the booming hum of its approach, its cunning, its audacity, and the perseverance with which it renews its attacks, however frequently repulsed.

[The paper went on to give Westwood's identification of the mosquito with the insect of the plague of flies of the Pentateuch, and then gave a description of the plague of mosquitoes in various parts of the world, from Silvio Pellico, Livingstone, Humboldt, Lord, and of the ancients from Xenophon, Hippocrates, and Pliny.]

DESCRIPTIONS OF NEW AUSTRALIAN PLANTS;

By Baron von Mueller, K.C.M.G., M. & Ph.D., F.R.S.

(Continued.)

Rhododendron Lochae.

Arborescent, somewhat scandent; leaves persistent, mostly whorled, some scattered, conspicuously stalked, flat, nearly ovate, rather blunt, glabrous, well veined, minutely scaly-dotted beneath; flowers rather large, in terminal umbelliform fascicles on very conspicuous stalklets; bracts cuneate or spatular-ovate, glabrescent; calyx rudimentary, oblique-patellar or sometimes variously short-lobed; corolla bright-red, glabrous but scaly-dotted outside, slightly hairy inside, the lower portion broadly cylindrical, the upper portion bluntly five-lobed and conspicuously veined; stamens ten, slightly emerging from the corolla-tube; filaments short-hairy towards the base; anthers very small, ellipsoid-cylindrical; style nearly as long as the filaments, short-hairy to about the middle; indusium truncate; stigma slightly lobed; fruit narrow-ellipsoid, about as long as the stalklet or longer, short-hairy, five-celled; seeds conspicuously appendiculated.

On the summit of Mount Bellenden-Ker, at an elevation of about 5000 feet. W. Sayer and A. Davidson.

This beautiful and singularly local plant, which attains a height of twenty feet, is cognate to R. Javanirum, from which it differs in longer petioles, blunter leaves, smooth pedicels, somewhat smaller flowers, as well as more hairy style and fruit. In some respects this Australian species approaches also R. Griffithianum, but the disposition and colour of the flowers are very different. From R. Celebicum it is easily distinguished by broader not acute leaves with not concealed veins, by not scaly pedicels, by mostly not narrow bracts, by larger lobes of the corolla and not

scaly ovary. From R. Arfakianum it is separated already by glabrous pedicels, by the lobes of the corolla being shorter than the tube and by shorter stamens.

When in 1855 the writer of these notes saw (on his passage with Mr. Gregory to what is now called the Kimberley-Country) from near the coast also the bold outlines of Mount Bellenden-Ker, the highest mount of tropical Australia, towering to 5000 feet, he was led to think, that the upper region might prove to be the home of species of Rhododendron, Vaccinium, Quercus, Begonia and Impatiens, forms of plants characteristic of cool Malayan sylvan regions; yet these anticipations became not realised. But Messrs. Sayer and Davidson, while accomplishing quite recently the only ascent hitherto made of Mount Bellenden-Ker, have now demonstrated by their botanic collections, that really a Rhododendron and a plant akin to Vaccinium do exist on the summit of that mountain as an entirely new feature in the flora of this part of the globe.

The dedication of the only Australian Rhododendron to Lady Loch, is in special recognition of the patronage, given by her Ladyship to Victorian Horticulture and in particular to that very group of plant, the occurrence of which in the Australian vegetation is now only rendered known, more than 80 years after the discovery of Mt. Bellenden-Ker.

AGAPETES MEINIANA.

Tall, somewhat climbing, glabrous throughout; leaves rather large, scattered, on short stalks, coriaceous, from almost lanceolar to roundish-ovate, acuminate, generally rounded at the base, not denticulated, shining on both sides, dark-green above, pale-green beneath and there dotted with minute scattered glands, strongly five-nerved from near the base, the veins amply reticulated and partly prominent; pedicels axillary or lateral, three or two together or solitary, with two minute deltoid bracteoles near the base; calyx campanular-semiovate, separable by articulation from the pedicel, almost truncate, only minutely denticulated; corolla several times longer than the calyx, dark-red, broadly tubular, terminated by five very short almost deltoid lobes; stamens ten, enclosed; filaments glabrous, hardly half as long as the anthers, flat, semi-connate in pairs and with their dilated lower portion adherent to the base of the corolla; anthers erect, free, fixed above their base, fully half as long as the corolla, cylindric-linear, without any appendages, their lower portion subtle-rough and at the blunt base somewhat bent forward, their upper portion paler, smooth, bifid, each division pointed and opening with a longitudinal fissure; style filiform, glabrous; stigma minute, undivided; ovary exceeded by the limb of the calyx, depressed and glabrous at the summit; fruit almost campanulate in outline, rather hard, five-

celled ; placentas turgid ; seeds rhomboid-or clavate-ovate, pale-brownish, shining, reticulated.

On the summit of Mount Bellenden-Ker ; Sayer and Davidson.

This first and perhaps only Australian species bears some resemblance to A. Vitiensis ; but the leaves are usually broader and more prominently veined, the corolla is less dilated towards the upper end and its lobes are considerably smaller, while the anthers are less curved at the base and open with longer slits. Our new plant shows also some affinity to the Himalaian A. setigera, but recedes from this as well as most othercongeners already in the lobeless calyx ; as regards this particular characteristic the Australian plant approaches A. Forbesii, but that Papuan species is essentially different in its nearly semi-globular calyx, longer-lobed corolla, stamens of quite other shape and fruits broader than long. The genus Pentapterygium is only sectionally separable from Agapetes and indeed Vaccinium. Our lovely and exceedingly local species (now brought under notice) of a genus of plants, scarcely distinct from that, which comprises the British Bilberry the Whortleberry and the Cranberry-plants (Vaccinium), has been named in honour of Dr. G. A. Mein, who professionally has evinced through many years a keen interest in the writer's researches.

Didymocarpus Kinnearii.

Stemless ; leaves lanceolar or cordate-ovate, almost membranous, conspicuously serrated, above conspersed with septate hair, beneath as well as the long petioles more silky-hairy ; peduncles reaching generally to the height of the leaves, as well as the many-flowered cyme spreadingly soft-hairy ; flowers small, on elongated almost capillary often umbellate pedicels ; bracts narrow ; calyx about half as long as the corolla, its segments broad-linear, narrowed upwards ; corolla white, glabrous, its upper lobes deeply divided, the middle one of the lower lobes somewhat longer than the others ; tube comparatively ample, not quite as long as the lobes ; stamens two, as well as the style and ovary glabrous ; fruit hardly three times as long as the calyx, about twice as long as the style, narrow ellipsoid-cylindrical, attenuated towards the summit, not stipitate ; placentas amply intruding ; seeds almost spindle-shaped.

At and near the summit of Mount Bellenden Ker ; Sayer and Davidson.

This species is in some respects allied to D. cordatus, but the vestiture is whitish, the leaves are all radical and long-stalked the calyces very hairy, the corolla is smaller and the fruit much shorter. Our plant has the general aspect of D. macrophyllus. In the shortness of the corolla-tube D. Kinnearii comes near

to Baea, and recedes from most of its congeners;—thus an additional instance is given for demonstrating the intenability of the genus Streptocarpus, it forming a section in Baea, like Jankaea in Ramondia. As indicated by Mr. Bentham the generic name Didymocarpus should undoubtedly be changed to Roettlera, as well established by Vahl 82 years ago in commemoration of the Danish missionary Roettler.

I have connected with this very neat and rare plant the name of Rob. Kinnear, Esqr., a strenuous promoter of horticulture at our metropolis.

CORRESPONDENCE.

The Geology of the You Yangs.

To the Editor of the Victorian Naturalist.

Sir,—In the last issue of our journal, Mr. S. H. Wintle takes exception to two sentences occurring in the account of the Club Excursion to the You Yangs, appearing in the December *Naturalist.*

Will you kindly allow me, as the writer of the article, to reply to his criticisms.

Respecting the first quotation, I have to confess that, in writing the account in a popular manner, I fell into the error of using, for the detached masses of granite, the word "boulders," which, as Mr. Wintle points out, in a geologic sense has quite a different meaning.

With regard to the second statement, I may mention that, not professing much knowledge of geological formations, I had to seek my information from other sources, and as a detailed survey of this part of Victoria was made some years ago during the progress of the Geological Survey, under the direction of Mr. A. R. Selwyn, now of the Geological Survey of Canada, I naturally considered it authoritative, and adopted the conclusions arrived at then.

The portion of country in question is mapped out in sheet No. 20 on the scale of two inches to one mile, showing a large area of "newer pliocene on granite" between the "upper volcanic" of the plains and the "granite" of the ranges. The map bears the inscription, "Geologically surveyed by Mr. Richard Daintree, Field Geologist, 1861," which, combined with the authority of the talented director, should be sufficient guarantee of the correctness of the details recorded. Some paleontological evidence of the age of the formation is obtainable in the locality, as the map bears one or two remarks, such as "cliff section showing soft calcareous clay containing fragments of bones."—I am, etc.,

F. G. A. Barnard,
Hon. Secretary F.N.C. of Victoria.

Field Naturalists' Club of Victoria.

President:
REV. J. J. HALLEY.

THIS Club was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

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The proceedings of the Club are recorded in its journal—the "Victorian Naturalist." Annual subscription, 6s. 6d., post free. (To members free.)

With the view of popularising the study of the Natural History of the Colony, correspondence, notes, and queries relating to this subject are invited for insertion, and should be addressed to the Editor at the Wesley College, Prahran.

Any of the numbers from the commencement, January, 1884, can be obtained from the Hon. Sec., Mr. F. G. A. Barnard, Kew, at sixpence each; or in sets, Vol. I. (1884-85), 16 numbers, 7s. 6d.; Vol. II. (1885-86), 12 numbers, 6s.; each set with title-page and index for binding.

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THE

Victorian Naturalist.

Vol. III.—No. 12. APRIL, 1887. No. 40.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 14th March, 1887.

Mr. C. A. Topp, M.A., LL.B., occupied the chair, and about fifty members and visitors were present.

A letter was read from Mr. T. A. Forbes-Leith, one of the vice-presidents, who is about to leave for England, conveying his farewell to the members, and thanking them for the confidence reposed in him for so long as an office-bearer. A resolution expressing the Club's regret at his departure was adopted, and ordered to be sent to Mr. Forbes-Leith.

The hon. librarian reported the receipt of the following donations to the Club's library:—"The Acacias of Australia," Decade I., from Baron F. von Mueller, K.C.M.G.; "Proceedings of the Linnean Society of New South Wales," Vol. I. (new series), Part 4, from the Society; "A Catalogue of the Marine Polyzoa of Victoria," by Dr. P. Macgillivray, from the author; four "Young Collectors' Handbooks," viz., Shells, British Birds, Orders of Insects, and Beetles, from Mr. P. H. Anderson; "Report of the Smithsonian Institution," Washington, U.S.A., for 1884, from the Institute; various papers from Dr. Ramsay, Sydney; and the "Journal of Pharmacy," February, 1887.

The hon. secretary read a short account of the excursion to Alphington on Saturday, 19th February, which was fairly successful in the entomological department, among the captures being a rare beetle of the genus Stephanops.

Mr. L. Hart and the Rev. H. J. Robertson were elected members of the Club.

Papers for future meetings were promised by Messrs. C. French, F.L.S., and D. Sullivan, F.L.S.

PAPERS READ.

1. By Mr. C. French, F.L.S., "The Orchids of Victoria," Part XI. In this number of the series, the author described and exhibited specimens of eight species of the genus Caladenia.

The paper elicited some interesting remarks from the members present.

2. Mr. J. H. Gatliff contributed "A List of the Victorian Marine Mollusca," Part I. His introductory remarks having been read, the list of species was taken as read, and ordered to be printed in the *Naturalist*.

3. Mr. Jas. Stirling, F.G.S., contributed a paper entitled "Notes on the Flora of Mount Hotham." The author gave some account of the topography and geology of the mountain and district, and then entered into an interesting account of the many endemic flowering plants to be found there, and recommended the district as well worthy of a visit from a botanical point of view, during January or February. The paper was well illustrated with dried specimens, which Mr. Stirling kindly presented to the Club's herbarium.

This paper also gave rise to some interesting remarks.

The following were the principal exhibits of the evening:— By Miss F. M. Campbell, Victorian fungi, *Podaxon pistillaris* and *Xylopodium Australe*, also plant of *Euphorbia Drummondii*, with particulars of the drug lately obtained from it. By Mrs. Flatow, shells, *Voluta fusiformis* and *Purpura*, eight sp.; also echini and crabs from Port Phillip Heads, and polyzoa from Point Lonsdale. By Mr. C. French, F.L.S., Australian beetles (Cetonidae), including *Schizorhina Bakewelli*, *Atripennis Brownii*, etc. By Mr. C. French, jun., eggs of wattled tallegallus, Australian megapode, common heron, and the Bass' Straits tern. By Mr. R. Hall, a flying fish, recently caught in 22 deg. N. and 25 deg. W. By Mr. W. Hatton, a souvenir of the Phillip Island trip. By Mr. E. H. Hennell, various ores from Bethanga, Victoria; silver crystals and rich silver ore from Broken Hills, Silverton. By Mr. H. Kennon, fossil fish, leaves, and ferns. By Baron F. von Mueller, K.C.M.G., a number of new plants from Mt. Bellender-Ker, N. Queensland, collected by Mr. W. Sayer at an elevation of 5200 feet. By Mr. F. Reader, unrecorded Victorian fungi, *Nematagonium aurantiacum*, Desm., *Phragmidium potentillae*, Pers. on *Acæna sanguisorbae*, *Puccinia aegra*, Grove, on *Viola hederacea*, *P. rimosa*, Tink on stem of *Isolepis nodosa*, and *Cyphella villosa*. By Mr. H. Watts, 70 specimens of Australian Hymenoptera, mounted as microscopic objects. By Mr. S. H. Wintle, F.L.S., fossils of species of Brachiopoda and Cephalopoda from the upper Silurian rocks of Melbourne, recent shells from New Guinea, gold precipitated by charcoal, the Newberry-Vautin process by exhibitor, also a singular bird's nest. By Master A. Yelland, rock fish, whale's blubber, pupil and lens of tiger's eye, and lens of shark's eye.

After the usual *conversazione* the meeting terminated.

OOLOGY OF AUSTRALIAN BIRDS.

By A. J. Campbell.

(Read before the Field Naturalists' Club of Victoria, 14th February, 1887.)

138. Rhipidura setosa *(isura)*—(Northern Fantail). *Locality*—North Australia and New Guinea. *Egg*—Ground colour yellowish or light stony-white, clouded about the upper half with yellowish-brown and grey markings, the latter colour appearing as if under the shell's surface. Markings somewhat bold, but in some examples fainter, and inclined to form a zone about the upper quarter. Dimensions in lines—(1) $9\frac{1}{4} \times 6\frac{3}{4}$; (2) $8\frac{3}{4} \times 6\frac{1}{2}$.

While in the Cardwell district, Northern Queensland, about he beginning of September, I noticed Northern Fantails, which appeared to be migrating from northwards.

144. Myiagra plumbea—(Leaden-coloured Flycatcher). *Locality*—Queensland, New South Wales, Victoria, and New Guinea. *Egg*—Soft whitish ground or surface colour, with a band of umber markings, intermingled with obscure grey round the upper quarter. Isolated spots at intervals also appear over other parts of the shell. Dimensions in lines, of a clutch—(1) $9\frac{3}{4} \times 6\frac{3}{4}$; (2) $9\frac{1}{2} \times 7$; (3) $9\frac{1}{4} \times 6\frac{3}{4}$.

The Leaden-coloured Flycatcher's eggs can hardly be termed new, because they are pretty well known to oologists, although I believe not previously described. Gould mentions the nest only. The nest and eggs now exhibited, together with the birds, were taken by field naturalists while encamped on the Glengarry River, Gippsland, Christmas-tide, 1885. The eggs are not so rounded as is usual in this genus. The nest is a model in bird-architecture. It was placed on an overhanging *Melaleuca* or ti-tree branch, constructed of bark and lined with grass. The rim and external portions are beautifully decorated with lichens, wonderfully adhered by aid of cobwebs. Dimensions, 2 inches across the mouth by $1\frac{1}{2}$ inch deep.

The Leaden-coloured or Plumbeous Flycatcher migrates very regularly to Victoria, arriving about the end of September.

Migration is a subject which is much occupying naturalists in Europe and America. We in the Antipodes would do well to keep abreast of the times. I may inform members that they are "sleeping upon their rights," for already a foreign society is poaching upon their ground, some of our lighthouse-keepers in Victoria having been furnished with printed schedules wherein to record movements of birds observed in their localities.

It has been recently asserted, by no mean authority, in the *Ornis*—a German periodical—that there are no migratory birds in Australia, only nomadic or wandering, such as Lorikeets, &c. Notwithstanding, I think it can be proved we have migratory birds as well as nomadic, but their numbers, I have observed, are regulated more or less by seasons. For instance, take the the late great drought in Queensland and the interior. Last season Unadorned or Pallid Cuckoos *(Cacomantis pallida)* were exceedingly numerous in Victoria, and might have been seen frequently perched on telegraph wires and on roofs in our city, and I knew of nine Shining Flycatcher's *(Myiagra nitida)* nests, with fresh eggs, having been observed in one day in December within an area of less than half a mile square, at the junction of two creeks, near Hobart, whither the birds had migrated from Australia. Since, the drought has thoroughly broken, with abundance of wet—in fact, causing devastating floods in parts—and this season, although frequently out, I have not noted a single Pallid Cuckoo, nor have the Flycatchers visited their old nursery grounds in Tasmania; and, still more remarkable, the Bronze Cuckoo *(Chalcites plagosus)*, a regular migrant from Australia to New Zealand in September, returning again before winter, has been entirely absent this season from some of its favoured localities in the latter country.

We are aware that wet seasons produce myriads of insect life (to wit, the locust and other plagues in our own colony), and no doubt these insectivorous birds at such periods, by a prolific supply of food, are tempted to remain in more northern latitudes, and consequently do not reach their ordinary southern limit of migration; while, on the other hand, by scarcity of food during prolonged droughts, the birds are driven in considerable numbers to their southern boundaries.

Before passing from the migration question I should like to state that, according to Dr. Seebohm, the Australian Curlew *(Numenius cyanopus)* breeds in south-eastern Siberia, from Lake Baikal to the mouth of the River Amoor, passing along the coasts of Japan and China on migrations, and crosses the Line to winter in Australia. There have been several occurrences of the Curlew in New Zealand, therefore it must sometimes travel over a 100° of the earth's surface, and if it be not a migrant, it certainly is a nomad on a gigantic scale.

302A. GLYCIPHILA MODESTA—(Modest-coloured Honey-eater). *Locality*—Cape York District, in North Australia, and New Guinea. *Egg*—White, with here and there a few minute specks of black; length, 9¼ lines; breadth, 6¼ lines.

364. PTILORHIS VICTORIÆ—(Queen Victoria's Rifle-Bird-of-Paradise). *Locality*—Rockingham Bay (Northern Queensland).

Egg—Well proportioned in shape. Colour, warm white or light flesh tint. Markings consist of softened spots and small blotches of dull red or brown, and are well distributed over the surface except upon the apex, where they are clouded into a patch. Texture of shell thin and fine, surface somewhat glossy. Length, 1 inch 1 line; breadth, 9½ lines. The egg, at first sight, is not unlike that of the well-known Garrulous Honey-eater (*Myzantha garrula*), with the exceptions that the markings are not so bright and surface more polished. (*Vide* illustration—photo-inkotype, by Mr. L. Hart, "Avenel," High-street, St. Kilda, and member of this Club. The figure is about two-tenths larger than natural size).

The discovery of the egg of this Rifle-Bird-of-Paradise will attract attention of oologists in all parts of the world. For the addition of this *desideratum* to my collection I am indebted to our energetic member, Mr. Charles French, F.L.S. Mr. French's informant states that the nest was an open structure placed in dense scrub. There were two eggs in the nest, but, most unfortunately, in navigating the terrible "lawyer" palms one was broken.

Members may recollect that two seasons ago I undertook an excursion to Northern Queensland, partly to glean, if possible, observation about the nidification of the Rifle-Bird. I succeeded in reaching those lovely verdure-clad islets—Barnard's Group—in the Coral Sea. It was the first week in September. I had ample opportunity of observing these gorgeously-plumed birds; but, somewhat to my chagrin, the breeding season had not, or was about to commence, as an examination of some of the females testified. Only in one instance were the ovaries fairly developed.

It is 38 years ago since this Bird-of-Paradise was discovered and dedicated by the immortal Gould to Queen Victoria, and it is a remarkable coincidence that in the jubilee year of the reign of our Most Gracious Sovereign Lady the egg of this gorgeous bird bearing her name should be revealed to science. It is also a further coincidence that this interesting specimen should be first exhibited and described in the fair colony that likewise bears our beloved Queen's name. Therefore, by permission of the Club, I shall call this rare and unique oological specimen the "JUBILEE EGG" of Queen Victoria's Bird-of-Paradise.

441. PEZOPORUS FORMOSUS—(Ground Parakeet). *Locality*—Queensland, New South Wales, Victoria, South Australia, and Tasmania. *Egg*—Very round, of a beautiful pure white colour, slightly polished. Length, 12¾ lines; breadth, 10¾ lines.

The Ground or Swamp Parrakeet breeds in a different situation to the majority of that family. Mr. E. D. Atkinson, F.L.S., of

Tasmania, kindly supplied the following with the eggs :—"Three eggs in nest, which was deeply hollowed out of the ground under a button-grass tussock, evenly lined with fine grass and most carefully concealed. Had not the bird flown from under my horse ('who nearly put his foot in it') I should certainly not have found this prize." The nest was taken about the beginning of October. These parrots used to be plentiful in the neighbourhood of Carrum Carrum Swamp, but with the reclamation of that morass, and the present wonderful march of civilisation, the place that knew them then "knows them no more for ever." The only record left of their having been found there is contained in a very interesting volume, published many years ago, entitled, "Bush Wanderings of a Naturalist," by an anonymous author. He mentions having observed nests in or under fallen logs.

468. LOPHOPHAPS FERRUGINEA—(Rust-coloured Bronzewing). *Locality*—Interior and South Australia. *Egg*—Oval, light, cream colour, or of a light stony tinge. Length, 1 inch; breadth, 9 lines.

My old friend and schoolfellow, Mr. Alfred Walker, manager of Innaminka Station, Cooper's Creek, presented me with the eggs of this elegant little pigeon. The nest was a slight depresssion in the ground shaded by a low bush, on a stony rise about ten paces from the edge of the creek. On the opposite bank was one of the depôts of the ill-fated explorers, Burke and Wills, and at a point about 6 miles up stream was where Burke perished. The pair of eggs was taken 20th October, 1886

538. CARPHIBIS SPINICOLLIS—(Straw-necked Ibis). *Locality*—Australia, except west. *Egg*—Long in shape, white outside and greenish inside. Surface of shell creased in places and minutely pitted all over. Length (1), 2 inches 8 lines; (2) 2 inches 6½ lines. Breadth (1), 1 inch 8½ lines; (2) 1 inch 9½ lines.

The Straw-necked Ibis breeds in companies, near billabongs and lagoons in the interior.

622. DIOMEDEA MELANOPHRYS—(Black-eyebrowed Albatross). *Locality*—Seas surrounding Australia, but seldom seen farther north than lat. 25° S. *Egg*—Oval, white, a few brown spots towards the broader end. Another example has a broad band of smaller and fainter brown dots round the larger end. Length, 4 inches 4 lines; breadth, 2 inches 9 lines. (Potts.)

620. DIOMEDEA CULMINATA—(Culminated Albatross.) *Locality*—Seas surrounding southern portion of Australia. *Egg*—"Measures 4¾ x 2⅜ inches. An oval form, smaller at one end. Both ends quite blunt. Colour inclines to light creamy-

white, with a ring of seemingly fine spattered burnt sienna specks or spots, like those made by drawing a brush of colour across a stick, as a painter does to get the effect of granite. They form a ring around the larger end, being about 2 inches broad. The centre of the ring runs together in the fine markings, making the colour almost solid, and fades away from the outer edge of the egg almost to needles' points.

"This egg was collected on 12th January, 1880, by Captain Thomas Lynch, at Diegos, Kavnen's Rocks, S. by E., 52 miles from Cape Horn. The nest was composed on the outside of tussocks of grass and mud; inside of fine grass and feathers. The diameter outside at the top was 12 inches, and at the base 18. Inside it was 10 inches, and the depth inside 5 inches. It was situated on the top of the rocks, on a loamy plain. The incubation was fresh. The following notes by J. W. Detmiller, M.D., accompanied the egg:—'The nests are very nicely and solidly built, lasting two or three seasons, even in that fearful climate. They are built very closely together, and are probably often mistaken by one and another of the birds, after the fashion of many sea birds. The nests are high, to enable the long-winged creatures to rise easily to wing, which they cannot do on a level. The birds are very tame, allowing themselves to be handled while sitting.'"—*Ornithologist and Oologist*, vol. ii., No. 2, p. 21.

641. PRION TURTUR—(Dove-like Blue Petrel). *Locality*—Off Queensland, New South Wales, Victoria, South and West Australia, and Tasmania. *Egg*—White, stout oval in shape, somewhat compressed at smaller end. Surface slightly pitted, and, in common with all Petrels' eggs, possesses a strong musty odour. Length, 1 inch $8\frac{3}{4}$ to 10 lines; breadth, 1 inch $3\frac{1}{2}$ lines.

Specimens here described were taken from an island in Cook Straits, New Zealand, and were from the collection of Mr. T. H. Potts, F.L.S. He previously described examples in 1884 in t' e *Mittheilungen des Ornithologischen Vereines in Wien.*

It may be casually noticed that Australian oology is receiving an impetus at the hands of the F.L.S.'s. Mr. Potts being the third Fellow I had, in honour, to acknowledge in this small paper.

650. PELECANOIDES URINATRIX—(Diving Petrel). *Locality*—Off Queensland, New South Wales, Victoria, South Australia, and Tasmania. *Egg*—Generally roundish in form, colour-white originally, but always more or less (sometimes entirely) stained with dirty brown from guano. Surface of shell very minutely pitted. Average dimensions of six examples—length, 1 inch $6\frac{1}{2}$ lines; breadth, 1 inch 2 lines.

On some isolated islets in Bass's Straits, Diving Petrels are

numerous. They generally remain in the vicinity of these rocks, but at times disappear for two or three months. During June and July the birds come ashore to scrape out or prepare their nest burrows. The laying season occurs about the end of July, and continues for about a fortnight. Each female bird deposits one egg only in a burrow, which is from 6 to 8 inches deep under ground, or under ledge of rock.

DESCRIPTIONS OF NEW AUSTRALIAN PLANTS;

By Baron von Mueller, K.C.M.G., M. & Ph.D., F.R.S.

(Continued.)

Hypsophila.

Sepals five, roundish, much overlapping in bud, persistent; the two outer smaller than the three inner. Petals five orbicular, entire, smooth, deciduous. Stamens five, opposite to the sepals, very short, inserted towards the centre of the disk; filaments free, filiform; anthers almost reniform, the cells divergent, dehiscent by an external slit. Disk depressed, crenulated. Style extremely short; stigma orbicular, convex, with a central cavity. Ovary immersed in the disk, three-celled; ovules many, axillary, ascendent. Fruit almost ellipsoid, somewhat pointed; pericarp coriaceous, tardily ruptured into three valves; septa membranous. Seeds several in each cell, almost ovate, somewhat oblique, long-persistent on elongating crisped funicles, and clasped at the base by an obconic-cupular arillus. Testa thinly crustaceous. Raphe longitudinal, prominent. Albumen carnulent. Embryo straight, somewhat shorter than the albumen. Cotyledons flat, about twice as long as the cylindric inferior radicle.—A tree with scattered coriaceous oval-or lanceolar-elliptical entire leaves, with short axillary cymes of small flowers and with rather large particularly elongated fruits.

Hypsophila Halleyana.

In the highest region of Mount Bellenden-Ker, descending to about 4000 feet; W. Sayer.

An evergreen tree, attaining a height of 40 feet. Foliage and all other parts of the plant glabrous. Branchlets angular, often flexuous. Leaves flat, rather blunt, reaching a length of four inches and a breadth of one and a half; their petiole very short; upper side of the leaves dark-green, lower side much paler; not shining; nervature faint; veins concealed. Cymes usually much shorter than the leaves, sometimes reduced to 3 or 2 flowers. Bracts and bracteoles minute, lanceolar-deltoid, the latter distant from the calyx. Petals about twice as long as the inner sepals, dull-red according to the collector's notes,

hardly attaining above $\frac{1}{8}$ inch length. Filaments not reaching beyond the disk, persistent; anther-cells ellipsoid, deciduous. Stigma not broader than the style. Fruit 1—1½ inches long. Arillus of about $\frac{1}{4}$ inch length, the funicle sometimes quite as long. Seeds seldom exceeding $\frac{1}{4}$ inch in length; testa brown, slightly wrinkled, subtle-dotted.

This new genus of Celastrinae is readily separable from Euonymus on account of the scattered leaves, the entire stigma and the many-seeded not prominently angular fruit;—from Lophopetalum in deeper and more unequally divided calyx, not appendiculated petals and form of the anthers;—from Hedreianthera in neither anthers nor stigma sessile, not hard pericarp and the shape of the arillus;—from Leucocarpon in the structure or the anthers, undivided stigma, not bony pericarp and seeds much emerging from the arillus.

I have connected with this tree,—one from the highest mountain of tropical Australia,—the name of the Rev. J. J. Halley, who, as President of the Victorian Field-Naturalists' Club, has amidst the onerous duties of his ecclesiastic position, still also advanced energetically the studies of living nature among us.

THE PLANTS OF MT. BELLENDEN-KER.

At the March meeting of the Field Naturalists' Club, Baron von Mueller exhibited specimens of the following plants, obtained by Mr. W. Sayer on the summit of Mt. Bellenden-Ker, the ascent of which, (particularly in the interest of the geography of plants) the Baron wished to be effected since many years, that culmination being the highest in tropical Australia.

Rhododendron Lochae.

Agapetes Meiniana.

Didymocarpus Kinnearii.

These are already described in the March Number of the Vict. Naturalist.

Dracophyllum Sayeri.

Spiraeanthemum Davidsoni.

Published in the March Number of the Austral. Journal of Pharmacy.

Polypodium Bakeri

Hypsophila Halleyana.

The last mentioned gives a new genus to the order of Celastrinae, and is dedicated to the worthy President of the Club. In the next number of the "Field Naturalist" a new genus of Proteaceae, *Hollandaea*, will be promulgated, which is constituted

by what will likely prove a new Nut-tree from the base of Mt. Bellenden-Ker. Proteaceous genera were in former years established by B. v M. already in honour of four successive Secretaries of States for the Colonies, to identify their names also with the Australian Flora. According to a memorandum from B. v. M. the summit of Mt. Bellenden-Ker contains in its vegetation species of the following genera, several of which are new to science: Hibbertia (H. volubilis), Mollineda, Pittosporum (P. rubiginosum), Elaeocarpus (E. foveolatus), Acronychia, Euodia, Flindersia, Cupania (C. pleurophylla), Tristania, Rhodomyrtus (R. trineura), Akama, Argophyllum, Gillbeea (G. adenopetala), Panax, Pentapanax (P. Willmottii), Helicia (H. Youngiana, H. ferruginea), Orites, Loranthus (L. alyxifolius), Morinda (M. hypotephra), Psychotria, Trochocarpa, Ardisia, Myrsine, Maesa, Alyxia, Smilax, Helmholtzia, Ptychosperma (P. laccospadix), Alsophila (A. Rebeccae). The consociation of Australian with New Caledonian and Himalayan forms of plants on this highland in tropical Australia is most significant.

On the lower parts of the Bellenden-Ker's ranges occurs the type of a new genus of Proteaceae, founded on the Helicia Sayeri, of which tree now only the fruit became known. This new genus received the name Hollandaea.

NOTES OF A HOLIDAY TOUR IN RIVERINA AND WESTERN VICTORIA.

By Messrs. C. French, F.L.S., and F. G. A. Barnard.

(Read before the Field Naturalists' Club of Victoria, 13th December, 1886.)

(Continued.)

Having spent a considerable time here we resumed our seats in the waggonette and drove across the paddocks, following down the river for some three miles or so. The rain, which had been threatening for some time, now came on in earnest, and a very cold wind was blowing. On our way we crossed a sandy strip of country running nearly north and south, in which were growing in considerable quantities the smaller grass-tree, *Xanthorrhœa minor*, and the spinifex, *Triodia irritans*. The village of Redruth now came in sight, and we were soon under shelter at the Wannon Inn, a pleasantly situated little hotel, with its front almost hidden from view by creepers, and under shadow of the verandah, numerous boxes or pots of plants, making it quite old-fashioned in appearance. It stands some little distance back from the road, and in front is a magnificent specimen of

the redgum, *Eucalyptus rostrata*. This inn was for some time the home of Adam Lindsay Gordon, the Australian poet.

As the rain still increased we were obliged to while away the time as best we could, the actions of a pair of swallows feeding their young nestlings under the roof of the verandah affording some amusement. Presently we were joined by a couple of gentlemen belonging to the Railway Survey department, and one of them being known to one of us, introductions were made all round, and we soon became friends in misfortune, and after chatting about various topics, one of our newly-made friends expressed his desire to join the ranks of the Field Naturalists' Club. After dinner—which, by the way, would have done credit to an hotel of much greater pretensions—the rain seemed as if it had cleared off for a while, so we started for the falls known as the Wannon Falls, about six hundred yards down the stream, which runs close by. Before we got there, however, the rain came down in sheets, and overcoats and mackintoshes, though a hindrance to walking, were, to some extent, very acceptable. Among other flowers noticed along the river bank was the pretty little *Glycine clandestina*, with its sprays of pale-purple blossoms.

We now reached the edge of the fall, and a beautiful sight presented itself—the Wannon falling clear over a ledge of rocks into a basin nearly a hundred feet below. The height of the fall is variously given by different authorities, but a hundred feet is very close to the actual height. This waterfall is so formed that tourists have no difficulty in crossing from one side of the river to the other behind the falling waters. In fact, some years ago, when a very high flood carried away the bridge just above the inn, and the current being so strong no boat could cross, the Coleraine mailman conveyed the mails by the track under the falls. We accordingly made our way along a narrow path which led us down under the fall. Here we found that the water falls over a bed of lava, which rests on a quantity of volcanic ashes and mud, which overlie the trap rock, and owing to the action of the water, the latter are gradually wearing away, thus allowing great blocks of basalt to fall away, leaving an overhanging roof about twenty feet from the back of the falling water. Thus the fall has doubtless receded at least three miles, as the rocky gorge, somewhat resembling that at Lal Lal, extends for that distance down the stream. Of course, the backward motion for this distance has taken perhaps millions of years, the actual change of site during the memory of the oldest inhabitant only amounting to a few feet.

In the volcanic ashes under the basalt may be found a rare and beautiful mineral known as Vivianite, a phosphate of iron.

It resembles a piece of a common green glass bottle crystallised, or the green copperas of commerce; but, unfortunately, like some other combinations of iron, it turns rusty on exposure to the air. There may also be obtained here pieces of partly petrified and partly carbonised wood, remains of trees destroyed by the fall of red-hot ashes from some volcano ages ago. Very little water makes its way through the rocks, and, though the wind drove the spray on to us, owing to the rain it was quite as dry under the falls as outside. Few plants were found under the fall. The ferns *Woodwardia caudata* and *Asplenium flabelli-folium* were rather plentiful, also several mosses and lichens. After watching the falling waters for some time, we returned; two of us by the way we had come, the other by the opposite bank of the river, crossing the Wannon by the bridge near the inn. Like most Australian falls, this should be visited during the wet season, but even as we saw it, with the river divided into three streams, it is well worth the journey from Melbourne, and may fairly be reckoned among the sights of Victoria. Had the weather been finer we could easily have spent some hours in exploring the picturesque gorge below the falls, which, doubtless, contains some interesting botanical specimens, but, under the circumstances, had to beat a hasty retreat to the hotel, and dry ourselves before we could start for Hamilton. Our drive back was not very cheerful, as steady rain was falling all the way. However, on reaching our hotel a change of boots and clothing soon made us comfortable again.

At the hotel our curiosity was excited by the news that a gentleman had just arrived who intended visiting the well-known fossil beds at Muddy Creek the next day. As we had partly planned the same trip for the morrow, this was an agreeable surprise, and was all the more satisfactory when we found our new visitor was such a well-known naturalist as Mr. J. Bracebridge Wilson, M.A., head master of the Geelong Grammar School, also a member of our club.

(To be concluded.)

Green Hydra.—Mr. W. Ball obtained specimens of a green hydra, at Mansfield, in February. The hydras previously observed in Australia would seem to have been typical specimens of *H. fusca*.

Two hen swallows were recently taken from their broods at Pavia, Italy, and released in Milan. It took them just thirteen minutes to get back to their nests again, so that their average rate of flight must have been eighty-seven and a half miles an hour.

Field Naturalists' Club of Victoria.

President:
REV. J. J. HALLEY.

THIS Club was founded in 1880 for the purpose of affording observers and lovers of Natural History regular and frequent opportunities for discussing those special subjects in which they are mutually interested; for the Exhibition of Specimens; and for promoting Observations in the Field by means of Excursions to various collecting grounds around the Metropolis.

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With the view of popularising the study of the Natural History of the Colony, correspondence, notes, and queries relating to this subject are invited for insertion, and should be addressed to the Editor at the Wesley College, Prahran.

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